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Education is a field of knowledge in which different disciplines intertwine to form a greater whole. **From Theory to Practice: A Modern Approach to Educational Sciences** is a work that expands this interconnection, bringing together 61 articles on various topics, written by experts from different areas of knowledge.

Developed by **Seven Publications**, this book presents a broad overview of the challenges, discoveries and advances in fields such as excel, chatgpt in school, education strategies and much more.

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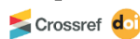
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DECADES OF INCONSISTENCIES IN EXCEL AND MICROSOFT'S STRATEGIC SILENCE: IMPLICATIONS FOR MATHEMATICAL ACCURACY AND GLOBAL EDUCATION

DÉCADAS DE INCONSISTÊNCIAS NO EXCEL E O SILÊNCIO ESTRATÉGICO DA MICROSOFT: IMPLICAÇÕES PARA A PRECISÃO MATEMÁTICA E A EDUCAÇÃO GLOBAL

DÉCADAS DE INCONSISTENCIAS EN EXCEL Y EL SILENCIO ESTRATÉGICO DE MICROSOFT: IMPLICACIONES PARA LA PRECISIÓN MATEMÁTICA Y LA EDUCACIÓN GLOBAL



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ABSTRACT

The Microsoft Excel software is widely used as an educational tool in schools, universities, and professional environments. However, it presents conceptual, operational, and semantic limitations that compromise both pedagogical rigor and mathematical reliability. This article analyzes recurrent failures in calculations, nomenclature, Boolean logic, and operator precedence, highlighting their significant impact on the teaching of mathematics, statistics, and finance. Comparative tests were carried out among Excel, Windows Calculator, Copilot, and free spreadsheet software, revealing conceptual discrepancies and inconsistent results. Although the Windows Calculator shares some divergences, it performs correctly the calculations that Excel evaluates inaccurately, suggesting that the origin of such inconsistencies lies in structural decisions within the software. It was also observed that Excel Copilot can overcome part of these errors, indicating that the corrections are technically feasible, although not yet incorporated into the traditional version. The article proposes that Microsoft implement parallel functions — semantically precise and pedagogically appropriate — capable of coexisting with the current ones, reconciling historical compatibility with greater conceptual accuracy. In addition to operational limitations, semantic inconsistencies were identified in mathematical functions and in the VBA language, which may contribute to the development of imprecise concepts. Teaching with Excel is different from calculating with Excel — and this discrepancy may compromise the education of millions of students worldwide.

Keywords: Microsoft Excel. Mathematical Errors. Semantic Inconsistencies. Boolean Logic. Operator Precedence. VBA. Pedagogical Impact. Spreadsheets.

RESUMO

O Microsoft Excel é amplamente utilizado como ferramenta educacional em escolas, universidades e ambientes profissionais. No entanto, apresenta limitações conceituais,

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operacionais e semânticas que comprometem o rigor pedagógico e a confiabilidade matemática. Este artigo analisa falhas recorrentes em cálculos, nomenclatura, lógica booleana e precedência de operadores, evidenciando impactos significativos no ensino de matemática, estatística e finanças. Foram realizados testes comparativos entre o Excel, a Calculadora do Windows, o Copilot e planilhas gratuitas, revelando discrepâncias conceituais e resultados inconsistentes. A Calculadora do Windows, embora compartilhe algumas divergências, executa corretamente cálculos que o Excel avalia de forma equivocada, sugerindo que a origem das inconsistências está em decisões estruturais do software. Observou-se ainda que o Copilot é capaz de contornar parte dessas falhas, indicando que as correções são tecnicamente viáveis, embora ainda não incorporadas à versão tradicional. Propõe-se que a Microsoft implemente funções paralelas — semanticamente precisas e pedagogicamente adequadas — que possam coexistir com as atuais, conciliando compatibilidade histórica com maior precisão conceitual. Além das limitações operacionais, identificam-se inconsistências semânticas em funções matemáticas e na linguagem VBA, as quais podem contribuir para a formação de conceitos imprecisos. Ensinar com Excel é diferente de calcular com Excel — e essa discrepância pode comprometer a formação de milhões de estudantes em todo o mundo.

Palavras-chave: Microsoft Excel. Erros Matemáticos. Inconsistências Semânticas. Lógica Booleana. Precedência de Operadores. VBA. Impacto Pedagógico. Planilhas Eletrônicas.

RESUMEN

Microsoft Excel es ampliamente utilizado como herramienta educativa en escuelas, universidades y entornos profesionales. Sin embargo, presenta limitaciones conceptuales, operativas y semánticas que comprometen el rigor pedagógico y la confiabilidad matemática. Este artículo analiza fallas recurrentes en cálculos, nomenclatura, lógica booleana y precedencia de operadores, evidenciando impactos significativos en la enseñanza de las matemáticas, la estadística y las finanzas. Se realizaron pruebas comparativas entre Excel, la Calculadora de Windows, Copilot y hojas de cálculo gratuitas, revelando discrepancias conceptuales y resultados inconsistentes. La Calculadora de Windows, aunque comparte algunas divergencias, ejecuta correctamente cálculos que Excel evalúa de manera errónea, lo que sugiere que el origen de las inconsistencias reside en decisiones estructurales del software. También se observó que Copilot es capaz de sortear parte de estas fallas, lo que indica que las correcciones son técnicamente viables, aunque aún no se han incorporado a la versión tradicional. Se propone que Microsoft implemente funciones paralelas — semánticamente precisas y pedagógicamente adecuadas — que puedan coexistir con las actuales, conciliando la compatibilidad histórica con una mayor precisión conceptual. Además de las limitaciones operativas, se identifican inconsistencias semánticas en funciones matemáticas y en el lenguaje VBA, las cuales pueden contribuir a la formación de conceptos imprecisos. Enseñar con Excel es diferente de calcular con Excel, y esta discrepancia puede comprometer la formación de millones de estudiantes en todo el mundo.

Palabras clave: Microsoft Excel. Errores Matemáticos. Inconsistencias Semánticas. Lógica Booleana. Precedencia de Operadores. VBA. Impacto Pedagógico. Hojas de Cálculo.

1 INTRODUCTION

The use of electronic spreadsheets as a didactic resource has intensified in recent decades, especially with the popularization of Microsoft Excel in school, university and professional environments. Borges (2022) highlights that the use of technological resources, such as worksheets, contributes to teachers making their classes more dynamic and more attractive to students.

Its accessible interface and widespread institutional adoption have made Excel a nearly ubiquitous tool in mathematics, statistics, and finance education. However, this ubiquity hides technical and conceptual limitations rarely discussed in depth — which can compromise the conceptual training of students.

Technical analysis indicates that Excel has inconsistencies in calculations, nomenclature, Boolean logic, precedence of operators, and decimal precision. Such divergences not only affect the reliability of the results, but also perpetuate conceptual misconceptions, especially when associated with functions whose names contradict academic terminology. The situation is aggravated when it is observed that these limitations also extend to the Visual Basic for Applications (VBA) language, used for automations and programmable logic within the tool itself.

This article proposes a critical analysis of these problems, highlighting that, although technically solvable, these flaws have not yet been corrected by Microsoft.

For analysis, comparative tests were carried out between Excel, VBA, Copilot, Windows Calculator and free spreadsheets (Google Sheets and LibreOffice Calc).

The absence of updates suggests a prioritization of historical compatibility over conceptual precision—setting up a silent technical debt that affects millions of spreadsheets already saved.

It should be noted that the observations and comparisons presented in this study are strictly technical and academic in nature, with the objective of contributing to the improvement of digital tools used in the teaching of quantitative disciplines. At no time does this work intend to disparage trademarks, nor to suggest misconduct on the part of their developers.

The analyses developed here seek to promote constructive reflections on the operational and conceptual limitations that impact educational training, reinforcing the need for solutions that reconcile historical compatibility and mathematical precision.

2 THEORETICAL FOUNDATION

2.1 MATHEMATICAL FOUNDATIONS AND EXCEL INCONSISTENCY

Microsoft Excel is widely used in the teaching of mathematics, statistics, and finance, and is often recognized as a benchmark for computational accuracy. In research on its educational use, Macêdo (2016) states that this tool allows the student to view the results of calculations and functions in a dynamic way, which facilitates understanding and stimulates logical reasoning.

According to the National Curriculum Parameters for High School (BRASIL, 1997, p. 46), "the student must properly use technological resources as instruments of production and communication, recognizing their limitations and potentialities". In this sense, Excel can be used to introduce and develop content, preparing the student to deepen concepts already worked on.

Perius (2012) observes that the teaching and learning process, combined with experimentation and the construction of knowledge, favors the autonomy of the student and expands the environment of possibilities in the teaching of Mathematics, especially with the use of digital technologies. Bianchini (2015) adds that this type of computational resource shifts the focus from calculation to interpretation and the interrelationships between the phenomena studied, reducing the time allocated to operations and graphs.

However, this confidence conflicts with persistent conceptual errors that compromise mathematical logic and the educational process. An emblematic example is the expression -2^2 , which, according to the precedence of operators defined by formal mathematics, should result in -4 . Excel, however, interprets it as $(-2)^2$, returning **+4**. This error was documented by Gonçalves (2014, p. 90) and remains uncorrected to this day.

These failures, ignored for more than a decade, accumulate a silent technical debt that affects spreadsheets already used in educational and professional environments. While Microsoft has made important advances in several areas of Excel—such as SEERRO, SOMASE, and XLOOKUP—it has yet to demonstrate the same commitment to improving its basic mathematical expressions. In view of this, it is questioned why such inconsistencies remain in the commercial version of Excel, considering the impacts they can generate in global education.

This evidence reinforces what this study calls Microsoft's 'strategic silence' — the persistence of known inconsistencies, maintained for reasons of historical compatibility, but which compromise the conceptual precision and pedagogical potential of Excel.

Note 1: Incorrect Evaluation of Chained Exponentiation

The expression 2^3^2 reveals a conceptual inconsistency in the way traditional Excel and Windows Calculator interpret exponentiation precedence. Mathematically, the operation is right-associative: $2^3^2 = 2^9 = 512$. However, both tools evaluate from left to right, such as $(2^3)^2 = 64$. This error, documented by Gonçalves (2025, p. 20553), remains uncorrected. In contrast, Excel's Copilot and Google Sheets correctly return 512, demonstrating that mathematical logic can be preserved through technical review. This divergence compromises the teaching of potentiation and the reliability of calculations in educational and professional contexts.

Comparison of the expression 2^3^2 in different environments

Traditional Excel

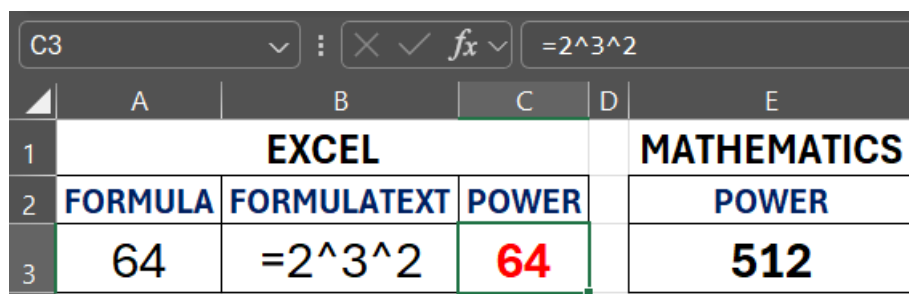
Result: 64

Rating: Interprets 2^3^2 from left to right, as $(2^3)^2$.

Technical comment: Contradicts the formal mathematical convention, which requires right-to-left evaluation.

Pedagogical impact: It can induce conceptual error in students when teaching chained potentiation.

Figure 1



	A	B	C	D	E
1	EXCEL				MATHEMATICS
2	FORMULA	FORMULATEXT	POWER		POWER
3	64	=2^3^2	64		512

Source: The author, 2025.

Visual Basic for Applications (VBA)

Result: 64

Rating: Interprets 2^3^2 from left to right, as $(2^3)^2$.

Technical Comment: The flaw lies in the language precedence logic, not just the Excel interface.

Pedagogical impact: Affects educational algorithms and reinforces the technical debt present in native Excel programming.

Figure 2

C3 $\times$ $\checkmark$ f_x =TEST1(2;3;2)								
	A	B	C	D	E	F	G	
1	EXCEL VBA				MATHEMATICS			
2	FORMULA	FORMULATEXT	POWER		POWER			
3	64	=2^3^2	64		512			

```

Function TEST1(BASE As Double, EXPONENT1 As Double,
EXPONENT2 As Double) As Double
    TEST1 = BASE ^ EXPONENT1 ^ EXPONENT2
End Function

```

Source: The author, 2025.

Windows Calculator

Result: 64.

Rating: Also interprets 2^3^2 from left to right.

Technical comment: It reproduces the same behavior observed in Excel, evidencing a structural inconsistency between tools in the same ecosystem.

Pedagogical impact: It can compromise trust in basic resources used in the classroom.

Figure 3



Source: The author, 2025.

Excel Copilot

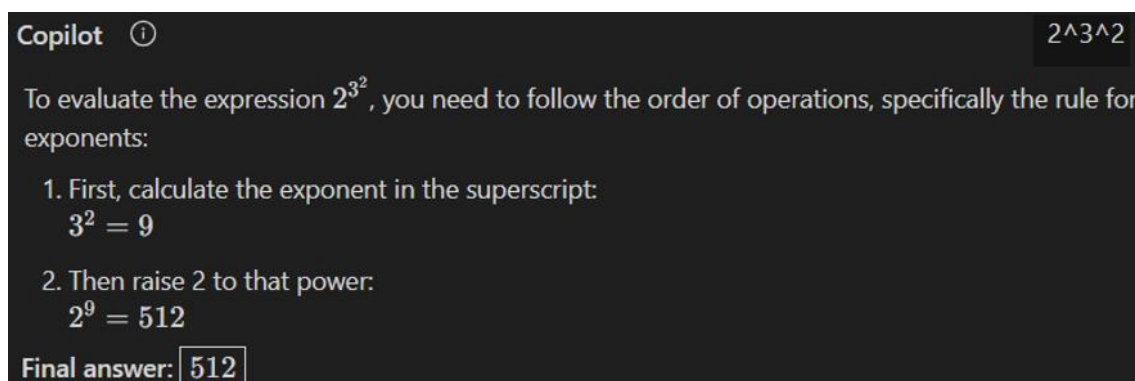
Result: 512

Rating: Correctly interprets 2^3^2 as 2^9 .

Technical Comment: Demonstrates that the fix is technically feasible within the Microsoft ecosystem itself.

Pedagogical impact: Reinforces the importance of technical revisions to preserve mathematical logic.

Figure 4



Source: The author, 2025.

Google Sheets

Result: 512

Rating: Correctly interprets 2^3^2 as $2^{(3^2)}$.

Technical comment: Respects formal mathematical convention and evidences adherence to the correct order of precedence.

Pedagogical impact: Offers a reliable and conceptually accurate alternative to teaching empowerment.

Figure 5

C3		$\text{fx} = 2^3^2$		
	A	B	C	E
1	EXCEL			MATHEMATICS
2	FORMULA	FORMULATEXT	POWER	POWER
3	512	$=2^3^2$	512	512

Source: The author, 2025.

2.2 OPERATOR PRECEDENCE AND LOGICAL AMBIGUITIES IN EXCEL

Observation 1: The Evidence of Conflict – The Silent Impact of Excel on Global Education

The inconsistency in the evaluation of the expression -2^2 by Excel — which returns **+4** when applying potentiation before negation — was documented by Gonçalves and Rodrigues (2013, p. 3511) in the work *Electronic Spreadsheet: Building Knowledge for Social Practices*. The same error occurs in the VBA language, and the authors suggest the use of explicit parentheses to ensure correct precedence, reinforcing the need for technical improvements in the teaching of mathematics and computing.

Traditional Excel

Description: Excel returns +4 when interpreting -2^2 as $(-2)^2$, contrary to the mathematical rule that applies potentiation before negation.

Impact: Compromises operator precedence teaching.

Figure 6

C3					
=A3^B3					
	A	B	C	D	E
1	EXCEL				MATHEMATICS
2	SIGN & BASE	EXPONENT	POWER	FORMULATEXT	POWER
3	-2	2	4	=A3^B3	-4

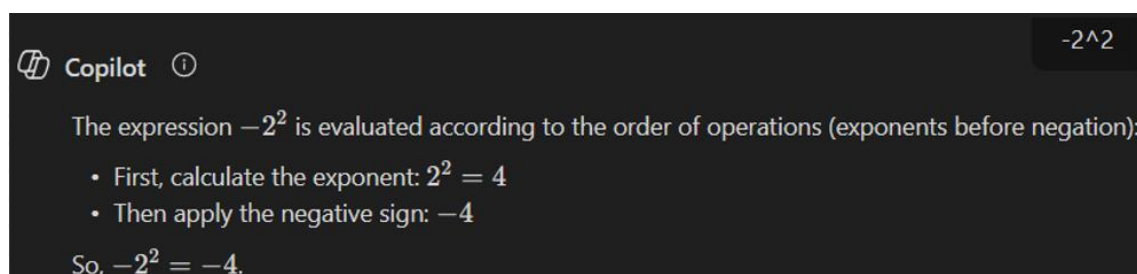
Source: The author, 2025.

Copilot do Excel

Description: Copilot correctly interprets the expression -2^2 , applying the potentiation before the negation, and returns **-4**, according to the formal mathematical rule.

Impact: Reinforces the correct logic of operator precedence, contributing to accurate math teaching.

Figure 7



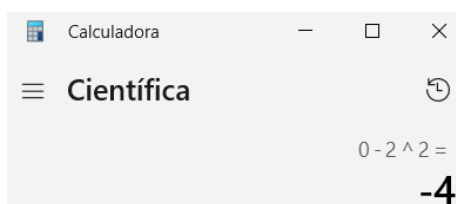
Source: The author, 2025.

Windows Calculator

Description: The Windows Calculator also correctly interprets the expression -2^2 , returning **-4**, in accordance with mathematical precedence.

Impact: Provides a reliable alternative to simple calculations, aligned with formal mathematical fundamentals.

Figure 8



Source: The author, 2025.

Visual Basic for Applications (VBA)

Description: VBA evaluates the expression -2^2 as $(-2)^2$, returning **+4**, which contradicts the formal mathematical convention, which establishes the application of potentiation before negation.

Impact: May compromise the accuracy of automated calculations and didactic clarity in educational settings.

Figure 9

C3						
=TEST1(A3;B3)						
	A	B	C	D	E	F
1	EXCEL					MATHEMATICS
2	SIGN & BASE	EXPONENT	POWER	FORMULATEXT		POWER
3	-2	2	4	=TEST1(A3;B3)		-4
4	Function TEST1(BASE As Double, EXPONENT As Double) As Double					
5	TEST1 = BASE ^ EXPONENT					
6	End Function					
7						

Source: The author, 2025.

Note 2: Incorrect Boolean evaluation: $(-2)^2 = -2^2$, true for Excel, false for Math Traditional Excel

Description: Microsoft Excel evaluates the expression $-2^2 = (-2)^2$ to TRUE, ignoring mathematical precedence between operators. This behavior occurs because Excel interprets -2^2 as $(-2)^2$, assigning the value 4 to both expressions and therefore considering them equivalent in a Boolean comparison.

Impact: This misevaluation compromises the reliability of mathematical, educational, and financial models built in Excel. By reproducing a mistaken algebraic logic, software negatively influences the conceptual formation of millions of users, especially in academic and technical contexts.

Figure 10

C3 $\times$ $\checkmark$ f_x $=-2^2=(-2)^2$				
	A	B	C	D
1	EXCEL			MATHEMATICS
2	FORMULA	FORMULATEXT	RESULT	RESULT
3	TRUE	$=-2^2=(-2)^2$	TRUE	FALSE

Source: The author, 2025.

The Boolean inconsistency observed in Microsoft Excel—in which the expression $-2^2 = (-2)^2$ returns TRUE—is evidence of a significant conceptual flaw. Although the principles of formal mathematics state that $-4 \neq 4$, Excel applies internal logic that ignores the precedence of operators, treating both expressions as equivalent.

Copilot

Description: When asked about the difference between -2^2 and $(-2)^2$, Copilot correctly interprets the mathematical precedence and answers: "Therefore, $-2^2 = -4$ and $(-2)^2 = 4$ ", demonstrating that it understands the algebraic distinction between the two expressions, even though Excel does not process them correctly in a Boolean comparison.

Impact: Copilot's correct answer reinforces its role as a reliable tool for conceptual validation and support for mathematical reasoning, guiding the user to avoid misinterpretations and adopt more precise procedures, even without directly interfering with the Excel logic.

Figure 11

Is -2^2 different from $(-2)^2$?

 Copilot ⓘ

Yes, they are different because of **operator precedence**:

- -2^2 means the negative sign applies **after** the exponent. So:

$$-2^2 = -(2^2) = -4$$
- $(-2)^2$ means the negative number is squared. So:

$$(-2)^2 = (-2) \times (-2) = 4$$

Key rule: Exponentiation has higher precedence than unary negation in standard math notation.

Source: The author, 2025.

Note 3: Propagated Error in Excel: The Inconsistency Affecting the IF Function Logic

Excel's behavior goes beyond an isolated calculation — it compromises the logic of the IF function, one of the most fundamental in the platform. When evaluating the expression $-2^2 = (-2)^2$, Excel returns "True", revealing an interpretation that is incompatible with formal mathematical convention. The formula `=IF(-2^2 = (-2)^2;" True";" False")` illustrates this behavior, where the result is displayed as text, rather than as the default logical value TRUE.

In contrast, Excel's Copilot correctly interprets operator precedence, resulting in:

$$-2^2 \rightarrow -(2^2) \rightarrow -4$$

$$(-2)^2 \rightarrow 4$$

$$-4 = 4 \rightarrow \text{FALSE}.$$

This shows that while Copilot's logic engine respects mathematical convention, traditional Excel still propagates errors that compromise logical decisions and the teaching of arithmetic. The persistence of this failure affects the reliability of the tool and can have significant impacts — including financial ones — on global mathematics education.

Figure 12

C3				
=IF(-2^2=(-2)^2;"True";"False")				
	A	B	C	D
1	EXCEL			MATHEMATICS
2	FORMULA	FORMULATEXT	RESULT	RESULT
3	True	=IF(-2^2=(-2)^2;"True";"False")	True	FALSE

Source: The author, 2025.

Figure 13

Explain the result of the formula =IF(-2^2=(-2)^2,"True","False")

Copilot

Great question! This formula demonstrates how operator precedence and parentheses affect calculations in Excel.

Formula:
`=IF(-2^2=(-2)^2,"True","False")`

Step-by-Step Evaluation:

- Understand operator precedence in Excel:**
 - Exponentiation (^) happens **before** negation (-).
 - So -2^2 is interpreted as $-(2^2)$.
- Evaluate each side of the comparison:**
 - Left side:** -2^2
 → First calculate $2^2 = 4$
 → Then apply the negative sign: $-(4) = -4$.
 - Right side:** $(-2)^2$
 → Parentheses force -2 to be squared: $(-2)^2 = 4$.
- Comparison:**
 $-4 = 4?$ → False.
- IF function result:**
 Since the comparison is false, the formula returns "False".

✓ **Final Answer:** The formula returns "False" because -2^2 equals -4, while $(-2)^2$ equals 4.

Source: The author, 2025.

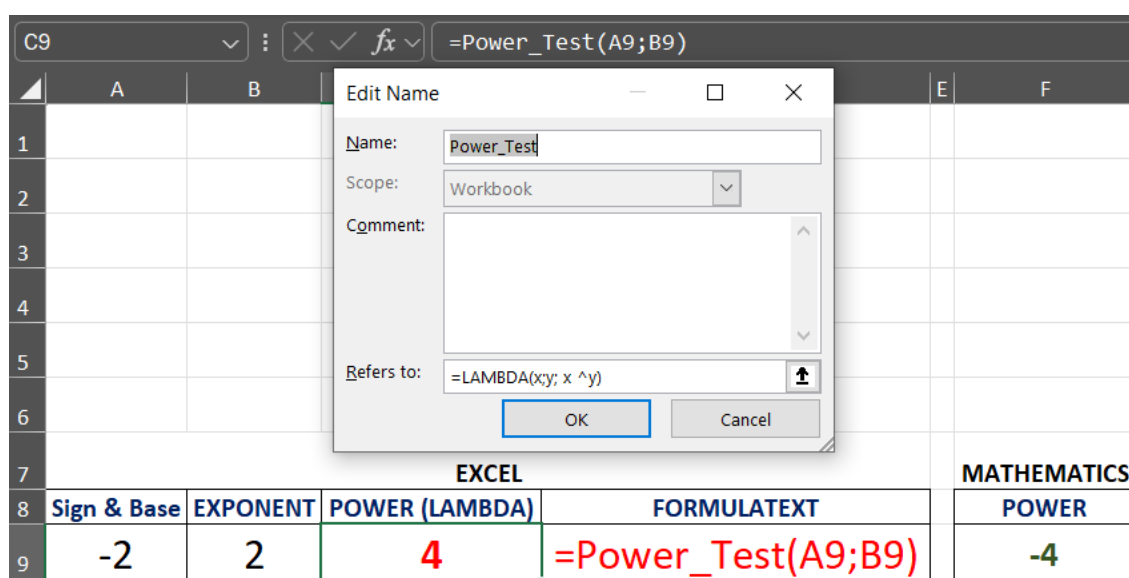
Note 4: The Excel Paradox: How a New Function Reveals a Decades-Old Error

Analysis of the Power_Test function (defined by the expression $\text{=LAMBDA}(x; y; x^y)$) reveals that Excel's problem is not just a miscalculation, but a persistent logical contradiction. The function, introduced in 2021, reproduces the same inconsistency that has persisted for decades in the program's standard notation. As pointed out by Gonçalves (2014, p. 20), this recurrence suggests that the origin of the problem is rooted in structural decisions related to the precedence of operators, and not in recent implementation limitations.

When executed with the variables $A9 = -2$ and $B9 = 2$, the function returns **+4**, corresponding to the evaluation of $(-2)^2$. However, Excel's standard notation (-2^2) also produces +4, contrary to the formal mathematical convention that the correct result would be -4.

This inconsistency demonstrates that while Microsoft has incorporated modern and efficient functions, an engineering decision made decades ago remains unchanged. This raises questions about software development priorities and the responsibility for algebraic accuracy in globally used tools. The observed behavior is therefore the result of a design decision — and not a technical limitation.

Figure 14



Source: The author, 2025.

2.3 LIMITATION OF ROOT CALCULATIONS AND INCONSISTENCY BETWEEN MICROSOFT TOOLS

The limitation of Excel's calculation mechanism becomes evident when analyzing the expression $= -4^{(1/2)}$. According to mathematical convention, the precedence of operators

determines that, in this expression, the potentiation must be processed before the application of the negative sign, resulting in -2. However, traditional Excel has a constraint in its architecture when performing this operation, returning the error #NÚM!, which indicates an inability to process the square root of a positive number preceded by a negative sign.

The impact of this failure is clearly noticeable when comparing Excel's result with that of other Microsoft tools. Excel Copilot and Windows Calculator interpret the expression correctly, returning the value -2. This discrepancy demonstrates that the problem does not stem from technical constraints, but from the permanence of a calculation engine based on old design decisions. Such inconsistency imposes an unnecessary obstacle to the teaching of algebra and reinforces the argument that traditional Excel does not ensure the elementary conceptual precision expected of a tool with a global reach.

Table 1

Resource	Result	Technical Comment	Impact on the Thesis
Traditional Excel	#NÚM!	Failure to process precedence between negation and fractional power, resulting in a miscalculation.	Evidence of failure in the calculation engine and inconsistency with the rest of the Microsoft ecosystem.
Copilot do Excel	-2	It correctly interprets precedence (Potency before Negation), aligning itself with the universal mathematical rule.	It demonstrates that the fix is technically feasible and implemented on the latest Microsoft technology.
Windows Calculator	-2	It follows the pattern of formal mathematical precedence.	Offers a reliable alternative in line with mathematical rigor

Source: The author, 2025.

Traditional Excel Result for $= -4^{(1/2)}$

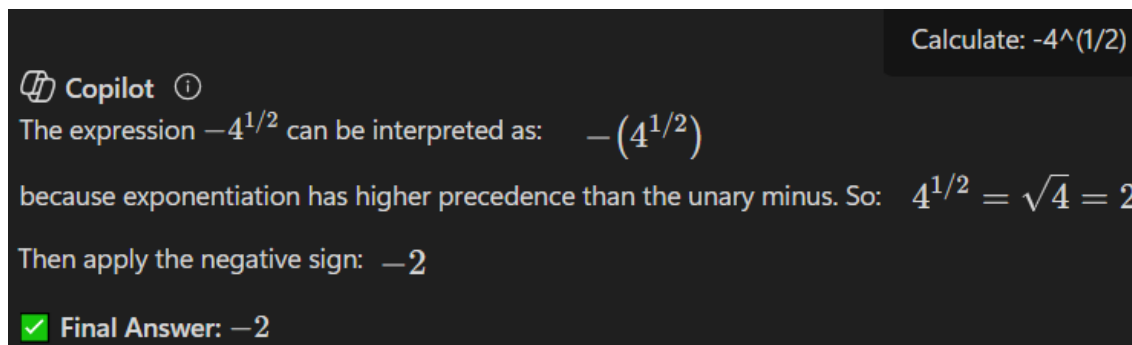
Figure 15

C3					
	A	B	C	D	E
1	EXCEL				MATHEMATICS
2	FORMULA	FORMULATEXT	ROOT		ROOT
3	#NUM!	= -4^(1/2)	#NUM!		-2

Source: The author, 2025.

Excel Copilot Result for $= -4^{(1/2)}$

Figure 16

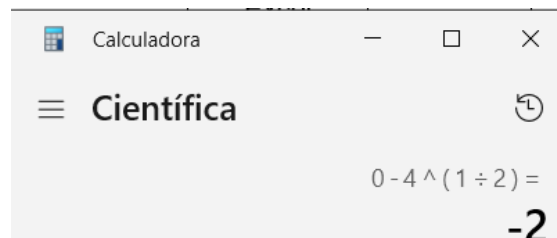


Source: The author, 2025.

Copilot explains how Excel applies exponentiation before the negative sign, returning -2 for the expression $-4^{(1/2)}$. However, the correct interpretation would be $(-4)^{(1/2)}$, which generates a mathematical error, evidencing the inconsistency of the tool.

Windows Calculator Result for $= -4^{(1/2)}$

Figure 17



Source: The author, 2025.

2.3.1 Conceptual Failure of the ROOT Function in Traditional Excel

The operation of radication, according to formal mathematics, requires two elements: the radicand (the number from which the root is extracted) and the index, which defines the order of the root. However, the traditional Excel ROOT function ignores this formal relationship, limiting itself to the square root and omitting the index altogether. This simplification compromises the conceptual clarity of the operation and can lead to the mistaken idea that "root" is an exclusive synonym of "square root".

This limitation is not only technical — it is also pedagogical. In teaching contexts, where conceptual precision is essential, the absence of the index in the ROOT function constitutes an obstacle to rigorous mathematical training. This topic has already been

discussed by Gonçalves & Rodrigues (2023, p. 131), who emphasize the importance of adequately representing the formal elements of rootedness in educational software.

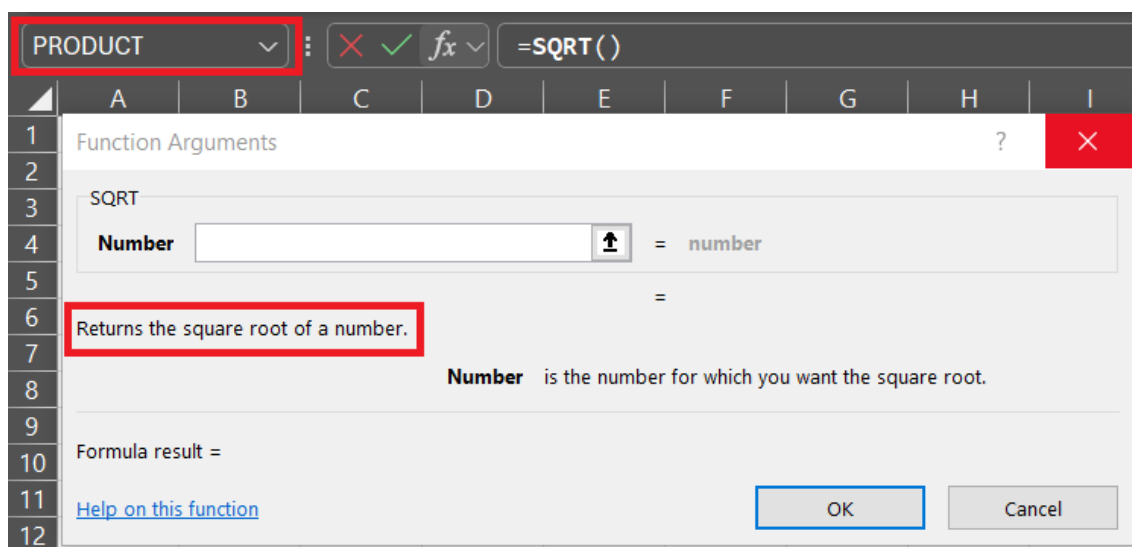
The following are three observations that illustrate this failure and propose ways to overcome it:

Note 1: Limited Structure of the ROOT Function in Traditional Excel

Description: The Excel ROOT(number) function accepts only one argument—the rootand—and implicitly assumes index 2 (square root). The absence of a parameter for the index and the generic label "Number" in the interface show a restricted approach that is not very faithful to the formal mathematical model.

Impact: This limitation reduces conceptual clarity and restricts the didactic use of the function, by inducing the idea that "root" is equivalent only to "square root". The impossibility of defining the index prevents the exploration of higher-order roots, compromising the mathematical rigor and educational applicability of the tool.

Figure 18



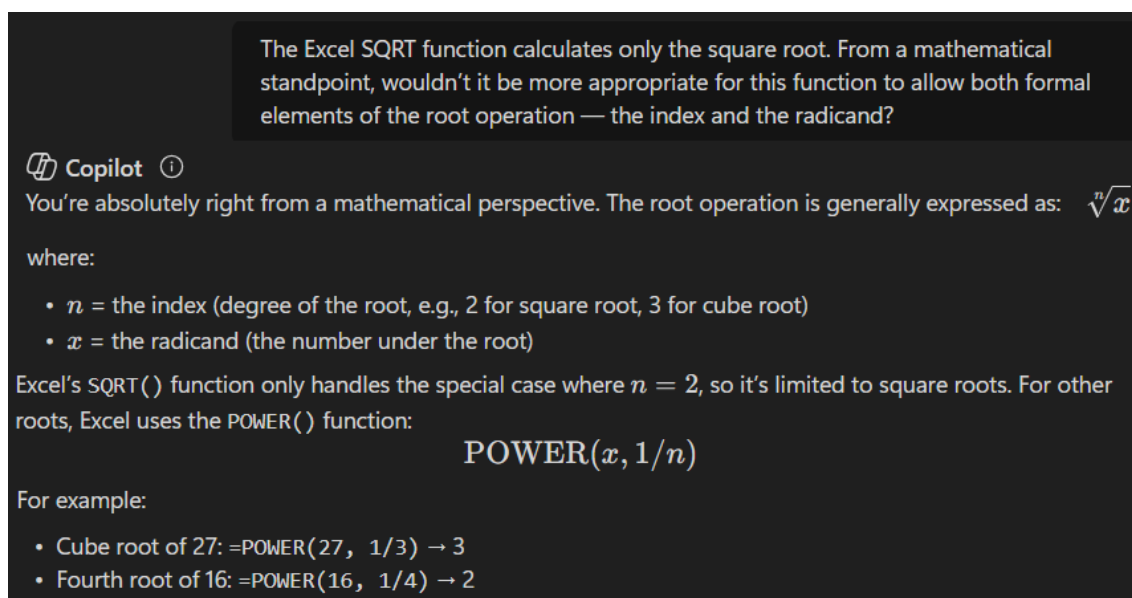
Source: The author, 2025.

Note 2: Throttling Recognition by Excel Copilot

Description: When asked about the structure of the ROOT function, Excel's Copilot recognizes that, from a mathematical point of view, it would be more appropriate to allow the explicit definition of the two elements of radication: the index and the root. The answer indicates that the operation of radication, as defined by formal mathematics, requires these two components. In this sense, a function such as ROOT(index, rooting) or RADICIATION(index, rooting) would be clearer, more intuitive, and in line with the traditional notation used in teaching.

Impact: Copilot's response confirms that such limitation is not technical, but conceptual. Recognizing the need for a more complete framework, Microsoft's own technology recognizes the pertinence of the criticism presented in this article. This demonstrates that correction is feasible and desirable, especially in educational settings that require semantic precision and didactic clarity.

Figure 19



Source: The author, 2025.

Note 3: Conceptual Correction via Custom Function in VBA

Description: To overcome the structural limitation of the =ROOT(x) function of traditional Excel, the custom function ROOT_RAFAEL(n; x) was developed, which requires two arguments: the root index (n) and the radicand (x). The relation is formally defined as: ROOT_RAFAEL(n; x) = $x^{(1/n)}$. The function's interface presents both elements with mathematically appropriate terminology, including an embedded description, which reinforces its conceptual and pedagogical alignment: "The function computes the root in an unlimited way in the reals, presenting the index and the root..."

In addition, unlike the native ROOT function—which has inconsistencies in the interface and conceptual structure (as detailed in Note 1)—the ROOT_RAFAEL function exhibits precise nomenclature that is fully aligned with the mathematical concept it represents. This semantic precision reinforces the importance of alignment between the user interface and the functional behavior of the tool.

Impact: This solution demonstrates that it is possible to conceptually fix Excel within its own framework without relying on changes from Microsoft. By offering a generalized, semantically coherent and pedagogically sound alternative, the ROOT_RAFAEL function

reestablishes the conceptual fidelity of the radication operation and contributes to the rigorous teaching of mathematics in computational environments.

As Gonçalves & Rodrigues (2023, p. 131) point out, "the conceptual precision of mathematical functions is an indispensable element for the pedagogical credibility of educational software and for the critical mathematical training of users".

Figure 20

The screenshot shows an Excel spreadsheet with the formula bar displaying `=ROOT_RAFAEL(E1;E2)`. The spreadsheet contains the following data:

	A	B	C	D	E	F	G	H	I
1	Index:	2		Index:	3		Index:	2	
2	Radicand:	16		Radicand:	-27		Radicand:	-4	
4	Root:	4		Root:	-3		Root:	N/D in R	

Below the spreadsheet, the 'Function Arguments' task pane for the `ROOT_RAFAEL` function is shown:

ROOT_RAFAEL	
INDEX	E1 = 3
RADICAND	E2 = -27
	= -3

Source: The author, 2025.

2.4 SEMANTIC INCONSISTENCIES AND CONCEPTUAL SILENCING

Excel's limitations go beyond the algorithmic and operational errors discussed in the previous sections, reaching the realm of semantic and conceptual inconsistencies. This section looks at how the nomenclature of basic functions and the terminology of their arguments depart from academic rigor and formal mathematics. By employing imprecise terms, the software plays an active role in conceptual misinformation and in the silencing of fundamental notions, compromising mathematical literacy — even if the final numerical result is correct.

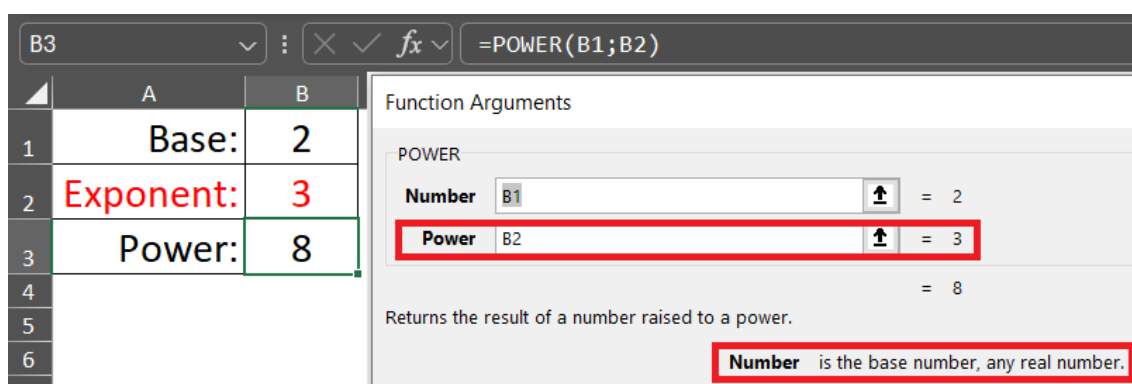
Note 1: The Naming Error in the POWER Function: Confusion between Exponent and Power

The impact of Excel on education is manifested critically through the semantic inconsistency present in its basic functions. The exponentiation operation, an elementary concept of formal mathematics, is represented in Excel by the POWER function, which requires the insertion of arguments (Number; Power). In the English interface of Excel, it is observed that the term Power is used to refer to the exponent. This choice is wrong, because in formal mathematics, power refers to the result of the operation, and not to the value to which the basis is raised — the exponent.

This conceptual ambiguity establishes a direct contradiction with the didactic material and with academic norms. As Gonçalves (2024, p. 477) observes, "software can introduce imprecise mathematical concepts to students".

The persistence of this error is especially notable because it is a semantic flaw—not a complex miscalculation. The result of the operation is correct. However, the correction would only require a change in the description of the arguments, replacing (Number; Power) by (Base; Exponent). The revision of this elemental nomenclature, which would significantly benefit global education by promoting conceptual rigor, reinforces Microsoft's prioritization of maintaining legacy code over didactic accuracy.

Figure 21



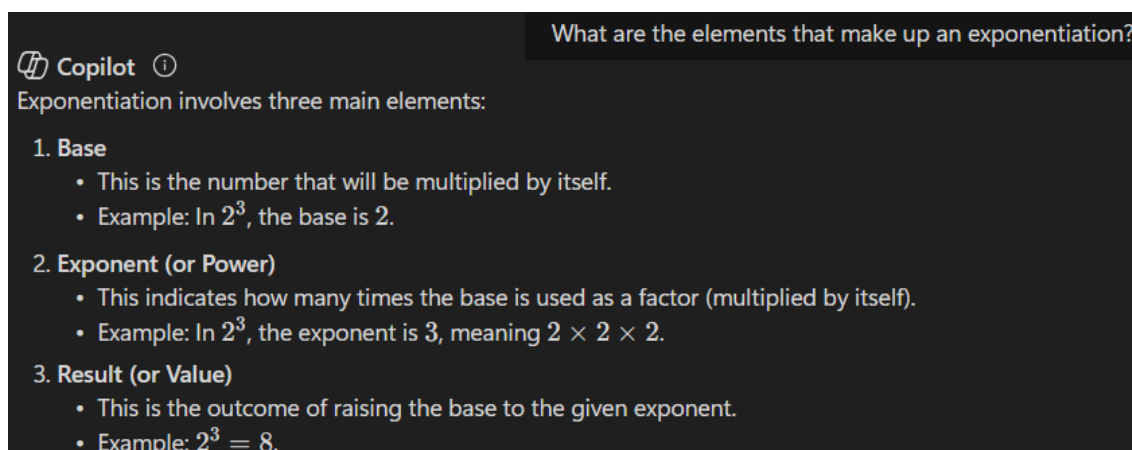
Source: The author, 2025.

Copilot

Description: Although Excel Copilot presents conceptual advances over traditional Excel, it still reproduces a semantic inaccuracy by treating "exponent" and "power" as equivalent terms. In formal mathematics, "exponent" designates the value to which the basis is raised, while "power" represents the result of the operation.

Impact: This ambiguity, although subtle, maintains a conceptual inconsistency that can generate terminological confusion in teaching. It is recognized, however, that Copilot represents a pedagogical advance by correctly explaining the process of potentiation and the precedence of operators.

Figure 22



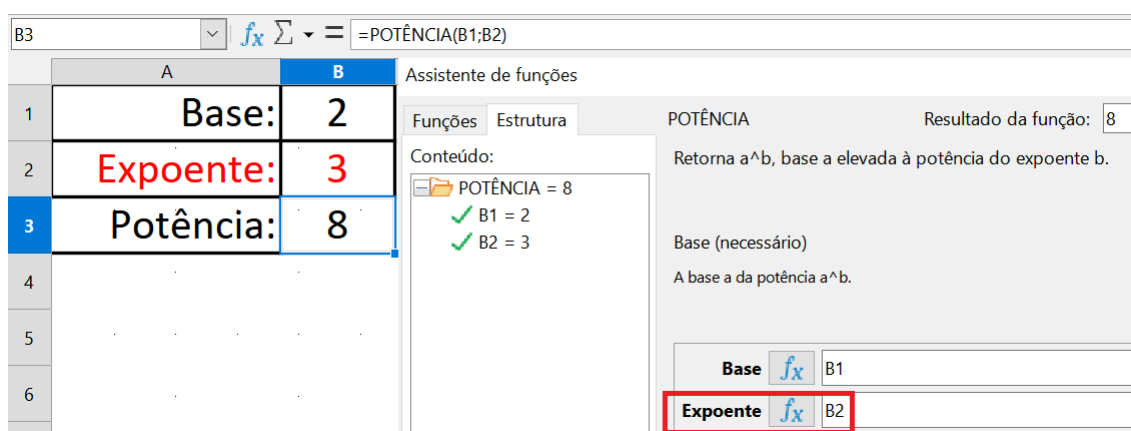
Source: The author, 2025.

Calc (LibreOffice)

Description: Similar to Excel's Copilot, Calc — a spreadsheet from the free LibreOffice package — correctly uses mathematical terms in the potentiation operation. The POWER function requires the arguments (base; exponent), respecting the formal nomenclature and avoiding semantic confusion between "power" (result) and "exponent" (value). This conceptual precision is in accordance with academic standards and with the didactic materials adopted in teaching.

Impact: As a free and open-source tool, Calc expands access to quality mathematics education, especially in educational settings with limited resources. By combining technical and conceptual rigor with accessibility, Calc becomes an important ally in the democratization of knowledge — without compromising mathematical accuracy.

Figure 23



Source: The author, 2025.

Google Sheets

Description: Google Sheets, a free and cloud-based tool, correctly adopts the mathematical nomenclature in the potentiation operation. The POWER function uses formal terms and avoids semantic confusion between "power" (result) and "exponent" (value), in accordance with the principles of academic mathematics and with the didactic materials adopted in teaching.

Impact: As a free tool and integrated into an online collaborative environment, Google Sheets significantly expands the reach of quality mathematics education. Its conceptual precision, coupled with ease of use and universal availability, strengthens both formal and informal education, offering a reliable and modern alternative for students, teachers, and institutions around the world.

Figure 24

	A	B	C
1	Planilha Google		
2	Base	Expoente	Potência
3	2	3	8
4			
5			
6			

Formula bar: `=POTÊNCIA(A3;B3)`

Function tooltip: **POTÊNCIA(base; expoente)**

EXEMPLO
`POTÊNCIA(4; 0,5)`

SOBRE
Retorna um número elevado a uma potência.

base
O número a ser elevado à potência de "expoente".

expoente
O expoente sobre o qual elevar "base".

Saiba mais

Source: The author, 2025.

Custom function in VBA (Excel)

Description: To demonstrate the feasibility of correcting the nomenclature directly in Excel, a custom function in VBA was developed that presents the elements of potentiation with mathematically appropriate terminology. The interface of the function requests the insertion of the base and the exponent and returns to the power as a result, respecting the formal concepts of mathematics. The embedded description reinforces this conceptual alignment and highlights its focus on didactic accuracy.

Impact: This solution demonstrates that even in the traditional Excel environment, it is possible to implement conceptual corrections that favor rigorous math education. By proposing a clear and semantically precise alternative, the personalized function contributes to the training of students and educators, valuing technical knowledge and promoting pedagogical autonomy — without detracting from the platform's original resources.

Figure 25

B3		=POWER_RAFAEL(B1;B2)	
	A	B	Function Arguments
1	BASE:	2	POWER_RAFAEL BASE B1 = 2 EXPONENT B2 = 3 - 8 CALCULATES THE POWER USING FORMAL MATHEMATICAL RULES (AUTHOR: RAFAEL).
2	EXPONENT:	3	
3	POWER:	8	
4			
5			
6			

Source: The author, 2025.

3 FINAL CONSIDERATIONS

Excel is arguably one of the most influential tools in the history of computing applied to education. However, its influence is not without consequences. This article revealed that, behind the user-friendly interface and the wide institutional adoption, Excel has conceptual, operational, and semantic errors that silently compromise the formal teaching of mathematics, statistics, finance, and several other areas that depend on logical and numerical precision, such as engineering, exact sciences, and information technology.

The evidence presented—from the incorrect evaluation of fundamental expressions to the absence of essential elements in mathematical functions—shows that teaching with Excel is substantially different from calculating with Excel. The discrepancy between numerical result and conceptual coherence is not trivial: it forms generations of students with distorted understanding of basic mathematical principles, often without teachers or institutions noticing.

Excel Copilot, by recognizing these limitations and suggesting conceptual corrections, confirms that the problems are technically solvable. Still, traditional Excel remains unchanged, prioritizing historical compatibility over academic accuracy. This inertia, which this study calls Microsoft's strategic silence, represents a deliberate decision to maintain the functional legacy even in the face of known conceptual inconsistencies—a choice that, while understandable from a commercial perspective, imposes a silent cost on global education.

Even more serious is the fact that Microsoft could incorporate new parallel functions — semantically correct and pedagogically adequate — without impacting already saved spreadsheets or compromising backward compatibility. The absence of these updates raises a legitimate question: why not fix what is already known to be wrong, if the fix is possible and does not harm the tool's legacy?

For more than a decade, the author has been identifying and publishing dozens of inconsistencies in Excel, proposing functional solutions in VBA and contributing to the improvement of technical and scientific education. Institutional silence and the continuity of

commercialization without conceptual corrections perpetuate a cycle of compromised training.

Correcting these flaws—and recognizing them as opportunities for improvement—is not only possible: it is necessary. Because, in an era where algorithms educate as much as teachers, the commitment to accuracy ceases to be technical and becomes ethical.

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FOR A CONTEXTUALIZED PRACTICE: FROM LITERACY TO THE PHONOLOGICAL ASPECTS OF LANGUAGE

POR UMA PRÁTICA CONTEXTUALIZADA: DA ALFABETIZAÇÃO AOS ASPECTOS FONOLÓGICOS DA LÍNGUA

POR UNA PRÁCTICA CONTEXTUALIZADA: DE LA ALFABETIZACIÓN A LOS ASPECTOS FONOLÓGICOS DE LA LENGUA



<https://doi.org/10.56238/sevened2026.011-002>

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ABSTRACT

This study proposed a concise analysis of the teaching material used by the classroom teacher, specifically Janilma Félix Monteiro, from the Municipal Elementary School Poeta José Camelo de Melo, in the city of Pilõezinhos, Paraíba, with the aim of reflecting on practical strategies as well as didactic activities as essential tools for students' development in the school context. According to the general objective—to analyze the teaching material “Phonological Awareness and Literacy: Assessment, Planning, and Intervention”—the more specific objectives were to define phonological awareness and literacy as essential means in the teaching–learning process; to address practical strategies and didactic activities as tools that develop children's skills; and to consider them as resources for professionals who need support in early childhood literacy. Based on the theoretical framework, the following authors were used: Andrade and Fernandes (2016); Antunes (2014); Brasil (1996); Cavaliere (2010); Guimarães et al. (2023); Pulieze (2024); Scherer and Wolff (2020); and Klein (2009). Regarding methodological procedures, an action research approach was conducted, seeking a self-analysis of the teaching material entitled Phonological Awareness and Literacy: Assessment, Planning, and Intervention. Working with contextualized and diversified materials according to students' particularities enables learners' protagonism, autonomy, and integral development, as well as the formation of critical and participatory citizens within their communities. Furthermore, phonological awareness and literacy were perceived as indispensable means in the teaching–learning process, as well as practical strategies and didactic activities as resources for education professionals and for the development of students' skills.

Keywords: Teaching Materials. Phonological Awareness. Contextualized Perspective. Integral Development. Practical Strategies.

RESUMO

Este trabalho propôs uma análise concisa do material didático trabalhado pela professora regente, mais precisamente, Janilma Félix Monteiro, da Escola Municipal do Ensino

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Fundamental Poeta José Camelo de Melo, na cidade de Pilõezinhos, Paraíba, em virtude de refletirmos estratégias práticas, como também as atividades didáticas como ferramentas essenciais para o desenvolvimento do alunado no âmbito escolar. Conforme o objetivo geral: analisar o material didático “Consciência fonológica e alfabetização: avaliação, planejamento e intervenção”. E como objetivos mais específicos: definir a consciência fonológica e a alfabetização como meios essenciais no processo ensino-aprendizagem; abordar as estratégias práticas, bem como as atividades didáticas como ferramentas que irão desenvolver habilidades nas crianças e como recurso para os profissionais que necessitam de suporte para alfabetização infantil. De acordo com os apontamentos teóricos, utilizamos: Andrade e Fernandes (2016); Antunes (2014); Brasil, (1996); Cavaliere (2010); Guimarães et al. (2023); Pulieze (2024); Scherer e Wolff (2020); Klein (2009). Quanto aos procedimentos metodológicos, realizamos uma pesquisa-ação à qual buscou-se uma autoanálise do material didático titulado a Consciência fonológica e alfabetização: avaliação, planejamento e intervenção. Ao trabalhar com materiais contextualizados e diversificados consoante às particularidades dos discentes, irá possibilitar aos estudantes protagonismo, autonomia, desenvolvimento integral, como também formar um cidadão crítico e participativo na comunidade em que vive. Outrossim, foram perceptíveis a consciência fonológica e a alfabetização como meios indispensáveis ao processo ensino-aprendizagem do alunado, bem como as estratégias práticas e as atividades didáticas como recurso para os profissionais da educação, além do desenvolvimento das habilidades dos discentes.

Palavras-chave: Material Didático. Consciência Fonológica. Perspectiva Contextualizada. Desenvolvimento Integral. Estratégias Práticas.

RESUMEN

Este trabajo propuso un análisis conciso del material didáctico trabajado por la docente titular, específicamente Janilma Félix Monteiro, de la Escuela Municipal de Educación Primaria Poeta José Camelo de Melo, en la ciudad de Pilõezinhos, Paraíba, con el fin de reflexionar sobre estrategias prácticas, así como sobre las actividades didácticas como herramientas esenciales para el desarrollo del alumnado en el ámbito escolar. De acuerdo con el objetivo general—analizar el material didáctico “Conciencia Fonológica y Alfabetización: Evaluación, Planificación e Intervención”—los objetivos específicos fueron definir la conciencia fonológica y la alfabetización como medios esenciales en el proceso de enseñanza-aprendizaje; abordar las estrategias prácticas y las actividades didácticas como herramientas que desarrollan habilidades en los niños; y considerarlas como recursos para los profesionales que necesitan apoyo en la alfabetización infantil. Según los aportes teóricos, se utilizaron los siguientes autores: Andrade y Fernandes (2016); Antunes (2014); Brasil (1996); Cavaliere (2010); Guimarães et al. (2023); Pulieze (2024); Scherer y Wolff (2020); y Klein (2009). En cuanto a los procedimientos metodológicos, se realizó una investigación-acción, mediante la cual se llevó a cabo un autoanálisis del material didáctico titulado Conciencia Fonológica y Alfabetización: Evaluación, Planificación e Intervención. Trabajar con materiales contextualizados y diversificados, de acuerdo con las particularidades de los estudiantes, posibilita su protagonismo, autonomía y desarrollo integral, así como la formación de ciudadanos críticos y participativos en la comunidad en la que viven. Además, se evidenció la conciencia fonológica y la alfabetización como medios indispensables en el proceso de enseñanza-aprendizaje, así como las estrategias prácticas y las actividades didácticas como recursos para los profesionales de la educación y para el desarrollo de las habilidades del alumnado.

Palabras clave: Material Didáctico. Conciencia Fonológica. Perspectiva Contextualizada. Desarrollo Integral. Estrategias Práticas.

1 INTRODUCTION

Literacy is essential for the child to develop, especially in terms of fluency in reading, as well as in writing skills. In this way, with regard to the school environment, students will be able to expand their knowledge, as well as interaction, from the contact with other individuals in the community in which they live.

In view of this, we propose a concise analysis of the children's didactic material worked by the regent teacher, more precisely, Janilma Félix Monteiro, from the Municipal School of Elementary Education Poeta José Camelo de Melo, in the city of Pilõezinhos, Paraíba, due to reflecting practical strategies, as well as didactic activities as essential tools for the development of students in the school environment. The children's didactic material is entitled Phonological awareness and literacy: evaluation, planning and intervention.

Phonological awareness refers to one of the skills that enables children to recognize, as well as manipulate the sounds of oral language, as the author of the respective material, Sandra Pulieze (2024), explains. In this sense, it is essential for the teacher to work in the initial phase of the student, the development of such skills, as these reflections not only contribute to the teaching practice, but also to the evolution of the individual according to full participation in society.

As a general objective, we intend to analyze the didactic material "Phonological awareness and literacy: assessment, planning and intervention". As for the more specific objectives: to define phonological awareness and literacy as essential means in the teaching-learning process; to address practical strategies, as well as didactic activities as tools that will develop skills in children, as well as a resource for professionals who need support for children's literacy.

This work will be subdivided according to the following structure: theoretical aspects (the school environment as a democratic management bias; teaching-learning focused on the contextualized perspective; Understanding phonological awareness from literacy) and the methodological ones, presentation and discussion of the results, according to the self-analysis of the children's didactic material, entitled Phonological Awareness and Literacy: evaluation, planning and intervention.

2 THEORETICAL FRAMEWORK

2.1 THE SCHOOL ENVIRONMENT AS A DEMOCRATIC MANAGEMENT BIAS.

The school is an environment in which all professionals, including the parents of the students and the community, must be in partnership so that there is in fact democratic management, according to the Law of Bases and Guidelines. According to Guimarães *et al.*

(2023, p.05), "(...) Everyone involved with the school, including families, must actively participate in this process, especially the community, aiming for quality education". In this way, students, more precisely, children, are encouraged to develop autonomy, knowledge and linguistic skills. To the extent that the individual is instigated in an active, participatory and critical way, he contributes to his protagonism as a human being, not only in school, but also active in the society in which he lives.

Furthermore, "Early childhood education, the first stage of basic education, aims at the integral development of children up to five (5) years of age, in their physical, psychological, intellectual and social aspects, complementing the action of the family and the community (BRASIL, 1996, p.14)". First, the family context contributes satisfactorily to the development of the human being, both in the personal, academic and even professional aspects. Therefore, it is of paramount relevance, in addition to school, family members, primarily parents, to give the necessary support to the child, emotionally, from birth.

Commonly, we notice some particularities of some students with difficulty concentrating on the activities proposed by the teacher, lack of attention when the teacher is explaining the subject, resistance to perform the task, because they do not understand the subject. In addition, absence from classes, with a high rate of absence, parallel conversations with colleagues, as well as disrespect for them and for the employees of the given educational institution. Many problems that have been mentioned above concern, above all, the way human beings are treated at home, as well as knowledge of the world and school learning. These need to be interconnected.

Education professionals, more precisely, teachers, constantly teach and learn from students, whether during the explanation of a content, or in the classroom, according to the baggage that each one brings with him. It is also pertinent to emphasize that, traditionally, students were seen as passive subjects, omissions, without autonomy, as well as without the power to actively participate in what was taught in the school environment. From now on, students need to construct meaning from what they study and be formed with the bias of a critical citizen, with the discernment to make their own choices, in an active and responsible way, as Guimarães *et al.* (2023, p. 04), states that "(...) from the moment the school acts democratically, it transforms the educational environment, enabling it to be able to offer contribution with regard to overcoming challenges and forming autonomous and critical citizens".

2.2 TEACHING-LEARNING FOCUSED ON THE CONTEXTUALIZED PERSPECTIVE

According to Andrade and Silva (2016), regarding the activities developed in an educational institution, it is essential that there is inseparability with regard to action-reflection-action in pedagogical practice, as it does not aim at a traditional perspective, but rather a perspective that omits the passivity of students, individualism of teachers, as the center of the teaching-learning process.

Thus, in the perception of Antunes (2014), in an interactionist perspective of language, any language is constituted from the interaction with two or more interlocutors in the communicative process. Furthermore, both teachers need to elaborate activities with real objectives and awaken meaning for students, as well as they need to be seen as protagonists in the interaction process, whether through writing, reading or orality. That is why one must work collectively, both constructing meanings in a given communicative situation, teacher and students, one learning from the other. In this sense, we can understand that regardless of whether they are the classroom professional or a student, everyone has different knowledge and life experiences, but that can be added with others.

2.3 UNDERSTANDING PHONOLOGICAL AWARENESS FROM LITERACY

Phonological awareness is interconnected, above all, with some factors at the beginning of literacy, as children need to be aware immediately, so that they can develop such skills in a significant way in the brain. This concerns some external factors, in addition to internal ones, more precisely regarding cultural, socioeconomic and linguistic aspects. With regard to speech and interaction, we can use them in a natural way, as well as through contact with others, however, as for reading and writing, this does not occur. According to Scherer and Wolff (2020), as we grow and consciously get to know ourselves better as human beings, we learn to interact and speak, commonly. This will favor the way we differentiate ourselves and have similarities with other human beings. Furthermore, we can understand that this applies to words as well, especially regarding their meanings.

As is notorious in everyday life, as well as from the experience of each one, the aforementioned authors affirm that, when reading and writing, it is not a natural process, since it is related to an arbitrary system, in the sense of experience with other readers; from its own rules regarding writing, the mechanism of logic. For this, according to oral language, the fact of presenting similarities, as well as distinctions, due to sound segments, is what is called phonological awareness (SCHERER; WOLFF, 2020).

And about students who have some type of disorder and/or disabilities, it is essential that professionals, especially teachers, be attentive, since it is one of the places where

students suffer the most certain difficulties, whether linguistic or behavioral (KLEIN, 2009). "It is believed that the cause of attention deficit hyperactivity disorder may be related to environmental agents and/or heredity (KLEIN, 2009, p.16)". Therefore, the relevance of working with materials that contribute to children's teaching-learning. The teacher must be the greatest encourager, knowledgeable about each student in the school environment, especially in the classroom, as well as the other professionals existing in the educational institution.

In view of this, it is necessary to work with materials that satisfactorily explore phonological aspects, instigating linguistic, behavioral, cultural, socioeconomic levels, among others, since we must consider what each learner has, as well as their particularities. It is known how challenging it is to be in the classroom daily, since obstacles arise, as it also requires dedication, availability, emotional balance; In addition to others that occur in an inopportune way, however, they are part of every profession, since all professions require a lot of effort, responsibility and even renunciations, when you decide to succeed in what you do.

3 METHODOLOGICAL PROCEDURES

According to the methodology used, we used action research:

Action research is a type of engaged participant research, as opposed to traditional research, which is considered to be "independent", "non-reactive" and "objective". As the name implies, action research seeks to unite research with action or practice¹, that is, to develop knowledge and understanding as part of practice. It is, therefore, a way of doing research in situations in which one is also a person of practice and one wishes to improve one's understanding of it (ENGEL, 2000, p. 182).

In view of this, we carried out a self-analysis of the didactic material Phonological awareness and literacy: assessment, planning and intervention, provided by the teacher in charge in the classroom, after the supervised internship. This criterion was due to giving visibility to the respective material, as well as theoretical basis as support for education professionals. Furthermore, as opposed to the traditional perspective, we work in a contextualized way.

4 PRESENTATION AND DISCUSSION OF RESULTS

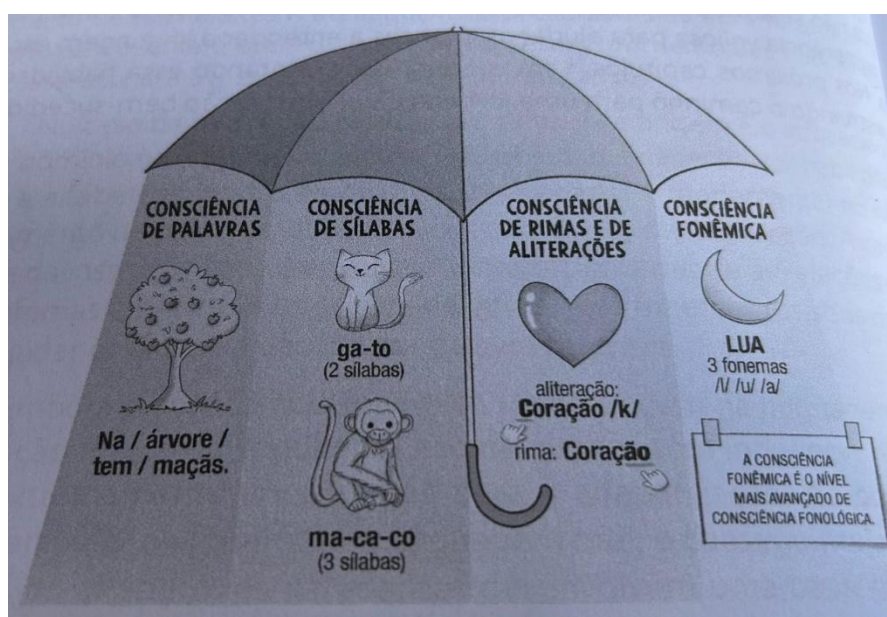
The respective didactic material entitled Phonological Awareness and Literacy, evaluation, planning and intervention, it is noticeable that from it, the teacher uses didactic resources with the objective of stimulating the student to learn in a playful, interactive way,

as well as working from a contextualized perspective. The didactic material serves as a subsidy to guide the professional regarding the planning, evaluation and intervention in Early Childhood Education.

With regard to what has been mentioned above, we will see Figures from the didactic material *Phonological Awareness and Literacy*, as a subsidy for the didactic sequence suggested by the teacher in the classroom:

Figure 1

An umbrella as an analogy to understand phonological awareness



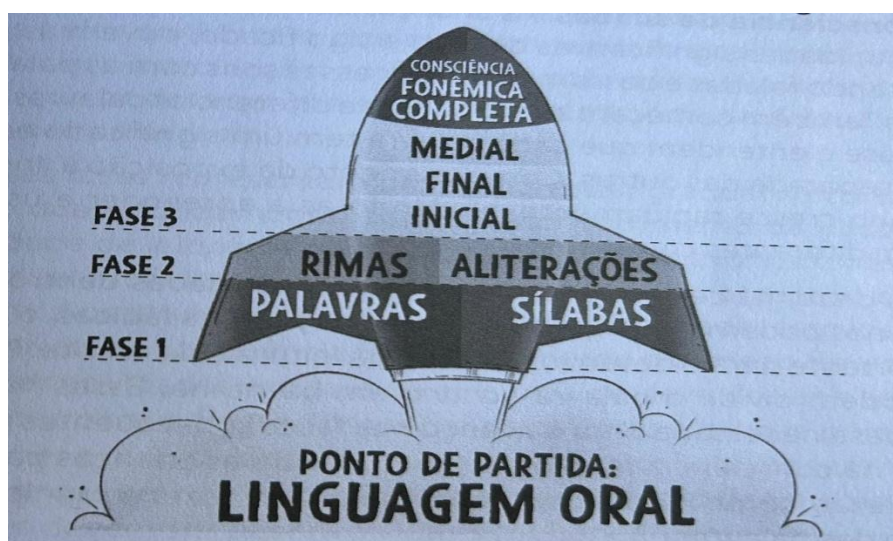
Source: Pulieze, 2024, p. 20

In chapter 01 of the book, there is the definition of phonological awareness, as well as the segments that involve the language, with regard to the way in which certain phrases of words can be divided, as well as regarding syllables and phonemes, according to Figure 01, present in chapter 02. The umbrella analogy visually represents the auditory process, as well as speech sounds. In this way, Pulieze (2024, p.21) uses the metaphor of the umbrella as "comprehensive protection"; "diversity of skills", "interconnection of sub-skills"; "progressive development" and the "basis for literacy".

In the following Figure, the progression in phonological awareness will be presented, especially with regard to "oral language to the complete development of phonemic awareness" (PULIEZE, 2024, p.25):

Figure 2

The rocket as a way to symbolize the progress of phonological awareness



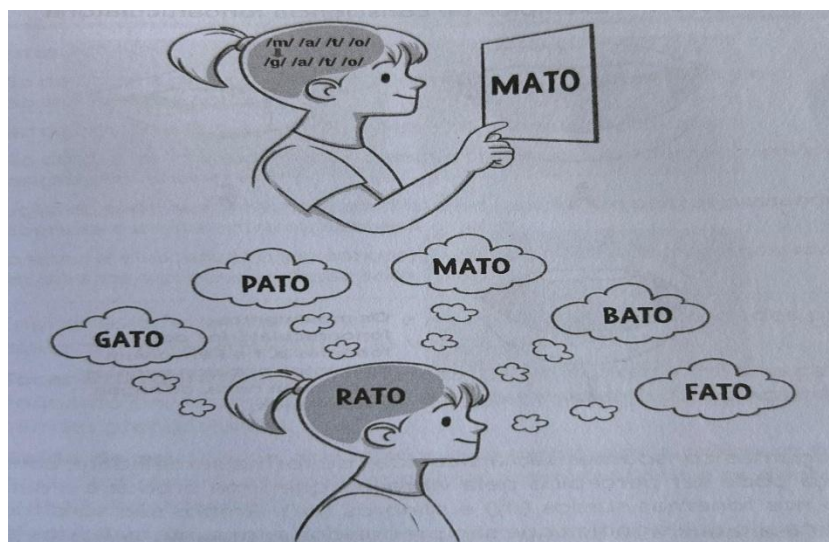
Source: Pulieze, 2024, p. 20

According to the conception of some people, for teaching to be effective, present the nomenclatures in the pedagogical work, it is just correcting the students and showing them the mistakes of the activities (ANTUNES, 2014). However, in the subsequent chapters, the definition of phonemic awareness, phonic instruction, according to the direction of teaching in a "more precise and effective way (PULIEZE, 2024, p. 18)", as well as the relevant role for literacy, since it is noticeable in Figure 02 above, is addressed.

In the following Figure, it is clear how development works in the child's mind:

Figure 3

Demonstration of the development of phonic awareness



Source: Pulieze, 2024, p. 20

In addition to the aforementioned skills, the author Sandra Pulize explains, later, what will be explored in the book, the fact that the levels help in terms of teaching strategies, as well as in the child's own development, as shown in Figure 03. In the same way, it is noticeable that phonological awareness is configured as one of the metalinguistic and metaphonological skills, that is, the intention of working with a material of this size is in function of stimulating the student to be a conscious and critical citizen. Furthermore, with the power of reflection, with regard to phonological awareness, according to an active and thinking subject in the society in which he lives, from reading and writing, from its initial phase.

According to the conception of some people, for teaching to be effective, present the nomenclatures in the pedagogical work, it is just correcting the students and showing them the mistakes of the activities (ANTUNES, 2014). However, in the subsequent chapters, the definition of phonemic awareness, phonic instruction, according to the direction of teaching in a "more precise and effective way (PULIEZE, 2024, p. 18)", as well as the relevant role for literacy, since it is noticeable in Figure 02 above, is addressed.

Next, we will see tables referring to the phonemes of Brazilian Portuguese:

Figure 4
Phonemes

Fonemas do português brasileiro	Fonema	Grafemas
Sons vocálicos orais	/a/	a
	/e/	e
	/i/	i
	/o/	o
	/u/	u
Sons vocálicos nasais	/ã/	ã, am, an
	/ê/	em, en
	/î/	im, in
	/õ/	ô, om, on
	/û/	um, um
Sons consonantais básicos	/m/	m
	/n/	n
	/s/	s
	/p/	p
	/f/	f
	/l/	l
	/t/	t
Sinais diacríticos e demais sons consonantais	/ɛ/	é
	/ɔ/	ó
	/n/	n
	/z/	z
	/b/	b
	/k/	c
	/d/	d
	/ʒ/	j
	/g/	g
	/ʁ/	r, rr
	/r/	r

Source: Pulieze, 2024, p. 20

Figure 5
Phonemes

Fonemas do português brasileiro	Fonema	Grafemas
Dígrafos e regras ortográficas	/h/	h
	/ʃ/	ch, x
	/ɫ/	lh
	/ɲ/	nh
	/z/	s, x
	/s/	ss, ce, ci, ç, x
	/k/	qu, k
	/g/	gu
	/i/	y
	/u/	w, l

Fonte: Representação dos fonemas com base no Alfabeto Fonético Internacional (Seara et al., 2011).

Source: Pulieze, 2024, p. 20

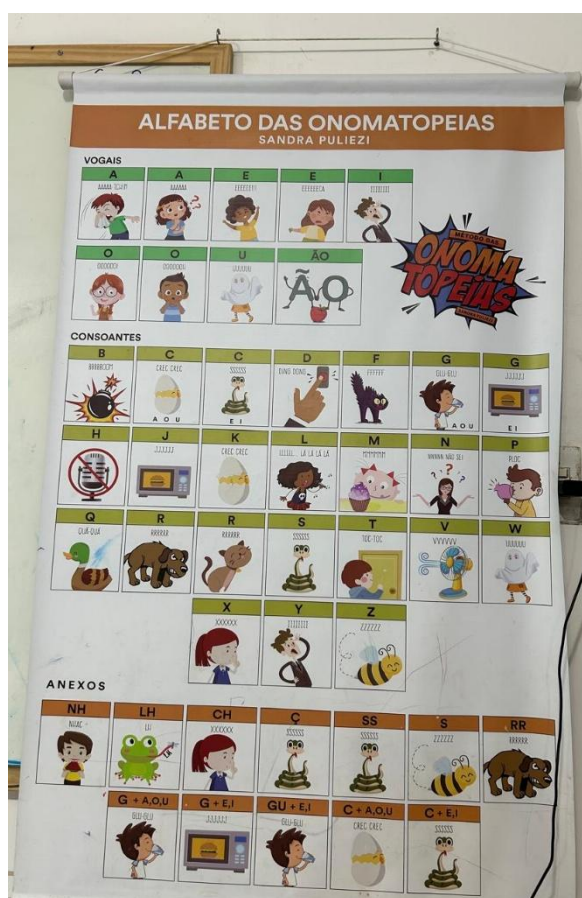
Above, we can see how important it is to start working with Portuguese phonemes, from the initial stage, in children. In this sense, we can understand that language plays a significant role in the construction of the act of speech aggregated with other extralinguistic factors, as well as those linked to them (CAVALIERE, 2010). From the Figure above, it is notorious some linguistic sounds, such as oral, nasal, basic vowel sounds, diacritics, as well as consonant sounds, digraphs, among some orthographic rules.

Thus, since early childhood education, the relevance of working in the classroom with oral, nasal and consonant sounds, the latter, which is articulated in isolation (CAVALIERE, 2010), in order to show students how to articulate and learn as they understand better. In addition, the students, by performing, can perceive the reason why the degrees of nasality are called, whether orally or nasally. Furthermore, this also corresponds to the other consonant sounds, diacritics and digraphs.

Given this, below, we will see more examples regarding the alphabet of onomatopoeia:

Figure 6

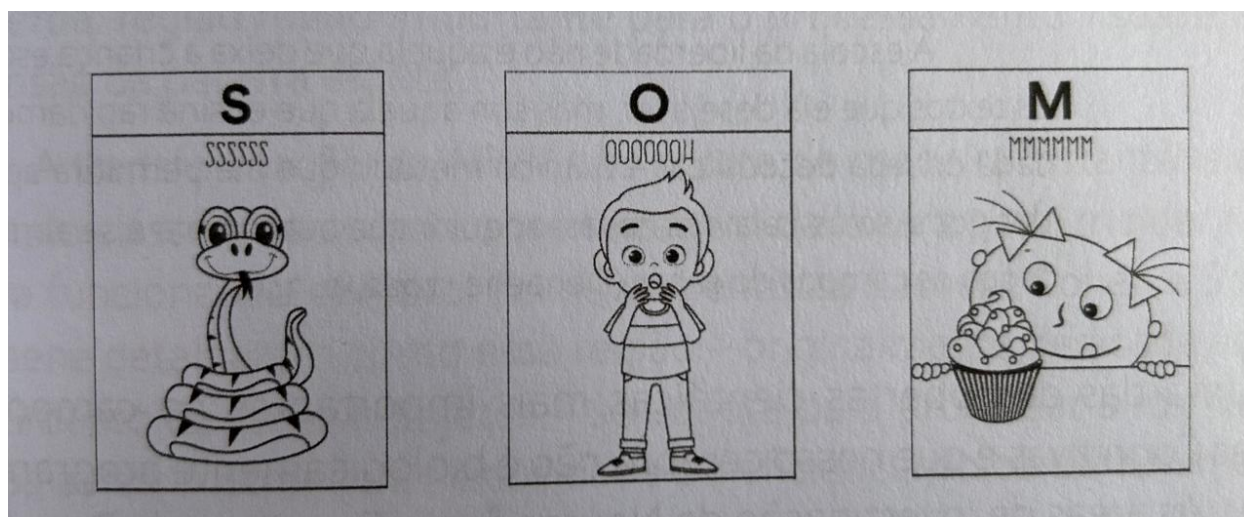
Onomatopoeia alphabet exposed in the classroom



Source: available by the regent teacher Janilma Félix Monteiro

Figure 7

Alphabet of onomatopoeia



Source: Pulieze, 2024, p. 20

In Figure 06, during a class of the teacher, the use of the alphabet of onomatopoeia was witnessed. Then the teacher made the sound of the letters connected to the symbolization of animals, according to the facial expression. Subsequently, the students performed the sounds of the letters. In this sense, the sounds of consonants and vowels can have one more. In Figure 07 it also represents the alphabet. The connection between the sounds and symbols that are part of writing is essential, both for there to be communication between individuals, as well as for them to learn to read and write, including becoming fluent citizens.

5 FINAL CONSIDERATIONS

We conclude this work according to positive subsidies, since it is of paramount relevance for the teacher to work with enriching materials, in order to stimulate students, help them in psychological, physical, intellectual, and cultural development, as well as approach a contextualized perspective from the support of children's didactic material. For this, we reflected on phonological awareness and literacy as indispensable means to the teaching-learning process, as well as the practical strategies and didactic activities in a diversified way that will serve for the development of students' skills, as well as a resource for education professionals.

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SCHOOL MANAGEMENT IN DISPUTE: NEOLIBERAL RATIONALITIES AND THE SOCIO-CRITICAL PERSPECTIVE IN POLITICAL-PEDAGOGICAL PROJECTS

GESTÃO ESCOLAR EM DISPUTA: RACIONALIDADES NEOLIBERAIS E A PERSPECTIVA SÓCIO-CRÍTICA NOS PROJETOS POLÍTICO-PEDAGÓGICOS

GESTIÓN ESCOLAR EN DISPUTA: RACIONALIDADES NEOLIBERALES Y LA PERSPECTIVA SOCIO-CRÍTICA EN LOS PROYECTOS POLÍTICO-PEDAGÓGICOS



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ABSTRACT

Brazilian education has been shaped by historical, political, and economic transformations that directly affect school management. From the civil–military regime, characterized by an authoritarian, technocratic, and dualistic educational model, to the redemocratization process initiated in the 1980s, public schooling became permeated by discourses of democratization and citizenship. However, from the 1990s onward, in line with the global advance of neoliberalism, an educational rationality became hegemonic in Brazil, oriented toward the redefinition of the role of the State, the centrality of managerial efficiency, and results-based logic, significantly impacting the management of public schools and their Political-Pedagogical Projects (PPP). In this context, the study analyzes PPPs as arenas of dispute between neoliberal rationalities and the socio-critical perspective of education. The guiding research question is: how do neoliberal rationalities, hegemonized since the 1990s, and the socio-critical perspective manifest and confront each other in the construction and implementation of public school political-pedagogical projects? The general objective is to analyze this dispute based on the main legal and normative frameworks of Brazilian education. Methodologically, the research adopts a qualitative, bibliographic approach grounded in the analysis of normative documents. The results indicate that, although neoliberal rationality has gained centrality in school management, tensions, resistances, and critical reconfigurations persist. It is concluded that the PPP remains a strategic political-pedagogical instrument for defending a fair, democratic public school oriented toward comprehensive human development.

Keywords: Fair Public School. Democratic Management. Educational Policies. Emancipatory Education. Teacher Education.

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RESUMO

A educação brasileira é marcada por transformações históricas, políticas e econômicas que incidem diretamente sobre a gestão escolar. Do regime civil-militar, caracterizado por um modelo autoritário, tecnocrático e dualista de educação, ao processo de redemocratização iniciado nos anos de 1980, a escola pública passa a ser atravessada por discursos de democratização e cidadania. Contudo, a partir dos anos de 1990, em consonância com o avanço do neoliberalismo em escala mundial, torna-se hegemônica no Brasil uma racionalidade educacional orientada pela redefinição da função do Estado, pela centralidade da eficiência gerencial e pela lógica dos resultados, impactando a gestão das escolas públicas e os projetos político-pedagógicos (PPP). Nesse contexto, a pesquisa analisa os PPP como espaços de disputa entre racionalidades neoliberais e a perspectiva sócio-crítica da educação. A questão de pesquisa norteadora é: como as racionalidades neoliberais, hegemônicas desde os anos de 1990, e a perspectiva sócio-crítica se manifestam e se confrontam na construção e na implementação dos projetos político-pedagógicos da escola pública? O objetivo geral consiste em analisar essa disputa com base nos principais marcos legais e normativos da educação brasileira. Metodologicamente, adota-se uma abordagem qualitativa, de natureza bibliográfica, fundamentada na análise de documentos normativos. Os resultados indicam que, embora a racionalidade neoliberal tenha adquirido centralidade na gestão escolar, persistem tensões, resistências e reconfigurações críticas. Conclui-se que o PPP permanece como instrumento político-pedagógico estratégico para a defesa de uma escola pública justa, democrática e orientada pela formação humana integral.

Palavras-chave: Escola Pública Justa. Gestão Democrática. Políticas Educacionais. Educação Emancipadora. Formação de Professores.

RESUMEN

La educación brasileña está marcada por transformaciones históricas, políticas y económicas que inciden directamente en la gestión escolar. Desde el régimen cívico-militar, caracterizado por un modelo educativo autoritario, tecnocrático y dualista, hasta el proceso de redemocratización iniciado en la década de 1980, la escuela pública pasó a estar atravesada por discursos de democratización y ciudadanía. No obstante, a partir de los años noventa, en consonancia con el avance del neoliberalismo a escala mundial, se volvió hegemónica en Brasil una racionalidad educativa orientada por la redefinición del papel del Estado, la centralidad de la eficiencia gerencial y la lógica de los resultados, impactando la gestión de las escuelas públicas y los Proyectos Político-Pedagógicos (PPP). En este contexto, el estudio analiza los PPP como espacios de disputa entre racionalidades neoliberales y la perspectiva socio-crítica de la educación. La pregunta de investigación es: ¿cómo se manifiestan y se confrontan estas racionalidades en la construcción e implementación de los proyectos político-pedagógicos de la escuela pública? El objetivo general es analizar dicha disputa a partir de los principales marcos legales y normativos de la educación brasileña. Metodológicamente, se adopta un enfoque cualitativo y bibliográfico, basado en el análisis de documentos normativos. Los resultados muestran que, aunque la racionalidad neoliberal ha adquirido centralidad en la gestión escolar, persisten tensiones, resistencias y reconfiguraciones críticas. Se concluye que el PPP continúa siendo un instrumento político-pedagógico estratégico para la defensa de una escuela pública justa, democrática y orientada a la formación humana integral.

Palabras clave: Escuela Pública Justa. Gestión Democrática. Políticas Educativas. Educación Emancipadora. Formación Docente.

1 INTRODUCTION

The history of Brazilian education is crossed by political and ideological disputes around the social function of the State, the public school and the meanings attributed to school management. Throughout the twentieth century, especially during the civil-military regime (1964-1985), education was submitted to an authoritarian and technocratic project, guided by the rationality of subordinate economic development and the training of functional labor to the demands of the market. In this context, LDBEN n. 5.692/1971 expressed in an emblematic way an exclusionary and dualistic educational model, by institutionalizing the separation between a vocational school aimed at the popular classes and a propaedeutic school aimed at the socially favored strata. Such a structure reinforced historical inequalities and consolidated an instrumental conception of education, dissociated from the critical, cultural and integral formation of the subjects.

The transition from the civil-military regime to the process of redemocratization, intensified throughout the 1980s, inaugurated a new political and social horizon, in which education began to be claimed as a social right and a fundamental condition for the exercise of citizenship. The promulgation of the Federal Constitution of 1988 constituted a decisive milestone in affirming education as a duty of the State and a right of all, paving the way for the defense of a democratic, inclusive and socially referenced public school. The Law of Guidelines and Bases of National Education, LDBEN, n. 9.394/1996 is part of this movement by reorganizing the Brazilian educational system and reaffirming principles such as the democratization of access, pedagogical autonomy and democratic management.

However, these legal and institutional advances are part of a broader international scenario, progressively marked by the rise of neoliberalism as a guiding rationality for public policies. This process has its roots in the structural crisis of capitalism in the 1970s and acquires greater political density at the end of that decade and throughout the 1980s, especially with the political-ideological convergence between the United States and the United Kingdom. Under the presidency of George H. W. Bush and the government of Margaret Thatcher, a political-economic project based on the deregulation of markets, the retraction of state intervention and the expansion of privatizations was consolidated. These principles were systematized in the Washington Consensus, formulated in 1989 with the protagonism of the International Monetary Fund and the World Bank, which began to condition financing and international cooperation policies to the adoption of structural reforms, fiscal discipline and trade liberalization. Directed mainly at peripheral and dependent countries, these guidelines contributed to the deepening of social inequalities and to the weakening of public policies.

In the 1990s, this rearrangement of the social function of the State began to have a more direct impact on educational systems, guiding reforms in different countries, including Brazil. Education has been progressively incorporated into an international agenda that favors managerial efficiency, measurement of results and administrative rationalization. Multilateral organizations, such as the World Bank and UNESCO, assumed a central role in this movement, whose symbolic inflection occurred with the World Conference on Education for All, held in Jomtien, in 1990. From this framework, an educational conception based on measurable learning, curricular organization by competencies and skills, and the accountability of schools and professionals for externally measured performances was disseminated, producing structural impacts on school management and political-pedagogical projects.

In this context, the main legal and normative frameworks of Brazilian education formulated since the 1990s begin to express, explicitly or implicitly, the hegemony of neoliberal rationalities. Documents such as LDBEN No. 9,394/1996, the National Curriculum Guidelines for teacher training (Resolutions CNE/CP No. 01/2002, No. 01/2006, No. 02/2015, No. 02/2019 and No. 04/2024) and the National Common Curricular Base (Resolution CNE/CP No. 02/2017) become structuring references of contemporary educational policy, directly affecting school management, curriculum, teacher training and the elaboration of political-pedagogical projects.

In this scenario, school management is no longer conceived primarily as a collective political-pedagogical practice and is progressively associated with managerialist models guided by goals, performance indicators and administrative efficiency. The political-pedagogical project, in turn, runs the risk of being reduced to a technical-bureaucratic instrument, emptied of its critical, political and democratic potential. However, this process does not develop in a linear or consensual way. Over the last decades, different conceptions of education, management and human formation have coexisted and entered into dispute within educational policies and school practices.

The analyses and academic production in the field of educational management indicate that, although neoliberalism has become hegemonic in Brazilian educational policies since the 1990s, alternative projects committed to the democratization of public schools and integral human formation remain in dispute. The socio-critical perspective of school management affirms the centrality of collective participation, pedagogical autonomy and the social commitment of the school, understanding the political-pedagogical project as a privileged space for resistance, reflection, criticism and democratic construction.

It is in this context of historical, geopolitical and normative disputes that this research is inserted, guided by the following guiding question: how do neoliberal rationalities, which have become hegemonic in Brazilian educational policies since the 1990s, and the socio-critical perspective manifest and confront each other in the construction and implementation of political-pedagogical projects in public schools?

The general objective of the research is to analyze the dispute between neoliberal rationalities and the socio-critical perspective in the political-pedagogical projects of public schools, based on the main legal and normative frameworks of Brazilian education formulated from the 1990s onwards, considering their implications for school management and for the social function of public schools.

As specific objectives, it is sought: (a) to examine the historical origin and theoretical foundations of educational neoliberalism in Brazil, contextualizing its emergence in the post-redemocratization scenario and the influence of multilateral organizations from the Jomtien Declaration (1990); (b) to analyze the main legal and normative references of Brazilian education, with emphasis on LDBEN n. 9.394/1996, the National Curriculum Guidelines for teacher training and the National Common Curricular Base, identifying the conceptions of school management and political-pedagogical project present in them; (c) to reflect on the impacts of the dispute between neoliberal rationalities and the socio-critical perspective on the organization of pedagogical work, on school management and on the processes of human formation in public schools.

From the methodological point of view, the research adopted a qualitative approach, of bibliographic and documentary nature, based on the critical analysis of academic productions and normative documents of the Brazilian educational policy. As highlighted by authors such as Minayo (2014), Bardin (2016) and Severino (2016), qualitative research allows us to apprehend meanings, contradictions and disputes present in social processes, going beyond merely descriptive analyses. The investigation involves the systematic reading, thematic categorization and critical interpretation of laws, resolutions, guidelines and official documents, articulated with the specialized literature in the field of education and school management. This methodological option makes it possible to understand the political-pedagogical project as a historical and political construction, situated in power relations and ideological disputes.

The justification of this research lies in the need to deepen the critical understanding of the directions of school management and the political-pedagogical project in a context marked by neoliberal hegemony and the persistence of historical educational inequalities. By analyzing the political-pedagogical project as a space for confrontation between different

educational projects, the research contributes to the reflection and management of a fair³, democratic and socially referenced public school, offering theoretical subsidies to researchers, managers and teachers committed to the resistance to the commodification of education and to the strengthening of emancipatory pedagogical practices.

This article is organized into five sections, articulated in order to highlight the historicity of the disputes around school management and the political-pedagogical project in the context of Brazilian educational policies. After this introduction, the second section analyzes the educational reforms and the affirmation of neoliberal rationality in school management in the period from 1990 to 2002, placing them in the context of the restructuring of the State and the influence of multilateral organizations. The third section discusses the disputes and provisional consensuses in the field of teacher training and school management between 2003 and 2016, highlighting advances, limits and contradictions of educational policies in the governments of the Workers' Party and the political-institutional inflection of 2016. The fourth section examines the National Common Curricular Base, management by results and the political-pedagogical projects in dispute in the period from 2017 to 2024, evidencing the deepening of neoliberal rationality and the possibilities of resistance. Finally, the fifth section presents the final considerations, systematizing the main discussions, analytical contributions and implications for the defense of a democratic, fair and socially referenced public school.

2 EDUCATIONAL REFORMS AND THE AFFIRMATION OF NEOLIBERAL RATIONALITY IN SCHOOL MANAGEMENT (1990-2002)

The objective of this section is to analyze the affirmation of neoliberal rationality in Brazilian school management in the period from 1990 to 2002, situating it in the global, Latin American geopolitical context and examining its implications for educational policies, teacher training and political-pedagogical projects of public schools.

At the international level, this process integrates the restructuring of contemporary capitalism and the consolidation of neoliberalism as the hegemonic rationality of public policies, marked by the reduction of state intervention, the centrality of the market, and the diffusion of control, competition, and performance mechanisms (Dardot; Laval, 2016).

In Latin America, these guidelines were incorporated through structural adjustment programs imposed on peripheral and dependent countries, with decisive action by the International Monetary Fund and the World Bank, which began to condition financing and

³ The term "just school" is recurrent in the theoretical production of José Carlos Libâneo, although it does not appear as a single conceptual category. Since the 1990s, in different works, the author has defended a school committed to social justice, equal access to knowledge and integral human formation, as opposed to meritocratic and managerialist conceptions.

international cooperation to the adoption of structural reforms, redefining the social function of the State and subordinating social policies to the logic of economic efficiency (Frigotto, 2010).

In Brazil, the neoliberal inflection began with the government of Fernando Collor de Mello (1990-1992), who, before being impeached, inaugurated an agenda of accelerated economic opening, trade liberalization, market deregulation, and privatizations, accompanied by the weakening of social policies. With Collor's impeachment, Vice President Itamar Franco (1992-1994) assumed the presidency, whose government was characterized by a phase of political and institutional transition, marked by economic stabilization and the reorganization of the state's bases. This period created the historical and institutional conditions for the deepening of structural reforms in subsequent governments, especially in the two terms of Fernando Henrique Cardoso (1995-2002).

The shock measures adopted in the early 1990s, such as the confiscation of savings and abrupt trade liberalization, produced strong economic and social instability, with direct impacts on employment, income, and living conditions of the population. Although it did not structure a systemic educational policy, the Collor government introduced in the educational field a discourse centered on administrative modernization, managerial efficiency and the reduction of the social function of the State, anticipating principles that would later be consolidated in the educational reforms of the following years. As Saviani (2008) analyzes, this period plays a decisive role in the diffusion of a conception of the minimal State and in the legitimization of policies guided by the logic of the market.

It is in this context that the neoliberal project was consolidated in a more systematic way during the governments of Fernando Henrique Cardoso (1995-2002), when policies of privatization, administrative decentralization, state reform and rationalization of public spending were intensified. In the educational field, such guidelines are expressed in the centrality given to large-scale evaluation, the definition of performance goals and the accountability of education networks, schools and education professionals for the results achieved. School management thus becomes guided by a managerial logic, shifting pedagogical work from a formative and collective perspective to an instrumental and performative rationality, characteristic of the so-called culture of performativity (Ball, 2014).

The 1990s are, therefore, a decisive period for understanding the structural transformations of Brazilian education, especially with regard to school management and teacher training. Inserted in an international scenario marked by the affirmation of neoliberalism as a guiding rationality for public policies, Brazil began to implement educational reforms guided by managerial efficiency, administrative rationalization and the

adaptation of education to the demands of the labor market. Such reforms are not presented as isolated initiatives, but as an expression of a broader political-economic project, which progressively redefines the social function of public schools and reorients the meaning of pedagogical work.

A central international milestone in this process is the World Conference on Education for All, held in Jomtien in 1990, which resulted in the World Declaration on Education for All. Although enunciated under the discourse of universalization of access to basic education, this Declaration introduces a significant inflection by prioritizing learning considered essential, useful and measurable, formulated in the language of competencies and skills. As Libâneo (2012) analyzes, it is a shift from the centrality of integral human education to learning evaluated by results, articulating education, productivity and economic efficiency.

In Brazil, these guidelines were initially materialized in the Ten-Year Plan for Education for All (1993-2003), which inaugurated a logic of educational planning based on goals, indicators and performance evaluation. The plan highlights the incorporation of the guidelines of multilateral organizations, such as the World Bank and UNESCO, whose activities now have a direct impact on the definition of national educational priorities. As Frigotto (2010) points out, such guidelines are far from neutral, as they subordinate education to the logic of economic competitiveness and the formation of human capital adjusted to market demands.

This movement acquires greater normative density with the enactment of the Law of Guidelines and Bases of National Education, LDBEN, n. 9.394/1996, which reorganizes the Brazilian educational system in line with the new configuration of the State in the neoliberal context. Although the LDBEN incorporates relevant principles, such as the expansion of access to basic education and the autonomy of education systems, it also creates conditions for the intensification of administrative decentralization, curricular flexibility and the accountability of schools and education professionals for the results achieved. As Apple (2002) observes, such devices are part of a broader neoliberal agenda, which redefines educational management under the logic of control, efficiency and performativity.

In the context of school management, these transformations contribute to the affirmation of managerialist models, in which the principal and the management team are conceived as managers of results, responsible for meeting previously established goals and raising institutional performance indicators. Stephen Ball (2014) analyzes this phenomenon as part of a culture of performativity, in which rankings, external evaluations, and performance metrics come to regulate educational work, producing new forms of control and subjectivation of education professionals.

The reconfiguration of the social function of the teacher and of the school management itself deepens with the approval of the National Curriculum Guidelines for teacher training, instituted by Resolution CNE/CP n. 01/2002. This document explains the centrality of competencies and skills as a structuring axis of teacher training, attributing privileged emphasis to the practice and resolution of immediate problems of daily school life. The establishment of 400 hours of practice as a curricular component expresses a conception of teaching guided by operational efficiency, to the detriment of a critical, historically and socially contextualized theoretical training.

Libâneo (2013) strongly criticizes this orientation by stating that the reduction of teacher training to a set of practical skills impoverishes pedagogical work and compromises the intellectual, ethical and political dimension of teaching. For the author, "teacher training cannot be reduced to technical training", under penalty of subordinating the school to the demands of the market (Libâneo, 2013, p. 89).

This rationality has a direct impact on political-pedagogical projects, which tend to assume a formal and bureaucratic character, often designed to meet legal and administrative requirements, and not as an expression of a collective project of human formation. Apple (2002) warns that, under neoliberal logic, pedagogical documents function as instruments of symbolic control, emptying their critical and democratic potential.

It is important to note, however, that the affirmation of neoliberal rationality between 1990 and 2002 did not occur in a homogeneous or consensual way. Even within these normative frameworks, tensions and resistance persist around the meaning of public education, teacher training and school management. As Frigotto (2010) observes, the Brazilian public school remains a contradictory space, in which antagonistic educational projects coexist, reflecting broader social, political and ideological disputes.

In summary, this section demonstrated that the period from 1990 to 2002 marks the progressive affirmation of neoliberal rationality in Brazilian educational policy, which began in the Collor de Mello government and was systematically deepened during the mandates of Fernando Henrique Cardoso. It was evident that documents such as the Ten-Year Plan for Education for All, LDBEN n. 9.394/1996 and the National Curriculum Guidelines of 2002 redefined school management and teacher training based on the centrality of efficiency, competencies and the logic of results. At the same time, the analysis revealed that this process established a field of disputes that is expressed, in a privileged way, in the political-pedagogical projects, understood as strategic spaces of confrontation between the neoliberal managerial rationality and perspectives committed to the democratization of the public school and to the integral human formation.

3 DISPUTES AND PROVISIONAL CONSENSUSES: TEACHER TRAINING AND SCHOOL MANAGEMENT (2003-2016)

The objective of this section is to analyze the disputes and provisional consensuses that marked teacher training and school management between 2003 and 2016, highlighting advances, limits and contradictions of educational policies in the governments of Luiz Inácio Lula da Silva (2003-2010) and Dilma Rousseff (2011-2016), as well as the political-institutional inflection resulting from the 2016 impeachment, which paved the way for the advancement of liberal policies in the Michel Temer government (2016-2018) and for the context that precedes the approval of the National Common Curriculum Base.

The period from 2003 to 2016 cannot be understood as a simple continuity of the neoliberal reform cycle of the 1990s, nor as a complete break with its foundations. Rather, it is a historical time marked by disputes within the state, in which the expansion of social policies, the discursive valorization of participation and the expansion of educational access coexist with mechanisms of regulation by performance, large-scale evaluation and growing dialogue with business agendas. In analytical terms, this ambivalence is expressed as a "possible consensus", that is, an unstable arrangement in which democratic projects and market demands are tensioned, producing norms and programs that sometimes expand rights, sometimes reinforce control and standardization devices (Saviani, 2008; Frigotto, 2010). In this context, school management and teacher training become strategic fields: what is at stake is not only "how to manage" the school, but what school one wants to build? For whom? And what is the Brazilian public school for?

From the political-economic point of view, the Lula administrations (2003-2010) combine economic growth, social inclusion and expansion of public policies with structural limits resulting from the maintenance of macroeconomic pillars and management instruments inherited from the previous period. In the educational field, there is an expansion of funding and programs, strengthening of national evaluation systems and induction of federal policies that reorder management practices in the networks and schools. This hybrid conformation supports the interpretation that educational democratization advances, but without completely breaking with the rationality that measures quality by indicators, goals and performance. As Ball (2014) warns, the culture of performativity tends to convert the school into a comparable, rankable and responsive unit to external metrics, producing new forms of control of the teaching work. Thus, even when public policies expand access and permanence, they can simultaneously intensify logics of accountability and institutional competition.

In the context of school management, the period registers efforts to participate and institutionalize councils, forums and planning processes, but also the consolidation of monitoring and evaluation instruments that put pressure on the organization of pedagogical work. Paro (2016) argues that democratic management is not reduced to formal rites, as it presupposes the effective socialization of power, dialogue, and collective decision-making as the foundations of school daily life. When participation is reduced to a procedure, democratic management is emptied and the political-pedagogical project runs the risk of becoming a bureaucratic piece. The central dispute, therefore, reappears in the school under two competing projects: the project of pedagogical democracy (autonomy, participation, collective project) and the project of managerial efficiency (goals, indicators, standardization and control).

In teacher training, a milestone of the period is Resolution CNE/CP No. 01/2006, which establishes the National Curriculum Guidelines for the Pedagogy course. Unlike the strongly instrumental orientation that marked previous guidelines, the 2006 text reaffirms teaching as the basis of identity and replaces training in a broader perspective, articulating theoretical foundations, critical reflection and understanding of the educational phenomenon as a social practice. Libâneo (2013) recognizes relevant inflections, but warns that the dispute with the logic of competencies and with the demands of the educational market does not end at the normative level; it reappears, with new mediations, in the real curriculum of institutions and in the way networks and systems translate "quality" into performance.

It is also necessary to situate the period due to the advancement and complexification of Special Education policies in the inclusive perspective, whose centrality has grown in the public agenda since the mid-2000s. The National Policy on Special Education in the Perspective of Inclusive Education (2008) affirms the right of students who are the target audience of special education to enroll in regular schools and to Specialized Educational Service (AEE), reinforcing the need to reorient school management, teacher training and pedagogical organization. In the same vein, Decree No. 7,611/2011 sets out guidelines for special education and SEA, strengthening the understanding that inclusion is not reduced to access: it implies pedagogical conditions, accessibility, resources, collective planning, and accountability of the system, and not just of the individual teacher. In this sense, inclusion directly puts pressure on managerial rationality, because they demand pedagogical time, critical training and collaborative work, dimensions often compressed by agendas of results.

With Dilma Rousseff (2011-2016), part of the movement to expand policies and programs is preserved, but the scenario becomes more unstable from 2014 onwards, with worsening of political conflicts, polarization and economic pressures that result in fiscal

adjustment policies and intensification of disputes over the social function of the State. In the educational field, the National Education Plan (PNE) 2014-2024 was born from strong social mobilization and defined ambitious goals (financing, teacher appreciation, expansion of access, quality), but its implementation began to face restrictions and distributive disputes. The contradiction is radicalized: the PNE projects the expansion of rights, while the political-economic environment presses for cost containment and managerial solutions, opening space for greater protagonism of private actors and foundations in the formulation of agendas.

In the field of teacher training, this conflict appears in an exemplary way in Resolution CNE/CP No. 02/2015, resulting from broad debates and, therefore, marked by internal tensions. The DCN/2015 reaffirm principles close to the socio-critical tradition, unity between theory and practice, praxis, social commitment, democratic management, integral human formation, but dialogue with the language of competencies and with the need for articulation with the demands of basic education. Frigotto (2010) interprets this type of document as an expression of an unstable equilibrium: there is progress in formulations and principles, but the structural bases that sustain commodification and managerial control continue to operate in educational policy. The result is a normative text with formative power, but vulnerable to instrumental reinterpretations according to the correlations of forces.

It is in this context of growing conquests of social rights, with political, economic and institutional instability, that the 2016 impeachment process, which took place during the second term of President Dilma Rousseff (2015-2016), must be understood. From a formal-institutional point of view, the trial in the Federal Senate is concluded on August 31, 2016, resulting in his definitive removal. However, in the field of critical analysis and academic production, a significant portion of the literature interprets this process as a parliamentary coup, insofar as it was not based on the unequivocal proof of a crime of responsibility, but was made possible by a broad articulation between conservative forces in the National Congress, business sectors, the financial system and large media groups (Saviani, 2017; Singer, 2018).

Saviani (2017) states that impeachment configures a political-institutional rupture that interrupts a cycle, albeit contradictory, of policies aimed at expanding social rights, allowing the recomposition of a regressive liberal agenda. For the author, it is a parliamentary coup because it operates within formal legality, but subverts the democratic content of the political process. In the same vein, Frigotto (2017) argues that the removal of Dilma Rousseff expresses the reaction of the economic elites to the limitations imposed, albeit partial, on the advance of neoliberalism during the governments of the Workers' Party.

Singer (2018) adds that Dilma's second term was marked by a strong conservative offensive, intensified by the international economic crisis, the policy of fiscal austerity, and the exhaustion of the political pact that sustained governability. In the educational field, this rupture creates the political conditions for the dismantling of inclusive policies, for the weakening of social participation and for the acceleration of structural reforms aligned with the logic of the market (Apple, 2002; Ball, 2014). Thus, the parliamentary coup of 2016 inaugurated a new cycle of democratic regression, whose effects are directly projected on public education, school management and the subsequent approval of the National Common Curriculum Base.

With the inauguration of Michel Temer (2016-2018), a liberal and fiscal orientation intensified in the country that began to have a structural impact on social policies, including education. A decisive milestone of this period is the approval of Constitutional Amendment No. 95/2016, which institutes the ceiling on public spending and compromises, for two decades, the State's ability to finance and induce social policies. Several authors point out that this measure produces regressive effects on educational planning, the valorization of education professionals and the expansion of historically conquered rights, by subordinating public investment to the logic of fiscal austerity (Saviani, 2017; Frigotto, 2017).

In this context of budget restriction and redefinition of the social function of the State, educational reforms are gaining strength guided by processes of curriculum standardization, institutional flexibility and accountability for results. The Secondary Education Reform, instituted by Law No. 13,415/2017, sanctioned in February 2017, is an emblematic expression of this inflection by reorganizing the school curriculum based on training itineraries, competencies and skills, bringing basic education closer to models aligned with the demands of the labor market. For Ball (2014), such reforms are part of the logic of performativity, in which educational quality is measured by measurable indicators and results, displacing the formative meaning of teaching.

Apple (2002) adds that this type of reform contributes to the expansion of educational inequalities, by weakening common education and deepening school segmentation processes. Thus, the Temer government consolidates a political-institutional environment favorable to the expansion of neoliberal rationality in education, creating the normative and discursive bases that make it possible, in the subsequent period, to approve the National Common Curricular Base and deepen management by results.

This set of movements helps to explain why the BNCC, approved in 2017, does not emerge as an isolated event, but as the outcome of a political and normative trajectory: (a) the coexistence, in the 2000s and early 2010s, of the expansion of rights and the

strengthening of evaluations; (b) the presence of teaching guidelines with hybrid language; (c) the intensification of disputes after 2014; and (d) the inflection of 2016, which reorders priorities and accelerates reforms with a liberal profile. In the school, the consequences are concrete: the pressure on managers and teachers to "deliver results" intensifies, standardized materials and strategies for controlling pedagogical work are expanded, and the PPP begins to suffer the risk of bureaucratic alignment with external requirements.

Even so, the essential mark of the 2003-2016 period is the contradiction: real advances coexist with mechanisms that re-actualize neoliberal rationality. In inclusive education, for example, the normative recognition of the right and the institutionalization of SEA are expanded, but inequalities in infrastructure, continuing education, working conditions, and effective participation of school collectives in the design of policies persist. In school management, democratic discourses are strengthened, but daily life is crossed by goals, evaluations and accountability. Freire (1996) synthesizes the critical core necessary to understand these tensions by stating that education is inevitably political and that teaching should be guided by the emancipation of the subjects, with no neutrality in educational practice. This warning underlies the central problem of this section: when the possible consensus gives way to managerial predominance, what is called "quality" tends to be reduced to measurement; When the socio-critical perspective is affirmed, quality once again means human formation, participation and social justice.

However, the period between 2003 and 2016 shows that teacher training and school management were crossed by a contradictory movement. On the one hand, important advances can be observed, such as the expansion of access to education, the strengthening of inclusive policies, the discursive valorization of democratic management, and the affirmation of the political-pedagogical project as a space for collective participation, especially in the governments of Luiz Inácio Lula da Silva and in the first term of Dilma Rousseff (Frigotto, 2010; Paro, 2016). On the other hand, there are still mechanisms of control, large-scale evaluation, and performativity, intensified in Dilma's second term, marked by austerity policies and retraction of social investment, which weaken the State's capacity to induce (Saviani, 2017). The 2016 impeachment deepened this process by inaugurating a liberal inflection in the Michel Temer government, with the adoption of restrictive fiscal measures and curricular reforms that created the political and institutional conditions for the approval of the BNCC in 2017 (Frigotto, 2017; Ball, 2014). In this context, the political-pedagogical project consolidates itself as a central arena of dispute between managerial compliance and the defense of a democratic, inclusive, equitable and socially referenced public school.

4 BNCC, MANAGEMENT BY RESULTS AND THE POLITICAL-PEDAGOGICAL PROJECTS IN DISPUTE (2017-2024)

The objective of this section is to analyze the deepening of neoliberal rationality in Brazilian educational policy between 2017 and 2024, focusing on the National Common Curriculum Base, the consolidation of management by results, the normative changes in teacher training and their impacts on school management, political-pedagogical projects and disputes for critical perspectives.

The period between 2017 and 2024 constitutes a decisive milestone in the consolidation of neoliberal rationality in Brazilian education, by articulating profound normative changes, institutional rearrangements and broader political reconfigurations of the State. The approval of the National Common Curriculum Base in 2017 occurred in the context of the Michel Temer government (2016-2018), characterized by explicit alignment with the guidelines of international neoliberalism, the adoption of fiscal austerity policies, and the expansion of the influence of multilateral organizations and business foundations in the formulation of educational policies (Apple, 2002; Frigotto, 2017).

In this same movement, the Secondary Education Reform is inserted, instituted by Law No. 13,415/2017, which restructures the final stage of basic education based on curricular flexibility, the centrality of training itineraries, and the reduction of common training, shifting the curriculum from a historical-critical perspective to a utilitarian and adaptive logic. The BNCC of High School, approved in the same year, consolidates this displacement by organizing school knowledge primarily in the language of competencies and skills, narrowing the relationship between curriculum, external evaluation and management by results.

In this scenario, education is regulated by parameters of efficiency, curriculum standardization, and institutional accountability, reinforcing the culture of performativity described by Ball (2014), in which educational quality is reduced to measurable indicators and pedagogical work is progressively subordinated to market demands and the logic of productivity, to the detriment of critical training. of teacher autonomy and the emancipatory social function of the public school.

This movement of educational regression is significantly deepened during the government of Jair Bolsonaro (2019-2022), whose political-ideological agenda articulates radical economic neoliberalism, moral conservatism, and the deliberate emptying of democratic instances of social participation. In the educational field, this project is expressed through the intensification of management by results, the systematic attack on the autonomy of public schools and universities, and the delegitimization of critical thinking and scientific production. As Saviani (2021) analyzes, this is a period marked by an ideological offensive

against public education, guided by the denial of science, anti-intellectualism, and the submission of educational policies to the logic of the market.

The consolidation of the BNCC and the implementation of the 2019 National Curriculum Guidelines for teacher training reinforce an instrumental conception of curriculum and teaching, aligned with the requirements of performativity and standardization, as Libâneo (2018) criticizes. In the same direction, Frigotto (2017) points out that the Bolsonaro government deepens the commodification of education by reducing teaching to the formation of functional skills, emptying its ethical, political, and emancipatory dimension. Ball's (2014) analysis contributes to understanding this process as an expression of the culture of performativity, while Apple (2002) warns that such policies widen inequalities and weaken educational democracy.

Thus, the period from 2019 to 2022 consolidates a scenario marked by the intensification of authoritarianism, institutional setbacks, and a profound democratic regression, in which public education is no longer conceived as a social right and is progressively reconfigured as an instrument of fiscal adjustment, ideological control, and subordination to the demands of the neoliberal market. In this context, the public school is pressured to abandon its critical, formative and emancipatory function, being reduced to a space for technical training, moral conformation and individual accountability for results, which deepens inequalities, weakens pedagogical autonomy and compromises the very possibility of building a democratic, plural and socially referenced education in Brazil.

The return of Luiz Inácio Lula da Silva to the Presidency, as of 2023, puts education as a social right and strategic public policy at the center of the official discourse; However, until 2024, the normative architecture of the educational reforms approved in 2017 remains unchanged, revealing the persistence of structural devices inherited from the previous neoliberal cycle. The permanence of the normative frameworks approved in the previous cycle, notably the Secondary Education Reform (Law No. 13,415/2017) and the National Common Curricular Base, signals the government's difficulty in facing, in a substantive way, the neoliberal legacy consolidated since 2016. As Saviani (2021; 2023) observes, democratic reconstruction requires more than discursive inflections; it demands a critical review of the reforms that subordinated education to the logic of fiscal austerity, curriculum standardization and management by results.

Frigotto (2023) adds that the non-repeal of these reforms keeps the rationality of the market active within the public school, limiting the State's ability to reorient educational policy towards integral human formation and the reduction of inequalities. Libâneo (2023; 2024), in turn, argues that the continuity of the BNCC and the teaching guidelines aligned with

competencies reinforces a conservative and technicist model of curriculum, incompatible with an effectively democratic education project. In this way, the Lula government, by preserving such provisions, reveals the tensions between political intention and the capacity for rupture, showing that the overcoming of the neoliberal paradigm in Brazilian education remains an open and historically conditioned challenge.

In the interval between 2017 and 2024, there is a continuity of devices and guidelines associated with neoliberal rationality in Brazilian educational policy, which cross different governments and begin to systematically affect school management, political-pedagogical projects, and the very definition of the social function of public education. This is a period marked by the consolidation of normative and managerial devices that reinforce curricular standardization, the measurement of results and institutional accountability, while maintaining, in a tense and contradictory way, spaces for dispute for critical and democratic perspectives within schools and education systems.

It is in this context that the institutionalization of the National Common Curricular Base (BNCC) is inserted, formalized by Resolution CNE/CP No. 02/2017, which represents a decisive turning point in the curricular organization of basic education. Although presented in the official discourse as an instrument to guarantee the right to learning and to promote educational equity, the BNCC consolidates a national curriculum model that subordinates school knowledge to previously defined performance descriptors, organized according to the language of competencies and skills. As Libâneo (2018) analyzes, this movement shifts the curriculum conceived as cultural, historical, and critical mediation to a functional curriculum, guided by criteria of utility, effectiveness, and measurability, closely articulated with external evaluation policies and management by results.

This curricular displacement is neither neutral nor merely technical. By prioritizing learning considered essential and measurable, the BNCC reconfigures pedagogical work and redefines the criteria of educational quality itself. Contents historically linked to critical education, philosophical reflection, the understanding of social contradictions and the expansion of the cultural repertoire tend to lose centrality, being replaced by operational, adaptive and pragmatic skills. Libâneo (2024) observes that this process implies an impoverishment of the school curriculum and a reduction in the formative function of the public school, bringing it closer to the immediate demands of the labor market and the demands of capital.

The BNCC is thus articulated with a broader logic of management by results, in which the quality of education is measured primarily by the performance of students in standardized external assessments. Stephen Ball (2014) interprets this phenomenon as an expression of

the culture of performativity, characterized by the intensification of mechanisms of control, comparison, and institutional accountability. For the author, performativity produces new forms of regulation of the teaching work, based on goals, rankings and indicators, redefining professional identities, pedagogical practices and meanings attributed to the educational practice.

In this scenario, school management undergoes a progressive shift from its political-pedagogical dimension to a predominantly technical-administrative function, guided by the fulfillment of performance indicators and external goals. The school principal starts to assume the social function of results manager, responsible for aligning the school with the normative and evaluative requirements, while teachers are pressured to adjust their pedagogical practices to the demands of the evaluation systems. This process contributes to the intensification of teaching work, the reduction of professional autonomy and the weakening of collective decision-making spaces, compromising the democratic construction of school daily life.

The institutionalization of the BNCC cannot be understood without considering the decisive action of business foundations, private institutes and movements articulated with the economic sector, such as the Movement All for Education. These actors play a central role in the formulation, legitimation, and dissemination of the BNCC, acting in the production of discursive consensus, in the training of managers and teachers, and in the provision of pedagogical materials in line with national curriculum prescriptions. Apple (2002) warns that the growing influence of private actors in the educational field redefines democratic decision-making processes, shifting the control of public policies from the public space to private instances guided by market interests.

In the Brazilian case, this dynamic configures what Frigotto (2010) calls indirect privatization of public education, to the extent that the school remains formally public, but its practices are organized according to business logics of efficiency, productivity and competition. It is a sophisticated strategy for the commodification of education, which operates through curriculum standardization, external evaluation and individual accountability, without the need for direct privatization of school institutions.

The deepening of this rationality becomes even more evident with the approval of the National Curriculum Guidelines for teacher training, instituted by Resolution CNE/CP No. 02/2019. This document establishes an explicit link between teacher training and the competencies and skills prescribed by the BNCC, significantly reducing the autonomy of training institutions. Teacher training is now guided by the logic of effectiveness, adaptation

and adequacy to previously defined curricular demands, reinforcing an instrumental conception of teaching.

Libâneo (2024) strongly criticizes this orientation by stating that the 2019 Resolution resumes, under a new guise, the discourse of the efficient, effective and performative teacher already present in the 2002 Guidelines. For the author, the centrality of practical competencies and the emphasis on solving immediate problems impoverish teacher training by disregarding its intellectual, ethical and political dimension, transforming the teacher into the executor of curricular and evaluative prescriptions.

Laval and Dardot (2016) contribute to the understanding of this process by analyzing neoliberalism as a normative rationality that goes beyond the economic sphere and constitutes a form of governance of conducts. In the educational field, this rationality institutes competition, permanent evaluation and individual accountability as structuring principles of school organization, redefining the meaning of management, curriculum and pedagogical work.

The consequences of this model have a direct impact on the political-pedagogical projects (PPP). Historically conceived as a space for collective reflection, for the affirmation of the school's identity and for the articulation between the educational project and the social context, the PPP tends to be reconfigured as an instrument of institutional alignment with the prescriptions of the BNCC and external evaluation policies.

Ball (2014) observes that this process produces an effect of depoliticization of school management, since pedagogical decisions are guided by technical criteria and external metrics, to the detriment of collective debate and professional autonomy. The school is no longer recognized as a space for the production of meaning and is now treated as a unit for the execution of centralized policies, subject to permanent monitoring and control mechanisms.

However, the deepening of neoliberal rationality between 2017 and 2024 does not occur without criticism and resistance. Researchers, scientific associations, unions, and social movements denounce the impacts of the BNCC and the 2019 Resolution on pedagogical autonomy, curricular diversity, and critical teacher training. These resistances show that neoliberal hegemony is not established in a linear or consensual way, but through permanent disputes within the State and civil society.

These disputes gain a new contour with the enactment of Resolution CNE/CP No. 04/2024, which redefines the National Curriculum Guidelines for teacher training. The normative emerges as a response to the criticisms directed at the 2019 Resolution and incorporates, more explicitly, concepts from the socio-critical tradition of education, such as

the unity between theory and practice, pedagogical praxis, democratic management, inclusive, equitable education, and the development of critical thinking.

Libâneo (2024) warns that the presence of these concepts in normative documents should not be interpreted in a naïve way, but neither can it be disregarded. For the author, its incorporation reveals the permanence of disputes within the State and indicates that neoliberal hegemony encounters limits and contradictions. Although it does not represent a structural rupture, the 2024 Resolution reopens possibilities for critical appropriation by educational institutions and schools.

From the point of view of school management, the 2024 regulation reaffirms democratic management as a structuring principle for the organization of pedagogical work, recognizing the school as a collective space for decisions and the construction of meanings. Paro (2016) emphasizes that democratic management is not reduced to formal mechanisms of participation, but implies the effective socialization of power, co-responsibility, and permanent dialogue among school subjects.

The explicit resumption of the notion of pedagogical praxis is another central element. Saviani (2008; 2023) points out that praxis is not to be confused with immediate or instrumental practice, but refers to conscious educational action, historically situated and guided by emancipatory ends. By valuing this dimension, the 2024 regulation reopens the possibility of teacher training that articulates theoretical reflection, social commitment, and critical intervention in the school reality.

In this scenario, the political-pedagogical project reassumes centrality as a strategic space of dispute. Veiga (2019) defines the PPP as a collective construction that expresses the school's identity, its values, objectives, and social commitments, inseparably articulating the political and pedagogical dimensions of educational practice. When elaborated in a participatory and contextualized manner, the PPP can constitute an instrument of resistance to the logic of performativity and education by results.

Frigotto (2023) reinforces that resistance to the commodification of education does not occur only at the normative level, but above all in the concrete practices developed in everyday school life. For the author, the public school remains a contradictory space, in which different societal projects are confronted, and the PPP can function as a fundamental mediation in the construction of pedagogical alternatives committed to integral human formation.

Libâneo (2024) adds that the defense of a fair and socially referenced public school requires the articulation between educational policies, teacher training and critical pedagogical projects. The PPP, in this sense, should be understood as a space of synthesis

between theory and practice, in which the ethical, political and pedagogical choices of the school are materialized.

In short, the analysis of the period from 2017 to 2024 demonstrates the deepening of neoliberal rationality in Brazilian education, especially in the governments of Michel Temer and Jair Bolsonaro, when policies of fiscal austerity, curriculum standardization, and management by results that weaken the social function of public schools are consolidated. The institutionalization of the BNCC represents a milestone in this setback by reaffirming a conservative and technicist conception of curriculum, aligned with the demands of the neoliberal market, centered on competencies, skills and performance indicators, to the detriment of the critical, cultural and integral education of students.

At the political-institutional level, Luiz Inácio Lula da Silva's new term, which began in 2023, reopens spaces for public debate and resumes the defense of education as a social right; However, the subsequent period exposes the limits and tensions of a process of democratic reconstruction that did not face, in a substantive way, the structural bases of the current educational reforms.

The non-repeal of the Secondary Education Reform and the National Common Curriculum Base keeps in force an educational model aligned with neoliberal rationality. This continuity reveals the political limits of educational reconstruction in a context marked by institutional constraints, unfavorable correlations of forces within the State and economic pressures of fiscal orientation, restricting the effective overcoming of the managerial paradigm established in recent decades.

Thus, the recent period is particularly challenging for the management of Brazilian public education, as the school remains tensioned between the mercantile logic, reinforced by policies of standardization and control, and the defense of its democratic, critical and emancipatory function. In this adverse scenario, political-pedagogical projects reaffirm themselves as strategic spaces of resistance, even if weakened, by enabling the collective construction of pedagogical alternatives committed to social justice, inclusion, equity and integral human formation, keeping alive the dispute for a fair, democratic and socially referenced public school.

5 FINAL CONSIDERATIONS

The central issue of this research was to investigate how neoliberal rationalities, which have been a dominant reference in Brazilian educational policies since the 1990s, and the socio-critical perspective are manifested and confronted in the construction and implementation of political-pedagogical projects in public schools. The analysis developed

throughout the article allowed us to demonstrate that this dispute not only persists, but is reconfigured historically, assuming different intensities and strategies according to the political, normative and geopolitical contexts examined.

The second section showed that the period from 1990 to 2002 constitutes the inaugural milestone of the structured affirmation of neoliberal rationality in Brazilian education, which began in the government of Fernando Collor de Mello (1990-1992), crossed by the transition administration of Itamar Franco (1992-1994) and consolidated in the two terms of Fernando Henrique Cardoso (1995-2002). Under the direct influence of multilateral organizations and the reconfiguration of the social function of the State, policies guided by managerial efficiency, performativity and accountability for results have been consolidated. Instruments such as the Ten-Year Plan for Education for All, LDBEN No. 9,394/1996 and the National Curriculum Guidelines of 2002 materialized a conception of school management aligned with business logic, shifting education from the field of social rights to that of economic competitiveness and the formation of human capital.

In the third section, when analyzing the period from 2003 to 2016, corresponding to the governments of Luiz Inácio Lula da Silva (2003-2010) and Dilma Rousseff (2011-2016), it was found a scenario marked by relevant institutional advances, especially in strengthening the discourse of education as a social right, in the expansion of inclusive policies and in the normative valorization of democratic management and critical teacher training. However, such advances occurred without a structural break with the foundations of the neoliberal model inherited from the previous decade. This arrangement was characterized as a possible consensus, in which socio-critical policies coexisted with mechanisms of external regulation, large-scale evaluation, and performance control. The 2016 impeachment process, widely interpreted by a significant part of the critical literature as a parliamentary coup, represented a decisive inflection, creating the political conditions for the deepening of liberal reforms in the subsequent period.

The fourth section showed that, from 2017 onwards, the most systematic deepening of neoliberal rationality in Brazilian education occurred. The institutionalization of the National Common Curricular Base, the consolidation of management by results and the linking of teacher training to nationally prescribed competencies reinforced curricular standardization, teacher performativity and the reduction of pedagogical autonomy. This process was intensified during the governments of Michel Temer (2016-2018) and Jair Bolsonaro (2019-2022), marked by explicit alignment with international neoliberalism, political conservatism, and the weakening of democratic bodies. The inauguration of Luiz Inácio Lula da Silva, in 2023, put the centrality of education as a social right back into the public debate; However,

throughout 2023 and 2024, there were no structural changes capable of breaking with the inherited educational reforms. The permanence of the BNCC and the Secondary Education Reform indicates the continuity of the managerial paradigm in public education, evidencing the political limits of confronting a neoliberal model institutionally implemented and consolidated in the previous period.

Based on these analyses, it is possible to answer the research question by showing that the dispute between neoliberal rationalities and the socio-critical perspective manifests itself in a permanent, contradictory and unequal way in political-pedagogical projects. In certain contexts, the PPP is captured as a technical-bureaucratic instrument of compliance with managerial requirements; in others, it constitutes a space for resistance, collective reflection and affirmation of an educational project committed to integral human formation. The political-pedagogical project emerges, therefore, as a strategic arena for confrontation between antagonistic conceptions of education: on the one hand, education conceived as a commodity and performance; on the other, education understood as a social right, an emancipatory practice and the foundation of democracy.

The conclusions of this research reinforce the criticism of the conservative neoliberal model, which reduces the public school to a business organization, submits the teaching work to external metrics and empties the political meaning of school management. In contrast, the socio-critical perspective reaffirms democratic management, pedagogical praxis and ethical commitment to social justice as indispensable foundations for the defense of fair public schools.

Finally, it is essential to situate these conclusions in a broader geopolitical scenario. In the recent international context, there has been an intensification of discourses and practices linked to neoliberal authoritarianism of North American origin, particularly in governments aligned with ultraliberal and neoconservative agendas, such as that of Donald Trump. Public statements, economic sanctions, threats of intervention, and allegations widely disseminated by the international press in early January 2026, according to which the U.S. government had announced a military operation in Venezuelan territory, with actions in Caracas, other regions, and the capture of President Nicolás Maduro and his wife, were interpreted by critical analyses as an expression of an imperial logic, interventionist and destabilizing.

Regardless of the narrative disputes, the episode, as publicized, contributes to the intensification of geopolitical instability in Latin America, reinforcing external pressures on regional sovereignty and creating political conditions favorable to the legitimization of austerity, securitization, and deepening neoliberalism agendas, with indirect but concrete impacts on social and educational policies. These movements can feed the advance of the

neoliberal extreme right in the subcontinent and intending national states to adopt policies of privatization, social control and restriction of social rights.

In this adverse geopolitical scenario, public education tends to be treated again as a variable of fiscal adjustment and an instrument of authoritarian governability, emptying its democratic and emancipatory meaning. For Brazil, new challenges are posed: sustaining democratic management, preserving pedagogical autonomy, and strengthening critical political-pedagogical projects in the midst of geopolitical instabilities, economic constraints, and conservative ideological offensives. It is thus reaffirmed that the defense of a fair, democratic and socially referenced public school goes beyond the strict field of educational policy, integrating a broader dispute for the meaning of democracy, sovereignty and human dignity in Brazil, Latin America and the Global South.

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CHATGPT IN SCHOOL GEOGRAPHY: SCOPING REVIEW (2023–2025) AND DESIGN OF A SUPPORT/RISK MATRIX BY TASKS IN SECONDARY EDUCATION

CHATGPT NA GEOGRAFIA ESCOLAR: REVISÃO DE ESCOPO (2023–2025) E DESENHO DE UMA MATRIZ DE APOIO/RISCO POR TAREFAS NO ENSINO SECUNDÁRIO

CHATGPT EN LA GEOGRAFÍA ESCOLAR: SCOPING REVIEW (2023–2025) Y DISEÑO DE UNA MATRIZ DE APOYO/RIESGO POR TAREAS EN SECUNDARIA



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ABSTRACT

This article analyzes the possibilities and limitations of ChatGPT as a support tool for teaching Geography in Secondary Education, from a “teaching task system” approach. Based on a recent review of generative artificial intelligence (GAI) in education and an applied categorization of curricular and professional tasks specific to Geography teaching, a unified matrix is constructed that relates macroprocesses (planning, resource design, instruction, and assessment) to the expected level of support provided by ChatGPT and the risk of cognitive substitution. The study is based on a documentary scoping analysis (2023–2025; n = 54 documents) and an applied task categorization, without empirical classroom validation at this stage. The results show high performance in linguistic structuring tasks (drafting materials, text adaptation, rubrics, and item banks with verification), medium performance in tutoring and methodological support under supervision, and significant limitations in tasks requiring factual accuracy, professional judgment in summative assessment, and advanced spatial reasoning without GIS mediation. A workflow and four demonstrative learning situations are proposed, aimed at preserving authorship, documenting processes, and strengthening geographic thinking through verification, source comparison, and reasoned argumentation.

Keywords: Generative Artificial Intelligence. ChatGPT. Geography Education. Secondary Education. Process-Oriented Assessment. Academic Integrity. Spatial Thinking. Teaching Task Matrix. Documentary Analysis. Scoping Review.

RESUMO

Este artigo analisa as possibilidades e os limites do ChatGPT como ferramenta de apoio ao ensino de Geografia na Educação Secundária, a partir de uma abordagem de “sistema de tarefas docentes”. Com base em uma revisão recente sobre inteligência artificial generativa

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(IAG) na educação e em uma categorização aplicada de tarefas curriculares e profissionais próprias do ensino de Geografia, constrói-se uma matriz unificada que relaciona macroprocessos (planejamento, design de recursos, instrução e avaliação) com o grau de apoio esperado do ChatGPT e com o risco de substituição cognitiva. O estudo fundamenta-se em uma análise documental de escopo (2023–2025; n = 54 documentos) e em uma categorização aplicada de tarefas, sem validação empírica em sala de aula nesta fase. Os resultados indicam alto desempenho em tarefas de estruturação linguística (rascunhos de materiais, adaptação de textos, rubricas e bancos de itens com verificação), desempenho médio em tutoria e apoio metodológico sob supervisão, e limitações relevantes em tarefas que exigem precisão factual, julgamento profissional na avaliação somativa e raciocínio espacial avançado sem mediação de TIG. Propõe-se um fluxo de trabalho e quatro situações de aprendizagem demonstrativas, orientadas à preservação da autoria, à documentação do processo e ao fortalecimento do pensamento geográfico por meio de verificação, contraste de fontes e defesa argumentada.

Palavras-chave: Inteligência Artificial Generativa. ChatGPT. Didática da Geografia. Educação Secundária Obrigatória. Avaliação Processual. Integridade Acadêmica. Pensamento Espacial. Matriz de Tarefas Docentes. Análise Documental. Revisão de Escopo.

RESUMEN

Este artículo analiza las posibilidades y límites de ChatGPT como herramienta de apoyo en la docencia de Geografía en Educación Secundaria desde un enfoque de “sistema de tareas docentes”. A partir de una revisión reciente sobre inteligencia artificial generativa (IAG) en educación y de una categorización aplicada de tareas curriculares y profesionales propias de la enseñanza de la Geografía, se construye una matriz unificada que relaciona macroprocesos (planificación, diseño de recursos, instrucción y evaluación) con el grado de apoyo esperable de ChatGPT y con el riesgo de sustitución cognitiva. El estudio se basa en un análisis documental de alcance (2023–2025; n = 54 documentos) y en una categorización aplicada de tareas, sin validación empírica en aula en esta fase. Los resultados muestran un rendimiento alto en tareas de estructuración lingüística (borradores de materiales, adaptación de textos, rúbricas y bancos de ítems con verificación), un rendimiento medio en tutoría y apoyo metodológico bajo supervisión, y limitaciones relevantes en tareas que exigen precisión factual, juicio profesional en evaluación sumativa y razonamiento espacial avanzado sin mediación de TIG. Se propone un flujo de trabajo y cuatro situaciones de aprendizaje demostrativas orientadas a preservar la autoría, documentar proceso y reforzar pensamiento geográfico mediante verificación, contraste de fuentes y defensa argumentada.

Palabras clave: Inteligencia Artificial Generativa. Chatgpt. Didáctica de la Geografía. Educación Secundaria Obligatoria. Evaluación Procesual. Integridad Académica. Pensamiento Espacial. Matriz de Tareas Docentes. Análisis Documental. Scoping Review.

1 INTRODUCTION

The incorporation of ChatGPT in school geography poses a problem of design and validity of tasks, not only of technological adoption. The tool can support textual production and revision, but also displace decisions, inferences and contrast evidence, deteriorating the correspondence between the cognitive effort of the students and the "deliverable" that is evaluated. This article adopts a teaching task system approach and develops a scoping review (2023–2025) aimed at the applied design of a task-based support/risk operational matrix, organized by macro-processes (planning, resource design/adaptation, instruction, and evaluation/feedback). The contribution consists of offering criteria to decide where support is didactically defensible and where the risk of cognitive substitution increases, incorporating safeguards based on verification, traceability and argued defense.

In school geography, this technological disruption intersects with a discipline with its own epistemological and didactic features. The teaching of Geography is aimed at the development of spatial thinking, understood as the ability to understand, explain and project space through structuring concepts such as location, scale and interrelation. In a complementary way, spatial literacy involves thinking about space in an informed and critical way to address territorial problems. In addition, as a school subject, Geography requires explaining reality and territorial problems, handling spatial sources, and developing reasoning that connects local and global scales (Adamini, Cafferata, & Velo, 2024). In this sense, it offers a favourable framework for developing critical thinking linked to the analysis of the territory and the interrelations between society and the environment.

The central problem lies in the possible rupture between the learning process and the deliverable, given that GAI can generate results that do not have a solid relationship with the cognitive effort of the students. In subjects that require an understanding of complex spatial and social phenomena, an uncritical use of AI can lead to "metacognitive laziness" and the loss of essential cognitive skills when technology replaces, rather than supports, students' efforts (Vallejo, 2024; Xiaoyu et al., 2025). At the same time, AGI poses a dual challenge: it can facilitate the personalization and simulation of scenarios, but it also entails risks of substitution of reasoning and inquiry (García & Pujol, 2025). Although the specific literature on AGIs in Geography is still incipient, there is evidence in the field of social studies that indicates that chatbots can improve academic performance and knowledge retention if they are properly integrated into didactic design (Sutabri et al., 2025; Yetişensoy & Karaduman, 2024).

The purpose of this article is to analyze the possibilities and limits of ChatGPT as a support tool within the system of teaching tasks in the teaching of Geography in Secondary

Education, proposing an integration matrix that preserves academic integrity and reinforces the role of teachers as pedagogical designers. The analysis also delimits in which aspects tools such as ChatGPT are insufficient with respect to the geospatial skills required and frames its use as an instrument that, under appropriate mediation, can promote a dialectical reflection on the socio-territorial reality without replacing the teaching function.

It should be emphasized that this work is documentary in nature and of applied design: it does not present an intervention in the classroom or data on the performance of students or teachers. Therefore, the matrix is offered as a reasoned guide to support planning, instruction, and evaluation decisions, and not as empirical evidence of educational impact. Its usefulness and validity should be tested in subsequent implementation studies.

With this objective, the work poses three research questions: (1) what types of teaching and curricular tasks of Geography in Secondary Education are most likely to receive useful support from ChatGPT and to what degree? (2) In which tasks does the risk of cognitive substitution increase and decrease the validity of the final product as evidence of learning? and (3) what didactic design decisions (process evidence, verification, traceability and contrast of sources) allow the tool to be integrated responsibly? The main contribution is a unified support/risk matrix and an applicable workflow that translates general AI integration frameworks to specific conditions of School Geography.

Based on this synthesis, an operational matrix is designed that classifies tasks by degree of support and risk of substitution, and that is accompanied by conditions of use and process evidence to guide its application in departments and centers.

2 CONCEPTUAL FRAMEWORK

2.1 TEACHING TASKS: OPERATIONAL DEFINITION AND LEVELS

Teaching practice can be described as a system of tasks that is articulated in recurrent macro-processes. In an operational definition, these macro-processes include lesson planning, generation and adaptation of teaching materials, direct classroom instruction, and assessment with feedback (Faculty AI, 2024). In the context of AI, this perspective shifts the focus from the logic of content transmission – associated with "banking education" – to pedagogical leadership of a strategic nature, where teachers design, decide and guide the learning experience (Vallejo, 2024).

To analyze where AI can intervene, it is useful to distinguish levels of intervention within the task system. At the macro-process level, focused on planning, teachers act as learning architects: they select content, sequence basic knowledge and structure the curriculum, with the possibility of algorithmic support to organise and propose design alternatives (Vallejo,

2024). At the task level, understood as didactic execution, there are specific actions (explanations, activities, guided practices) where AI can operate as an assistant or tutor, supporting the creation of resources, the generation of questionnaires, the preparation of case studies, and the preparation of review activities (Adiguzel et al., 2023; Cronje et al., 2023). At the product level, associated with evaluation and final evidence, IAG stresses traditional approaches based solely on deliverables, since it facilitates the generation of products without necessary correspondence with the learning process; therefore, it is proposed to prioritize evidence distributed during the process and designed to document the cognitive effort of students (García & Pujol, 2025).

This operationalization is aligned with frameworks that structure teaching practice in broad dimensions. From the EurekaAI competency model, adapted from the DigCompEdu framework, teaching tasks range from professional development and pedagogical reflection to classroom practice and student training, understanding each task as a means to produce learning evidence and reduce the gap between effort and result that HAI can cause (García & Pujol, 2025). In parallel, specific use cases where AI intervenes directly have been described, such as the "lesson plan generator", the "review and feedback activity generator" and the "essay marker". Collectively, the level of the task can range from automating routine administrative processes to supporting the design of complex learning experiences (Faculty AI, 2024).

2.2 CHATGPT AS A LINGUISTIC AND COGNITIVE SUPPORT

In the case of language models, this translates into the production of coherent text and the response to queries in natural language, with variability in precision and stability depending on the context of use and the design of the prompt. ChatGPT, based on the *Generative Pre-trained Transformer* (GPT) architecture, operates through probabilistic inference, predicting the next word in a sequence; it does not "understand" the world, but simulates human conversations with high fidelity (Office of Science and Technology of the Congress of Deputies, 2024; Organisation for Economic Co-operation and Development [OECD], 2023; Osamor et al., 2023). In addition, in the current ecosystem it coexists with other tools – such as Copilot (Microsoft) and Gemini (Google) – described as multimodal and capable of processing text, images and code.

From a didactic perspective, its value is concentrated in linguistic and cognitive support functions: it can facilitate conceptual clarification, offer immediate feedback, support the generation of ideas, and sustain continuous interactions, which opens up options for personalizing itineraries and maintaining support outside school hours (Osamor et al., 2023;

Vallejo, 2024). They may also play specific conversational roles—for example, as a "Socratic opponent" or as a "co-designer"—that favor the testing of arguments and the revision of drafts, provided that a demanding verification framework is adopted (Area, 2025; Urmeneta & Romero, 2024).

Its limits, however, are structural and condition its educational use. These systems are described as "black boxes" with explainability problems, and can generate "hallucinations", that is, inaccurate or false information with a plausible appearance (Area, 2025; Bobula, 2024; Ali Elkot et al., 2025). In addition, they incorporate biases associated with the training data and lack human ethical judgment, which forces us to assess the adequacy of their responses in terms of equity, relevance, and pedagogical responsibility (Lorenz, Perset, & Berryhill, 2023). In addition, they do not have real-world understanding and do not guarantee reliable performance in complex mathematical logic without additional tools, which limits their use when formal validations or high precision are required (Cornell University, 2023). For these reasons, a use with continuous human supervision ("*human-in-the-loop*") is recommended, aimed at validating accuracy, didactic quality, and adequacy to the context (Bernal et al., 2025; U.S. Department of Education, 2023). Along these lines, a "golden rule" is formulated for formative use: ask the AI about what is already known, so that students contrast, validate and criticize the answer from previous knowledge (García & Pujol, 2025).

2.3 PARTICULARITIES OF SCHOOL GEOGRAPHY

School Geography presents specific requirements that condition the integration of the IAG. In the twenty-first century, its teaching requires moving from the classroom to the territory, incorporating field trips and Geographic Information Technologies (GITs) to promote learning linked to sustainability and environmental awareness (Correa, López & Díaz, 2024). In terms of competencies, the discipline requires developing skills such as spatial perception, spatial reasoning and spatial citizenship, which involve understanding spatial relationships, interpreting patterns and taking an informed position on territorial problems. This approach includes cartographic literacy and the use of TIG to analyse and interpret spatial phenomena, placing working with data, representations and scales at the core of geographical learning (Guallart, 2025b).

These particularities introduce specific challenges for mainly language-based tools. Unlike purely linguistic tasks, geographical thinking requires manipulating and interpreting spatial data and topological relationships, so the intersection with textual language models presents limitations when factual accuracy, complex spatial reasoning, or direct generation of cartographic representations are required (Tao & Xu, 2023). The evidence available in

nearby areas suggests, however, that chatbots can add value if they are designed with clear objectives: in the teaching of Geography and Social Sciences, experiences such as "*Sosyalcibot*" have been associated with improvements in motivation and performance by providing explanations (including visuals) and immediate feedback (Yetişensoy & Karaduman, 2024). At the same time, variable performance has been observed in tasks that require high precision or demanding spatial reasoning, with results conditioned by the difficulty of the task (Salman et al., 2025).

In this framework, the IAG can support school geography without replacing spatial experience or working with sources, but acting as a mediator in tasks such as explaining data analysis methodologies, generating draft maps in textual formats (e.g. ASCII code) or simulating future territorial scenarios, always with verification and contrast with reliable data and representations (Guallart, 2025a). Likewise, it can contribute to the search for information and the comparison of perspectives on conflicting and socially relevant territorial problems, while teachers maintain the responsibility of defining the territorial cut, selecting sources, demanding precision and promoting reasoned reflection (Adamini, Cafferata & Velo, 2024).

Given that part of the debate on the educational use of IAG is articulated in institutional guides and technical documents that are quickly updated, the work incorporates grey literature (reports, *policy papers* and guides) from educational bodies along with academic studies. In the analysis, guidelines are used to describe operational practices and recommendations, while claims about learning effects and risks are preferably supported by published reviews and studies.

3 METHODOLOGY

3.1 CORPUS AND UNIT OF ANALYSIS

The study adopts a design of documentary analysis and applied categorization aimed at producing a didactic support instrument (matrix). The corpus is composed of two sets: (a) recent academic literature on HAIs in education and their didactic integration (2023–2025), selected by thematic relevance (HAG/LLM, assessment, academic integrity, task design and/or Social Sciences) and by type of contribution (evidence-based reviews, case studies, frameworks and guides); and (b) a didactic-curricular corpus made up of representative tasks of the teaching of Geography in Secondary Education and associated common knowledge/content (e.g. territory and landscape, demographic dynamics, economic activities and globalisation, urbanisation and spatial planning, socio-environmental challenges and

geopolitics), in order to translate evidence and general frameworks into concrete planning decisions, instruction and assessment.

A bilingual search strategy based on three blocks of terms (IAG/LLM; geographic education; secondary stage) and iterative adjustment was applied through pilot tests. The body of the article describes the inclusion/exclusion criteria and the composition of the corpus, while the full equation and variants are presented in Annex I to facilitate replication. The differential methodological core is the coding by tasks: inventory of typical tasks, definition of criteria to estimate degree of support and risk of substitution, classification A/M/B/N and contrast with an integration framework (EIADD) to ensure coherence between level of intervention and didactic design.

Selection was completed by reference review (*snowballing*) and screening for thematic relevance and applicability to school contexts. In the didactic-curricular corpus, the tasks were defined based on their representativeness in usual units of Compulsory Secondary Education (ESO) and their correspondence with basic knowledge, prioritizing those that generate assessable products and, therefore, are more sensitive to cognitive substitution.

Table 1

Characteristics of the documentary corpus and search/selection strategy (n = 54)

Dimension	Specification
Study design	Scoping Desk Analysis (2023–2025) and Applied Categorization Aimed at Producing a Task-Based Operational Support/Risk Matrix.
Search window	September 1, 2025 – December 1, 2025.
Sources consulted	Scopus, Web of Science, ERIC and Google Scholar.
Search languages	Spanish and English (bilingual equations).
Search structure	Combination of three blocks of terms: (a) IAG/LLM; (b) Geography/geographic education; (c) educational stage (secondary). Iterative adjustment through pilot testing, incorporating additional terms where necessary (e.g., "spatial thinking", "geographical thinking", "GIS").
Inclusion criteria	(i) Publication 2023–2025; (ii) focus on educational uses of IAG/LLM or assessment/integrity; (iii) applicability to the school context or teacher training.
Exclusion Criteria	Informative entries without identifiable authorship or without bibliographic traceability; Documents

Dimension	Specification
	unrelated to geographic education or not relevant to secondary school.
Selection process	Screening by title/abstract and full reading; final selection of n = 54 documents. Complement by reference review (<i>snowballing</i>) and screening for relevance and applicability.
Role of the corpus in the study	Guidelines/policies are used for operational practices and recommendations; Claims about risks and effects are preferably supported by published reviews and studies.
Stated methodological limitation	Systematized scope search (<i>scoping review</i>), aimed at mapping trends and uses in the period analyzed. No formal evaluation of methodological quality or meta-analysis was performed, so the results should be interpreted as a mapping of the field and as a basis for the design of the matrix, not as evidence of effects.

3.2 CODING AND CATEGORISATION PROCEDURE

The procedure was carried out in four steps. First, an inventory of teaching tasks and learning tasks typical of the teaching of Geography in Secondary Education was developed, organized by macroprocess (planning, design/adaptation of resources, instruction and evaluation/feedback). Second, categories of analysis were defined to estimate the "degree of support" and the "risk of substitution" based on explicit criteria (expected precision, need for verification, dependence on the context, requirement of professional judgment and potential for delegation of reasoning). Third, each task was classified on the A/M/B/N operational scale and contrasted with integration frameworks (EIADD) to ensure coherence between intervention level and didactic design. Fourth, the classifications were reviewed looking for inconsistencies and adjusting definitions until a unified matrix with operational observations was obtained for use in centers and departments.

To make the level of AI intervention comparable between tasks, the AI Integration and Didactic Design Scale (EIADD) is adopted, which allows the intervention to be classified from non-AI scenarios to full delegation scenarios, including intermediate levels of assistance and collaboration (Caldeiro & Odetti, 2024). In addition, a taxonomy of educational uses of AI is used that distinguishes purposes such as creating resources, personalizing, correcting (in a formative key) and making materials and activities accessible, which facilitates the analysis of the didactic function pursued in each task (Ezcurra, Corica & Micco, 2025). In addition,

categories aimed at controlling didactic risk are incorporated: practices to avoid (cognitive substitution), practices to be reviewed (for example, tasks vulnerable to plagiarism or the opaque use of AI) and practices to be promoted (when they favour critical thinking and creativity) (García & Pujol, 2025). In the design and analysis of interactions, *structured prompts* are used using models such as R-I-T-A (Role, Information, Task, Adaptability) to standardize the degree of specification and facilitate comparison between results (Guallart, 2025a).

To increase consistency, the categorization was reviewed in two rounds: a first coding and a subsequent review of discrepancies (analogous tasks with different levels). When doubts arose, operational definitions were reformulated and borderline cases were re-classified until internal coherence between 'degree of support' and 'risk of substitution' was achieved. A change log was retained to ensure traceability.

3.3 CRITERIA FOR "DEGREE OF SUPPORT" AND SCALE

The "degree of support" is defined as the practical and pedagogical utility of the output of the IAG for a particular task, considering both the quality of the outcome and the associated risks and the need for supervision. To estimate it, convergent criteria are applied: accuracy and reliability of the response, time savings for teachers, need for human supervision, real autonomy of the tool and risk of undesired effects (e.g., systematic errors or overconfidence in plausible answers) (Faculty AI, 2024). In addition, two pedagogical adequacy filters from the Effective Integration Matrix are incorporated: whether the task favours effective learning or is limited to automation, and whether the presence of IAG supports the process or replaces the students' reasoning; in this framework, the "golden rule" of use is prioritized: asking AI about what is already known, so that students validate and expand on previous knowledge and do not delegate to unknown areas (García & Pujol, 2025).

Based on these criteria, an operational scale of support is established that integrates equivalent formulations of the different blocks and maintains a gradation compatible with other scales of use (such as AIAS) (Furze, 2024). In practical terms, four levels are distinguished. High support (A) corresponds to tasks in which the AI produces useful drafts or proposals with minimal editing and low uncertainty (e.g., brainstorming or basic structures), always with teacher control. Medium support (M) is assigned when the AI provides structures or alternatives that require significant contextual adaptation through prompt iteration and teacher review (e.g., planning or adapting materials to the group). Low support (B) is reserved for tasks where AI shows frequent errors or variability that forces thorough verification (e.g., specific statistical data or high-accuracy claims) (Cornell University, 2023). Finally, null

support (N) is attributed to tasks that are not suitable for delegation in AI due to their material, ethical, or relational nature, such as physical fieldwork or dimensions that require deep and situated empathy, as well as final evaluative decisions without supervision (Ali Elkot et al., 2025; Faculty AI, 2024; Videla, 2025d).

3.4 ETHICAL AND PRIVACY CONSIDERATIONS

The research is aligned with principles of data protection and minimization of risk in the use of chatbots with minors, avoiding introducing students' personal information in the interactions analyzed and in any example of *prompts* (Ezcurra, Corica & Micco, 2025; U.S. Department of Education, 2023). It is warned that the use of free tools or personal accounts may involve reuse of data entered for training or other purposes, which is incompatible with the protection of sensitive student data and privacy requirements in school contexts (Holdsworth, 2023).

From a pedagogical governance point of view, the "*human-in-the-loop*" principle is adopted: AI does not make final decisions on assessment or learning trajectory without teacher supervision, and all relevant outputs are validated to mitigate biases and hallucinations (Amiri et al., 2025; U.S. Department of Education, 2023; Fonteneau & Anvar, 2025). Likewise, an AI literacy perspective is incorporated that includes understanding of bias and intellectual property, in order to sustain academic integrity and avoid opaque or uncritical use in school assignments (Giannini, 2024; U.S. Department of Education, 2023; Wilby & Esson, 2023).

This study has limitations derived from its documentary nature and applied design: the proposed matrix is not validated here by classroom intervention, nor is its impact on learning or academic integrity measured with student or teacher data. Consequently, the support/risk classifications should be interpreted as a reasoned guide for didactic design, susceptible to adjustment according to context, the school's evaluative culture, access to TIG and students' level of AI literacy.

Since the performance of the models changes with updates, the support/risk assessments are formulated as dependent on the state of the tool in the period analyzed. In real applications, it is recommended to revalidate critical tasks (e.g., factual accuracy, evaluation) when version or institutional configuration changes occur.

4 RESULTS

4.1 TAXONOMY OF TASKS IN GEOGRAPHY IN SECONDARY EDUCATION

The analysis allows to delimit a set of representative tasks of the teaching of Geography in Secondary Education, focused on the understanding of territorial and socioeconomic processes, the analysis of socio-environmental problems and the interpretation of phenomena at different scales. These tasks require students to observe, analyse, interpret, assess and infer from territorial and social information, with different degrees of cognitive complexity, incorporating cartographic literacy and, when possible, the use of TIG to support spatial reasoning.

To specify the variability of cognitive demands, the classification is triangulated with an adaptation of Bloom's taxonomy and the DOK (*Depth of Knowledge*) model to the context of AI. In tasks of remembering and understanding, definitions of physical elements and demographic data are located; in applying and analyzing, comparisons of population pyramids or analysis of the causes of geopolitical conflicts; and in evaluating and creating, designs of territorial planning proposals or argued debates on sustainability. Overall, the resulting taxonomy describes a repertoire that combines factual tasks, analytical tasks with the need to contrast sources, and territorial judgment tasks with an ethical and citizen component (Area, 2025; Correa, López & Díaz, 2024).

4.2 CHATGPT SUPPORT MATRIX: PATTERNS BY MACROPROCESS

The results show a consistent pattern: ChatGPT adds value as a generator of initial ideas, creator of rubrics and producer of administrative or communicative texts, with a generally high performance in verbal structuring tasks. In planning, support focuses on the sequencing of knowledge, the proposal of lesson structures, the diversification of resources and the ideation of projects; however, practical usefulness depends on teachers providing specific context and writing *detailed prompts, since direct usability decreases when working with generic instructions and without information from the specific group or curriculum* (Faculty AI, 2024; U.S. Department of Education, 2023).

In the production of resources and materials, support tends to be high: ChatGPT facilitates the adaptation of texts at different reading levels, the simplification of language, the generation of review questions, and the creation of case studies and scenarios (including fictional ones) that serve as the basis for teaching design (Prud'homme-Généreux, 2024; Wilby & Esson, 2023). In direct instruction, the support appears as medium or medium-low, because it can explain concepts and sustain continuous personalized tutoring, but the risk of hallucination requires systematic verification and use aimed at contrasting, not replacing,

study and comprehension (Osamor et al., 2023; Salman et al., 2025; Langreo, 2025). In assessment, the difference between formative and summative assessment is decisive: for formative feedback on drafts (grammatical, structural improvements and initial suggestions), the support ranges from medium to high; on the other hand, for summative grading of complex trials or products that require contextual nuance and professional judgment, support is at low levels and at risk, due to inconsistencies and possible biases (Apata & Oladapo, 2025; Salman et al., 2025; Yetişensoy & Karaduman, 2024).

In specifically geographical tasks, performance is high in conceptual clarification and in simulation of territorial debates, while it shows limitations when the task requires precise visual mapping or advanced spatial treatment without complementary tools. This result reinforces the idea that the value of ChatGPT is concentrated in the linguistic-cognitive, and that its integration into Geography needs to be supported by TIG when the evidence of learning requires cartographic representation or spatial analysis with georeferenced data (De la Torre, 2024; Tao & Xu, 2023).

4.3 NON-RECOMMENDED TASKS AND HIGH-RETURN TASKS WITH TEACHER CONTROL

In the set of tasks analysed, two problematic areas stand out. The first is the vulnerability to cognitive substitution in descriptive essays and generic essays for home, which AI can complete from start to finish without leaving a trace of the learning process; in these cases, the final product ceases to be a valid indicator of understanding (García & Pujol, 2025). The second is the automated summative assessment of complex work (including essays or products associated with fieldwork), where lack of precision, inconsistency, and potential bias advise against its use to assign final grades, which must be maintained under professional teaching judgment (Cornell University, 2023; Fonteneau & Anvar, 2025; Salman et al., 2025).

In contrast, high-return tasks are identified when teacher control directs use towards verification, contrast, and argumentation. These include the generation of practice questionnaires and question banks (with revision to avoid errors), linguistic adaptation to attend to diversity, and brainstorming for field trips, which free up teachers' time without displacing the cognitive core of the subject (Cornell University, 2023; Faculty AI, 2024). Tasks designed for students to critically analyse AI responses, identify biases or errors and contrast them with reliable sources, as well as the use of AI to generate opposing arguments in debates on geographical controversies, so that students evaluate evidence and refine their position (Guallart, 2025a; Prud'homme-Généreux, 2024). Finally, two frequent uses are

considered not recommended due to their specific risk: requesting "real" academic bibliography without verification, due to the possibility of inventing sources, and requesting the direct creation of visual maps without intermediation (code or GIS tools), due to technical limitations and the risk of producing incorrect representations (Tao & Xu, 2023; Wilby & Esson, 2023).

A synthetic version of the matrix (representative tasks by dimension) is presented; the extended version with prompts and traceability evidence is offered as Annex II (excerpt).

Table 2

Unified ChatGPT Support and Risk Matrix in Geography Tasks in Secondary Education

Dimension	Key task (representative)	ChatGPT's role	G	R	Condition of use/safeguard (and evidence)
Planning	Knowledge sequencing and session design	Structurer (Alternatives and Connections)	A–M	B	It requires curricular and group context; Final teaching decision. (P+B)
Planning	Itineraries / field trips (logistics and <i>checklist</i>)	Ideation + checklist	M	M	Verify coordinates/times/accessibility; it does not replace territorial recognition or security. (F+V)
Design/adaptation of resources	Adaptation of texts and instructions (easy reading, levels)	Editor/Adapter	To	M	Mandatory review for bias/errors; Pin to source text. (P+V)
Design/adaptation of resources	Summary of reports/news for critical reading	Structured Summarizer + Critical Questions	A–M	M	Require short appointments/location and check "VERIFY" on sensitive data. (F+V)
Instruction	Territorial debate and dilemmas (multi-perspective)	Socratic mediator + counterarguments	To	B	Forcing evidence and comparison of sources; Avoid caricatures of actors. (F+D)
Geographical task	Data/map/graph analysis (patterns and hypotheses)	Methodological assistant/verifier	M	M	Triangulation with data and sources; record checks and confidence level. (F+V)

Dimension	Key task (representative)	ChatGPT's role	G	R	Condition of use/safeguard (and evidence)
Geographical task	Spatial planning/urban solutions (<i>trade-offs</i>)	Alternative Generator + Impact Matrix	M	M	Demand assumptions, data and justification; avoid "nice solutions" without viability. (F+B)
TIG/SIG	Support for ArcGIS Online or others (steps, queries, debugging)	Procedural Assistant	M	B	It does not replace GIS; test in a real environment and apply cartographic criteria. (F+V)
Evaluation/feedback	Rubric for formative feedback (without final grade)	Justification by criteria + review questions	M	M	Not assigning final grade; use as support and contrast with evidence from the student. (B+D)
Administration and communication	Family Communications/Instructions/Minutes	Draft Writer	To	M	Privacy and tone control; not to enter personal data; Final review. (P+V)
Not recommended	Generic descriptive essay for home (no process)	Generate full text	A–B	To	Redesign: outline + drafts + oral defense/application. (B+D)
Not recommended	"Real" bibliography without verification	Generate referrals	B	To	Replace with search and verification strategy (DOI/ISBN). (F+V)
Not recommended	Direct visual mapping as a substitute for GIS	"Substitute" for GIS	N	To	Ask for flow in GIS (layers/symbology/projection) and quality criteria, not "image". (F+V)

The authors.

Note. G = estimated degree of support (A = high; M = medium; B = low); R = risk of substitution (A = high; M = medium; B = low). In "evidence" abbreviations are used: P = prompt; B = drafts/versions; F = sources/data; V = verification/contrast; D = oral defense/argumentation.

5 DIDACTIC IMPLICATIONS AND IMPLEMENTATION EXAMPLES

5.1 IMPLEMENTATION EXAMPLES: LEARNING SITUATIONS (SDA)

The responsible integration of ChatGPT in Geography can be specified, by way of **example**, in a set of learning situations (SdA) that can be adapted to Secondary Education that illustrate how to incorporate the tool without replacing the geographical reasoning of the students. In all cases, it is proposed that the final product requires decision-making and

justification with evidence, and that learning evidence includes traceability of the process (history of prompts, intermediate drafts, and critical reflection on the use of AI), in order to preserve authorship and academic integrity (Area, 2025; García & Pujol, 2025; Loos, 2025).

A first SdA is based on a field trip on the island of Tenerife (or an analogous local context) aimed at the analysis of sustainability and economic activities. The final product combines a digital poster and a field report focused on waste management and the energy transition, with evidence distributed in an initial questionnaire, field notebook and oral presentation. This option prioritizes direct observation and the link between classroom and territory as a didactic condition of school geography (Correa, López, & Díaz, 2024).

The second SdA, called "The Demographic Consultant", is located in Human Geography and addresses demographic and migratory challenges through a fictitious country with marked aging. The final product takes the form of a report of public policy recommendations, where students must justify decisions and anticipate medium-term effects. Evidence includes the history of interaction with AI, successive drafts, and a reasoned reflection on the help received and discarded (García & Pujol, 2025; Loos, 2025).

The third SdA, "Demographic dynamics and territorial development: depopulation in Spain", shifts the focus from the essay to a strategic proposal for territorial revitalization supported by data. The didactic itinerary incorporates conceptual clarification, analysis with digital maps and official sources (for example, INE) and a propositional closing in which the students defend measures and assess their limitations. In this SdA, AI supports methodological understanding and argument construction, but does not replace visual map reading or working with sources (Guallart, 2025a).

The fourth SdA focuses on "Socio-economic inequalities and migration" and combines a mock debate with a subsequent report that looks at causes and consequences. It is linked to learning objectives aligned with SDG 10 (Reduced inequalities) and requires teachers to select a clear territorial cut to avoid generalizations and to support spatial analysis with evidence. The evidence incorporates the registration of *prompts*, the validation of demographic data, and critical reflection on the reliability of the information generated by AI (Adamini, Cafferata, & Velo, 2024; Area, 2025).

5.2 IMPLEMENTATION GUIDELINES: PHASED WORKFLOW (TEACHERS AND CHATGPT)

Based on the support and risk matrix, a phased workflow is proposed that clearly separates pedagogical decisions (non-delegable), linguistic-cognitive supports (delegable with control) and moments of direct spatial experience (not mediatized by AI). In the design

phase, the teachers define objectives, select the territorial area, plan the sequence of activities and decide on the final product and process evidence; at this level, ChatGPT can support the generation of didactic scenarios (e.g., fictitious countries or conflicts), the diversification of resources, and the initial development of rubrics, always under teacher review and contextualization (Adamini, Cafferata & Velo, 2024; Wilby & Esson, 2023).

During the territorial work phase (exit or direct observation work), **it is** recommended that AI does not intervene directly, in order to favor spatial perception and in situ evidence collection; this decision is linked to the need to sustain spatial experience as the basis of geographical learning (Correa, López & Díaz, 2024).

In the synthesis and production phase, students can use ChatGPT to organize memory, improve writing or prepare a presentation, as long as they declare the use and do not delegate the central argument or interpretative decisions. In parallel, teachers can use AI to generate a poster or report rubric and to prepare formative assessment instruments, maintaining professional judgement in the final assessment (Correa, López & Díaz, 2024). To increase the pedagogical return, it is suggested to incorporate interactions with AI configured as "Socratic opponent", "skeptical demographer" or "territorial planner", so that students defend proposals, anticipate objections and refine their arguments with an empirical basis, instead of accepting answers as an authority (García & Pujol, 2025; Prud'homme-Généreux, 2024; Urmeneta & Romero, 2024).

5.3 OPERATIONAL RESOURCES: *PROMPTS*, TEMPLATES AND QUALITY CONTROLS

Prompts formulated as reusable templates *are proposed* , accompanied by quality controls aimed at precision, curricular alignment and traceability of the process.

- ✓ In preparation teaching tasks, an example of a prompt to generate an initial diagnostic instrument is: *"Act like a Geography teacher. Generate 5 multiple-choice questions to assess understanding of island waste management, adapted to a student aged [x] years. Include justification of the correct answer and mark with [VERIFY] any factual data."*
- ✓ In the design of case studies for debate, it is proposed: *"Acts as an expert in geography didactics. It creates a case study of a water conflict between two fictional regions, including conflicting climate and economic data to encourage discussion."*
- ✓ For the complete design of an SdA with evaluation criteria, a structured *prompt* (R-I-T-A model) can be used: *"You are a geography teacher... Design a learning situation about depopulation... including a rubric to assess critical analysis"*.

- ✓ In role-playing games, ChatGPT can generate profiles of actors (e.g., migrant, local politician, business, NGO) as a starting point for the debate: *"It acts as an expert in geography didactics. Generate 4 short and contrasting profiles for a role-playing game about the installation of a wind farm in a rural municipality with depopulation: newly arrived migrant, local politician, businessman and environmental NGO. For each profile, include objectives, 3 arguments and 1 possible concession. Mark with [VERIFY] any factual data or cipher"*

In the students' work, it is recommended to prioritize *prompts* that prevent direct response and force verification, revision or argumentation.

- ✓ For controlled tutoring (study mode), it is proposed: *"Help me understand what the energy transition is, ask me questions to see if I understand it, don't give me the direct answer"*.
- ✓ To activate critical thinking, *adversarial* prompts are used: *"Act like a skeptical demographer. He criticizes my proposal to increase the birth rate through subsidies, pointing out three possible long-term economic failures", or "He acts as an expert in demography who questions my proposal for repopulation based on rural tourism. It points out three economic weaknesses of my plan."*
- ✓ In content sensitive to bias, an explicit control of the framing is incorporated: *"It acts like a geographer expert in demography. It explains the causes of current migrations in the Mediterranean for secondary school students, avoiding Eurocentric biases. Includes 2 nuances/counterexamples and 3 verification questions."*

Quality controls are recommended as assessable requirements. At the factual and curricular level, teachers verify that the questions and statements do not contain errors and conform to the curriculum, given the possibility of plausible but incorrect answers (Cornell University, 2023; Faculty AI, 2024). In terms of authorship, students are required to submit the chat history and a reflection on what information was useful and what was discarded as inaccurate; in addition, it is requested to explain why it accepted or rejected suggestions from the AI, since the inability to justify decisions works as an indicator of dependency and lack of authorship. On the methodological level, triangulation is required: no data provided by AI is considered valid without contrast with an official or equivalent source (e.g., INE, World Bank) (Area, 2025; Loos, 2025). Finally, in terms of transparency, the students declare the use of AI in the final product when it has been used to structure or revise the writing, clearly differentiating linguistic support for the construction of the argument.

6 RISKS, LIMITS AND SAFEGUARDS

The risks associated with AGI (plausible errors, biases and privacy) only acquire didactic meaning when they are translated into **task decisions** and **enforceable evidence**. Therefore, in this article, the risks are not presented as a general inventory, but as criteria that explain the classification of the matrix: tasks that are "not recommended" because of high delegability (e.g., generic essay without process or bibliography without verification) and tasks that are "supportable" when verifiable phases are required (drafts, contrast with sources, and defense). Safeguards are formulated as assessable process requirements (sources, verification, interaction history, and justification of decisions), so that support is not a substitute for geographical reasoning.

A second risk is algorithmic bias. The models can reproduce biases present in their training data and project them onto territories and populations, which introduces interpretive distortions and equity issues (Gallent-Torres et al., 2024; Holdsworth, 2023; Lorenz, Perset & Berryhill, 2023). In Geography, this bias can take specific forms, such as cultural stereotypes about the "Global South" or an overrepresentation of perspectives from the "Global North", with the consequent impoverishment of approaches and the marginalization of underrepresented realities (Furze, 2025; Giannini, 2024; Lorenz, Perset & Berryhill, 2023; Wilby & Esson, 2023). For this reason, bias should not be treated as an external technical problem, but as content to be worked on explicitly in the classroom, linking it to multiperspective and critical analysis of sources.

The third limit concerns privacy and data protection. Students' personal data or work with sensitive information should not be entered on IAG's public platforms, especially because they are minors and due to the lack of control over the subsequent processing of what is entered (Gallent-Torres et al., 2024; Giannini, 2024; U.S. Department of Education, 2023). In line with this principle, it is proposed to reduce risk through tools that do not require personal data and, where available at the institution, through accounts managed by the school or the administration (Ezcurra, Corica & Micco, 2025).

In terms of academic integrity and assessment, an additional problem appears: the automatic detection of AI-generated text is unreliable, described as a "mission impossible" when the aim is to infer authorship only from the final product (Loos, 2025). Consequently, the most solid safeguard shifts the emphasis from the final text to the evaluation of the process: intermediate evidence, recording of decisions, contrast of sources and oral defense of arguments and data, so that students demonstrate understanding and control of reasoning (García & Pujol, 2025). Along the same lines, it is recommended to incorporate transparency

scales for students to declare the level of AI used, facilitating an adjusted and explicit evaluation of the type of aid received (Caldeiro & Odetti, 2024).

The operational safeguards are articulated in three complementary measures. First, institutionalize verification: teach to "re-question", demand contrast with reliable sources and, when possible, with primary sources, incorporating contrast as an assessable part of the task (Gallent-Torres et al., 2024; Office of Science and Technology of the Congress of Deputies, 2024). Second, ensure traceability: students document *prompts*, relevant responses, acceptance or rejection decisions, and the verification process, so that the final product is anchored in evidence of authorship and learning (Area, 2025; García & Pujol, 2025). Third, maintaining teacher supervision when AI intervenes in activities related to evaluation or feedback, preventing content generated without control from conditioning grades or educational decisions (Fonteneau & Anvar, 2025).

7 DISCUSSION

In the light of the proposed matrix, the central input is not 'if' to use IAG, but 'where' and 'under what conditions' its use preserves geographical learning. The discussion suggests that the differential value of ChatGPT is concentrated in linguistic-cognitive and design supports, while tasks that demand factual accuracy, situated evaluative judgment, and advanced spatial reasoning require teacher mediation and, frequently, TIG/GIS tools. Consequently, responsible integration depends on shifting evaluation towards process evidence (verification, traceability and defense), rather than towards easily delegated end products.

This change of role has direct implications for the departments of Geography and for the educational centers. The literature converges on the need for coherence and standardization of criteria: it is not feasible to sustain contradictory approaches within the same school, where one part of the teaching staff totally prohibits AI while another demands or encourages it without a common framework (Vallejo, 2024). Hence, school policies are required that define acceptable uses, conditions for citation and declaration of the use of AI, as well as minimum verification and data protection procedures, so that students receive clear and comparable expectations between subjects and groups (Gallent-Torres et al., 2024; Guallart, 2025c). This standardization is also linked to the reduction of digital and pedagogical gaps: without shared frameworks, the integration of AI can amplify inequalities according to the level of teaching competence, the evaluation culture of the school or access to resources. In this sense, it is proposed to rely on reference frameworks such as EurekaAI or DigCompEdu

to align practices, train teachers and provide consistency to integration (García & Pujol, 2025).

On the didactic level, the results reinforce the idea that evaluation must move from the final product to the process. If AI can generate complete essays, the learning indicator ceases to be the text delivered and becomes the quality of the inquiry process: formulation of questions, selection and contrast of sources, decision-making, argumentation and oral defense. This approach opens a specific line in Geography: the question as evidence of learning, understood not as a formal feature, but as an ability to delimit a territorial problem, guide the search for data and construct a situated explanation. At the same time, the standardization of effective *prompts* is configured as an emerging teaching competence, not as an accessory resource, since it conditions the quality of interactions and, by extension, the quality of learning processes mediated by AI (Area, 2025; García & Pujol, 2025). This requirement is connected to AI literacy for both teachers and students: understanding the tool not as an oracle, but as a reasoning engine that requires expert supervision and validation strategies, with special attention to the risk of metacognitive laziness (Vallejo, 2024; Xiaoyu et al., 2025).

Finally, Geography introduces a disciplinary counterpoint that is particularly relevant in the face of the virtuality of AI. Due to its focus on territory and physical reality, the subject reaffirms the value of direct contact with the environment (e.g., fieldwork, in situ observation, reading the landscape) as a dimension that cannot be replaced by generative systems (Correa, López & Díaz, 2024). This specificity suggests a practical orientation for integration: to assess by application to local contexts and through evidence that combines spatial experience, contrasted data and argumentation, including situations in which AI lacks situated knowledge and, therefore, cannot replace the geographical criterion constructed by students (Area, 2025).

In terms of transferability, the matrix is especially useful as a departmental working tool to agree on minimum criteria (verification, traceability and process evidence), but its application must be adapted to specific regulatory and curricular contexts and technological availability (e.g., access to TIGs and institutional accounts). Future research should validate the instrument through classroom implementation studies (quasi-experimental designs or action-research), comparing tasks and process evidence with and without the mediation of AGI, and incorporating quality analyses of spatial reasoning and source contrast practices.

8 CONCLUSIONS

Geography teaching in Secondary Education, understood as a system of tasks, can benefit significantly from generative artificial intelligence (AGI) when integrated with a critical approach and teacher supervision. In this framework, tools such as ChatGPT are useful, above all, to support the personalization of learning, improve efficiency in the preparation of resources and facilitate scaffolding for writing and structuring activities, freeing up time for teachers to concentrate their intervention on pedagogical interaction and student accompaniment (Adiguzel et al., 2023; López-Vasco et al., 2025; Sharma & Rajarajan Eds, 2025). However, these benefits depend on the type of task, the degree of AI literacy and the existence of verification protocols; Without these conditions, the tool can increase the burden (revisions, correction of errors) and amplify inequalities between groups with different access or accompaniment.

The results also clearly delineate the limits of these tools. ChatGPT can fail as a substitute for factual accuracy, ethical judgment, and pedagogical criteria, which discourages its autonomous use in summative evaluation and in tasks that require deep territorial analysis without human guidance (Giannini, 2024; Salman et al., 2025; Wirzal et al., 2024). In Geography, moreover, it should not replace direct observation of the territory or spatial reasoning, which constitute the formative core of spatial competence; its role is justified when it acts as a scaffolding to manage complexity, contrast arguments, or organize evidence, not when it replaces spatial experience and work with sources (Guallart, 2025b).

In this way, the future of geographical education with AI does not lie in the automation of learning, but in the design of tasks that AI cannot solve on its own without critical student intervention. This orientation makes it possible to avoid a "techno-banking education", in which technology reinforces logics of transmission or substitution of cognitive effort, and favours, instead, a hybrid model where AI amplifies geographical thinking without replacing it (Adamini, Cafferata & Velo, 2024; Ubal et al., 2023; Vallejo et al., 2024). In terms of curriculum and evaluation, this implies prioritizing process evidence, tasks of application to local contexts, and argumentation and defense activities that force data to be contrasted, decisions justified, and territorial interpretations sustained.

The viability of responsible integration depends on the pedagogical leadership of teachers and on school agreements that regulate verification, traceability and privacy, but also on recognizing the limits of this work: the matrix is derived from documentary analysis and applied categorization, without empirical validation in the classroom, so its levels of support/risk should be considered indicative and reviewable. As future lines, it is proposed to evaluate the matrix through real implementations in Secondary Education classrooms that

measure (a) quality of spatial thinking and the use of sources, (b) changes in processes assessment and oral defense practices, and (c) effects on academic integrity and equity, especially in centers with different technological availability.

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APPENDIX

The table organizes common teacher tasks and describes the role of ChatGPT as a support. The level of support (G) reflects potential usefulness (High, Medium, Low, Null) with teacher supervision; the risk of substitution (R) estimates the probability (high, medium, low) that the use will shift towards the substitution of the intellectual work of the students or of the teacher's judgment.

Table 1

Matrix of teaching tasks and ChatGPT support (Geography 3rd year of Secondary)

Dimension	Task (examples)	ChatGPT's contribution/role	G	R	Operational Observations	Example of prompt	Minimum evidence to be archived (traceability)
Planning	Sequencing of basic knowledge, temporal structure, design of units and sessions.	Generator of structure, alternatives and connections between contents.	A-M	B	It requires curricular context, group profile and precise instructions; The utility falls with generic instructions.	Propose a sequence of 8 sessions for 3rd year of Secondary on "[topic]", with objectives, activities, resources and evidence; It adapts to [curriculum] and to a group with [characteristics].	Prompt and version; final sequence annotated with teaching decisions; List of sources/data used.
	Design of itineraries and field trips (objectives, stops, times, logistics, safety).	Ideation, organization and operational checklist assistant.	M	M	You can propose stops, order times and generate checklists; validates coordinates, times and accessibility if data is provided. It is not a substitute for territorial recognition or risk management on the ground.	Design a 4-hour outing in [place] to work on [knowledge]; it includes an itinerary with stops, times, approximate coordinates and contingency plan; points out risks and accessibility needs.	Final itinerary; map/track and cartographic sources; safety checklist; Record of changes after the previous visit.
Resource Design	Adaptation of texts and instructions (easy reading, simplification, support levels).	Rewriter and linguistic adaptor; graduated version generator.	To	M	Mandatory review to avoid factual errors, biases or inappropriate simplifications; risk of "hallucinations" if rewritten without anchoring to sources.	Rewrite this text for students aged 14-15 with easy reading: keep the key concepts and add a glossary of 8 terms. Don't make up data; mark with [DATA] what needs to be verified.	Original text and versions; changelist; verification of marked data; Adaptation criteria.
	Case studies, fictional scenarios and role-plays on	Generator of scenarios, scripts, roles, simulated sources and	A-M	B	Useful for contextualizing and activating the debate; it requires	Create a role-play on "[conflict/theme]" with 5 actors, conflicting	Script/roles; actual sources used to anchor the case; criteria and rubric;

Dimension	Task (examples)	ChatGPT's contribution/role	G	R	Operational Observations	Example of prompt	Minimum evidence to be archived (traceability)
	territorial conflicts, resources and geopolitics.	discussion questions.			adjustment to the curriculum, to evidence and to real sources when the product requires factuality.	objectives, a brief dossier per actor (max. 150 words), 6 guiding questions and a final task with evaluation criteria.	evidence of the debate (minutes, audio, notes).
	Immersive and interactive simulations (climate change, migrations, erosion, urban planning) with variables and consequences.	Rule, variable, event, and feedback designer; generator of materials for dynamization.	A-M	M	It provides speed to prototype dynamics; it needs validation of the causal model, the ranges of variables and territorial coherence. It is advisable to integrate real data (e.g., climatic or demographic series) to avoid plausible but false results.	Design a classroom simulation on "[topic]" with 4 controllable variables, 3 random events, and explicit rules; It includes a registration sheet for students and analysis questions with evidence requirements.	Rules and versions; dataset or data sources; student registration sheets; Final analysis with traceability of decisions.
	Review questions, item banks, practice quizzes, and distractors.	Generator of items, variants and explanatory feedback.	To	B	Suitable for practice and review; it requires error checking, ambiguities, and biases in distractors.	Generate 20 multiple-choice items on "[topic]" with 4 options, justification of the correct one and explanation of why the others are plausible distractors; indicates level (basic/medium/high).	Item bank with version; teacher review (errors and adjustments); Outcome statistics if applied in LMS.
Direct instruction	Explanation of concepts and processes (e.g., coastal erosion, tertiary sector) with examples, analogies, and counterexamples.	Adjustable explainer; Generator of analogies, graduated examples and verification questions.	M-A	To	It saves time and supports clarification, but students must contrast; risk of plausible but incorrect answers. It requires instructions that force us to cite evidence and identify uncertainties.	Explain "[concept]" in 120 words for 3rd year of Secondary, use 2 analogies and 1 counterexample; End with 3 check-through questions and a list of facts that need to be verified with sources.	Prompt and response; data verification; Contrast activity (source consulted + students' conclusions).
Mentoring and support	Personalized tutoring (e.g., study modes), clarification of doubts and generation of adapted exercises.	Conversational tutor; study guide; differentiation of tasks and scaffolding.	M	M	It provides customization and availability, but requires verification and design of tasks that document the process. It is advisable to limit the scope: explanation, guided practice	Act as a guardian. Ask me 5 questions first to diagnose my understanding of "[topic]". Then propose a 20-minute plan with graded exercises and self-correction, without giving the complete solution on the first try.	Diagnosis (questions/answers); plan and exercises; record of attempts; Brief metacognitive reflection.

Dimension	Task (examples)	ChatGPT's contribution/role	G	R	Operational Observations	Example of prompt	Minimum evidence to be archived (traceability)
					and metacognition, not "doing the task".		
	Response to motivational questions and connection with students' interests without trivializing the content.	Generator of contextualized connections (interests-people-places) and close examples.	M	M	Engagement can be improved by avoiding misleading analogies or stereotypes; It is advisable to require students to translate the connection into a geographical argument.	Answer "why learn [topic]?" Connect with 2 possible interests (e.g., sports, video games, music) and end with a short task: "apply the concept to a real case and cite a source."	Initial question; response; application task with cited source; self-assessment of students.
Formative assessment	Initial feedback on drafts (structure, clarity, grammar) and support on rubrics and criteria.	First Layer Reviewer; suggestor of improvements; Base Rubric Generator.	M-A	B	Useful before teacher feedback; It does not provide personal context or knowledge of the actual process. Review biases and criteria.	Evaluate this draft with a rubric (4 criteria, 4 levels). Point out 5 improvements in structure and 5 in argumentation, without rewriting the entire text. It returns questions for me to improve.	Draft and versions; rubric used; comments from the model and the teacher; Registration of student reviews.
	Qualification of complex tests or products with deep geographical reasoning.	Automated "dialer" (use restricted to support).	B	To	Inconsistency, biases and lack of nuance; Not suitable for final grade without teaching judgment. If used, it should be limited to detection of formal criteria and diagnostic support, with auditing and control samples.	Apply this rubric (included) and justify each criterion with textual evidence (short quotes). Point out uncertainties and do not assign a final grade; proposes 3 questions for an oral review.	Official Signature; model output; textual evidence cited; Teacher review and final decisions.
Administration and communication	Draft reports, communications to families, homework instructions, minutes and institutional messages.	Draft generator and adaptation of tone and clarity.	To	M	It speeds up writing and reduces the "blank page"; requires confidentiality control, regulatory compliance, and tone review. Avoid entering students' personal data and verifying statements.	Write a communication to families about "[topic]" in 180-220 words: objective, what students will do, evaluation criteria and how to support at home. Clear, non-paternalistic tone, without personal data.	Draft and final version; compliance checklist (privacy/style); Review and approval record.
Geographical task	Territorial debate and dilemmas (e.g.,	Mediator and Socratic adversary;	To	B	It provides value for multiperspective	Simulate a debate about "[dilemma]." It generates 4 actors	Discussion script; sources provided; record of evidence

Dimension	Task (examples)	ChatGPT's contribution/role	G	R	Operational Observations	Example of prompt	Minimum evidence to be archived (traceability)
	urbanization vs. agricultural park; renewables vs. landscape) with multiperspective.	generator of actors' positions and counterarguments.			if teachers demand evidence and contrast of sources. Useful for simulating the voices of actors (mayor's office, primary sector, NGOs, promoters, etc.) without caricaturing.	with different interests, 3 arguments and 3 expected evidences per actor, and cross-questions. It includes a guideline for evaluating the quality of evidence.	cited by students; Minutes of conclusions.
	Analysis of spatial data (method, interpretation, verification) and support for the reading of maps and graphs.	Methodological assistant, verifier and generator of interpretation questions.	M	M	It requires triangulation with sources and data; Variable performance according to difficulty. Useful for proposing hypotheses, checking coherence and detecting inconsistencies in calculations or readings.	With these data/table/map described: (1) explain patterns, (2) propose 3 hypotheses, (3) suggest 5 data quality checks and (4) write 3 tentative conclusions indicating their level of confidence.	Dataset and metadata; analysis steps; checks carried out; Conclusions with a level of confidence and sources.
	Summary and synthesis of reports, articles and news to prepare classes and design activities to contrast sources.	Structured Summarizer; key idea extractor; Critical reading question generator.	A-M	M	Useful for processing long texts, but can omit nuances or introduce errors. It is advisable to require: short textual quotations, location of paragraphs and external verification of figures and statements.	Summarize this text in 10 numbered ideas. For each idea, add: (a) short quote (max. 20 words), (b) location (section/paragraph), and (c) a critical question. Mark any sensitive figures or data with [VERIFY].	Source text; summary with locations; checklist; Critical reading activity for students.
	Design of urban and territorial planning solutions with future scenarios and impact assessment.	Scenario simulator; generator of alternatives and matrix of impacts.	M	M	Useful for ideation, but it requires criteria, data and evaluation argued by the students. Avoid "pretty" proposals without territorial viability or evaluation of <i>trade-offs</i> .	Propose 3 management alternatives for "[case]". For each one, it includes objectives, measures, affected actors and a matrix of impacts (environmental, social, economic, landscape) with explicit assumptions.	Alternatives and assumptions; data and sources; impact matrix; Reasoned justification of the students.
	TIG/GIS support (ArcGIS Online or others): step-by-step guides, consultations, expressions,	Procedural and debugging assistant; Translator of requirements into operational steps.	M	B	It does not replace the GIS tool or guarantee visual accuracy; It helps formulate queries, structure	In ArcGIS Online I want "[target]". Give me a sequence of steps with expected captures, possible errors and how to	Target and dataset; steps executed; screenshots or registration; cartographic quality checks.

Dimension	Task (examples)	ChatGPT's contribution/role	G	R	Operational Observations	Example of prompt	Minimum evidence to be archived (traceability)
	procedure review.				flows, and understand errors. It requires tests in the real environment and mapping criteria.	check them. If you propose expressions or queries, explain to me what they do and how to check results.	
Not recommended	Generic descriptive essays for home without evidence of trial or oral defense.	Full text generator.	A-B	To	It breaks the relationship between process and product; it is advisable to redesign tasks with process evidence (drafts, sources, decisions) and oral or applied defense.	(Do not use for final delivery) Instead: "Help me plan the essay: Generate an outline, guiding questions, and a list of sources, but don't write the text. Ask me for evidence and review my draft."	Scheme; drafts; sources; registration of revisions; oral defense or applied product.
	Request "real" academic literature without systematic external verification.	Reference generator.	B	To	Risk of invention of sources; requires external verification (catalogs, DOIs, databases). Integrate a protocol for the verification and registration of bibliographic evidence.	Give me possible search lines and keywords (in ES/EN) on "[topic]". Don't make up references. Suggests databases and how to check DOI/ISBNs.	Search strategy; database captures/exports; verified list with DOI/ISBN.
	Direct creation of visual mapping as a substitute for a GIS tool.	GIS tool replacement.	N	To	You need mediation with code or TIG (e.g., ArcGIS Online); limits representational accuracy.	If you need a final map: describe the cartographic objective and ask for a flow in GIS (layers, symbology, scale, projection) and quality criteria, not a "made-up" image.	GIS Project; data sources; cartographic decisions; Exported final map with metadata.

SCHOOL MANAGEMENT AND CONTINUING EDUCATION FOR EDUCATION PROFESSIONALS

GESTÃO ESCOLAR E FORMAÇÃO CONTINUADA DOS PROFISSIONAIS DA EDUCAÇÃO

GESTIÓN ESCOLAR Y FORMACIÓN CONTINUA DE LOS PROFESIONALES DE LA EDUCACIÓN" OU "GESTIÓN EDUCATIVA Y DESARROLLO PROFESIONAL DOCENTE



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ABSTRACT

This article aims to discuss the relationship between school management and the continuing education processes of education professionals, reflecting on the role of the management team in encouraging teacher development. Continuing education is seen as an essential element for the quality of teaching, as it contributes to pedagogical updating and the improvement of educational practices. The adopted methodology was bibliographic research, based on authors who address educational management, public policies, and the professional development of teachers. The analysis points out that the school manager's performance is decisive for the effectiveness of training actions, especially when there is dialogue between the school's needs and available training programs. It is concluded that management committed to the valorization of educators and collective pedagogical planning favors the construction of more democratic and formative school environments, directly impacting student learning.

Keywords: School Management. Continuing Education. Teaching Practice. Professional Development.

RESUMO

Este artigo tem como objetivo discutir a relação entre a gestão escolar e os processos de formação continuada dos profissionais da educação, refletindo sobre o papel da equipe gestora no incentivo ao desenvolvimento docente. A formação continuada é vista como elemento essencial para a qualidade do ensino, pois contribui para a atualização pedagógica e o aprimoramento das práticas educativas. A metodologia adotada foi a pesquisa bibliográfica, com base em autores que abordam a gestão educacional, políticas públicas e o desenvolvimento profissional de professores. A análise aponta que a atuação do gestor escolar é determinante para a efetivação de ações formativas, especialmente quando há diálogo entre as necessidades da escola e os programas de formação disponíveis. Conclui-se que uma gestão comprometida com a valorização dos educadores e com o planejamento

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pedagógico coletivo favorece a construção de ambientes escolares mais democráticos e formativos, impactando diretamente a aprendizagem dos alunos.

Palavras-chave: Gestão Escolar. Formação Continuada. Prática Docente. Desenvolvimento Profissional.

RESUMEN

Este artículo tiene como objetivo discutir la relación entre la gestión escolar y los procesos de formación continua de los profesionales de la educación, reflexionando sobre el papel del equipo directivo en el fomento del desarrollo docente. La formación continua se ve como un elemento esencial para la calidad de la enseñanza, ya que contribuye a la actualización pedagógica y al perfeccionamiento de las prácticas educativas. La metodología adoptada fue la investigación bibliográfica, basada en autores que abordan la gestión educacional, políticas públicas y el desarrollo profesional de los docentes. El análisis apunta que la actuación del gestor escolar es determinante para la efectividad de acciones formativas, especialmente cuando hay diálogo entre las necesidades de la escuela y los programas de formación disponibles. Se concluye que una gestión comprometida con la valorización de los educadores y con la planificación pedagógica colectiva favorece la construcción de ambientes escolares más democráticos y formativos, impactando directamente el aprendizaje de los alumnos.

Palabras clave: Gestión Escolar. Formación Continua. Práctica Docente. Desarrollo Profesional.

1 INTRODUCTION

The continuing education of education professionals is an essential condition to ensure the quality of teaching and the development of effective pedagogical practices. In the current scenario, in which education faces increasingly complex challenges, school management has assumed a strategic role in promoting training actions that meet the needs of teachers and the school community. The articulation between management and training is not only a legal or institutional requirement, but a practice that contributes to the strengthening of the school as a space for collaborative learning and pedagogical innovation.

According to Oliveira (2018), continuing education is a dynamic process, which must be incorporated into the school routine, with the active mediation of managers. In this sense, it is essential to understand how school leaders can favor a formative culture, encouraging reflection on teaching practice, pedagogical updating and the collective construction of knowledge. Also according to the same author, training ceases to be a one-off event to become an integral part of the political-pedagogical project.

This article aims to analyze, through a literature review, the interface between school management and continuing education processes, with emphasis on the contributions of pedagogical leadership to the professional development of teachers. The methodology adopted consists of a survey and analysis of works and articles published between 2015 and 2025, by authors who address the themes of educational management, teacher training and public policies aimed at basic education.

The delimitation of this study is centered on the context of Brazilian public basic education, focusing on the practices of continuing education promoted in the school environment, especially in elementary schools. It is intended to understand how the performance of the management team can positively influence the training processes and contribute to a more reflective, contextualized and transformative pedagogical practice.

In addition, it is necessary to consider that the effectiveness of continuing education is directly related to the context in which it occurs. As Formosinho and Machado (2018) state, situated education, developed within the school itself, tends to be more significant because it is articulated with the real demands of daily school life. In this scenario, the manager acts not only as an administrator, but as a pedagogical leader, capable of mobilizing the teaching team, promoting spaces for reflection and ensuring that training actions dialogue with the concrete challenges faced by the school.

Another important point is the alignment of training with the institution's Political-Pedagogical Project (PPP). According to Lück (2019), when continuing education is planned based on the goals and values of the PPP, it strengthens institutional identity and contributes

to collective development. This requires the manager to be sensitive to listen to teachers, diagnose training needs and seek strategies that promote continuous learning, in a collaborative process.

In addition, public policies play a decisive role in encouraging (or not) teacher training. Although programs such as the National Pact for Literacy at the Right Age (PNAIC) and the National Policy for Teacher Training have sought to expand access to training, there are still gaps in implementation, especially in municipal public networks. As Gatti and Barreto (2021) point out, the absence of continuity and effective evaluation of these policies compromises their long-term impacts, especially in contexts marked by social and structural inequalities.

The school needs to be a space for continuous training, in which teachers' learning is planned and intentional, occurring in interaction with other professionals and with the practices of daily education. (GATTI; BARRETO, 2021, p. 18)

Therefore, studying the relationship between school management and continuing education allows us to understand how the school can become a space for permanent learning not only for students, but also for educators. This reflection is indispensable for the strengthening of pedagogical practices and for the construction of a more democratic school, committed to the professional and human development of all its actors.

2 THEORETICAL FRAMEWORK

2.1 SCHOOL MANAGEMENT AS A SPACE FOR PEDAGOGICAL LEADERSHIP

Contemporary school management goes beyond the administrative function and consolidates itself as a pedagogical leadership committed to the formative processes and to the meaningful learning of students. For Lück (2019), the school manager is an articulator of actions that involve the collective, promotes teamwork and leads the school with a focus on improving the quality of teaching.

This role requires the manager to be attentive not only to the bureaucratic aspects, but mainly to the human and formative dimension of the school. According to Libâneo (2020), democratic management presupposes the effective participation of teachers in pedagogical decisions and values teacher training as a structuring axis of educational practice.

Thus, the manager acts as a mediator between educational policies and the real needs of the school, building bridges between what is proposed in official documents and what is practiced in the classrooms. Their performance directly influences the institutional climate, the motivation of the team and the engagement of teachers in continuous training processes.

In this context, the school manager needs to assume a reflective and purposeful posture, capable of interpreting the educational guidelines in the light of the specific needs of the school community. As Franco and Nóvoa (2018) state, pedagogical leadership is not limited to the coordination of tasks, but involves the construction of meanings, the appreciation of the teaching experience, and the encouragement of continuous professional development.

In addition, effective leadership is deeply linked to the creation of an organizational culture that favors collaboration and knowledge sharing. According to Tardif (2015), teaching knowledge is built in practice and becomes more solid when shared in collective training contexts. This means that the manager has the responsibility to foster spaces for dialogue, active listening and joint production of knowledge among teachers.

Another important element is the coherence between discourse and practice in management performance. It is common for schools to have pedagogical projects with innovative proposals, but that, in practice, are not effectively executed due to lack of support, training or incentive. As "Paro" (2017) points out, school management needs to be committed to the concrete achievement of pedagogical objectives, which requires systematic monitoring, participatory evaluation and investment in the training of education professionals.

Therefore, the strengthening of pedagogical leadership depends on an ethical, democratic and engaged posture on the part of the manager, who understands continuing education as an instrument of institutional transformation. It is in this movement that the school is configured as a living space for learning and development, both for students and teachers.

2.2 CONTINUING EDUCATION: CONCEPTIONS AND PRACTICES

Continuing education is understood as a permanent and contextualized process, which must consider the real demands of the school and the knowledge built in the teaching experience. For Imbernón (2016), continuous training is part of the professionalization of teachers and should be linked to their practice and context.

In Brazil, several programs sought to institutionalize continuing education, such as the PNAIC and the National Policy for the Training of Education Professionals. However, Gatti and Barreto (2021) highlight that these actions, although relevant, face difficulties in continuity, financing, and impact assessment in public networks.

In addition, training is often imposed in a vertical way, disregarding the real needs of teachers. Nóvoa (2017) argues that it is necessary to break with the prescriptive training

model and move towards collaborative and autonomous practices, in which teachers recognize themselves as protagonists of their own development.

Thus, it is essential that continuing education processes are aligned with school daily life and are developed through strategies that value listening, the exchange of experiences and critical reflection on pedagogical practice. For Lima and Lopes (2020), effective training happens when there is teacher protagonism, methodological flexibility, and institutional support so that the teacher has time and space to develop.

The absence of a training policy articulated with local needs leads to the demotivation of educators, who start to see training as a bureaucratic and unproductive obligation. Therefore, as Day (2019) argues, it is essential that training is connected to the cultural and social context of the school, allowing teachers to attribute meaning to what they learn and to be able to apply the knowledge acquired in their pedagogical routines.

It is also necessary to recognize that continuing education should not be an isolated event, but an integral part of the school's pedagogical project. Libâneo (2020) emphasizes that training needs to be inserted in institutional practices, such as pedagogical meetings, class councils, and collective planning moments, which favors a permanent formative perspective.

Therefore, promoting effective continuing education requires more than offering courses and workshops. It is necessary to create a formative culture, sustained by the appreciation of the teacher, by the dialogue between theory and practice and by the commitment of school management to ensure real conditions for professional development.

2.3 THE INTERRELATIONSHIP BETWEEN MANAGEMENT AND TRAINING IN PUBLIC SCHOOLS

The connection between school management and continuing education becomes even more relevant in the context of Brazilian public schools, where structural challenges require articulated, planned actions that are sensitive to the local reality. The leadership of the management team can create objective and subjective conditions for training to occur in a meaningful way.

As Formosinho and Machado (2018) state, the school should be understood as a space of situated education, where knowledge is collectively constructed from the practices, challenges and reflections of everyday school life. For this, the manager needs to promote times and spaces dedicated to training, such as pedagogical meetings, study groups, and collaborative projects.

The absence of this managerial mediation can result in the fragmentation of training actions and the devaluation of teacher training. On the other hand, when the manager assumes a mobilizing and pedagogical role, there is greater integration between the political-pedagogical project, the school's goals and the teachers' training paths.

This integration between management and continuing education only materializes when there is an alignment between the pedagogical principles of the school and the professional valorization of teachers. For Oliveira (2018), the performance of school management should consider teachers as formative and formable subjects, capable of building knowledge from their practices and experiences. This perspective breaks with a hierarchical view of knowledge and promotes horizontality in the training processes.

In addition, the effectiveness of training in public schools depends on minimum structural conditions, such as adequate time for studies, access to materials, technical support and institutional incentive. Gatti (2020) points out that, in many public networks, training actions face obstacles such as the overload of teaching work and the absence of continuity in the proposals, which makes it difficult to consolidate a culture of permanent training.

In this scenario, the manager's role as an articulator between public policies and the school floor is essential. According to Lück (2019), it is the manager who enables the conditions for training programs to get off the ground and materialize into effective pedagogical actions, connected to the real needs of the teaching staff and the educational context.

Therefore, promoting the interrelationship between school management and continuing education means recognizing that teacher learning is also an institutional responsibility. The construction of a quality public school necessarily involves the commitment of school leadership to the critical, collaborative and permanent training of educators.

Another relevant aspect in this process is the co-responsibility between management and teachers in the planning of training actions. When the manager involves teachers in the definition of themes, methodologies and objectives of training, he promotes an environment of trust and belonging. According to Placco and Souza (2020), the active participation of teachers in training decisions strengthens the link between training and teaching practice, making the process more meaningful and effective.

In addition, it is necessary to understand that continuing education in the public context cannot be restricted to formal moments, such as external courses or lectures. Often, the most powerful spaces for learning occur in the daily school life, during moments of collective

planning, in pedagogical meetings or even in informal exchanges between peers. Nóvoa (2017) highlights that the school needs to assume itself as a space for permanent training, where teachers learn with and from each other, in a continuous and situated way.

Another challenge concerns the articulation between educational policies at the macro level and the micro-localized needs of schools. As Lima (2021) states, there is a frequent mismatch between what policies propose and what schools are able to execute, especially in contexts of social vulnerability. In this scenario, it is up to the management to adapt, negotiate and reinterpret such guidelines so that they make sense for their reality, ensuring the effectiveness of training actions.

"The school needs to be understood as a space for permanent training, in which teachers learn from their practice and from others, in a collaborative and reflective way. " (NÓVOA, 2017, p. 45).

In summary, the interrelationship between management and training in public schools requires political-pedagogical commitment, sensitivity to deal with the specificities of the school territory and the ability to collectively build solutions that value the teaching experience and enhance institutional learning.

3 CONCLUSION

This article aimed to analyze the relationship between school management and the continuing education of education professionals, with emphasis on the practices developed in the context of the Brazilian public school. From the literature review, it was possible to understand that the continuous training of teachers is not an isolated action, but a process that depends directly on the commitment of the management team to promote favorable conditions for professional learning.

The studies of authors such as Lück (2019), Imbernón (2016), Nóvoa (2017) and Gatti and Barreto (2021) show that pedagogical leadership is decisive for training processes to take place in an articulated, contextualized and permanent way. The role of the school manager as an articulator of knowledge and an incentive for teacher development contributes to the strengthening of pedagogical practice, professional autonomy and the quality of teaching.

It was also found that, despite the political initiatives aimed at continuing education, there are still weaknesses in the public education networks, such as lack of resources, discontinuity of programs and absence of effective involvement of teachers in the planning

processes. Thus, a management committed to teacher training needs to adopt more collaborative, democratic and coherent postures with the reality of the school.

As a suggestion for future investigations, it is recommended to deepen empirical studies that analyze concrete experiences of articulation between management and continuing education in different education networks. It would also be relevant to evaluate the impact of collectively planned training actions, focusing on the professional development of teachers and the improvement of student learning.

In addition, it is essential that training proposals are not treated as an appendix of school activities, but as a strategic part of institutional planning. For this to happen, it is necessary for management to understand continuing education as a priority investment, articulating the available resources with the real needs of the faculty and promoting a culture of professional appreciation.

Another point that deserves attention is the creation of permanent spaces for listening and dialogue between teachers and managers. These spaces favor the collective identification of pedagogical challenges and the joint construction of training solutions, strengthening the teacher's professional identity and the cohesion of the school team. The absence of this listening tends to weaken the engagement of educators and compromise the success of the actions implemented.

The importance of public policies that guarantee stability, financing and continuity of training programs is also highlighted. Punctual and discontinuous actions tend to produce little real impact on the daily life of the school. It is necessary to move towards a more structural perspective, which understands training as a right of education professionals and as a structuring element of the social quality of education.

Finally, it is reaffirmed that the transformation of pedagogical practices necessarily involves valuing teacher training and strengthening pedagogical leadership. When managers and teachers walk together towards professional development, the public school becomes a more democratic, formative space committed to everyone's learning.

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EDUCATIONAL STRATEGIES FOR TEACHING ENVIRONMENTAL SCIENCE IN ELEMENTARY EDUCATION

ESTRATÉGIAS EDUCATIVAS PARA O ENSINO DE CIÊNCIAS AMBIENTAIS NO ENSINO FUNDAMENTAL

ESTRATEGIAS EDUCATIVAS PARA LA ENSEÑANZA DE LAS CIENCIAS AMBIENTALES EN LA ESCUELA PRIMARIA



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ABSTRACT

This article aims to analyze the educational strategies used in the teaching of Environmental Sciences in Elementary Education, with emphasis on water and sustainability, in the municipality of São Sebastião da Boa Vista, located in the Marajó Archipelago, state of Pará, Brazil. The study is based on the understanding that environmental education is essential for the formation of critical, conscious and participatory individuals committed to the preservation of natural resources. A qualitative methodological approach was adopted, including documentary, bibliographic and field research. Data collection was carried out through the analysis of the Political Pedagogical Project, textbooks, curricular planning and the application of questionnaires with objective and subjective questions to nine teachers of the 5th grade of Elementary School. The results indicate that environmental themes are present in school documents and pedagogical practices, mostly addressed through an interdisciplinary approach. However, weaknesses were identified regarding continuing teacher education, conceptual understanding of Environmental Sciences and knowledge of the 2030 Agenda and the Sustainable Development Goals, especially SDG 6. It is concluded that strengthening contextualized educational strategies, combined with teacher training and diversified methodologies, is essential for consolidating a critical and transformative environmental education in Elementary Education.

Keywords: Environmental Sciences. Elementary Education. Educational Strategies.

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RESUMO

O presente artigo tem como objetivo analisar as estratégias educativas utilizadas no ensino de Ciências Ambientais para alunos do Ensino Fundamental I, com ênfase na temática da água e da sustentabilidade, no município de São Sebastião da Boa Vista, localizado no Arquipélago do Marajó, estado do Pará. A pesquisa fundamenta-se na compreensão de que a educação ambiental constitui um elemento essencial para a formação de sujeitos críticos, conscientes e comprometidos com a preservação dos recursos naturais. A abordagem metodológica adotada foi qualitativa, envolvendo pesquisa documental, bibliográfica e de campo. A coleta de dados ocorreu por meio da análise do Projeto Político Pedagógico, do livro didático, do planejamento curricular e da aplicação de questionários com questões objetivas e subjetivas a nove professores do 5º ano dos anos iniciais do Ensino Fundamental. Os resultados evidenciam que as temáticas ambientais estão presentes nos documentos escolares e nas práticas pedagógicas, sendo trabalhadas, em sua maioria, de forma interdisciplinar. No entanto, identificaram-se fragilidades relacionadas à formação continuada dos docentes, ao domínio conceitual sobre Ciências Ambientais e ao conhecimento acerca da Agenda 2030 e dos Objetivos do Desenvolvimento Sustentável, especialmente o ODS 6. Conclui-se que o fortalecimento de estratégias educativas contextualizadas, aliadas à formação docente e ao uso de metodologias diversificadas, é fundamental para a consolidação de uma educação ambiental crítica e transformadora no Ensino Fundamental.

Palavras-chave: Ciências Ambientais. Ensino Fundamental. Estratégias Educativas.

RESUMEN

Este artículo tiene como objetivo analizar las estrategias educativas utilizadas en la enseñanza de las Ciencias Ambientales en la Educación Primaria, con énfasis en la temática del agua y la sostenibilidad, en el municipio de São Sebastião da Boa Vista, ubicado en el Archipiélago de Marajó, estado de Pará, Brasil. La investigación se basa en la comprensión de que la educación ambiental es fundamental para la formación de sujetos críticos, conscientes y comprometidos con la preservación de los recursos naturales. Se adoptó un enfoque metodológico cualitativo, que incluyó investigación documental, bibliográfica y de campo. La recolección de datos se realizó mediante el análisis del Proyecto Político Pedagógico, libros didácticos, planificación curricular y la aplicación de cuestionarios con preguntas objetivas y subjetivas a nueve docentes del quinto año de la Educación Primaria. Los resultados muestran que los temas ambientales están presentes en los documentos escolares y en las prácticas pedagógicas, siendo trabajados, en su mayoría, de manera interdisciplinaria. No obstante, se identificaron debilidades relacionadas con la formación continua de los docentes, el dominio conceptual sobre las Ciencias Ambientales y el conocimiento de la Agenda 2030 y de los Objetivos de Desarrollo Sostenible, especialmente el ODS 6. Se concluye que el fortalecimiento de estrategias educativas contextualizadas, junto con la formación docente y el uso de metodologías diversificadas, es esencial para consolidar una educación ambiental crítica y transformadora en la Educación Primaria.

Palabras clave: Ciencias Ambientales. Educación Primaria. Estrategias Educativas.

1 INTRODUCTION

For decades, the problem of environmental degradation has been discussed, evidenced by processes such as deforestation, global warming, pollution and the depletion of natural resources. Despite the progress of debates and institutional initiatives, it is observed that environmental impacts have intensified over time. Such a scenario results, to a large extent, from the development model adopted by contemporary society, marked by productive practices and consumption patterns that disregard the limits of ecosystems. In this sense, environmental fragility manifests itself as a consequence of the way of life historically constructed by humanity in its relationship with the environment (Moura; Moura; Vieira, 2020).

Even in the face of legal achievements aimed at environmental protection, such as Law No. 13,123/2015, which provides for the conservation and sustainable use of biodiversity (Brasil, 2015), the effects of modern life continue to cause significant damage to nature. Among these impacts are the intensification of climate change, the degradation of natural ecosystems, the contamination of groundwater and the growing scarcity of drinking water, problems that are aggravated as unsustainable practices of exploitation of natural resources are maintained (Cavalcanti, 2004).

Among the various contemporary environmental problems, water assumes a central position, as it is an indispensable resource for the maintenance of life and the balance of ecosystems. However, the way it has been used and disposed of over the last decades reveals a worrying picture, characterized by the pollution of aquatic environments, the inappropriate disposal of waste and the absence of effective basic sanitation policies. This reality compromises the quality of water and directly affects the health of populations, especially those who depend on rivers and streams for supply and daily use.

In the municipality of São Sebastião da Boa Vista, located in the Marajó Archipelago, in the state of Pará, this problem becomes even more evident. Surrounded by an extensive network of rivers, boreholes and islands, the municipality has weaknesses related to basic sanitation and the management of water resources. Situations such as silting of watercourses, inadequate disposal of solid waste, the presence of open cesspools and the proximity of garbage disposal areas to streams and rivers are observed, factors that contribute to water contamination and local environmental degradation.

In this context, the school plays a fundamental role in the formation of critical and conscious subjects, capable of understanding socio-environmental problems and acting responsibly in their territory. Environmental Education, articulated with Environmental Sciences, and guided by the National Policy of Environmental Education, instituted by Law No. 9,795/1999, should permeate all modalities of basic education, promoting awareness,

the construction of values and the development of attitudes aimed at the preservation of the environment (Brasil, 1999).

In view of this reality, the research is guided by the following research question: what are the methodological strategies in Environmental Sciences aimed at raising awareness about sustainable consumption, the reuse of solid waste and the care of household water, rivers and streams, developed with students in the fifth year of the initial years of Elementary School in public schools in the municipality of São Sebastião da Boa Vista, in the state of Pará?

The relevance of this study is justified by the need to understand how socio-environmental themes, especially those related to water and basic sanitation, have been addressed in the school context of the municipality, considering the scenario of environmental vulnerability and the dependence of the local population on water resources. It is expected that the analysis of pedagogical practices will contribute to the strengthening of Environmental Education and to the promotion of sustainable attitudes in the school and community environment.

With the above, the objective of this work was to analyze the methodological strategies in Environmental Sciences used in public schools in the municipality of São Sebastião da Boa Vista, focusing on raising awareness for sustainable consumption, reuse of solid waste and water care, in the fifth year of the early years of Elementary School.

2 THEORETICAL FRAMEWORK

The theoretical framework of this study is based on scientific productions, legal documents and educational norms that address Environmental Sciences, Environmental Education and their interfaces with Elementary Education. The discussion includes reflections on the socio-environmental impacts resulting from human action, especially with regard to the degradation of water resources, as well as the role of the school in the formation of critical subjects committed to sustainability. In addition, it dialogues with authors who defend interdisciplinarity, contextualized teaching and the articulation between different types of knowledge as fundamental strategies for the consolidation of pedagogical practices aimed at environmental awareness, in line with current educational and environmental public policies.

2.1 THE IMPACTS OF SOLID WASTE ON THE WATERS OF RIVERS AND STREAMS

Water is an indispensable resource for the survival of all living beings, which is why the growing degradation of rivers and streams arouses concern in the face of the neglect and

lack of awareness of a significant portion of humanity. The improper dumping of solid waste of various natures in watercourses causes contamination, pollution of water resources and, consequently, serious public health problems. This pollution process tends to intensify progressively, accumulating waste on the banks of rivers and configuring one of the most serious environmental problems today (Freitas; Oliveira; Silva, 2017).

In the Brazilian context, the pollution of rivers and streams is frequently reported by the media. However, its impacts are experienced more intensely by riverside populations, who directly depend on these resources for supply, food and transportation. Among the main environmental damages are the silting of watercourses, the death of aquatic animals as a result of the entrapment or ingestion of plastic waste, and the contamination caused by oil spills from vessels. Such human actions cause profound changes in aquatic ecosystems, including the extinction of species of fauna and flora, in addition to compromising the health of the populations living in these areas (Frank; Berbet, 2017).

In the legal sphere, Federal Law No. 12,305/2010 instituted the National Solid Waste Policy, establishing guidelines for the integrated management and proper management of waste, as well as the responsibilities of the government and generators (Brasil, 2010). Despite this normative advance, it is observed that the contamination of aquatic environments by solid waste continues to intensify, evidencing the fragility in the implementation of effective public policies, especially in municipalities that depend heavily on water resources, such as São Sebastião da Boa Vista, the locus of this research.

The reality of the municipality can be observed in the following figures, which show situations of siltation and pollution of rivers and streams, demonstrating the neglect and absence of systematic actions for environmental preservation.

Figure 1

Siltation and pollution of watercourses in the municipality of São Sebastião da Boa Vista, PA



Source: Author of the research.

The images show the high level of environmental degradation of the municipality's

watercourses, a worrying factor, considering that these rivers and streams are the main sources of water supply for the local population. This scenario reinforces the relevance of choosing the municipality of São Sebastião da Boa Vista (PA) as a case study, given the urgency of educational and preventive actions aimed at the conservation of water resources.

Another aspect that aggravates this problem refers to disorderly urban growth, characterized by the construction of residences and stilt houses in inadequate areas, often on streams or on the banks of rivers, without inspection by the public authorities and without compliance with environmental standards. In view of the lack of awareness of both the population and public managers, there is a need to strengthen the teaching of Environmental Sciences in schools, as a strategy to promote awareness, stimulate community participation, and contribute to improving the quality of water used for supply (ANA, 2023).

2.2 ENVIRONMENTAL SCIENCES IN BASIC EDUCATION

Over the last decades, school education has sought to promote the awakening of environmental awareness, integrating different areas of knowledge in the search for solutions to socio-environmental problems. This perspective is based on the interdisciplinary articulation of knowledge, so that educational institutions, guided by an integrative approach, are able to contribute to the reunification of fragmented knowledge (Leff, 2012).

Interdisciplinarity in Environmental Sciences enables the articulation between empirical and scientific knowledge, favoring the construction of a broader and more critical understanding of environmental issues. This integration allows the school community to overcome fragmented or accommodated views of reality, transforming common sense knowledge into investigative, reflective knowledge committed to social transformation (Carvalho, 2009).

The consolidation of Environmental Sciences in the educational field intensified from the 1990s onwards, with the inclusion of the area in the subprograms of the Support Program for Scientific and Technological Development, promoting the integration of different fields of knowledge to understand the impacts of technological advances on the environment (Philippi Jr., 2000). Such a movement contributed to the development of a critical, participatory and sustainability-oriented environmental awareness, aiming at the preservation of natural resources for future generations.

It is essential to understand that Environmental Sciences are not configured as an isolated discipline, but as an area of knowledge that articulates several disciplines around a common objective, that is, to understand and face socio-environmental problems. In this sense, education plays a strategic role in promoting dialogue between different fields of

knowledge, encouraging teachers and students, from early childhood education to higher education, to reflect on environmental transformations and seek solutions to contemporary challenges (Floriani, 2000).

2.3 ENVIRONMENTAL EDUCATION IN THE GUIDING LAWS OF BASIC EDUCATION

Environmental Education has been consolidated, over time, as a central theme in educational debates, due to the need to form a more critical, participatory society committed to sustainability. The emergence of environmental movements, especially from the second half of the twentieth century, boosted the insertion of environmental issues in political and educational agendas.

The United Nations Conference on the Human Environment, held in Stockholm in 1972, marked a historic moment by recognizing Environmental Education as a fundamental element in facing the environmental crisis. In Brazil, this perspective was incorporated into the National Curriculum Parameters, which propose the treatment of socio-environmental issues in a transversal way, permeating all areas of knowledge (Brasil, 1997).

The Brazilian legal framework advanced significantly with the enactment of Law No. 6,938/1981, which instituted the National Environmental Policy, and with the Federal Constitution of 1988, which assigned to the public power the duty to promote Environmental Education at all levels of education (Brasil, 2012). Subsequently, Law No. 9,795/1999 established the National Policy on Environmental Education, reaffirming the obligation of its integrated approach to the school curriculum (Brasil, 1999).

The Law of Guidelines and Bases of National Education, Law No. 9,394/1996, reinforces the importance of Environmental Education by evidencing its presence at all levels and modalities of education, even if in a transversal way (Brasil, 1996). In addition, CNE/CP Opinion No. 8/2012 established the National Curriculum Guidelines for Environmental Education, highlighting the need to understand the environmental problem on a local and global scale, in order to promote attitudes of care and preservation.

In the current context, the National Common Curriculum Base defines essential learning for Basic Education, highlighting, among its general competencies, the formation of subjects capable of critically analyzing socio-environmental problems and acting responsibly in their environment (Brasil, 2017). In the state of Pará, Law No. 9,981/2023 stands out, which institutes the Formal Education Policy for the Environment, Sustainability, and Climate, making the inclusion of the Environmental Education curricular component mandatory in the state education network (Pará, 2023).

In this way, Environmental Education presents itself as a fundamental instrument for

students to recognize their insertion in nature and understand their role in the construction of an environmental rationality guided by the preservation of biodiversity and the sustainable use of natural resources (Morin, 1991).

3 METHODOLOGY

This article is part of a master's thesis produced within the scope of the Graduate Program in the National Network for the Teaching of Environmental Sciences (PROFCIAMB), of the class of 2022, defended on March 7, 2024. The research was submitted to the Ethics Council and approved by Opinion No. 6,161,356. It was self-funded, with no conflict of interest.

The present research is characterized by a qualitative approach, since it seeks to understand and interpret the methodological strategies of themes emphasized in the Environmental Sciences developed in the school context, considering the perceptions, pedagogical practices and institutional documents. The qualitative approach allows an in-depth analysis of educational phenomena in their natural environment, enabling the understanding of the meanings attributed by the subjects to the practices developed (Luna, 2011).

As for the objectives, the study is characterized as descriptive and exploratory, since it seeks to understand and describe the pedagogical practices developed in the scope of Environmental Sciences, in articulation with Environmental Education. The investigation emphasizes themes such as sustainable consumption, reuse of solid waste and water care, understanding Environmental Education as a transversal formative dimension and Environmental Sciences as an integrating field of knowledge. Thus, it is analyzed how these approaches materialize in the school daily life of the municipality of São Sebastião da Boa Vista, in the state of Pará.

The study was developed in three public elementary schools located in the urban area of the municipality of São Sebastião da Boa Vista, in the Marajó Archipelago, Pará. Nine teachers who work in the fifth year of the initial years of Elementary School participated in the research, all with higher education and belonging to different areas of knowledge.

Regarding the data collection procedures, documentary research, bibliographic research and field research were used. The documentary research included the analysis of the Pedagogical Political Project of the schools, the lesson plans, the textbooks and the curricular components aligned with the National Common Curricular Base, with the objective of identifying the socio-environmental themes addressed and the methodological strategies proposed. The bibliographic research was carried out from books, scientific articles,

legislation and official documents, providing the theoretical basis necessary for the understanding of the environmental and educational problems investigated.

The field research was conducted through the application of questionnaires with objective and subjective questions to the participating teachers, in order to obtain information about the pedagogical practices developed, the perception of teachers about Environmental Education and the challenges faced in addressing Environmental Science themes. The use of the questionnaire enabled the collection of data in a systematic way, favoring the analysis of the conceptions and experiences of the subjects involved (Luna, 2011).

The data obtained were evaluated through qualitative analysis, seeking to identify emerging thematic categories related to methodological strategies, pedagogical approaches and the insertion of Environmental Education in the school context. The interpretation of the data was carried out in the light of the theoretical framework adopted, allowing the establishment of relationships between the practices observed, the documents analyzed and the contributions of the scientific literature.

Finally, it is emphasized that the research respected ethical principles, ensuring the confidentiality of information and the confidentiality of the participants, as well as the use of data exclusively for academic and scientific purposes.

4 RESULTS AND DISCUSSIONS

The diagnostic analysis of the perception of the nine teachers participating in the research evidenced relevant aspects about the teaching of Environmental Sciences in the school context investigated. When questioned about their knowledge related to this area, six teachers stated that they had knowledge, while three indicated that they knew only partially. Although the majority answered affirmatively, it is observed that a significant portion does not have full mastery of the theme, which is a worrying fact, considering the centrality of Environmental Sciences in the formation of critical and conscious subjects.

This result signals weaknesses in the initial and continuing education of teachers, since Law No. 9,795/1999 establishes, in its Article 11, that the environmental dimension must be part of teacher training curricula at all levels and modalities of education (Brasil, 1999). This finding reinforces the need for investments in public policies for continuing education, capable of strengthening the theoretical and methodological knowledge of educators, enabling contextualized and socially committed pedagogical practices. According to Freire (1996), the teacher needs to create conditions for the student to build his own knowledge, in a dialogical process that allows him to intervene critically in the social reality.

Regarding the themes addressed with the students, in the Environmental Sciences classes, there was unanimity among the participants regarding the insertion of contents such as water resources, biodiversity, solid waste and pollution. This data reveals that environmental problems are present in the daily school life, which is positive, since such issues are part of the reality experienced by students. However, more than the simple approach to the themes, it is essential that these contents be worked on in a critical and reflective way, promoting environmental awareness and understanding of the relationships between society and nature (Carvalho, 2009).

When asked about the relevance of working with environmental issues in schools, the teachers highlighted awareness, awareness and the formation of responsible citizens as the main objectives. These perceptions dialogue with the conception of critical environmental education, which understands the school as a privileged space for the construction of values, attitudes and practices aimed at sustainability. In this sense, Floriani (2000) emphasizes that interdisciplinarity and the valorization of different types of knowledge are essential for a broad understanding of contemporary socio-environmental problems.

With regard to the documents and institutional resources that guide the teaching of Environmental Sciences, the results indicated that the themes are present in the Political-Pedagogical Project, in textbooks, in curriculum planning and in interdisciplinary projects. This finding demonstrates alignment with the National Common Curriculum Base, which assigns to education systems the responsibility of adapting content to the reality of students (Brasil, 2017). However, the presence in the documents does not guarantee, by itself, the effectiveness of transformative pedagogical practices, and it is necessary that such orientations materialize in the school routine.

The theme of water stood out as central to teaching practices, being considered relevant by all participants. Teachers associated its importance with the preservation, conscious consumption and survival of life. This understanding shows an adequate perception of the value of this natural resource, especially in a municipality marked by direct dependence on rivers and streams. However, despite the recognition of the relevance of the theme, some of the teachers stated that they felt only partially prepared to address it, pointing out the lack of specific training and didactic resources as the main difficulties.

This reality reinforces the need for training actions that enable teachers to understand the complexity of water-related issues, going beyond a simplified approach. Although basic knowledge about the importance of water is widely disseminated, critically discussing the causes of water resource degradation requires theoretical and methodological preparation. According to Leff (2012), overcoming the environmental crisis necessarily involves

overcoming the crisis of knowledge, which demands an education based on interdisciplinarity and dialogue of knowledge.

Regarding the interdisciplinary approach, the data indicated that the theme of water is mostly worked on in an integrated way between disciplines such as Natural Sciences, Geography and Portuguese Language, or even in all curricular components. This practice favors the systemic understanding of environmental problems, contributing to the articulation between human needs, social practices and natural dynamics, as highlighted by Floriani (2000).

As for the methodological strategies and didactic resources used, it was observed the predominance of the textbook, combined with dialogued expository classes, videos, posters and conversation circles. Although such strategies are relevant, the low use of alternative resources, such as didactic games and reusable materials, which have great pedagogical potential in the teaching of Environmental Sciences, is noteworthy. The dialogued expository class, widely cited, proves to be positive by promoting interaction and valuing students' previous knowledge, contributing to the formation of a learning community, as pointed out by Moreira and Santos (2020).

Regarding the teachers' knowledge about the Sustainable Development Goals, the results showed that only four participants stated that they knew them, while the others reported lack of knowledge or superficial knowledge. This data is worrying, considering that the 2030 Agenda and the SDGs are important references for the promotion of sustainable development at the global and national levels. The lack of knowledge about SDG 6, specifically related to water and basic sanitation, reinforces the need for greater dissemination and training on this topic in the school context, in view of the problems related to water supply in the municipality of São Sebastião da Boa Vista, Pará.

In view of this scenario, it is evident that the school, as a space for citizenship education, needs to take a more active role in the socialization of knowledge related to sustainability and the global commitments assumed by the country. According to Freire (1996), it is up to the teacher to promote an education that enables students to critically understand their role in society, contributing to the construction of environmental knowledge committed to the transformation of reality (Leff, 2012).

5 CONCLUSION

The present study made it possible to analyze the perceptions and pedagogical practices of basic education teachers about the teaching of Environmental Sciences, with emphasis on the theme of water and sustainability, in the context of the municipality of São

Sebastião da Boa Vista, in the Marajó archipelago (PA). The investigation showed that, although teachers recognize the relevance of environmental issues and address them in the classroom, there are still weaknesses related to specific training, conceptual mastery and the use of diversified methodologies and didactic resources.

The results showed that environmental themes are present in school documents and pedagogical planning, in line with the National Common Curriculum Base and with the current legislation. However, it was found that the implementation of these guidelines occurs, in many cases, in a limited way, lacking greater theoretical depth, interdisciplinarity and contextualization with the local socio-environmental reality, especially with regard to the problem of water resources.

It was observed that the theme of water is widely recognized by teachers as essential to life and sustainability, being worked on in an interdisciplinary way. However, a significant part of the teachers reported insecurity or partial preparation to address the complexity of problems related to water quality, basic sanitation and environmental degradation. This reality highlights the need for continuous investments in teacher training, since continuing education is fundamental for professional qualification and for strengthening pedagogical security in the sharing of curricular knowledge. In this sense, it is understood that "the school space can recover its public and democratic dimension, becoming an environment of integral education for all" (Betiate; Derisso, 2025, p. 12), contributing to the consolidation of a critical, reflective, and transformative environmental education.

Another relevant aspect refers to the misinformation, on the part of some teachers, about the 2030 Agenda and the Sustainable Development Goals, especially SDG 6, which deals with drinking water and sanitation. This data points to the urgency of institutional actions that promote the socialization of these global references in the school environment, understanding the school as a strategic space for the construction of an environmental awareness committed to sustainable development.

In view of the above, it is concluded that the teaching of Environmental Sciences, when articulated with the local reality, interdisciplinarity and dialogue between different knowledges, has great potential to contribute to the formation of critical, conscious and participatory subjects. Thus, it is essential that the government, educational institutions and education professionals act in an integrated manner, promoting continuing education policies, encouraging the use of innovative methodologies and valuing pedagogical practices that encourage the care, preservation and sustainable use of natural resources.

Finally, it is highlighted that this research has limitations related to the number of participants and the spatial cut adopted, which does not invalidate its results, but points to

the need for future studies that expand the investigated universe, deepen the analysis of pedagogical practices and explore educational strategies aimed at sustainability in riverside and Amazonian contexts.

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SCHOOL MEDIATION AND A CULTURE OF PEACE: STRATEGIES FOR REDUCING VIOLENCE AND IMPROVING EDUCATION

MEDIAÇÃO ESCOLAR E CULTURA DE PAZ: ESTRATÉGIAS PARA REDUÇÃO DA VIOLÊNCIA E MELHORIA DA EDUCAÇÃO

MEDIACIÓN ESCOLAR Y CULTURA DE PAZ: ESTRATEGIAS PARA LA REDUCCIÓN DE LA VIOLENCIA Y LA MEJORA DE LA EDUCACIÓN



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ABSTRACT

The increase in conflicts and manifestations of violence in the school environment has become one of the main challenges faced by educational institutions, affecting coexistence, the educational process, and the well-being of students and education professionals. In this context, school mediation emerges as a pedagogical and preventive alternative for the constructive management of conflicts, contributing to the promotion of a culture of peace. This article aimed to analyze school mediation as an instrument for the prevention and reduction of violence in the educational setting, as well as its contribution to strengthening interpersonal relationships based on dialogue, respect, and solidarity. The research problem consisted of understanding how school mediation can effectively address violence and promote the transformation of school culture. Methodologically, a qualitative approach was adopted, with an exploratory and bibliographic design, based on the analysis of books, scientific articles, and institutional documents addressing school violence, culture of peace,

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and conflict mediation. Data analysis was conducted using thematic content analysis. The results indicate that school mediation promotes improvements in school climate, strengthens interpersonal bonds, fosters the development of socio-emotional competencies, and reduces violent practices by encouraging dialogue, shared responsibility, and the participation of educational actors in conflict resolution. It is concluded that school mediation constitutes an effective and necessary strategy for building safer, more democratic, and more humane educational environments, contributing significantly to the dissemination of a culture of peace and to the civic education of children and adolescents.

Keywords: School Conflicts. Conflict Management. School Coexistence. Restorative Practices. Education for Peace.

RESUMO

O aumento dos conflitos e das manifestações de violência no ambiente escolar tem se consolidado como um dos principais desafios enfrentados pelas instituições de ensino, afetando a convivência, o processo educativo e o bem-estar de estudantes e profissionais da educação. Nesse contexto, a mediação escolar surge como uma alternativa pedagógica e preventiva para a gestão construtiva dos conflitos, contribuindo para a promoção da cultura de paz. O presente artigo teve como objetivo analisar a mediação escolar enquanto instrumento de prevenção e redução da violência no espaço educacional, bem como sua contribuição para o fortalecimento das relações interpessoais baseadas no diálogo, no respeito e na solidariedade. O problema que orientou a pesquisa consistiu em compreender de que maneira a mediação escolar pode atuar de forma eficaz no enfrentamento da violência e na transformação da cultura escolar. Metodologicamente, utilizou-se uma abordagem qualitativa, de natureza exploratória e bibliográfica, fundamentada na análise de livros, artigos científicos e documentos institucionais que abordam a temática da violência escolar, da cultura de paz e da mediação de conflitos. A análise dos dados foi realizada por meio da técnica de análise de conteúdo temática. Os resultados apontam que a mediação escolar favorece a melhoria do clima escolar, o fortalecimento dos vínculos interpessoais, o desenvolvimento de competências socioemocionais e a redução de práticas violentas, ao estimular o diálogo, a responsabilização e a participação dos atores educacionais na resolução dos conflitos. Conclui-se que a mediação escolar se configura como uma estratégia eficaz e necessária para a construção de ambientes educacionais mais seguros, democráticos e humanizados, contribuindo significativamente para a disseminação da cultura de paz e para a formação cidadã de crianças e adolescentes.

Palavras-chave: Conflitos Escolares. Gestão de Conflitos. Convivência Escolar. Práticas Restaurativas. Educação para a Paz.

RESUMEN

El aumento de los conflictos y de las manifestaciones de violencia en el entorno escolar se ha consolidado como uno de los principales desafíos que enfrentan las instituciones educativas, afectando la convivencia, el proceso educativo y el bienestar de estudiantes y profesionales de la educación. En este contexto, la mediación escolar surge como una alternativa pedagógica y preventiva para la gestión constructiva de los conflictos, contribuyendo a la promoción de la cultura de paz. El presente artículo tuvo como objetivo analizar la mediación escolar como instrumento de prevención y reducción de la violencia en el ámbito educativo, así como su contribución al fortalecimiento de las relaciones interpersonales basadas en el diálogo, el respeto y la solidaridad. El problema que orientó la investigación consistió en comprender de qué manera la mediación escolar puede actuar de forma eficaz en el enfrentamiento de la violencia y en la transformación de la cultura escolar. Metodológicamente, se adoptó un enfoque cualitativo, de carácter exploratorio y bibliográfico, fundamentado en el análisis de libros, artículos científicos y documentos

institucionales que abordan la temática de la violencia escolar, la cultura de paz y la mediación de conflictos. El análisis de los datos se realizó mediante la técnica de análisis de contenido temático. Los resultados indican que la mediación escolar favorece la mejora del clima escolar, el fortalecimiento de los vínculos interpersonales, el desarrollo de competencias socioemocionales y la reducción de prácticas violentas, al estimular el diálogo, la corresponsabilidad y la participación de los actores educativos en la resolución de los conflictos. Se concluye que la mediación escolar se configura como una estrategia eficaz y necesaria para la construcción de entornos educativos más seguros, democráticos y humanizados, contribuyendo de manera significativa a la difusión de la cultura de paz y a la formación ciudadana de niños, niñas y adolescentes.

Palabras clave: Conflictos Escolares. Gestión de Conflictos. Convivencia Escolar. Prácticas Restaurativas. Educación para la Paz.

1 INTRODUCTION

The growing number of acts of indiscipline and infractions committed by children and adolescents in the school context has aroused significant social concern, evidencing the complexity of the phenomenon of violence in the educational environment (Silva; Assis, 2018). The school, historically conceived as a space for training, socialization, and integral development, began to live with recurrent situations of aggressiveness, interpersonal conflicts, and violent behaviors, compromising the teaching-learning process and collective coexistence (UNESCO, 2019; Silva; Negreiros, 2020).

In this regard, such a scenario has caused relevant impacts, not only on the school performance of students, but also on the safety and well-being of education professionals. It is observed that many teachers are afraid to attend the work environment safely, while students and their families, in view of the insecurity established, opt for school transfer. These facts reinforce the perception that school violence is no longer an isolated episode, but a structural problem that demands effective and articulated responses (Silva et al., 2019).

The intensification of this phenomenon is associated, among other factors, with the advance of serious social problems, such as drug use and trafficking, family breakdown, social exclusion, and the weakening of community bonds (UNESCO, 2019). In this way, school violence goes beyond the limits of the educational institution, becoming a concern shared by society, families, public security systems, and educational policies (Jural et al, 2024).

From this perspective, there is a need to reflect on strategies capable of facing violence in the school environment in a preventive, educational and restorative way. Thus, the following research problem is formulated: in the contemporary socio-educational context, what is the importance of school mediation as a factor in reducing violence in the school environment?

The relevance of this study is justified by the urgency of discussing and implementing mechanisms that promote the peaceful resolution of conflicts in the school space, breaking with traditional punitive practices that often prove to be ineffective. School mediation presents itself as a promising alternative, as it prioritizes dialogue, active listening, co-responsibility, and the strengthening of interpersonal relationships, contributing to the construction of a safer, more democratic, and inclusive educational environment (Mello, 2023).

In addition, by fostering a culture of peace, school mediation collaborates with the citizenship formation of children and adolescents, developing socio-emotional skills that are fundamental for social coexistence and the exercise of citizenship. In this way, the study

contributes both to the academic field and to educational practice, offering theoretical subsidies for managers, educators, and public policy makers (Mello, 2023; Jural et al., 2024).

In this sense, this article aimed to analyze the importance of school mediation as a factor in reducing violence in the educational environment, as well as its contribution to the dissemination of the culture of peace in educational institutions, providing a healthy and conducive space for the educational development of children and adolescents.

2 METHODOLOGY

The present research was developed under a qualitative approach, of exploratory and bibliographic nature, with the objective of understanding school mediation as a strategy for the prevention and reduction of violence in the educational environment, as well as its contribution to the dissemination of the culture of peace in educational institutions. It is a theoretical-reflective study that seeks to systematize and critically analyze the knowledge produced on the subject, without collecting empirical data from subjects.

The exploratory nature of the research is justified by the need to deepen the conceptual and methodological understanding of school mediation, especially with regard to its theoretical bases, principles, forms of implementation and impacts on the educational context. The bibliographic approach is based on the analysis of previously published materials, enabling the mapping of the state of the art and the identification of relevant contributions to the field of study.

The theoretical basis of the work is based on the critical analysis of books, scientific articles and institutional documents, which address themes related to school violence, culture of peace, conflict mediation, restorative justice and educational practices of conflict management. This methodological strategy allowed to bring together different theoretical and empirical perspectives, favoring a broad and integrated understanding of the investigated phenomenon.

The selection of sources was carried out based on criteria of relevance, timeliness and scientific rigor, prioritizing publications indexed in recognized databases, such as Google Scholar, SciELO, Redalyc, ScienceDirect, Scopus, CAPES Journal Portal, as well as documents made available by international organizations and institutions linked to education and the promotion of the culture of peace, such as UNESCO. Works that had a direct relationship with the object of the research were included, while outdated materials, without consistent theoretical foundation or unrelated to the theme were excluded.

The analysis of the bibliographic data was conducted through the thematic content analysis technique, as proposed by Bardin (2011), which enables the identification,

categorization and systematic interpretation of the contents present in the selected sources. Based on this technique, analytical categories were defined that guided the discussion of the results, such as: violence and conflicts in the school environment; fundamentals of the culture of peace; school mediation as a pedagogical practice; advantages and limits of mediation in school; and school mediation as an instrument for preventing and reducing violence.

Although it is a bibliographic research, the study adopts the school environment as a contextual cut, considering the dynamics of educational institutions and the complexity of the interpersonal relationships established in them. There was no specific geographical delimitation, since the central objective consisted of the conceptual and theoretical analysis of school mediation, based on relevant national and international productions.

Finally, the information extracted from the sources was organized in a systematic way and articulated in a critical way, seeking to establish connections between the theoretical frameworks, the educational practices described in the literature and the contemporary challenges faced by school institutions in confronting violence and promoting peaceful coexistence.

3 VIOLENCE AND ITS ASPECTS

3.1 CONCEPT OF VIOLENCE

In the contemporary social context, it is observed that the media often emphasize episodes of violence, evidencing the relevance and severity of this phenomenon in the Brazilian scenario (Silva et al., 2019). Violence, in its multiple aspects, has reached significant proportions, reflecting a society that, in recent years, has shown increasing difficulties in the peaceful resolution of its conflicts (Silva; Negreiros, 2020). This reality stems from several social factors that directly influence the way individuals relate to each other.

From this perspective, it is essential to conceptually understand the phenomenon of violence, which has assumed significant visibility in the contemporary social context. According to the definition adopted by the World Health Organization, as presented by Elias (2011), violence consists of the deliberate use of physical force or power, either effectively or by means of threat, directed against oneself, against third parties or against groups and communities, which may result, or present a high probability of resulting, in physical damage, death, psychological damage, developmental impairment or situations of deprivation.

This concept highlights the breadth of the phenomenon of violence, as it encompasses both the use of physical force and the exercise of power, which are central elements for its understanding. By practicing violence, the individual or group seeks to impose its will on the other, reducing it to the condition of subordination. Such imposition can occur directly, through

physical aggression, or indirectly, through threat and psychological coercion, with the aim of minimizing the resistance of the other party and achieving the desired claim (Mello, 2023; Jural et al., 2024).

Regardless of its form of manifestation, violence causes significant damage to the subject of the action, and can result in severe consequences, such as physical injuries, death, psychological damage, damage to development or situations of deprivation. The concept of violence can be defined as the dishonest, arrogant and opportunistic use of power over the opponent, without legitimacy for it (Fernández, 2005).

Thus, it is inferred that violence is deeply incorporated into the social fabric, manifesting itself directly or indirectly and generating negative impacts on social relations and collective coexistence, compromising individual and social well-being.

However, it is essential to highlight that violence is not to be confused with conflict. Although all violence stems from a conflict, not all conflict results in violence. The main distinction lies in the fact that violence is socially constructed and, therefore, avoidable, while conflict is inherent to human coexistence and, to a large extent, inevitable (Elias, 2011; Digiácomo, 2026).

In the same sense, Crispino and Crispino (2002) define conflict as the situation in which two or more people have opposite, incompatible or perceived interests as such. Thus, conflict is a constitutive part of social relations, because where there is human interaction there are divergences of opinions, values and expectations. Violence, in turn, emerges from the inadequate conduct of these conflicts, and can be avoided when managed in a positive, dialogical and constructive way.

3.2 TYPES OF VIOLENCE

Violence manifests itself in the most diverse spheres of social life, taking on multiple forms and expressions. In this sense, it can be classified according to the context in which it occurs, highlighting the categories of self-directed, interpersonal, and collective violence (Rogers; Wilson; Dixon, 2026).

In this sense, Dahlberg and Krug (2006), in a widely recognized study on the subject, propose a classification that contributes significantly to the understanding of violence. The authors identify self-directed violence, collective violence, also called structural, and interpersonal violence.

Self-directed violence refers to actions in which the individual directs aggression against himself, manifesting itself, for example, through suicide and self-mutilation. Collective violence, on the other hand, is practiced by political, economic, or social groups, with the aim

of imposing power, ideology, or specific interests, usually resulting in oppression and social exclusion (Stelko-Pereira; Williams, 2010; Rogers; Wilson; Dixon, 2026).

Finally, interpersonal violence occurs in the daily relationships established within the family, the community, and social institutions. These are actions that involve physical, verbal, or psychological aggression, used as instruments of domination and imposition of will on the other, which can lead to injuries, traumas, and, in extreme cases, death (Jural et al., 2024).

Thus, it is perceived that violence is deeply inserted in the social dynamics, manifesting itself in different ways and directly impacting human relations in its various contexts.

3.3 VIOLENCE AND THE SCHOOL

In recent years, it has been observed that violence has reached social institutions traditionally considered safe spaces, among which the school stands out. As an environment for intellectual, moral, and social formation, the school has faced a significant increase in violent behaviors practiced by children and adolescents, who often resort to aggressiveness as a way to impose wills or achieve goals (Silva et al., 2019).

This reality has contributed to the establishment of a climate of insecurity, fear and instability in the school space, negatively affecting the teaching-learning process and the interpersonal relationships between students, teachers, managers and families. In this context, bullying stands out as one of the most recurrent and visible forms of school violence. Although historically naturalized as simple "jokes", it is now recognized that bullying produces deep and lasting consequences in the lives of victims, impacting their emotional health, academic performance, and socialization (Groff et al., 2022).

In addition, several conflicts present in daily school life can act as triggering factors for violence. In this sense, Gorbeña and Arregui (2012) identify the following as the main types of school conflicts: indiscipline, disruption, mistreatment between equals, school objection, absenteeism, vandalism and interpersonal conflicts.

School indiscipline is characterized by students' attitudes that transgress institutional norms, compromising the order and organization of the school environment. Disruption refers to intentional behaviors, usually occurring in the classroom, that aim to interrupt or impair the progress of pedagogical activities (Chrispino; Melo; Chrispino, 2024).

Mistreatment between equals corresponds to bullying, understood as the repeated practice of physical, verbal or psychological violence, with the aim of dominating and humiliating the other. School objection occurs when the student attends school against his will, motivated only by legal obligation, manifesting resistance, disinterest, and rejection of the educational process (Groff et al., 2022).

School absenteeism consists of repeated absence from classes, compromising the student's academic development. Vandalism, in turn, involves actions that cause damage to school and public property, negatively affecting the learning environment. Finally, interpersonal conflicts emerge from the relationships between students, teachers, and families, due to divergent interests, expectations, and values (Groff et al., 2022).

Thus, it is evident that the school, by bringing together individuals from different social, cultural and family origins, constitutes a space prone to the occurrence of conflicts and violence. It should be noted, however, that the list presented is merely illustrative, given the multiplicity of conflicting situations that may emerge in the school context.

4 CULTURE OF PEACE

From the perspective of a culture of peace, it can be said that it presents itself as a model of social coexistence oriented towards the promotion of harmonious, fraternal and solidary relationships, based on the recognition of the other as a subject of rights (Couto; Monteiro, 2026). It is a conception that values dialogue, interpersonal communication and altruism, seeking to overcome practices of violence and exclusion through cooperative and ethical attitudes.

The United Nations Educational, Scientific and Cultural Organization (UNESCO) emphasizes that the culture of peace is not restricted to the absence of violence, but comprises a set of values, attitudes and behaviors that reject violence and prevent conflicts, acting on its structural causes through dialogue and negotiation (UNESCO, 1999).

In this perspective, the concept of a culture of peace can be worked on as a form of harmonious and fraternal coexistence, interconnected by the spirit of love for the other, focused on a solidary, interpersonal and altruistic communication experience (Digiácomo, 2026).

4.1 CONCEPT

The culture of peace can be understood as a form of social coexistence based on the construction of solid foundations for peace, based on respect for differences and tolerance of diversity, considering the distinct individual, cultural and social characteristics of subjects and peoples. From this perspective, the culture of peace seeks to develop essential competencies, such as communicative skills, negotiation skills and consensus-building, guided by a non-prejudiced conception of interculturality and based on peaceful coexistence (Morgado; Oliveira, 2009).

This understanding is corroborated by Monteiro (2026), when he states that the culture of peace presupposes educational practices aimed at valuing dialogue, cooperation, and the constructive resolution of conflicts, understood not as threats to social coexistence, but as opportunities for learning and human development. For the author, peace is not configured as the simple absence of violence, but as a dynamic process of transformation of social relations.

In a complementary way, the United Nations Educational, Scientific and Cultural Organization (UNESCO, 1999) highlights that the culture of peace involves a set of values, attitudes and behaviors that reject violence and promote respect for human rights, social justice and solidarity, through dialogue and cooperation between individuals and groups.

Thus, the culture of peace reveals itself as a solidary coexistence, sustained by mutual respect and interpersonal communication, favoring the construction of more balanced and lasting social relationships. Therefore, by prioritizing dialogue and understanding, it enables the transformation of conflicts into positive elements of personal and collective growth, contributing to the strengthening of the social fabric and the consolidation of fairer and more democratic environments.

4.2 FEATURES

In this same perspective, it can be said that the culture of peace is essentially characterized by three basic principles for harmonious social coexistence: solidarity, dialogue, and respect (Digiácomo, 2026).

Solidarity is a fundamental element for peaceful coexistence, since it presupposes the recognition of the other as a subject worthy of care, empathy and cooperation. It is an ethical attitude that involves the feeling of otherness, of donation and of sensitization in the face of the needs and experiences of others. In this sense, solidarity can be understood as "mutual cooperation, interdependence among beings, identity of feelings and ideas" (HOUAISS, 2004, p. 689).

Dialogue, in turn, refers to the communication process established between individuals, characterized by the exchange of ideas, knowledge, and experiences. It is an indispensable principle for the construction of a culture of peace, as it enables people to express their opinions and be effectively heard, favoring mutual understanding and the construction of consensus, as well as the prevention and constructive resolution of conflicts (Silva; Negreiros, 2020).

Respect completes this conceptual tripod, configuring itself as the attitude of consideration and recognition of the other in their dignity, identity and differences. Built on

solidarity and dialogue, respect represents the element that consolidates more balanced and ethical social relations, serving as a basis for the effectiveness of the culture of peace in the social environment (Silva et al., 2019).

Therefore, the characteristics of the culture of peace are essential for the construction of a way of living based on respect, cooperation and peaceful coexistence, enabling the construction of fairer and more humanized social relations. Based on this understanding, it becomes pertinent to move on to the analysis of mediation, as a fundamental instrument for the constructive management of conflicts.

5 MEDIATION

In the midst of the multiplicity of conflicts and manifestations of violence present in contemporary society, Brazilian society has sought, in recent years, effective alternatives for the resolution of conflicts and the reduction of violence in the most diverse social contexts. This movement reflects the need to overcome traditional models, focused exclusively on judicialization, which often prove to be slow and insufficient to meet social demands (Silva et al., 2019).

In this scenario, several studies have been developed with the objective of analyzing and implementing alternative methods of conflict resolution, resorting, in many cases, to comparative law, in order to identify successful experiences in other countries capable of contributing to the improvement of the Brazilian justice system. Such initiatives seek to foster, in the social sphere, the autonomy of individuals and communities to manage their own conflicts, reducing dependence on the Judiciary as the only way to solve them (Silva; Negreiros, 2020).

Among the alternative methods of conflict resolution, mediation stands out, due to its unique character, as it gives the parties involved the leading role in the construction of the most appropriate solution to the conflict, with the help of an impartial third party. Mediation values dialogue, co-responsibility and cooperation, promoting consensual and sustainable solutions.

5.1 CONCEPT OF MEDIATION

Mediation is configured as an alternative means of conflict resolution, understood simultaneously as art and technique, through which an impartial third party, the mediator, assists the parties involved in conducting the dialogue, with a view to the peaceful resolution of the conflict. This process is not limited to the signing of agreements, but seeks, above all, the construction and strengthening of bonds of trust, as well as the reciprocal commitment

between those involved, contributing to the improvement of interpersonal relationships (Barcellas, 2012; Yu; Wang, 2022)

It is observed, from this conceptualization, that mediation presents itself as an alternative mechanism that is not to be confused with the performance of the Judiciary, constituting a voluntary option of the parties to obtain faster, more participatory and appropriate solutions to their realities. This method operates through the consensual choice of an impartial third party, who acts confidentially and equidistantly, coordinating and guiding the communicative process between those involved (Barcellas, 2012; Yu; Wang, 2022).

The consensual nature of mediation is also highlighted, as the parties freely decide to participate in the procedure and assume an active role in the construction of the solution to the conflict, which promotes the empowerment of the subjects and favors the elaboration of viable, sustainable and satisfactory solutions for all.

In the same sense, Moreira (2012) understands mediation not only as an instrument, but as a process of transformation of antagonisms, oriented to the convergence of interests, which is effected through the intervention of a third party voluntarily chosen by the parties. Such a process aims to resignify the conflict, shifting it from an adversarial logic to a collaborative perspective.

Both authors emphasize that mediation develops as a structured process, in which the presence of an impartial third party is essential to guide dialogue and communication between the parties. This mediator, oblivious to the conflict situation, employs specific techniques and strategies to facilitate listening, mutual understanding, and the construction of peaceful and consensual solutions (Digiácomo, 2026).

From the conceptual understanding of mediation, it becomes pertinent to analyze it in its application in the school context, a space marked by intense interpersonal relationships and the recurrence of conflicts that demand educational and restorative management practices.

5.2 SCHOOL MEDIATION

The school environment is a privileged space for learning, socialization and construction of interpersonal relationships, in which children and adolescents, belonging to different age groups and sociocultural contexts, live together on a daily basis. This intense and continuous coexistence, although fundamental for the integral development of students, is also a favorable terrain for the emergence of interpersonal conflicts that, when poorly conducted, can evolve into situations of violence (Barcellas, 2012; Yu; Wang, 2022).

It should be noted, however, that conflict should not be understood as a negative phenomenon in itself. On the contrary, it is an element inherent to human relations and life in society, being inevitable and necessary (Silva et al., 2019). What is imposed as a challenge is not the elimination of conflict, but its conduct in a positive, constructive and educational way. As Morgado and Oliveira (2009, p. 5) point out, "living together does not mean the absence of conflicts or having the objective of eliminating them. Conflict is inevitable to the human condition, conflict is the natural state of man."

In this sense, mediation in the school context presents itself as a relevant strategy for both the prevention and alternative resolution of conflicts, directing them in a pedagogical way to the construction of a healthy, safe and harmonious educational environment. School mediation breaks with merely punitive practices, prioritizing dialogue, co-responsibility, and the restoration of interpersonal relationships (Digiácomo, 2026).

But how to define school mediation? According to Morgado and Oliveira (2009), school mediation can be understood as a process of conflict resolution developed within the school institution, which, due to its specificities, involves all actors in the educational community, such as students, teachers, managers, parents and other members of the community. It is a procedure marked by characteristics such as flexibility, confidentiality and voluntariness, conducted by an impartial third party, who can be a properly trained education professional, with the objective of assisting the parties in the construction of viable and consensual solutions, stimulating values such as solidarity, tolerance, dialogue and equality.

Thus, the mediation of school conflicts can be understood as an adaptation of mediation methods to the educational context, incorporating the subjects that make up school life into the conflict management process. Its central purpose is to prevent and resolve latent or manifest conflicts, leading educational actors to understand the problem, to identify its causes and, above all, to the joint construction of constructive solutions, capable of strengthening peaceful coexistence and favoring the teaching-learning process.

5.2.1 Advantages of School Mediation

School mediation, as an alternative means of conflict resolution in the educational sphere, offers not only effective ways of coping with conflict situations, but also multiple advantages for the promotion of a peaceful, democratic and inclusive school environment.

In this sense, Morgado and Oliveira (2009, p. 45) highlights several advantages associated with the implementation of school mediation, among which the following stand out:

a) Creation of safe learning environments, since mediation programs contribute to the reduction of violence and to the reduction of conflicts between students, especially those based on ethnic, racial or social differences. In addition, they favor the reduction of suspensions, absenteeism and school dropout, often related to educational contexts marked by insecurity.

b) Promotion of constructive learning environments, characterized by a positive classroom climate, in which the proper management of behaviors favors discipline associated with respect and affection, essential elements for children and adolescents to feel safe to express ideas, feelings and opinions.

c) Personal and social development of students, through the learning of skills related to problem solving, recognition and management of emotions, reduction of aggressive behaviors and the use of constructive strategies in the face of conflicts, both in the school environment and in family and community contexts.

d) Construction of a constructive perspective of conflict, which seeks to stimulate social justice and the co-responsibility of the subjects for the problems and solutions produced in the school community. This approach favours the participation of families and the community in school life, as well as the extension of the skills acquired beyond the walls of the school, contributing to the reduction of tension and violence in the wider social context.

Thus, it is evident that school mediation plays a fundamental role in improving the educational environment, promoting constructive conflict management and the individual and collective development of students, contributing significantly to the consolidation of a culture of peace and harmonious coexistence in the school context.

6 THE IMPLEMENTATION OF MEDIATION AS A FACTOR FOR PREVENTING AND REDUCING VIOLENCE

School mediation plays a fundamental role in the educational context by contributing to the transformation of the culture of students and other school actors, recognizing them as active agents in the construction of social peace. Through this alternative method of conflict resolution, it seeks not only to solve specific situations of divergence, but, above all, to rebuild interpersonal relationships that have been weakened or broken as a result of conflicts and practices of violence, promoting dialogue, co-responsibility and the strengthening of social bonds (Barcellas, 2012; Yu; Wang, 2022).

The implementation of mediation in the school environment is a complex process that requires ideological, attitudinal and behavioral changes on the part of the entire educational community. As Morgado and Oliveira (2009) point out, the transformation of conflicts through

alternative methods, especially mediation, presupposes the development of skills related to the constructive management of conflicts, the improvement of interpersonal communication and the overcoming of models traditionally centered on repression and punishment. Thus, school mediation implies a break with authoritarian paradigms, opening space for a flexible, dialogical, and self-compositional approach to the conflicts experienced in everyday school life (Silva et al., 2019).

Before the effective implementation of school mediation, it is essential to carry out an institutional diagnosis that allows the identification of the main types of conflicts and manifestations of violence present in the educational context. Such a survey makes it possible to measure the situations to be worked on by the mediation program, as well as the understanding of the social, economic and cultural context in which the school and its actors are inserted, favoring the adoption of strategies compatible with the local reality. Next, it is necessary to sensitize the school community, students, teachers, managers, families, and other employees about the objectives, principles, and benefits of mediation, in order to promote collective engagement and commitment to the project (Digiácomo, 2026).

Subsequently, a team responsible for the implementation of the mediation program is constituted, with a clear definition of the attributions of each member, followed by the training of school actors on the fundamentals, techniques and principles of mediation. This stage aims to disseminate the mediating philosophy in the school environment, strengthening the understanding of mediation as a legitimate and effective strategy for conflict management. Subsequently, the selection and specific training of school mediators is carried out, which may include teachers, employees and students with an appropriate profile, in order to improve technical and communicational skills essential to the conduct of the mediating process (Barcellas, 2012).

With the mediators properly trained, the execution of the school mediation program begins, accompanied by continuous monitoring, with the purpose of identifying difficulties, evaluating partial results and promoting the necessary adjustments. At the end of this process, a systematic evaluation of the project is carried out, analyzing the achievement of the proposed objectives, the obstacles faced and the strategies adopted to overcome them, in order to ensure the effectiveness and sustainability of the initiative (Barcellas, 2012; Silva et al., 2019).

Regarding the functioning of the school mediation process, Crispino and Crispino (2002) describe that the mediating session is developed in structured stages, starting with the presentation and opening, when the mediator clarifies the objectives of the mediation, its rules and principles. Then, the exposition of the parties occurs, a phase in which each

involved presents their perception of the conflict, with the mediator being responsible for listening carefully, organizing the information and synthesizing the central points through techniques such as paraphrasing. Subsequently, the exchange between the parties takes place, a stage aimed at facilitating dialogue, identifying the underlying interests and stimulating empathy. In the next phase, possible solutions are searched for and evaluated together, analyzing their impacts and feasibility, until a consensus is reached. Finally, the agreement is formalized, reviewed by the parties and the mediator, ensuring its enforceability, and is then signed and monitored by the mediation team as to its fulfillment (Barcellas, 2012; Silva et al., 2019).

It should be emphasized that school mediation should not be conceived as an absolute or immediate solution to all the problems of the educational environment, but as a continuous process of cultural transformation. By encouraging practices of dialogue, respect and cooperation, mediation contributes significantly to the prevention and reduction of school violence, by promoting the capacity to resolve conflicts without the use of force or violence. In this sense, it acts directly in the reconstruction of interpersonal relationships and in the formation of more conscious, empathetic and responsible subjects (Barcellas, 2012; Silva et al., 2019).

Consequently, school mediation has an impact not only on the daily life of the school, but also on the lives of the educational actors and the social reality in which they are inserted, favoring the transition from a culture marked by violence and repression to a culture based on respect, solidarity and peace. Thus, it is consolidated as an essential pedagogical instrument for the construction of fairer, more democratic and humanized educational environments.

7 FINAL CONSIDERATIONS

It is concluded that school mediation is configured as a relevant pedagogical strategy, capable of re-signifying the conflicts inherent to school coexistence, transforming them into opportunities for learning, dialogue and socio-emotional development.

The findings show that school mediation favors the improvement of the institutional climate, the strengthening of bonds between educational actors and the reduction of violent practices, by stimulating communication, co-responsibility and the active participation of those involved in the resolution of conflicts. In addition, mediation contributes to the construction of a constructive perspective of the conflict, breaking with exclusively punitive practices and promoting a more democratic and humanized management of school relations.

It was verified, however, that the effectiveness of school mediation is conditioned to its systematic implementation, the engagement of the school community and the adequate training of mediators. The absence of training, institutional support and integration with the school's pedagogical project can compromise the expected results, limiting the scope of mediation as a continuous educational practice.

Finally, it is recommended that educational institutions invest in the continuing education of teachers and student mediators, in raising awareness in the school community and in incorporating mediation into pedagogical policies and practices. It is also suggested that future empirical studies be carried out to evaluate the application of school mediation in different educational contexts, contributing to the improvement and consolidation of this strategy as a permanent policy for promoting a culture of peace.

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YOUTH AND ADULT EDUCATION: PERSPECTIVES OF RESIDENTS OF SLUMS AND URBAN PERIPHERIES

EDUCAÇÃO DE JOVENS E ADULTOS: PERSPECTIVAS DE MORADORES DE FAVELAS E PERIFERIAS

EDUCACIÓN DE JÓVENES Y ADULTOS: PERSPECTIVAS DE HABITANTES DE FAVELAS Y PERIFERIAS URBANAS



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ABSTRACT

Considering the profound social, territorial, and educational inequalities that have historically shaped Youth and Adult Education (Educação de Jovens e Adultos – EJA) in Brazil, especially in the contexts of urban slums and peripheral areas, this article problematizes this educational modality as a public and subjective right whose implementation remains constrained by structural processes of exclusion. The study aims to critically analyze EJA based on the experiences and living conditions of individuals residing in these territories, discussing the meanings attributed to this modality within Brazilian educational policies. To this end, the article adopts a qualitative theoretical essay approach, grounded in a critical analysis of the academic literature on EJA, popular education, and structural inequalities, in dialogue with authors such as Freire (2004), Arroyo (2017), Paiva, and Julião (2019). The analysis reveals that educational policies aimed at EJA have historically been marked by a compensatory and utilitarian character, often subordinated to labor market demands and correction-of-flow logics, which limits access, permanence, and educational success for students in this modality. It is concluded that strengthening EJA requires its affirmation as a space for human, political, and emancipatory education, guided by the principle of equity and the recognition of differences, overcoming reductionist practices and reaffirming education as an instrument of social justice.

Keywords: Youth and Adult Education. Socio-educational Inequalities. Territory. Popular Education. Equity.

RESUMO

Considerando as profundas desigualdades sociais, territoriais e educacionais que historicamente atravessam a Educação de Jovens e Adultos (EJA) no Brasil, especialmente nos contextos de favelas e periferias urbanas, este artigo problematiza essa modalidade como um direito público e subjetivo cuja efetivação permanece tensionada por processos estruturais de exclusão. Objetiva-se analisar criticamente a EJA a partir das experiências e condições de vida de sujeitos moradores desses territórios, discutindo os sentidos atribuídos à modalidade no âmbito das políticas educacionais brasileiras. Para tanto, procede-se a um

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ensaio teórico de abordagem qualitativa, fundamentado na análise crítica da produção acadêmica sobre EJA, educação popular e desigualdades estruturais, em diálogo com autores como Freire (2004), Arroyo (2017), Paiva e Julião (2019). Desse modo, observa-se que as políticas educacionais destinadas à EJA foram historicamente marcadas por um caráter compensatório e utilitarista, frequentemente subordinadas às demandas do mercado de trabalho e à lógica de correção de fluxo, o que limita o acesso, a permanência e o sucesso escolar dos sujeitos da modalidade. Conclui-se que o fortalecimento da EJA exige sua afirmação como espaço de formação humana, política e emancipatória, orientada pelo princípio da equidade e pelo reconhecimento das diferenças, superando práticas reducionistas e reafirmando a educação como instrumento de justiça social.

Palavras-chave: Educação de Jovens e Adultos. Desigualdades Socioeducacionais. Território. Educação Popular. Equidade.

RESUMEN

Considerando las profundas desigualdades sociales, territoriales y educativas que históricamente atraviesan la Educación de Jóvenes y Adultos (EJA) en Brasil, especialmente en los contextos de favelas y periferias urbanas, este artículo problematiza esta modalidad educativa como un derecho público y subjetivo cuya efectivización permanece tensionada por procesos estructurales de exclusión. El objetivo es analizar críticamente la EJA a partir de las experiencias y condiciones de vida de los sujetos residentes en estos territorios, discutiendo los sentidos atribuidos a esta modalidad en el ámbito de las políticas educativas brasileñas. Para ello, se desarrolla un ensayo teórico de enfoque cualitativo, fundamentado en el análisis crítico de la producción académica sobre EJA, educación popular y desigualdades estructurales, en diálogo con autores como Freire (2004), Arroyo (2017), Paiva y Julião (2019). De este modo, se observa que las políticas educativas destinadas a la EJA han estado históricamente marcadas por un carácter compensatorio y utilitarista, frecuentemente subordinadas a las demandas del mercado laboral y a la lógica de corrección de trayectorias escolares, lo que limita el acceso, la permanencia y el éxito educativo de los sujetos de esta modalidad. Se concluye que el fortalecimiento de la EJA exige su afirmación como espacio de formación humana, política y emancipadora, orientada por el principio de la equidad y el reconocimiento de las diferencias, superando prácticas reduccionistas y reafirmando la educación como instrumento de justicia social.

Palabras clave: Educación de Jóvenes y Adultos. Desigualdades Socioeducativas. Territorio. Educación Popular. Equidad.

1 INTRODUCTION

Youth and Adult Education (EJA) is historically a modality marked by tensions, disputes and contradictions within Brazilian educational policies. Aimed at subjects who had their schooling processes interrupted or denied, EJA reveals, in a striking way, the structural inequalities that cross class society, especially when considering the territorial cut of residents of favelas and urban peripheries. These subjects, for the most part, carry fragmented school trajectories, crossed by experiences of poverty, multiple violence and systematic restrictions on access to basic rights.

In the Brazilian context, the processes of urbanization and industrialization, intensified from the beginning of the twentieth century, contributed to the consolidation of territories marked by the precariousness of living conditions and the historical denial of social rights. The favelas and peripheries, constituted in this movement, began to concentrate populations subjected to unequal labor relations, low levels of schooling and successive forms of educational exclusion. In this scenario, EJA emerges, simultaneously, as a possibility of guaranteeing the right to education and as a space tensioned by compensatory policies, often guided by the logic of minimum training for the labor market.

Although the Federal Constitution of 1988 and the Law of Guidelines and Bases of National Education (Law No. 9,394/1996) recognize education as a right of all, ensuring the full development of the person, the exercise of citizenship and the qualification for work, it is observed that, in practice, this right materializes in a profoundly unequal way. For the subjects living in favelas and peripheries, access, permanence and school success in EJA are crossed by social, territorial and institutional conditions that limit the realization of this right, revealing the limits of public educational policies in the face of structural inequalities.

In this context, this article aims to critically analyze EJA from the perspectives and living conditions of residents of favelas and peripheries, problematizing the meanings attributed to this modality within Brazilian educational policies. It is based on the understanding that EJA cannot be reduced to a strategy of flow correction or functional adaptation to the labor market, but must be conceived as a space for human, political and emancipatory education.

Methodologically, it is a theoretical essay with a qualitative approach, based on the critical analysis of the literature on EJA, popular education, territory and social inequalities. The dialogue with authors such as Freire (2004), Arroyo (2017), Paiva and Julião (2019) allows us to understand EJA as a field of disputes between antagonistic educational projects: on the one hand, practices aligned with the reproduction of social inequalities; on the other,

experiences and conceptions guided by emancipation, equity and the recognition of differences.

The article is organized into four sections, in addition to this introduction. Initially, the historical relationship between EJA, territory and social inequalities is discussed. Then, the impacts of educational policies and living conditions on the processes of access and permanence of subjects in EJA are analyzed. In the third section, the contemporary challenges imposed by territorial violence and the precariousness of social rights are problematized. Finally, in the final considerations, the need to strengthen EJA as a public policy committed to social justice and to the critical formation of subjects is reinforced.

2 THEORETICAL FRAMEWORK

Youth and Adult Education (EJA) is historically an educational modality intrinsically linked to the struggles for the right to education and the democratization of access to school knowledge in Brazil. Although the Federal Constitution of 1988 and the Law of Guidelines and Bases of National Education recognize EJA as an integral part of basic education and as a public and subjective right, its implementation remains marked by profound contradictions. As Paiva (2019) points out, the distance between normative recognition and the concrete guarantee of this right highlights the limits of educational policies in the face of the structural inequalities that cross Brazilian society. In this sense, EJA cannot be understood as a residual or merely compensatory policy, but as an expression of interrupted school trajectories produced by historical processes of exclusion.

The subjects who demand EJA are, for the most part, workers and residents of favelas and urban peripheries, whose life experiences evidence the articulation between social class, work, territory and schooling. Arroyo (2017) highlights that these subjects bear the marks of a profoundly unequal society, in which the right to education is constantly postponed, especially for those inserted in contexts of social precariousness. Favelas and peripheries are configured as socially produced territories, crossed by processes of socio-spatial segregation, daily violence, precariousness of public services and the selective presence of the State. Such conditions directly affect the access, permanence and academic success of EJA students, reinforcing that their educational trajectories cannot be interpreted from individualizing or meritocratic explanations.

The incorporation of the territory category into the EJA analysis allows us to understand that educational inequalities are produced beyond the school space. Territorial violence, long working hours, the instability of public policies and the multiple forms of violation of rights directly impact the daily school and learning processes. In this context, the

school can assume both the role of reproducing inequalities and a space for welcoming, resistance and collective construction, depending on the political-pedagogical project that guides it and the recognition of the experiences and knowledge of the EJA subjects.

The perspective of popular education, especially from the contributions of Paulo Freire (2004), offers important theoretical contributions to the understanding of EJA as a space for human, political and emancipatory formation. For Freire, education should be conceived as a social practice committed to dialogue, awareness and the transformation of reality, breaking with banking and technicist models of teaching. This conception recognizes students as historical subjects, bearers of knowledge built in their life and work experiences, and places concrete reality as a starting point for the formative processes. Such an approach is opposed to utilitarian practices that reduce EJA to rapid certification or immediate adaptation to the demands of the labor market.

However, educational policies aimed at EJA have historically been marked by a compensatory and utilitarian logic, often associated with flow correction and the fulfillment of quantitative goals. Paiva (2019) argues that this perspective reinforces the structural duality of the Brazilian educational system, allocating differentiated educational projects to different social segments. For EJA subjects, especially those from peripheral territories, this logic results in lightened curricula, precarious teaching conditions and devaluation of teaching work, limiting the emancipatory potential of the modality.

Julião (2019) highlights that, despite these limitations, EJA can constitute a privileged space for the affirmation of rights and strengthening of citizenship, as long as it is guided by political-pedagogical projects committed to equity, the recognition of differences, and social justice. Reaffirming EJA as an emancipatory public policy implies overcoming reductionist perspectives and facing the structural inequalities that produce educational exclusion. Thus, thinking about Youth and Adult Education from the territories of favelas and peripheries requires recognizing the subjects as protagonists of their stories and education as a central instrument in the construction of a more just and democratic society.

3 YOUTH AND ADULT EDUCATION, TERRITORY AND STRUCTURAL INEQUALITIES

Youth and Adult Education (EJA) expresses, in a particularly acute way, the social and educational inequalities historically produced within Brazilian capitalist society. The subjects who demand this modality, for the most part, belong to the popular classes and live in territories marked by precarious living conditions, such as favelas and urban peripheries. Their interrupted school trajectories cannot be understood as individual choices or personal failures, but as the result of structural processes of exclusion that articulate social class, territory, work and unequal access to rights.

The processes of urbanization and industrialization, intensified in Brazil throughout the twentieth century, contributed to the consolidation of peripheral territories intended for the housing of the labor force necessary for the expansion of capital. In this movement, the schooling of the popular sectors was historically conceived in an instrumental way, oriented towards the minimum training required by the labor market. This perspective reinforced the structural duality of the Brazilian educational system, in which education aimed at the elites differs profoundly from that offered to the working classes, both in terms of access and quality.

In this context, EJA began to occupy an ambiguous place in educational policies. On the one hand, it constitutes a strategy to guarantee the right to education to those who were deprived of this right in childhood; on the other hand, it often assumes a compensatory and utilitarian character, aimed at correcting the flow and rapid certification, without addressing the structural causes of school exclusion. As Paiva (2019) points out, the formulation of EJA policies reveals deep contradictions between the principles of inclusion, citizenship and quality and the material and institutional conditions effectively offered to the subjects of the modality.

The relationship between territory and schooling is central to understanding these contradictions. Favelas and peripheries are not only configured as geographical spaces, but as socially produced territories, crossed by historical inequalities, stigmatizations and systematic denials of rights. As Patrocínio (2018) points out, these territories bear the marks of socially excluding processes that directly impact the educational experiences of their residents. Thus, the difficulties faced by EJA students are not restricted to the school space, but are articulated with living conditions marked by insecurity, the precariousness of public services and instability in the world of work.

Throughout the Brazilian trajectory, educational policies aimed at the training of young people and adults were, to a large extent, designed based on the needs of economic development, and not on the formative demands of the subjects. The creation of institutions such as the National Service for Industrial Learning (SENAI) and the National Service for

Commercial Learning (SENAC), still in the 1940s, exemplifies the centrality of technical training aimed at the qualification of the workforce. Although such initiatives have contributed to the expansion of training opportunities, they have also reinforced the subordination of education to the demands of capital, limiting its emancipatory potential.

This logic is maintained, in different ways, in contemporary EJA policies, especially when the modality is used as a mechanism for statistical adjustment of education systems, without due investment in conditions of access, permanence and school success. The persistence of high rates of functional illiteracy and age-grade distortion shows that the denial of the right to education is not solved only by expanding the supply of vacancies, but requires confronting the structural inequalities that cross the territories and the subjects. Paiva (2019, p.92) points out that:

[...] What would become of capitalist society, however, without the labor force that constitutes the illiterate and uneducated reserve army that submits to unqualified underemployment, without labor guarantees and without opportunities for advancement, if these uneducated people began to recognize the processes of subordination and oppression that maintain the wealth of a few with the poverty of so many?

Thus, understanding EJA from the territory category allows us to shift the focus from individualizing analyses to a critical reading of the social, political and economic conditions that produce educational exclusion. By recognizing EJA students as historical subjects, bearers of knowledge and experiences built in adverse contexts, space is opened to think of education not as an instrument of adaptation to the current order, but as a social practice committed to the transformation of the conditions that produce inequality.

4 FAVELAS, PERIPHERIES AND EDUCATIONAL POLICIES: LIMITS OF ACCESS AND PERMANENCE

The realization of the right to education in the modality of Youth and Adult Education (EJA) faces profound limits when analyzed from the concrete living conditions of the subjects living in favelas and urban peripheries. Although the Brazilian legal system recognizes education as a public and subjective right, educational policies aimed at EJA have proven to be insufficient to ensure, in an equitable way, the access, permanence and school success of these students. Such insufficiency reveals the distance between legal normativity and the reality experienced daily in popular territories.

Territorial inequalities operate as one of the main conditions of access to school. In many peripheral and slum contexts, the commute to the school is crossed by precarious

public services, lack of adequate transportation, restrictions imposed by armed conflicts and police operations, in addition to the constant fear resulting from daily violence. These factors have a direct impact on school attendance, especially in EJA, which is mostly offered during the night shift, a period in which security conditions become even more fragile.

The permanence of students in EJA is also impacted by multiple social vulnerabilities. Many subjects reconcile long working hours, family responsibilities and precarious housing conditions, which compromises the time and willingness necessary to monitor school activities. In addition, it is not uncommon for the school to be configured as the only space for access to regular food or basic services, revealing the assistance character that sometimes permeates the educational experience of these students.

In this scenario, the recurrent use of EJA as a strategy for correcting the flow and administrative management of education systems is observed. The early allocation of adolescents to the modality, with the objective of reducing age-grade distortion rates, tends to disregard the formative specificities of EJA and the complexity of interrupted school trajectories. Data from the United Nations Children's Fund (UNICEF, 2017) indicate that millions of students in Brazilian basic education are in a situation of school delay, most of whom come from the lower classes. The transfer of these subjects to EJA, without adequate monitoring and support policies, contributes to the worsening of educational inequalities, instead of addressing them. Paiva (2019, p.97) states that:

Quality, therefore, is not only made in the dimension of the subjects who study in school, but is linked with those who transit and orbit around them, in all the social and political spaces that shape them as subjects of rights for whom the school can be a powerful device of human and political formation.

The quality of education offered in EJA is another critical point of educational policies. As Paiva (2019) argues, the notion of quality cannot be dissociated from the social, institutional and political conditions that shape the school experience. In the case of EJA, the absence of structural investments, the precariousness of teaching work, the turnover of professionals and the fragility of pedagogical projects compromise the construction of significant training processes. Thus, the permanence of students does not depend only on their "individual motivation", but on the school's ability to recognize their experiences, knowledge and specific needs.

By prioritizing quantitative goals to the detriment of qualitative actions, public educational policies tend to make the obstacles faced by EJA subjects invisible. The expansion of the supply of vacancies, although necessary, does not guarantee, by itself, the right to education. According to Julião (2019, p.51):

We need to move forward by rebuilding our institutions and strengthening our "Democratic Rule of Law" [Article 1 of the Federal Constitution]. It is essential that the Councils strengthen and empower themselves institutionally to assert their rights as representatives of society in the State, defending the implementation of public policies that will guarantee the democratization of education in its various instances – elementary, secondary and higher education –, proposing that the expansion of access, the socialization of discussions, thus enabling social equity, guaranteeing no less rights for the entire population.

As Julião (2019) points out, the democratization of education requires the articulation between access, permanence, and learning, as well as the strengthening of participatory instances and the role of the State in the implementation of policies committed to social equity.

It is in this context that the strategic role of the school as a space of mediation between educational policies and territorial realities is evident. When detached from the students' life contexts, the school tends to reproduce exclusionary practices, reinforcing the distance of the subjects from EJA. On the other hand, when guided by a critical and democratic perspective, it can constitute a space for welcoming, recognition and resistance, contributing to the construction of fairer educational trajectories.

Therefore, the limits of access and permanence in EJA cannot be understood as individual failures of the students, but as an expression of the structural inequalities that cross educational policies and peripheral territories. Facing these limits implies rethinking the place of EJA in public policies, overcoming its use as a compensatory mechanism and affirming it as an educational policy committed to social justice and the effective guarantee of the right to education.

5 TERRITORIAL VIOLENCE, THE STATE AND THE RIGHT TO EDUCATION IN YOUTH AND ADULT EDUCATION

The analysis of Youth and Adult Education (EJA) in the territories of favelas and urban peripheries requires the recognition of the multiple forms of violence that cross the daily lives of the subjects who demand this modality. Violence, far from being restricted to specific episodes, constitutes a structural dimension of social life in these territories, manifesting itself in a physical, symbolic, institutional and political way. Such forms of violence directly impact the exercise of the right to education, compromising the access, permanence and learning processes of EJA students.

In peripheral and favela territories, the presence of the State occurs in an ambiguous and selective way. While essential public policies — such as sanitation, health, urban mobility, and quality education — have historically been insufficient or absent, state public security actions tend to materialize through police operations marked by the logic of confrontation and

repression. These interventions, often violent, directly affect school routines, interrupting classes, making travel unfeasible and producing fear, insecurity and emotional suffering among students and education professionals.

In addition to state action, many of these territories are crossed by the presence of parallel powers, such as drug trafficking and militias, which impose their own forms of social and territorial control. The coexistence between these powers and the State produces a scenario of permanent instability, in which the residents' right to come and go is constantly threatened. For EJA students, this reality often means the need to negotiate their permanence in school on a daily basis in the midst of concrete risks to physical and emotional integrity.

The consequences of this violence for educational processes are profound. Irregular attendance, constant interruptions in the school calendar, and physical and emotional exhaustion resulting from experiences of violence compromise learning and reinforce trajectories of school failure. As Arroyo (2017) points out, the subjects who arrive at EJA carry marks of unjust lives, crossed by systematic denials of rights, which requires the school to have an ethical and political posture committed to understanding these trajectories.

In this sense, violence cannot be understood only as a factor external to the school, but as a constitutive element of the conditions in which the educational process develops. The school located in these territories is crossed by the contradictions of the social context, being, at the same time, a space of protection and exposure to inequalities. The absence of integrated policies that articulate education, social assistance, health and public safety shows the fragmentation of State actions and the fragility of institutional responses to the demands of EJA subjects.

The reflection proposed by Freire (1997) contributes decisively to understanding the relationship between violence and education. By denouncing the multiple faces of violence — economic, racial, class, gender, and symbolic — the author highlights the need for an educational practice committed to humanization and the construction of critical consciousness. For Freire, education cannot be limited to the transmission of content, but must be constituted as a practice of freedom, capable of problematizing the historical conditions that produce oppression and dehumanization.

In the context of EJA, this perspective implies recognizing students as historical subjects, bearers of knowledge built in the midst of adversity. Instead of blaming them individually for school failure, it is necessary to understand how territorial and institutional violence affects their educational trajectories. Such recognition requires from the school and educators a pedagogical posture sensitive to the realities experienced, capable of transforming the school space into an environment of welcoming, listening and resistance.

On the other hand, it is also essential to consider the working conditions of the teachers who work in EJA in these territories. Teachers and managers face, on a daily basis, the precariousness of working conditions, the lack of institutional support and the emotional impacts resulting from living with contexts of violence. Even so, many build pedagogical practices committed to the defense of the right to education and to the appreciation of life, reaffirming the role of the school as a space of resistance in the face of multiple forms of oppression.

Thus, the relationship between territorial violence, the State and the right to education in EJA highlights the urgency of integrated public policies, guided by the principle of equity and the centrality of human rights. Overcoming the limits imposed by violence requires recognizing that the right to education cannot be implemented in isolation, but depends on the guarantee of dignified living conditions, security and social justice for the subjects who inhabit popular territories.

6 IMPLICATIONS FOR AN EMANCIPATORY YOUTH AND ADULT EDUCATION: EQUITY, CURRICULUM AND RESISTANCE

The analysis of the living conditions, school trajectories and the multiple forms of violence that the subjects of Youth and Adult Education (EJA) living in favelas and urban peripheries go through imposes the need to rethink the political, pedagogical and curricular foundations of this modality. In the face of structural inequalities that limit access, permanence and school success, EJA cannot be conceived only as a compensatory strategy or as a mechanism for correcting the flow, but as a public policy committed to equity, social justice and human emancipation.

The principle of equity assumes centrality in this debate, since recognizing the right to education implies considering the concrete inequalities that subjects go through. As Paiva (2019) argues, formal equality is not enough to guarantee the right to education in contexts marked by deep social asymmetries. Equity, in this sense, requires the provision of differentiated conditions, capable of responding to the specific needs of EJA students, especially those who live in territories historically neglected by the State.

In the curricular sphere, this perspective implies overcoming homogeneous and decontextualized proposals, which disregard the knowledge, experiences and identities of the EJA subjects. A curriculum committed to emancipation must dialogue with the sociocultural realities of students, valuing their previous knowledge and promoting problematizing pedagogical practices. As Freire (2004) argues, education needs to start from

the critical reading of the world in order to then enable the reading of the word, building formative processes that articulate knowledge, political awareness and transformative action.

The valorization of the knowledge built in popular territories is also a central element of an emancipatory EJA. The experiences of work, struggle for survival, community organization and resistance to violence configure legitimate forms of knowledge, often made invisible by traditional school curricula. Recognizing this knowledge does not mean romanticizing poverty or exclusion, but affirming the dignity of the subjects and their right to actively participate in the construction of knowledge.

In this process, the role of educators assumes strategic relevance. Teachers who work in EJA in contexts of favelas and peripheries face challenges that go beyond the pedagogical field, requiring sensitivity, ethical commitment and political positioning. Arroyo (2017) highlights the importance of reinventing educational identities capable of understanding the human and inhuman paths of students, recognizing them as subjects of rights and protagonists of their stories. Teacher training, therefore, must contemplate critical reflection on social, racial, territorial and class inequalities, strengthening pedagogical practices committed to social transformation.

In addition, thinking of EJA as a space of resistance implies recognizing the school as a territory of dispute. In contexts marked by the presence of parallel powers and institutional violence, the school can be one of the few spaces for protection, dialogue and collective construction. This function, however, cannot be sustained only by the individual effort of educators and managers, but requires integrated public policies that guarantee material conditions, institutional support and appreciation of teaching work.

Emancipatory EJA, therefore, demands a break with the utilitarian logic that has historically subordinated education to the demands of the labor market. Although the dimension of professional qualification is relevant, it cannot override the right to integral human education. Education, in this sense, should contribute to the strengthening of critical awareness, to the recognition of inequalities and to the construction of collective projects guided by social justice.

Thus, the implications for an emancipatory EJA point to the need for educational policies that articulate equity, critical curriculum and pedagogical practices committed to human dignity. By affirming EJA as a space of resistance and production of meanings, education is reaffirmed as a right and as a social practice capable of tensioning the structures that produce and reproduce inequality.

7 CONCLUSION

This article aimed to critically analyze Youth and Adult Education (EJA) from the living conditions and experiences of subjects living in favelas and urban peripheries, understanding this modality as a public and subjective right tensioned by deep social, territorial and educational inequalities. Throughout the text, it was sought to show that the interrupted school trajectories of these subjects cannot be explained by individual factors, but must be understood in the light of historical and structural processes of exclusion produced within the Brazilian capitalist society.

The analysis developed showed that, although EJA is legally guaranteed as a right, its materialization occurs in an unequal way, marked by policies of a compensatory and utilitarian nature and, in many cases, guided by the logic of flow correction and rapid certification. Such a configuration limits the formative potential of the modality and contributes to the reproduction of inequalities that have historically distanced young people and adults from regular school trajectories.

By considering the territories of favelas and peripheries as central analytical categories, the article highlighted the impact of territorial inequalities, structural violence, and the selective presence of the State on access, permanence, and school success in EJA. The multiple forms of violence — physical, symbolic, institutional, and political — cross the daily lives of students and educators, compromising the full exercise of the right to education and revealing the need for integrated public policies that articulate education, human rights, security, social assistance, and decent living conditions.

In this context, EJA was defended as a strategic space for resistance and dispute of educational projects. An EJA committed to human emancipation requires the strengthening of the principle of equity, the construction of critical and contextualized curricula and the recognition of the knowledge produced in the life experiences of the subjects. Valuing this knowledge not only reaffirms the dignity of students, but also contributes to the construction of pedagogical practices capable of promoting critical awareness and social engagement.

The role of educators thus emerges as a central element in this process. Teachers who work in EJA, especially in contexts of favelas and peripheries, face challenges that go beyond the pedagogical field, requiring critical training, sensitivity to territorial realities, and ethical-political commitment to the defense of the right to education. However, such responsibilities cannot fall exclusively on school subjects, and it is essential to strengthen public policies and institutional conditions that sustain the teaching work.

Finally, it is recognized that this study, as it is a theoretical essay, does not exhaust the complexity of the experiences lived by the subjects of EJA in popular territories. As a result,

the need for empirical research that deepens the listening of students and educators is pointed out, contributing to the construction of educational policies and practices that are more sensitive to territorial inequalities and committed to social justice.

It is concluded that strengthening EJA as an emancipatory public policy implies breaking with reductionist perspectives and reaffirming education as a right, as a social practice and as an instrument for transforming the conditions that produce exclusion. By recognizing the subjects of EJA as protagonists of their stories and bearers of legitimate knowledge, the possibility of building an education guided by equity, human dignity and the struggle for a socially just society is reaffirmed.

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THE YOUTH AND ADULT EDUCATION POLICY IN THE MUNICIPALITY OF IMPERATRIZ/MA

A POLÍTICA DE EDUCAÇÃO DE JOVENS E ADULTOS NO MUNICÍPIO DE IMPERATRIZ/MA

LA POLÍTICA DE EDUCACIÓN DE JÓVENES Y ADULTOS EN EL MUNICIPIO DE IMPERATRIZ/MA



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ABSTRACT

Youth and Adult Education (EJA) in Brazil is a fundamental component of inclusive education; however, it faces a series of structural and social challenges that compromise its development and student retention. In many localities, especially in peripheral areas, difficulties related to the labor market, the overload of family responsibilities, and the lack of institutional support make the educational process even more challenging. This article investigates the relationship between Youth and Adult Education and the world of work in the city of Imperatriz, Maranhão, a municipality characterized by significant social and economic inequalities. From this perspective, the study seeks to critically analyze the advances and challenges of EJA policy based on the materialization of this educational modality at the Maria Evangelista Municipal School, located in the municipality of Imperatriz/MA. In addition, the study explores the importance of humanizing the educational process by providing a space of inclusion and transformation that takes into account the specificities of the local context and the realities of those living on the urban periphery.

Keywords: Youth and Adult Education. EJA. Educational Policy. Social Inequality. Imperatriz.

RESUMO

O Ensino Jovem Adulto (EJA) no Brasil é um componente fundamental da educação inclusiva, mas enfrenta uma série de desafios estruturais e sociais que comprometem seu desenvolvimento e a permanência dos estudantes. Em muitas localidades, especialmente nas periferias, as dificuldades relacionadas ao mercado de trabalho, à sobrecarga de responsabilidades familiares e à falta de apoio institucional tornam o processo educativo ainda mais desafiador. Este artigo investiga as relações entre a educação da EJA e o mundo do trabalho na cidade de Imperatriz, Maranhão, um município caracterizado por suas desigualdades sociais e econômicas. A partir dessa perspectiva, busca-se analisar, de maneira crítica, os avanços, desafios da política da EJA, a partir da materialidade dessa

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modalidade educacional na Escola Municipal Maria Evangelista, localizada no município de Imperatriz/MA. Além disso, explora-se a importância de humanizar o processo educacional, proporcionando um espaço de acolhimento e transformação que considere as especificidades do contexto local e as realidades de quem vive na periferia urbana.

Palavras-chave: Educação de Jovens e Adultos. EJA. Política Educacional. Desigualdade Social. Imperatriz.

RESUMEN

La Educación de Jóvenes y Adultos (EJA) en Brasil constituye un componente fundamental de la educación inclusiva; sin embargo, enfrenta una serie de desafíos estructurales y sociales que comprometen su desarrollo y la permanencia de los estudiantes. En muchas localidades, especialmente en las periferias, las dificultades relacionadas con el mercado laboral, la sobrecarga de responsabilidades familiares y la falta de apoyo institucional hacen que el proceso educativo sea aún más desafiante. Este artículo investiga la relación entre la Educación de Jóvenes y Adultos y el mundo del trabajo en la ciudad de Imperatriz, Maranhão, un municipio caracterizado por profundas desigualdades sociales y económicas. Desde esta perspectiva, se busca analizar de manera crítica los avances y desafíos de la política de la EJA a partir de la materialización de esta modalidad educativa en la Escuela Municipal Maria Evangelista, ubicada en el municipio de Imperatriz/MA. Asimismo, se explora la importancia de humanizar el proceso educativo, proporcionando un espacio de acogida y transformación que considere las especificidades del contexto local y las realidades de quienes viven en la periferia urbana.

Palabras clave: Educación de Jóvenes y Adultos. EJA. Política Educativa. Desigualdad Social. Imperatriz.

1 INTRODUCTION

Youth and Adult Education (EJA), historically relegated to the margins of the Brazilian educational structure, is a privileged expression of the contradictions of the country's social formation. From the colonial period, through the Empire and the Republic, access to education was concentrated in the economic, political and racial elites, reproducing the classist and excluding character of the Brazilian State (SAVIANI, 2011; LOMBARDI, 2008). Thus, the marginalization of young people and adults who did not have access to school at the "appropriate" age is not an accidental phenomenon, but the result of the very logic of reproduction of inequality characteristic of dependent capitalism (FERNANDES, 1972; MARINI, 1973).

EJA plays an essential role in the process of social inclusion and reduction of inequalities in Brazil. However, the country has serious challenges in the high dropout rates of the EJA program. According to data from the 2022 School Census, this rate was 21.7% between 2018 and 2022, with a dropout rate of 19.75% in elementary school and 24.7% in high school. In the year 2024, the school census data show that enrollment in EJA continues to fall, with 2.4 million students in 2024, the lowest level since 2020. In 2024, there were a total of 2.4 million enrollments, a reduction of 600 thousand students compared to 2020 (INEP, 2025). being a problem that has been developing, affecting not only the dropout individuals, but an entire community or environment in which they find themselves.

This whole context grows when observed and analyzed in a regional way, as in the case of Maranhão, a state with a large historical framework of socioeconomic inequality that threatens the development of young people and adults in Maranhão supported by the EJA program. Maranhão, according to IBGE data (2025), has the lowest average monthly household income per capita in Brazil, reaching R\$ 1,078 in 2024; The state has the highest proportion of poor people in Brazil, with 57.90% in 2021, and the second highest rate of extreme poverty in the country; 5.1% of the persons per household live with severe food insecurity. With regard to data on education in the state, Maranhão has the lowest Human Development Index (HDI) in the education dimension, with an index of 0.612; Approximately only 11% of the population of Maranhão has higher education and 11.4% of the population is illiterate (IBGE, 2025).

The Maranhão Institute of Socioeconomic and Cartographic Studies indicates that data from IMESC point to high dropout numbers of EJA students in Maranhão, who often find themselves in a circle of lack of economic control and educational structural deficiency. These aspects are combined to create an environment in which many students drop out of school because they are unable to reconcile learning with their daily obligations such as work and

livelihoods, or because they do not find the social justifications to study, due to stereotypes focused on ages, gender and even the places and communities where they live where there is no incentive to study.

EJA is therefore located at the intersection between work, inequality and social reproduction. As Mészáros (2008) argues, capitalism not only produces inequalities: it needs them to preserve itself, subordinating education to the demands of accumulation. The school exclusion of workers and their subsequent reintegration in the form of compensatory policies is part of the cycle of expanded reproduction of this social order. In the Brazilian case, marked by massive informality, overexploitation of labor, and racial and regional inequality, EJA reveals the most explicit face of the secular denial of the right to education to the popular classes, especially to black women and precarious workers (ARROYO, 2017; GONZALEZ, 1988).

Recent data reinforce this structural thesis. Between 2018 and 2024, EJA enrollments had a significant reduction, falling from 3 million to 2.4 million students (INEP, 2025), while school dropout remained above 21%, as already mentioned in previous lines. These indicators cannot be explained by supposed "individual disinterest", but rather by the objective living conditions of this population, marked by long working hours, informality, high prices, urban violence, domestic overload and the absence of intersectoral public policies. As Antunes (2018) points out, the advance of neoliberalism has intensified the precariousness of life, producing "exhausted subjectivities" incapable of guaranteeing educational stability.

The city of Imperatriz/MA expresses, on a local scale, these structural determinations. Disorderly urban growth, the absence of robust public policies, socio-spatial segregation and the predominance of informal work constitute the daily scenario in which the Maria Evangelista Municipal School is inserted, located in a periphery marked by social vulnerability and precarious public services. The reality of its students, mostly poor women, housewives, informal workers and heads of household, synthesizes the relationship between class, gender, race and territory in the constitution of the subjects of EJA (HIRATA; KERGOAT, 2007; ARROYO, 2017).

Interrupted school trajectories, late return to school, strenuous domestic responsibilities and constant migration between precarious occupations make up the picture that explains the strong dropout rate of this modality. As Charlot (2000) argues, "school failure is always socially produced, and it is necessary to understand the conditions of existence of students in order to interpret their relationship with knowledge" (p.27). In EJA, this is even more evident, as its subjects are workers who daily compete for their time, energy and survival with the demands of capital.

However, Freire (1987) reminds us that, even in the most adverse contexts, adult education constitutes a privileged space for the construction of critical awareness, autonomy and reading of the world. For him, EJA is, above all, a humanizing project that must start from the concrete reality of the oppressed, recognizing their life experience as social and political knowledge. In dialogue with this perspective, Saviani (2011) states that an emancipatory educational policy cannot ignore the class determination that runs through the educational process, at the risk of reducing EJA to a mere compensatory action.

Thus, understanding EJA in Imperatriz/MA requires articulating it to the social totality, recognizing that its materiality is produced at the intersection between fragile policies, historical inequalities, precarious work, urban segregation and interrupted school trajectories. The analysis of this educational modality demands, therefore, a critical approach that considers both the macrosocial conditioning factors and the local and singular expressions of the subjects involved.

In view of this, this article aims to analyze, from a theoretical-critical perspective based on historical-dialectical materialism, the limits, potentialities and contradictions of the Youth and Adult Education policy in the municipality of Imperatriz/MA, taking the Maria Evangelista Municipal School as an empirical axis. To this end, empirical data, institutional documents and classical and contemporary theoretical references are articulated that discuss education, work, public policy and inequality, with emphasis on Freire, Saviani, Frigotto, Arroyo, Kuenzer, Ciavatta, Mészáros, Charlot and other authors in the critical field.

The critical perspective that guides the discussions developed here highlights the need for a dialogical, participatory and contextualized education, according to the Freirean method, based on the assertion that education must start from the concrete reality of students, recognizing their knowledge and life experiences as a starting point for the construction of knowledge (Freire, 1987). After all, understanding the Youth and Adult Education policy is not just an academic exercise, but a commitment to social justice and the democratization of access to knowledge.

2 THEORETICAL FRAMEWORK

Youth and Adult Education (EJA) only becomes intelligible when we situate its genesis and development in the historical movement of Brazilian social formation as a concrete totality. As Marx (2011) warned, scientific analysis requires apprehending the phenomenon in its multiple nexuses, that is, as a synthesis of historical, economic, political and cultural determinations that are condensed in a specific educational form. In this sense, EJA is a product of the long duration of structural inequalities, and not an episodic phenomenon.

Saviani (2011) interprets Brazilian education as a mechanism for the expanded reproduction of relations of domination, operating in the ideological superstructure as an instance of legitimation of order. The selective function of the school, expressed in the dualization between hegemonic education for the elites and precarious schooling for workers, shows that school inequality is not a dysfunction, but a structural function of dependent capitalism (FRIGOTTO, 2010; KUENZER, 2017).

EJA, therefore, emerges as a compensatory policy, aimed at remedying ex post facto the gaps produced by the education system itself. Haddad and Di Pierro (2000) demonstrate that no EJA policy was conceived as a strategy for the universalization of rights, but always as an emergency response to alarming rates of functional illiteracy, rates that, in turn, result from the articulation between poverty, exploitation and the historical absence of massive social policies.

EJA is presented, therefore, as a pedagogical expression of a society founded on structural inequality and the historical denial of the right to full education.

In Brazil, EJA is an essential educational modality for the correction of historical inequalities in access to schooling. Aimed at subjects who, for various reasons, did not complete basic education at the regular age, it is both a social right and a fundamental strategy for the promotion of citizenship and inclusion (Brasil, 1996). The trajectory of EJA in the country reflects the challenges inherent to the universalization of education in a reality marked by deep socioeconomic disparities.

In the 1990s, neoliberalism inaugurated a qualitatively distinct phase in the relationship between the State, capital and educational policy. It is no longer just a question of the old structural duality; now the State is repositioned as an apparatus that guarantees the financial reproduction of capital, through deregulation, privatization and permanent austerity (HARVEY, 2005).

In this neoliberal perspective, EJA undergoes a double process, the first is Programmatic Relegation, where neoliberalism operates through the logic of "efficient downsizing" (GENTILI, 2002). EJA, because it is not economically profitable and serves invisible subjects, becomes a preferred target of budget cuts and political discontinuity. The second process is Ideological Reinterpretation, following the statement of Althusser (1985) who states that the school is the main ideological apparatus of the State. Under neoliberal hegemony, it begins to inculcate values such as: self-entrepreneurship, meritocracy, individual accountability, depoliticization of poverty, adaptation to market demands.

Shiroma, Evangelista and Moraes (2011) show that EJA is now resignified as a space for the "recovery of productive citizenship", shifting the struggle for rights to a discourse of individual competence.

The Gramscian reading is decisive here in stating that neoliberalism reconfigures hegemony, transforming the school into an arena for the production of pro-market consensus (GRAMSCI, 2011). EJA loses its critical and social character, being framed in the technicist rationality of "employability".

Following the analysis of the neoliberal State, Poulantzas (1978) adds that it intervenes selectively to guarantee the interests of the dominant fractions of capital, especially financial capital and transnational corporations. Thus, when the State disinvests in EJA, it is not "absence", but the active presence of the logic of capital.

EJA thus becomes a space where neoliberal policies and discourses intensify precariousness: lack of teachers, multigrade classes, absence of materials, low night supply and generalized institutional abandonment.

From a legal point of view, EJA finds its foundation in the Federal Constitution of 1988, which guarantees the right to education for all. This right is detailed by Law No. 9,394, of December 20, 1996 - the Law of Guidelines and Bases of National Education (LDB), which recognizes it as an integral part of basic education. However, as Ribeiro and Paiva (2021, p. 16) warn, "the effective implementation of this modality has been limited by structural problems and the prejudiced view that still persists in relation to its subjects and their social function". Such challenges are aggravated by discontinuous public policies, insufficient funding and the devaluation of educators and students.

The critical analysis of EJA must recognize that its students are precarious workers, inserted in the dynamics of super-exploitation (MARINI, 1973). Work — a fundamental ontological category — structures the experience of these subjects. Marx (2013) reminds us that work is a central mediation in the constitution of the social being; when it is precarious, it becomes a denial of the human possibility of omnilateral development.

In peripheral Brazil, such precariousness takes specific forms, such as: structural informality, turnover and chronic unemployment, long hours without rights, concentration of black women in reproductive work, low pay, urban violence and insecurity.

Arroyo (2017) calls these paths "biographies marked by social denial". They reveal that school interruption is not an individual choice or pedagogical failure, but the result of the founding contradiction between the need to survive and the material impossibility of remaining in school.

Charlot (2000) expands the analysis by demonstrating that the relationship with knowledge is mediated by the historicity of the subject. When the subject lives under multiple structural forms of violence — hunger, racism, misogyny, informality, compulsory care — his or her permanence is systematically made unfeasible.

Gonzalez (1988) and Fanon (2008) show that race and gender are constitutive dimensions of the working class in the peripheries. Thus, black women, the majority base of EJA, face a triple oppression: class, race and gender. This explains its presence and, at the same time, its vulnerability in EJA.

Thus, the subjects of EJA are not "backward students", but workers expropriated of time, rights and schooling.

In the face of these structural determinations, the pedagogical challenge of EJA is not technical, but ontological and political. Freire (1987) states that "there is no reading of the world without a critical reading of reality" (p.38).

Historically, EJA has been linked to literacy initiatives, such as the National Literacy Plan (1964) - interrupted by the military regime - and, later, to the Campaign for the Eradication of Illiteracy. From the 1990s onwards, the modality gained new momentum with programs such as Literate Brazil and, more recently, in 2005, with the National Youth Inclusion Program (ProJovem), which aimed to combat dropout and promote the social inclusion of young people between 18 and 29 years old who did not complete elementary school (MEC, 2024). However, for Arroyo (2005, p. 21), "these policies often focus on education as a corrective mechanism, without considering the emancipatory and transformative potential that EJA can and should assume".

Decree No. 5,154, of July 23, 2004, which regulates EJA, is an important milestone in detailing the flexibility of teaching methodologies, essential to meet the diversity of experiences and needs of students. He specifies that EJA should be offered with a pedagogical approach adapted to the conditions of time and pace of learning, enabling quality education for those who, for various reasons, interrupted their studies (Brasil, 2004).

In 2021, CNE/CEB Opinion No. 1, approved by the National Education Council, reinforced the need for a specific and adapted EJA. The document recognizes that this modality should be more than a retrieval of content; it should be a tool for citizenship education, allowing students to develop cognitive, social, and political skills, being encouraged to actively participate in community life (Brasil, 2021).

The pedagogical perspective that guides this work is aligned with the thought of Paulo Freire (1987), for whom education should start from the concrete reality of students, recognizing their knowledge and experiences as a starting point for the construction of

knowledge. A dialogical, participatory and contextualized education is, therefore, fundamental for EJA to fulfill its emancipatory role.

However, the transformative potential of EJA comes up against an adverse socioeconomic reality. Silva and Carvalho (2020, p. 781) find that "more than 70% of EJA students face situations of social vulnerability, such as unemployment, informal work, and lack of access to basic services, factors that compromise their educational trajectory". This scenario is aggravated by the precarious training of educators. Oliveira and Lima (2019, p. 574) point out that "there is a significant gap in the initial and continuing training of teachers who work in EJA, resulting in pedagogical practices that often do not dialogue with the realities of students".

Despite the obstacles, EJA maintains its potential as an inclusion strategy. As Haddad (2022, p. 09) points out, "EJA is more than a compensatory policy; It is an inclusion strategy that can contribute to the reduction of social inequalities and the strengthening of democracy." For this potential to be realized, a joint effort between government, civil society, and educational institutions is imperative, ensuring robust funding, adequate teacher training, and supportive policies that ensure not only access, but student permanence, and success.

3 METHODOLOGY: RESEARCH PATHS

This investigation is anchored in the epistemology of Historical-Dialectical Materialism, understood not only as a method, but as a critical epistemology of social reality, founded on the ontology of social being (MARX, 2011). Thus, the research does not seek to describe appearances, but to understand the genesis, movement and internal logic of educational phenomena in the Brazilian social formation.

The fundamental ontological principle is that educational phenomena are historical and social products, determined by the totality of the relations of production and by the class struggle.

EJA, therefore, is investigated not as an isolated modality, but as an educational form dialectically linked to the structure of dependent capitalism (MARINI, 1973), to forms of labor exploitation (ANTUNES, 2018), to neoliberal austerity policies (GENTILI, 2002), to disputes for hegemony in the State (GRAMSCI, 2011; POULANTZAS, 1978), to the pedagogical practices of resistance (FREIRE, 1987; ARROYO, 2017).

We start from the principles of Totality where EJA is understood in its macrostructural determinations (State, capitalism, public policies) and in its local mediations (school daily life, territory, concrete subjects). From the principle of Historicity, where each category analyzed (evasion, permanence, work, territory, curriculum) is situated in its historical process, not

treated as a timeless phenomenon, and from the principle of Contradiction considering that EJA is a space of dispute between right and denial of right, between emancipation and adaptation, between neoliberal hegemony and popular resistance.

The research adopted a qualitative approach of an exploratory and descriptive nature, based on the Freirean critical perspective, which understands education as a transformative social practice (Freire, 2019). The study is part of the interpretative paradigm, seeking to understand the meanings, experiences and representations of the subjects involved in Youth and Adult Education (EJA) in their specific context, as proposed by Minayo (2014, p. 22), for whom qualitative research works with "the universe of meanings, motives, aspirations, beliefs, values and attitudes".

The universe of the research was divided by the seventeen students enrolled in the EJA modality of the Maria Evangelista Municipal School, located in the Itamagará neighborhood, municipality of Imperatriz/MA. The selection of the locus is justified by its location in a peripheral area characterized by significant socioeconomic vulnerabilities, configuring itself as a representative environment of the complexities faced by EJA in peripheral urban contexts.

Data collection was structured in three articulated methodological procedures, following the principle of triangulation to ensure validity and comprehensiveness of the investigation.

A priori, a documentary research was carried out through a systematic analysis of official records provided by the Municipal Department of Education of Imperatriz SEMED, covering data on enrollment, attendance, dropout and demographic characteristics of Youth and Adult Education (EJA) students in the year 2024. This stage enabled the quantitative contextualization of the phenomenon studied and the identification of trends and patterns at the municipal level.

Then, ethnographic field research was conducted in the EJA class of the Maria Evangelista Municipal School. This phase included: unstructured participant observation over ten face-to-face meetings between August and November 2024, allowing immersion in everyday school life and the capture of group interactions and dynamics, application of a semi-structured questionnaire, containing open and closed questions, to all seventeen students, an instrument that enabled the systematic recording of perceptions, trajectories, and expectations; and individual semi-structured interviews, with an average duration of 45 minutes, recorded with prior consent and later transcribed, which deepened the participants' understanding of subjective experiences and the meanings attributed to education.

Finally, the qualitative data obtained were submitted to thematic content analysis, as

proposed by Bardin (2011):

"a set of communication analysis techniques aimed at obtaining, through systematic and objective procedures for describing the content of messages, indicators (quantitative or not) that allow the inference of knowledge related to the conditions of production/reception (inferred variables) of these messages". (Bardin. 2011, p. 37)

The analytical process was developed in three phases: pre-analysis, characterized by the organization and floating reading of the material; exploration of the material, with coding and classification of data; and treatment of the results, involving the inference and interpretation of the contents. From this process, analytical categories emerged that reflect the experiences, perceptions and challenges experienced by the students, while the quantitative data were treated through descriptive statistical analysis, complementing the interpretation of the investigated phenomena.

The construction of the research instruments was based on the ethical principles established by Resolution No. 510/2016 of the National Health Council. All participants signed a Free and Informed Consent Form (ICF), guaranteeing anonymity through the use of numerical coding (Student 1, Student 2, etc.). The research obtained prior approval from the Research Ethics Committee of the home institution.

The methodological triangulation combining documentary analysis, participant observation, questionnaires and interviews ensured analytical rigor and internal validity to the research findings, as recommended by Minayo (2014) when he highlights that "the triangulation of methods and techniques is an important strategy to apprehend the complexity of social phenomena". This multifaceted approach allowed capturing the complexity of the object studied, overcoming limitations of isolated methods and ensuring greater consistency in the interpretations performed.

4 THE POLITICS OF EJA IN BRAZIL

The Youth and Adult Education policy in Brazil is a direct product of the social form of the dependent capitalist State, whose functioning, as demonstrated by Poulantzas (1978) and Gramsci (2011), consists of the material condensation of the correlation of forces between social classes in dispute. Therefore, EJA cannot be understood as an administrative arrangement, but as an organic part of the strategy of reproduction of bourgeois hegemony within the educational superstructure.

The Brazilian State was constituted as a racialized class State, marked by the structural exclusion of the poor and black population. Education, in this process, was no exception, but a key part of maintaining order. The school has historically operated as an

ideological apparatus of the State (ALTHUSSER, 1985), legitimizing inequalities and naturalizing the idea that the schooling of the working classes can be postponed, precarious or simply denied.

Thus, the very existence of EJA is an expression of the structural contradictions of the Brazilian social formation. EJA always appears as a residue, as a late, emergency and subordinate policy, never as a structuring policy for the universalization of education. This is explained because, according to Marini (1973, p.29), "Brazilian capitalism has not demanded, at any time in its history, the universal schooling of the workforce".

Also according to the author, the dynamics of dependent capitalism operates through the overexploitation of the labor force, which is sustained by low wages, long hours and low qualification of the working class. The schooling of adult workers, therefore, is not seen as a strategic investment, but as a superfluous cost.

Historically, we can divide EJA in Brazil into three periods, the first is the pre-1964 period, when adult education was considered as a moral tutelage, understood as an act of "civilization" of the popular classes, an idea aligned with the hygienist, racialized and moralizing discourse. The subjects were seen as "backward", "incapable", "not very productive" and, therefore, candidates for punctual, philanthropic and welfare programs. The second historical period of EJA is between 1964-1985, considered as an authoritarian technocratic education and pedagogy of order. The military dictatorship transformed EJA into an instrument of social control, articulated with the authoritarian developmental project. The Brazilian Literacy Movement (MOBRAL) expressed the pedagogy of adaptation and submission, denying any critical dimension. It is the pedagogical materialization of the authoritarian-capitalist State, where literacy becomes a technique of discipline. The third historical period of EJA in Brazil is the Post-1988, The 1988 Constitution inaugurates an ambivalent era, while affirming EJA as a right, the neoliberal State emerges restricting funding, privatizing, focusing policies and criminalizing poverty. The post-1988 EJA policy was shaped by the tension between an emancipatory project (Freire, social movements, popular educators), and a neoliberal project (managerial management, efficiency, goals, employability).

Currently, Youth and Adult Education is one of the main instruments of educational inclusion in Brazil, providing the resumption of studies for those who, for different reasons, were unable to complete schooling at the conventional age. This audience is composed of young people and adults with diverse life trajectories, who often face significant obstacles such as the need for work for family subsistence, socioeconomic difficulties and interruptions in the educational process.

The legal basis of EJA is guaranteed in the Federal Constitution of 1988 and consolidated by Law No. 9,394, of December 20, 1996 - Law of Guidelines and Bases of National Education (LDB), which recognizes EJA as an integral part of basic education, emphasizing that access to education is a right of all, without distinction of age or school history (Brasil, 1996).

However, as Ribeiro and Paiva (2021, p. 16) point out, "the effective implementation of this modality has been limited by structural problems and the prejudiced view that still persists in relation to its subjects and their social function". These challenges are rooted in discontinued public policies, insufficient funding, and lack of appreciation of educators and students in this type of education.

Historically, EJA has been linked to adult literacy initiatives, such as the National Literacy Plan (1964), interrupted by the military regime, and later to the Campaign for the Eradication of Illiteracy. From the 1990s onwards, the modality gained new impetus with initiatives such as the Literate Brazil Program and, more recently, in 2005, with the National Youth Inclusion Program (ProJovem), which aimed to combat school dropout and promote the social inclusion of young people between 18 and 29 years of age who had not completed elementary school (MEC, 2024).

As Arroyo (2005, p. 21) warns, "these policies often focus on education as a corrective mechanism, without considering the emancipatory and transformative potential that EJA can and should assume".

Decree No. 5,154, of July 23, 2004, regulates EJA, detailing the teaching modalities and the flexibility of methodologies, essential to meet the diversity of experiences and needs of students. The decree specifies that EJA must be offered with a pedagogical approach adapted to the conditions of time and pace of learning (Brasil, 2004).

In 2021, CNE/CEB Opinion No. 1 reinforced the need for youth and adult education to be designed specifically and adapted to the characteristics of this audience. The document recognizes that EJA should be more than a simple retrieval of academic content; it should be a tool for citizenship education, allowing students to develop cognitive, social, and political skills (Brasil, 2021).

Despite legislative advances, considerable challenges persist for EJA to effectively meet the needs of the public. Inequalities in access to education, especially in peripheral regions, still represent a significant obstacle. In these areas, the educational infrastructure is often precarious, with poorly equipped schools and a lack of skilled human resources.

According to data from the National Institute of Educational Studies and Research Anísio Teixeira (INEP), the dropout rate in EJA remains high, especially in the older age

groups, demonstrating the need for adjustments in the offer and teaching methodologies.

The challenges of EJA transcend pedagogical issues, involving economic and social factors that make it difficult for students to stay. Silva and Carvalho (2020, p. 781) find that:

More than 70% of EJA students face situations of social vulnerability, such as unemployment, informal work and lack of access to basic services, factors that compromise their educational trajectory. (Silva and Carvalho 2020, p. 781)

This reality is confirmed in the universe of the 17 EJA students of the Maria Evangelista Municipal School, where 8 are housewives with no income, 1 is unemployed and the remaining 8 have an income not exceeding one minimum wage, 7 of whom are informal workers and only 1 has a formal contract. Structural precariousness is also reflected in teacher training. Oliveira and Lima (2019, p. 574) point out that "there is a significant gap in the initial and continuing training of teachers who work in EJA, resulting in pedagogical practices that often do not dialogue with the realities of students".

Despite the challenges, EJA maintains significant potential to promote structural changes in Brazilian society, especially when articulated with other public policies. As Haddad (2022, p. 09) points out, "EJA is more than a compensatory policy; It is an inclusion strategy that can contribute to the reduction of social inequalities and the strengthening of democracy."

5 EJA IN THE MUNICIPALITY OF IMPERATRIZ/MA

Imperatriz, as a medium-sized city in the Legal Amazon, expresses the typical contradictions of uneven urbanization. Unregulated urban expansion has produced a mosaic of territories marked by densely populated peripheries, structural economic informality, high rates of violence, and precariousness of public services.

From a critical Marxist point of view, the city is an example of what Harvey (2005) calls "accumulation by dispossession", urbanization advances on vulnerable populations, expelling them to the fringes of urban space, where the State arrives late or in a precarious way.

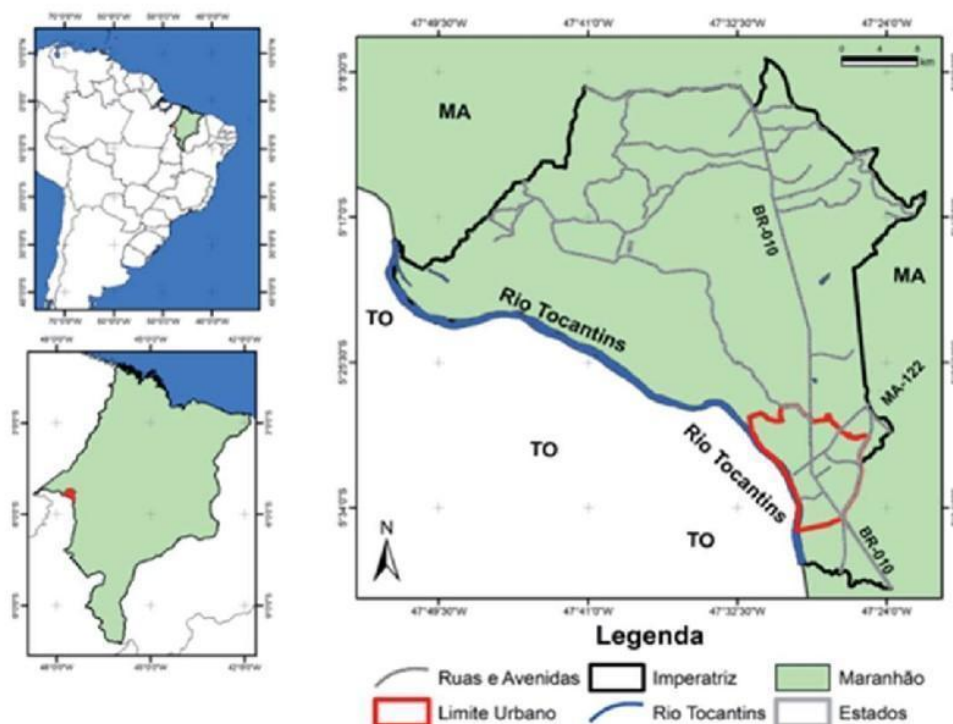
In this context, the EJA policy in Imperatriz is configured as a "residual policy" when EJA is treated as a supplementary program, not as part of the core of the educational system. Classes are closed, inadequate schedules are maintained and the infrastructure is deficient; as a "precarious policy", when schools located in the peripheries, such as the Maria Evangelista School, face issues such as lack of meals, absence of transportation, teaching overload, insufficient materials, unsafe night shifts and constant discontinuity; and as a "policy captured by neoliberal rationality", when, for example, The city government implements policies of targeting and accountability, shifting dropout to the individual sphere and making

invisible the material conditions that produce it.

The municipality of Imperatriz is located in the southwest region of Maranhão, with an estimated population of 285,146 inhabitants in 2024 (IBGE, 2024). According to data from the IBGE (2023), of the 138 elementary schools in the municipality, only 23 schools offer the EJA modality - 21 in the urban center and 2 in the rural area.

Figure 1

Location of the municipality of Imperatriz – MA



Source: Source: IBGE (2018); IMESC (2021); Santos et al. (2018).

The challenges in Youth and Adult Education are intensified in the urban peripheries, such as in the Itamagará neighborhood, where the Maria Evangelista Municipal School is located. The lack of continuity in the educational process is not only due to students' lack of interest, but reflects socioeconomic difficulties that directly affect school permanence.

The irregular attendance of students is revealed as a repetitive reality in the school researched. Many absences are related to the need for work to ensure family support, often leading to the abandonment of studies for survival.

The majority presence of women in EJA classes - 8 of the 17 students surveyed - highlights gender inequalities in the educational context. These women seek to balance their studies with the responsibilities of reproductive work and family care, facing the overload of domestic tasks without adequate support.

For these women, education represents an opportunity for transformation, but the

weight of daily responsibilities often prevents them from continuing their studies, putting education in the background to the urgent needs of the home.

Despite the adversities, there is a notorious enthusiasm and determination among the students, especially the older ones. The desire to complete elementary school and proceed to high school remains a central motivation in the search for better professional and life opportunities.

5.1 EJA AT THE MARIA EVANGELISTA SCHOOL

The research carried out with the 17 students of Youth and Adult Education reveals life stories that reflect not only the diversity of age and experiences, but also the challenges and aspirations of people who seek a new educational opportunity.

Figure 2

Socioeconomic panorama of EJA students from the Maria Evangelista municipal school

1	F	40	6/7º	2	2024	FRIENDS	MY MOTHER HAS ALREADY STUDIED	6TH GRADE	WORK	LIFE DREAMS	I DON'T REMEMBER WHICH ONE	LEARN MORE	HOUSEWIFE	X
2	F	42	6/7º	6	2022	MY SISTER WAS STUDYING	SISTER	3RD YEAR	VISION PROBLEMS	WILLINGNESS TO LEARN READ AND WRITE BETTER	NO	FOR ME IT'S GOOD BECAUSE I CAN STUDY AND WORK	DOMESTIC WORK	MY CARD IS NOT SIGNED
3	M	15	6/7º	0	2024	FRIEND	NO	7º I LEFT THE TRADITIONAL AND WENT TO THE NIGHT	I DIDN'T STOP	I was late	X	X	NO	X
4	M	22	6/7º	0	2024	FRIENDSHIP	MY MOTHER STUDIES	6TH GRADE	LACK OF INTEREST, DISINTERESTED I HAD NO FOCUS AND STOPPED	WILLPOWER	NO	I WANT TO FINISH MY STUDIES AND BE SOMEONE IN LIFE	PRODUCTION FEEDER	SIGNED CONTRACT
5	M	38	6/7º	0	2020	FRIEND	YES MY WIFE	I STUDIED UNTIL THE 1ST YEAR OF THE 2ND GRADE / (2005)	FAR SERVICE AND BUS	SEEK WORK IMPROVEMENTS	YES. IT HAD TO BE IN ALL MUNICIPAL SCHOOLS	GRADUATING AND GOING TO COLLEGE	YES, BRICKLAYER	INFORMAL
6	M	37	6/7º	2	2024	RESEARCH	YES BROTHER	6TH GRADE	WORK	LEARN MORE	STUDYING IN ANOTHER NEIGHBORHOOD	ALWAYS LEARN	LEARNING	YES
7	M	15	8/9º	0	2024	MY GRANDMOTHER	NO	8TH YEAR 2024	I LEFT THE REGULAR AND CONTINUED	HAD TO WORK	NO	TO WORK AND FINISH QUICKLY	REPLENISHER	MY CARD IS NOT SIGNED
8	F	X	8/9º	3	2024	MARIA EVANGELISTA SCHOOL MANAGERS	YES MY MOTHER	8TH GRADE I STOPPED IN 2014	FINISH YOUR STUDIES AND SEEK LEARNING FOR THE JOB MARKET	NO	IT MAKES IT MUCH EASIER BECAUSE OF THE SCHEDULE	HOMEMAKER	INFORMAL	
9	M	16	8/9º	0	2022	MOTHER	BROTHER STUDIED	6TH YEAR / 2022	I DIDN'T STOP	GET STARTED	NONE	FINISH FASTER	WORK IN A GROCERY STORE	INFORMAL
10	F	55	1/5º	3	2024	CHURCH, FRIENDS, WHATSAPP GROUP, TEACHERS, I WAS ALREADY DOING IT IN ANOTHER CITY.	CHILDREN	4º	RAISING SIBLINGS, EXPULSION, LIVING IN THE COUNTRYSIDE, TIME, WORK, 1ST CHILD, RAISING SIBLINGS.	TEACH THEIR CHILDREN, READ THE BIBLE, LEARN TO READ, READ AND WRITE, SIGN THEIR NAME, TAKE A BUS.	DISTANCE NEIGHBORING NEIGHBORHOODS	FINISH STUDIES, DIPLOMA, LEARN TO READ AND WRITE.	HOUSEWIFE	X
11	F	64	1/5º	4	2022			I NEVER STUDIED					HOUSEWIFE	X
12	F	40	1/5º	6	2024			5º					HOTEL ATTENDANT	INFORMAL
13	F	30	1/5º	5	2024			4º					HOUSEWIFE	X
14	F	56	1/5º	5	2024			I NEVER STUDIED					HOUSEWIFE	X
15	F	58	1/5º	5	2022			DID FROM 0					HOUSEWIFE	X
16	F	46	1/5º	8	2024			3º					HOUSEWIFE	X
17	M	59	1/5º	5	2022			1º					RETIREE	INSS

Source: Fieldwork (2024).

Organizer: SERAFIM, Tiago Silva Oliveira

The analysis of the socioeconomic data present in Figure 2, which gathers detailed information about the 17 EJA students of the Maria Evangelista Municipal School, reveals a set of structural determinations that not only explain the presence of these subjects in the modality, but expose, in a crystal clear way, the way in which the Brazilian social formation, dependent, racialized, patriarchal and territorially unequal, systematically produces and reproduces educational exclusion. The finding that 8 students do not have any income of their own, while 7 of the 8 who do have income work in informal occupations, is not an empirical coincidence; it is a direct expression of the logic of dependent capitalism (MARINI, 1973), in which the overexploitation of the labor force is not a deviation, but a structural component of accumulation. In this sense, the precariousness of labor identified in the picture is not a mere background of the school experience: it constitutes the very materiality that conditions, limits and, many times, makes permanence unfeasible.

The dialectical reading of these data requires understanding that EJA, as it appears in the school studied, is inscribed in the fundamental contradiction between work and time, with time being expropriated from workers in such an intense way that studying at night, after long hours, becomes an almost unsustainable effort. The predominance of informal workers reveals what Antunes (2018, p. 89) calls the "new morphology of the working class", marked by intermittence, lack of protection, and absence of rights. The impact of this on schooling is direct: informality prevents any long-term planning, and students report constant absences motivated by "odd jobs", domestic emergencies, child care or simple physical exhaustion. It is the materialization of what Lukács (1979) would call "life degraded by reification", in which the worker loses not only control over his production, but over his own existential time.

The situation of gender and race presented in Figure 2, predominance of black women, housewives with no income and mostly responsible for family care, reinforces the need for an intersectional reading, which is not a theoretical addition, but an analytical requirement incorporated into Latin American critical Marxism. As Gonzalez (1988) states, black women live a "triple historical journey", that is, economic exploitation, patriarchal oppression and racial subordination. This is clearly shown in the table: the fact that 8 women have no income and accumulate domestic work demonstrates how reproductive work, analyzed by Federici (2019) and Kergoat (2009), acts as an educational determinant, naturalized and invisible, but fundamental to understand dropout. These students do not absent themselves from school due to "lack of interest", but because they carry on themselves the maintenance of life, what Federici (2019) calls "invisible work", essential to capital, but unpaid and historically despised.

This insertion of women in reproductive work is directly connected to the point developed by Hirata (2010), according to which the sexual division of labor produces

educational inequalities throughout life, as it restricts women's temporal and energetic availability for training activities. The data in Figure 2 confirm this thesis, indicating that the late schooling of women in EJA is not an individual choice, but a result of socioeconomic and cultural conditions that limit access to formal education during childhood and youth.

Observing that 10 of the 17 students entered in 2024, the conjunctural dynamics of EJA is also perceived, subject to fluctuations in the labor market, intermittent government programs, and socioeconomic crises. Lefebvre (1991) already stated that the social space and, consequently, the school space, is produced by economic and political rhythms that condition the flows of people. Thus, the year 2024 may have functioned as a milestone for individual and collective reorganization, due to local changes, specific programs, or even the intensification of job insecurity. The table, although it does not specify the causes, evidences this dialectical relationship between the conjuncture and the search for education.

The desire expressed by the students to "improve their reading and writing", "complete their studies" or "get a better job", categories present in Figure 2, refers to the centrality of what Freire (1987, p. 43) calls "ontological hope". For Freire, the oppressed subject is not a mere object of history; He carried within himself the power of transformation. However, this hope is frustrated when there are no material conditions to sustain it. Frigotto (2010, p. 58) reinforces that the individual cannot be held responsible for failures that are an expression of social and structural determinations, because "school inequality is a direct consequence of social inequality".

Figure 2 reveals, in a striking way, the structural character of dropout in EJA. It is not a pedagogical problem, but a socioeconomic phenomenon. The reported absences and interruptions, motivated by childcare, exhaustion, lack of income, insecurity on the way, are objective expressions of what Gramsci (2011) would call "diffuse coercion", that is, forms of domination that are not expressed only by the direct violence of the State, but by the structural precariousness that prevents self-determination. In his analysis of hegemony, Gramsci argues that the state operates through the combination of coercion and consensus. In EJA, this coercion appears in the form of structural inequality that limits access to educational citizenship.

The territory also plays a fundamental role. The school is located in an area of urban vulnerability, with security problems, poor transportation and little presence of the State. This territorial condition reinforces Harvey's (2005) reading, according to which urban space in capitalism is produced in an unequal way, concentrating precariousness in popular neighborhoods. Figure 2 shows this spatial inequality when it is observed that students travel long distances in unsafe conditions, which directly affects their permanence.

Finally, the picture shows that EJA, as a public policy, is not politically neutral. It arises as a response to the historical failures of the educational system, already denounced by Saviani (2011), but remains weakened by budget cuts and the absence of integrated policies. By crossing income, gender, work and reasons for interruption, Figure 2 reveals that EJA cannot be understood as a "second chance", but as an expression of the class struggle in the educational field, in which historically excluded subjects compete for space to exist, learn and resist.

Thus, Figure 2 is not just a statistical tableau; it is a condensation of the historical, economic, social and political determinations that shape the lives of EJA student workers. It demonstrates that educational exclusion is an active production of capital, and permanence is a political act of resistance.

We can see that the year 2024 stands out in the survey, with 10 of the 17 participants starting the course this year. For many, the decision to return to school is directly linked to the desire to achieve previously interrupted goals, either due to the need to improve reading and writing, or due to a search for personal and professional development. Student 2, for example, expressed the desire to "read and write better", reflecting the importance of literacy in the daily lives of these people. Student 1, mother of two, highlighted the desire to learn more to be able to help her family, demonstrating how education becomes a tool for change for those who seek it.

The reasons for interrupting the studies were diverse, with a predominance of the need for work. Many interviewees, such as Student 5, reported having to stop studying to help support their families. Others, such as Students 3 and 7, faced the reality of reconciling work and study, which resulted in the delay of their training. Student 4, in turn, interrupted his studies due to lack of focus and interest, but found motivation to start over in EJA with the objective of "being someone in life". These accounts illustrate how adult life, with its responsibilities, often puts educational dreams in the background.

The motivation to resume her studies at EJA, however, is clear: the desire to change her life. For many, the goal transcends the completion of elementary or high school, aiming for a diploma that opens doors to new opportunities in the job market. Student 5, who works as a bricklayer, expressed ambition to attend higher education, a goal that seemed distant during the interruption of studies, but which becomes achievable through EJA. The search for qualification to improve living conditions and ensure a better future for her children is constant in the testimonies.

The reconciliation between studies, work and personal life presents itself as a significant challenge. Many students, such as Student 7, point to the lack of time as the main

obstacle, due to the need for work for subsistence. The difficulty of balancing responsibilities, added to the lack of transportation or distance to school – mentioned by Student 10 –, creates additional barriers to the educational process, reflecting the common reality among EJA students.

Another relevant fact is the predominance of informal work among students, which implies a lack of access to labor benefits and professional stability. Students 5 and 7, among others, cite informality as a limiting factor to growth opportunities. Thus, the contradiction faced by those who seek education as a form of social ascension, but come up against precariousness in the labor market, is evidenced.

Despite the challenges, the search for education represents a significant achievement. The flexibility of schedules offered by EJA facilitates the inclusion of students who otherwise would not be able to attend regular education. Student 8 highlighted that the possibility of studying at night is crucial, as the daily working day does not allow availability for studies in other shifts. This demonstrates the adaptation of EJA to the student reality, enabling the continuity of training without giving up family support.

6 FINAL CONSIDERATIONS

The analysis developed throughout this study shows that Youth and Adult Education at the Maria Evangelista Municipal School constitutes an exemplary synthesis of the contradictions that structure the Brazilian social formation. Far from being a peripheral or residual policy, EJA appears as a privileged window to understand the interaction between economic structure, territorial dynamics, labor relations, racialized and patriarchal oppressions, and the concrete functioning of the State in contemporary times. The set of empirical data, especially those summarized in Figure 2, reveals that the school trajectory of EJA students cannot be explained from isolated pedagogical categories; on the contrary, it requires a rigorous reading that articulates totality, mediation and contradiction, according to the ontological tradition of historical-dialectical materialism.

The predominance of students marked by precarious employment relationships, low incomes, absence of social protection, exhausting working hours and accumulation of unpaid domestic work demonstrates that education, especially in EJA, is located within the concrete totality of social reproduction.

Youth and Adult Education (EJA) in Brazil remains a challenging field, dealing with a diverse and multifaceted audience. Historically, the modality has provided reintegration into the educational system to those who interrupted their studies in childhood or adolescence. However, unfavorable socioeconomic conditions and family responsibilities, evidenced in the

reality of Imperatriz, make access to and permanence in EJA constant obstacles. In the context of Maranhão, the scarcity of infrastructure, social inequality and economic pressure on families perpetuate a cycle of school dropout that is difficult to break. Education, a key potential for social transformation, loses priority in the face of the immediate needs of survival.

Imperatriz, like other Brazilian cities, reveals a scenario in which EJA mirrors regional and social contrasts. The irregular attendance of students, especially in the peripheries, reflects an unequal socioeconomic structure that imposes constant negotiation between study and work.

The data also demonstrate that educational exclusion has deep and persistent gender and race markers. The predominance of black women, many of them housewives with no income, reaffirms the thesis that colonial dehumanization, what Fanon (2008) called the "ontological destitution of the black subject", that is, continues to structure the concrete possibilities of life, free time and social recognition. Marxist feminist critical theory reinforces this understanding, Federici (2019) and Kergoat (2009) demonstrate that reproductive work, historically attributed to women, is a central mechanism for the reproduction of capital, even if it is carried out outside the paid spheres. The table in Figure 2 confirms this determination: women concentrate domestic care, accumulate income inequality and miss school due to overload of family responsibilities, making explicit the inseparability between reproductive work and educational inequality.

This scenario is also articulated with the territorial dimension of inequality. The school studied is located in an area marked by urban precariousness, insecurity, absence of public services and socioeconomic vulnerability. This spatiality is not contingent: as Harvey (2005) argues, urban space is one of the material expressions of class struggle, and its unequal production reflects the way wealth and poverty are organized. The analysis shows that the territory acts as a determining mediating category: long commutes, absence of adequate transportation, violence during the commute and lack of public lighting configure material barriers that operate as indirect mechanisms of school expulsion. Thus, the territory is not a neutral scenario of education: it is a constitutive part of the very condition of possibility of schooling.

EJA in Imperatriz, and in similar locations, cannot be treated as an isolated modality, but as part of an integrated set of public policies that address the multiple dimensions of students' lives. The flexibility of pedagogical methods, the offer of alternative schedules and psychological support are measures that facilitate student permanence. In addition, the implementation of social support programs – such as scholarships, food stamps and transportation – could ease the burden of responsibilities, especially on women, allowing

them to balance studies and family demands.

The strengthening of support networks for families, especially those overloaded by domestic and work tasks, is an essential strategy. Social assistance programs that include care spaces for children and the elderly during the school period can be fundamental to reduce dropout. The school, in turn, must be a welcoming environment, capable of recognizing and meeting student specificities, promoting inclusion that considers diversity of experiences and ages – which, in addition to reducing dropout, strengthens students' commitment to the educational process.

It is equally essential that the State invests in the continued training of EJA educators, guaranteeing them pedagogical and emotional tools to deal with student diversity and possible learning difficulties. Teachers must be prepared to adopt methodologies that respect students' times and rhythms, integrating theory and practice to make learning accessible and meaningful.

Thus, the research concludes that EJA in the Maria Evangelista School and, by extension, in similar contexts, can only fulfill its emancipatory role if its actions are articulated with a historical project that confronts the determinations of capital and affirms education as a right and as a practice of freedom. This implies recognizing that overcoming educational inequalities will only be possible through profound transformations in the social, economic and political structure of the country. Any EJA policy that is limited to the school environment will be doomed to frustration. Transformation requires confronting structural racism, the sexual division of labor, informality, economic dependence, and the neoliberal logic that dismantles rights.

In summary, EJA, as an instrument of inclusion and social transformation, demands a multifaceted and integrated approach. In the case of Imperatriz, it is imperative that public and educational policies adjust to local realities, promoting curricular flexibility, creating social support networks and strengthening school infrastructure. Education, as a fundamental right, must be understood as an opportunity for change, and only through articulation between different spheres of public power and society will it be possible to ensure that EJA students, especially in the urban peripheries, overcome barriers and carry out their life projects.

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PEDAGOGICAL POLITICAL PROJECT AND THE PARTICIPATION OF THE STUDENT UNION: AUTONOMY OR TUTELAGE OF ACTIONS?

PROJETO POLÍTICO PEDAGÓGICO E A PARTICIPAÇÃO DO GRÊMIO ESTUDANTIL: AUTONOMIA OU TUTELAMENTO DAS AÇÕES?

PROYECTO POLÍTICO PEDAGÓGICO Y PARTICIPACIÓN DEL SINDICATO DE ESTUDIANTES: ¿AUTONOMÍA O TUTELA DE LAS ACCIONES?



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ABSTRACT

This article aims to analyze how the Political-Pedagogical Project (PPP) of two public schools considers the participation of the student council as a tool for developing autonomy among its members. It adopts the following question as its guiding principle: Is it possible to identify elements within the PPPs of schools that indicate actions to be carried out by the participants of the Student Council in a way that contributes to the development of student participation and autonomy? To this end, the methodological approach adopted was a review of the literature (authors and academic publications) on the subject, the selection of two Political-Pedagogical Projects for reading the proposed actions, and a documentary analysis of these projects. The results achieved indicate that although the PPPs of the schools surveyed list democratic principles of participation and document that they prioritize these, in the associations this does not occur freely and autonomously on the part of the students. The existing associations operate in a fragmented manner, given that student actions are established in accordance with the opinions of the management team, which leads us to note a weakness both in effective student participation, with a view to exercising citizen autonomy in school spaces, and in the continued low representativeness of student councils in public schools.

Keywords: Pedagogical Political Project. Student Guild. Student Participation.

RESUMO

O artigo em tela tem como objetivo analisar como o Projeto Político-Pedagógico (PPP) de duas escolas públicas contempla a participação do grêmio estudantil enquanto instrumento de desenvolvimento de autonomia pelos sujeitos que o integram. Adota como questionamento norteador a seguinte inquietação: É possível identificar no interior dos PPP das escolas elementos que indiquem ações a serem realizadas pelos sujeitos participantes do Grêmio Estudantil de maneira que contribua para o desenvolvimento da participação e

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autonomia discente? Para isso, adotou-se como percurso metodológico a revisão de literatura (autores e produções acadêmicas) que versam sobre o assunto, seleção de dois Projetos Políticos Pedagógicos para leitura das ações propostas e a análise documental dos mesmos. Os resultados alcançados indicam que apesar do PPP das escolas pesquisadas elencar princípios democráticos de participação e documentarem que primam por estes, nas agremiações esta não ocorre de maneira livre e com autonomia por parte dos estudantes. As agremiações existentes possuem sua atuação de maneira fragmentada, haja vista as ações estudantis são estabelecidas em acordo com os pareceres da equipe gestora, o que nos leva a constatar uma fragilidade tanto na participação estudantil efetiva, com vias ao exercício da autonomia cidadã em espaços escolares quanto a permanência da pouca representatividade dos grêmios estudantis em escolas públicas.

Palavras-chave: Projeto Político Pedagógico. Grêmio Estudantil. Participação Discente.

RESUMEN

El presente artículo tiene como objetivo analizar cómo el Proyecto Político-Pedagógico (PPP) de dos escuelas públicas contempla la participación del consejo estudiantil como instrumento de desarrollo de la autonomía de los sujetos que lo integran. Adopta como pregunta orientadora la siguiente inquietud: ¿Es posible identificar en el interior de los PPP de las escuelas elementos que indiquen acciones a ser realizadas por los sujetos participantes del Consejo Estudiantil de manera que contribuyan al desarrollo de la participación y la autonomía estudiantil? Para ello, se adoptó como metodología la revisión de la literatura (autores y producciones académicas) que trata el tema, la selección de dos Proyectos Político-Pedagógicos para la lectura de las acciones propuestas y el análisis documental de los mismos. Los resultados obtenidos indican que, a pesar de que el PPP de las escuelas investigadas enumera principios democráticos de participación y documenta que estos prevalecen, en las asociaciones esto no ocurre de manera libre y con autonomía por parte de los estudiantes. Las asociaciones existentes actúan de manera fragmentada, ya que las acciones estudiantiles se establecen de acuerdo con las opiniones del equipo directivo, lo que nos lleva a constatar una fragilidad tanto en la participación estudiantil efectiva, con vistas al ejercicio de la autonomía ciudadana en los espacios escolares, como en la permanencia de la escasa representatividad de los consejos estudiantiles en las escuelas públicas.

Palabras clave: Proyecto Político Pedagógico. Gremio Estudiantil. Participación Estudiantil.

1 INTRODUCTION

The Political-Pedagogical Project (PPP) is the macro document of a school unit. And because it is the epicenter of the actions to be developed in the school, it has as one of the structural elements the interaction of the school and local community, through pedagogical actions aimed at improving the quality of teaching and learning of students. In addition, it is the guiding document that should express what concept of Education believes, the mission of the school, the pedagogical current that guides it and how school management will enable the effectiveness of participation mechanisms, thus consolidating democracy in the educational establishment (Veiga, 1995; Vasconcellos, 2006).

In this sense, observing the effectiveness of democratic principles and mechanisms, the PPP must be prepared with the participation of all segments and the school community, including the various subjects interested in improving the quality of education: teachers, parents, management team, financial team, other servers and students, being able to participate in this democratic process of elaboration of the most important school document, also through Grêmio representation.

The article in question aims to analyze how the Political-Pedagogical Project (PPP) of two public schools contemplates the participation of the student council as an instrument for the development of autonomy by the subjects that integrate it. It adopts as a guiding question the following concern: Is it possible to identify within the PPPs of schools (municipal and state) elements that indicate actions to be carried out by the subjects participating in the Student Council in a way that contributes to the development of student participation and autonomy?

To answer this question, the methodological path was adopted the literature review (authors and academic productions) that deal with the subject, selection of two Pedagogical Political Projects to read the proposed actions and the identification of points related to the actions directed to the activities to be carried out by the student council of the same. In the table below, we explain our understanding of the methodological instruments: bibliographic review and document analysis.

Table 1

Methodological path used to write this article

Literature Review	Document Analysis
It is elaborated from all the bibliography already made public in relation to the theme of study. It consists mainly of books, journal articles and currently with articles and periodicals available on the Internet. This type of research is common in any area of knowledge	Made from materials that have not received analytical treatment. Documentary analysis differs from bibliographic research due to the nature of the sources. The documents are rich and stable sources of data, not requiring contact with the research subjects. Thus, documents, research reports, statistical tables, autobiographies, regulations, laws, notarial documents, norms, opinions, letters, memoranda, personal diaries, etc. are considered.

Source: Tenfen, Tenfen and Korah (2018, p. 33-34)

Thus, as shown in the table, we understand that the bibliographic review and the documentary analysis complement each other, enabling a greater understanding of the concern: *Is it possible to identify within the PPPs of the schools (municipal and state) elements that indicate actions to be carried out by the subjects participating in the student council in a way that contributes to the development of student participation and autonomy?*

It is worth informing that the theoretical contribution of this work is based on authors such as: Veiga (1995; 2007); Vasconcellos (2006), Brito (2022), Hora (2012), Antunes (2002), Muñoz (2004), Brito, Miranda and Sousa (2023), as well as Carvalho and Lagares (2022). The researchers referred to express in their propositions the importance of the implementation of the PPP built in the collective, that students (represented in student unions) need to develop their citizenship formation by participating in the decision-making processes of the school in which the school and local community, through their participation in the review and implementation of this considerable document, contribute to the elucidation of democratic processes in the school environment.

This article is organized into four parts. Starting with this Introduction, followed by two sections and ending with Final Considerations. In the first section, reinforcing conceptual arguments are presented about the relevance of the PPP as the epicenter of the school's pedagogical actions, striving for collective participation both for its elaboration and in the effectiveness of the actions listed, mechanisms that promote democratic processes within the school and that implement in a procedural way the active participation of the school community, place and students, always remembering that this process is also marked by tensions and debates that enhance the construction of this manuscript.

In the second section, the documentary analysis undertaken in the PPPs of a municipal and a state school is presented, identifying the occurrence of relationships between the current legislative actions with the guarantee of the implementation/performance of the associations in the school units. Finally, in the Final Considerations, the findings resulting from the study undertaken, with ways to exercise citizen autonomy in school spaces, highlighting the role of the student council.

2 THE POLITICAL-PEDAGOGICAL PROJECT AS THE EPICENTER OF DEMOCRATIC ACTIONS IN THE SCHOOL UNIT

Democracy is not built only with discourse (Antunes, 2002, p. 67).

The title of this section begins with a word (which in our view) is of paramount importance in the field of geological studies regarding earthquakes, "epicenter", (Dourado, 2020) and which, according to the Michaelis Dictionary (online), originates in the area of Geology studies and refers to the "point on the earth's surface hit first and most intensely by seismic waves". Considering the PPP as the central document for the organization of an educational institution, it can be understood as the epicenter of the pedagogical, financial and administrative actions that should be developed in the school. These, in turn, should promote a movement (generating a seismic shock), that is, in all the dimensions that make up the schools, aiming at improving the quality of teaching and effective democratic management.

Thus, the elaboration and implementation of the PPP goes through periods of collective construction, mobilization in the participation of various segments and subjects that work in the school unit such as: management team, teachers, local community, parents and students. It is through this representative plurality that this document becomes the legal instrument within the school unit that regulates all the action of the school team. In this regard, Vasconcellos (2006, p. 169) conceptualizes the Political-Pedagogical Project as being:

[...] the institution's overall plan. It can be understood as the systematization, never definitive, of a participatory planning process, which is perfected and concretized in the journey that clearly defines the type of educational action that one wants to carry out. It is a theoretical-methodological instrument for intervention and change in reality. It is an element of organization and integration of the institution's practical activity in this transformation process.

As mentioned by the author cited above, the global and integral planning of a school institution involves the collective elaboration of the PPP, which takes place in a participatory way, not ordinary but daily, carrying out a review whenever necessary so that its implementation does not materialize with an autocratic-bureaucratic character, centered only

on the school team to the detriment of the participation of the local and student community (Vasconcellos, 2006).

Another interesting perspective is that of Veiga (1995, p. 13), when he clarifies that the PPP provides "the democratic experience necessary for the participation of all members of the school community and the exercise of citizenship". By enabling the participation and exercise of citizenship in a democratic way, it favors the organization of the pedagogical, financial and administrative work of the school aiming at the elimination of centralizing attitudes in educational institutions, aligned by the school manager and his team. In this way, when this document is built by several hands, implemented and reviewed annually (or with another periodicity) by the entire school and local community, the bureaucratic routine of the school is defragmented and allows the subjects involved to know the school routine, its strengths, weaknesses in order to solve the problems detected throughout the school year.

This, to a certain extent, also impels us to recognize that putting into effect democratic and participatory principles in the school environment is not a simple task as it is sometimes presented in the discourse, given that exercising mechanisms of participation aiming at the development of democratic actions among the subjects directly and indirectly present in school practices, involves tensions and contradictions, in addition to being an exhausting work full of conflicts (Beane and Apple, 1997).

In the same direction, Hora (2012, p. 20) points out that "the consolidation of democratic management within the school is not a spontaneous and easy process". Despite the existing obstacles to the effectiveness of democratic management, the PPP of an educational institution becomes the preamble that consolidates the participation of the community, contributing to the implementation of a political and citizen culture of the participants in this process of collective construction. Regarding the process of elaboration of the PPP, Hora (2012, p. 53) points out that:

Elaborating the political-pedagogical project of a school means mobilizing the entire school community around a great movement that aims at the global transformation of the school: a work that identifies the real conditions of the school and also the ideal working conditions for all.

Thus, it is important to emphasize that the collective construction of the PPP in Brazilian educational institutions is a legal achievement, resulting from struggles and discussions in the period of redemocratization of the country, which began in the 1980s. The participation of the local community and students in the school's decision-making processes is widely referenced in legislative actions such as: Federal Constitution (1998, Article 206, Item VI), Law of Guidelines and Bases of Education (LDB - Law No. 9,394/1996, Article 3,

item VIII; Article 14) and in the National Education Plan (PNE-Law No. 13,005/2015, Goal 19). Although there is all the legal apparatus that supports and suggests the participation of the community in the school's actions, Veiga (2007, p. 115) points out that:

It is impossible for the existence of the law - by itself - to democratize the management of the school, that is, the law is an important instrument for democratization, but in isolation it does not direct democracy and participation; for this, it is necessary to have policies that make them viable. It is interesting to consider that the legal mechanisms aim to guarantee the space for processes of collective deliberation on the pedagogical practice of the school, as something instituted. If the mechanisms are decreed, the school needs to be open to the construction of the space for the exercise of autonomy (emphasis added).

In view of the above, it is understood that the legislative actions enacted in the federative spheres are important for the effectiveness of democratic management in school units, but these alone do not guarantee that management will excel in the democratic and participatory principles of the local community. Brito *et al.* (2022, p. 220) reinforce that "the path to democracy is a daily construction that requires participation, debate, dialogue, respect for the different, and the establishment of horizontal conditions for its implementation".

With this, it is understood that the participation in the elaboration and discussions of the actions provided for in the PPP cannot be the responsibility of the school manager and his team alone, but if it occurs, the adoption of centralized actions such as this one, will demonstrate that school management does not excel in democratic principles, evidencing a school organization still centered on the perpetuation of autocratic principles, that permeate capitalist society, expressing the tendency of stratified social divisions and maintenance of power in the hands of the dominant class (Hora, 2012; Carvalho and Lagares, 2022).

Thus, it is emphasized that in order to transcend managerialist practices in the educational sphere, the school team must foster elucidatory practices that lead to democratic management, through the daily reflection of actions that promote the participatory process of the school community, both local and of students in the instances of collective deliberations (Brito *et al.*, 2022), and it is necessary not only to limit oneself to meetings for the transfer of financial investments, discussions on how to apply some resource from the programs instituted in the school aimed at physical improvement or acquisition of pedagogical materials for the school unit.

In this regard, Carvalho and Lagares (2022, p. 88), emphasize that by promoting "moments of speech" of all participants in decision-making processes in the school unit, they come to understand in practice that they can directly influence their reality in a political way,

given that "the more one participates, the more one learns the games of democracy and the more democratic practices are deepened".

The learning provided by these deliberative moments is essential for citizen participation to occur both in a micro and macro way. This will lead them to feel interested in contributing to the materialization of participatory actions, which can be effective in their entry into councils, unions, associations, and in the case of students, in associations in the various federated entities.

In addition to favoring participatory and democratic processes, the construction, review and implementation of the PPP also enables school units to exercise in practice autonomy (pedagogical and financial) as a result of collectively decided actions. Through these, democracy is strengthened in the school environment, to the extent that the school also develops an environment favorable to the institutionalization of participatory citizenship, which, as Gadotti emphasizes:

The school must *train for citizenship*, and for that, it must set an example. The democratic management of the school is an important step in the learning of democracy. The school does not have an end in itself. It is at the service of the community. In this, the democratic management of the school is also providing a service to the community that maintains it (Gadotti, 2004, p. 35, emphasis in the original).

Reinforcing this proposition, Ciseski and Romão (2004) emphasize that the pedagogical function of the school is not only to teach content provided in teaching programs, given that such a practice does not contribute to democratic and citizen learning on the part of the student, but that this should favor students to learn democracy in *praxis* participatory, because when they are involved in collective decision-making processes, they understand that they are part of a project of society in which they are inserted.

Thus, putting into effect the democratic and participatory principles through the elaboration of the PPP is a daily exercise and this process presupposes some procedures that are not carried out in a linear or sequential way, as provided in Table 2, which presents the criteria for the implementation and possible effectiveness of democratic management through this document:

Table 2

Criteria for implementation and effectiveness of democratic management

Train the members of intercollegiate bodies	Participation in a democratic environment requires learning. For the full exercise of democratic management in the school environment, it is necessary to train the segments: councils, associations, associations, etc. The training offered needs to go beyond modular studies of the functions of each person within the intercollegiate body. It is necessary that the formative moments be reflective and effective in praxis, because this is the path to a political and citizen education.
Consult the school community	The implementation of democratic principles does not occur in isolation or centered on one person or team. Thus, holding meetings and assemblies to listen to the school community is essential for the interventions and discussions of the actions listed in the PPP. Consultation with the school community needs to be a two-way street: it is necessary to listen, systematize and give feedback on the deliberations that have taken place. When this consultation occurs in a participatory and involved manner, everyone feels co-responsible for the applicability of the actions listed.
Institutionalizing democratic management	Democratic management is institutionalized when democratic, autonomous and participatory principles are chained in school direction. Therefore, the more management excels in these principles, the more possibilities there will be for school subjects to continuously promote participatory processes. As mentioned above, institutionalizing democratic management is not an easy job, it is surrounded by tensions and conflicts.
Transparency and agility in information and negotiations with the community	To favor the participatory and democratic process in the school, it is necessary to democratize the information that permeates the school environment. Access to information on school progress needs to be transparent and should be known to all. For this, the discussion agendas need to be made public before they happen, because if someone wants to include or request changes, the school management can include the topic in time or reschedule it for the next meeting. The information must be disseminated by digital and analog means (bulletin board, letters, printed messages, memos, etc.).

Source: Prepared by the authors based on Hora (2012), Ciseski and Romão (2004) and Antunes (2002).

In accordance with what has been presented, it is understood that the PPP of an educational institution goes through processes of mobilization/training of the subjects involved in its elaboration and implementation, especially when it will take as a founding principle of participatory democratic management. The criteria presented in Table 2 reinforce the assertion that exercising democratic management in the school environment requires more than establishing democratic and participatory principles in official documents, but that the school also becomes the predominant field of its effective realization.

In this sense, Flach and Luz (2022) reinforce that the spaces and mechanisms of democratic management existing in the school environment are favorable for participation

and elucidation of the character of participatory and citizen democracy. Therefore, it is necessary that school management, committed to the participatory processes that permeate the PPP, adopt strategies that aim at the effective participation of the school and extra-school community, thus promoting the consolidation of space for the performance of councils, associations and associations.

In order to identify as the PPP of two public schools: one municipal and the other state, the result of the investigation of this research is presented, identifying the elements that indicate actions to be carried out by the subjects participating in the student council in a way that contributes to the development of student participation and autonomy.

3 DOCUMENTARY ANALYSIS: WHAT THE PPP SAYS ABOUT THE PERFORMANCE OF ASSOCIATIONS IN THE SCHOOL ENVIRONMENT

Education is the alternative for the formation of citizen consciousness, but in order for it to be able to fulfill its function of social emancipation, the postulated values must be for human formation and not for the formation of human capital (Ribeiro, 2019, p. 105).

According to what has been stated in the epigraph, it is of fundamental importance that there is an understanding of the entire school team that education is the path of citizenship and political formation of students and that their active participation in the school's decision-making contributes to this human formation, of contents and learning of socially produced knowledge by all generations.

For citizenship education to be effective, it is necessary that the mechanisms of democratic management occur within school spaces are unrestricted and unlimited, that is, everyone, including students, need to participate autonomously, in the main space of their school representativeness: the student council.

The Michaelis Dictionary (on-line) has as the meaning of the entry *grêmio*, that it has an etymological origin in the Latin *gremium* and means "lap, lap, breast". Currently, this term has been used to designate individuals who act in a corporate manner governed by statutes and regulations. In the school environment, the student council is the main representative association of students who have cultural, political and citizenship training purposes.

The guiding question that led to the writing of this article was the following: Is it possible to identify within the PPPs of municipal and state schools elements that indicate actions to be carried out by the subjects participating in the student council in a way that contributes to the development of student participation and autonomy?. In order to answer this question, an

investigation was undertaken on how the associations are included in the actions and activities developed in the school³.

Table 3 below briefly presents the municipal location, the levels and modalities of education offered in the schools where the PPPs were borrowed to carry out the research.

Table 3

Levels and modalities of education offered in the surveyed public schools (2025)

School	Stages	Modality
Municipal (Tocantnia)	Elementary School (Early and Final Years)	Youth and Adult Education (EJA)
State (Miracema do Tocantins)	Elementary School (Final Years) Regular High School	Youth and Adult Education (EJA), Regular High School, National Program for the Integration of Professional Education with Basic Education in the modality of Youth and Adult Education (PROEJA): Nursing Technician

Source: Prepared by the authors based on the PPP of the schools surveyed (Tocantins; Tocantnia, 2025).

In time, it is important to emphasize that the implementation of student unions in school units is established by law in all federative spheres of Brazil, namely: Free Guild Law (1985), Federal Constitution (1998), Education Plans at the national, state and municipal levels (2014/2015, PNE, Goal 19 and strategy 19.4) and Statute of the Child and Adolescent (ECA-1990, Article 53, item IV). Carvalho *et al.* (2023, p. 15) clarifies that:

As spaces for democratic-participatory learning, the unions are fundamental to the promotion of students' autonomy and their socio-political formation, therefore, a place for the exercise of their citizenship. The legislation, by establishing the need to create these spaces within public schools, seeks to demarcate that the unions contribute to the construction of democracy in the school, in the municipality and in society, therefore, they cooperate to strengthen the public sphere.

It can be inferred, therefore, that the associations contribute to the construction of democracy in the school environment, and are also an integral part of the school's guiding document, the PPP, and that in it, there are actions that include student participation in the school's decision-making processes and not only the protection of pedagogical actions set out in the action plan prepared and decided by the management team. teachers and other adults.

³ In respect of the right to anonymity and in compliance with the standards of the Brazilian Association of Technical Standards (ABNT) that guides academic publications, the information of the educational institutions researched will be referred to as municipal school and state school.

Table 4 below presents the data produced from the readings and analyses of the schools' PPPs with a focus on the student council and how these are arranged in their action plans for execution in the year 2025 with regard to attributions, standardization, and representativeness.

Table 4

Analysis of the PPP of a municipal and state school on the performance of the Student Councils (2025)

PPP in Analysis	What is recorded about student unions
Municipal	It establishes that it is the responsibility of the school manager to ensure the implementation of school councils and student councils (p. 27); Regulates the participation of the association in the class council held bimonthly (p. 32); He sees the student council as a space for the formation of children's leaders (p. 33); The internal regulations (annex to the PPP) ensure that students in Article 2, Item IV "meet with colleagues for the organization of the guild or educational campaigns, under the student conditions established and approved by the board" (p. 154);
State	Regulates the participation of the student council and class representatives in class councils held bimonthly (p. 53); It establishes that the restructuring of the association and the action plan of this intercollegiate body is the responsibility of the school's multidisciplinary team (p. 65); Aiming at youth protagonism, the PPP establishes that the weekly reception of the other students will be carried out by the management and multidisciplinary team with the participation of the student council and class representatives (p. 67);

Source: Prepared by the authors based on the PPP of the schools surveyed (Tocantins; Tocantínia, 2025).

The analysis undertaken by the authors points out that in the PPPs of both the municipal and state schools, there are indications that the school management reinforces attitudes that restrict the performance of the student unions, revealing a centrality of the actions proposed with the student involvement supervised either by the multidisciplinary team or by the management, as stated in what refers to the holding of meetings to organize the members and/or establish plans must have authorization.

Attitudes such as these are far from contributing to the effectiveness of the management mechanisms that enable the autonomy and political and civic education of students and reminds us of what Martorano (2011) warns, that the development and vitality of intercollegiate bodies is an indication that democracy is implemented in this space and that the absence expresses democratic decline, favoring autocratic attitudes aimed at perpetuating attitudes typical of the capitalist hegemony of power.

Another observation found was that one of the recurrent actions in both PPPs is the institution of the participation of the association in the class councils, which is carried out in schools every two months, that is, minimum participation, far from the incentive of daily exercise for the development of participatory citizenship. It is perceived that this action in itself does not contribute to the political and civic formation of the student, since the participation in this school action occurs only as a bureaucratic and not formative character.

A relevant finding in the PPP of the municipal school is the written record that among the functional attributions of the school principal, is to ensure the creation and implementation of the school council and the association. A management that strives for democratic principles will adopt the necessary strategies and procedures so that the participation of the local and student community is also achieved within the scope of participatory management.

In this sense, Brito, Miranda and Sousa (2023, p. 326) reinforce that "it is necessary for the school team as a whole to foster, contribute and grant spaces so that students can exercise their citizenship. This process is carried out in Brazilian school units with the creation of student unions" by and with students, not only by the manager and his team.

The PPP of the municipal school records that the association is a space for the formation of "student leaders" and that the Grêmio organization must be approved by the board. Now, political and citizen education goes beyond training leaders, as this practice contributes to the formation of demagogues and autocrats, who seek to use their influence to perpetuate themselves in power (Levitsky and Ziblatt, 2018). Democratic work is a demanding and challenging job, which requires commitment and concessions from those involved.

In this line of reasoning, Paro (2014, p. 70) reinforces that "the final objective that guides democratization must be the student and the development of his autonomy". Thus, the imposing tutelage of the actions of the unions, with the authorization and approval of the board or another adult, does not contribute to the formation of the students' autonomy.

Regarding the tutelage of an association, Idelbrando (2021, p. 58) points out that centralizing attitudes in student decision-making in the figure of the principal demonstrate hierarchical and hegemonic attitudes, in addition to the perpetuation of power arising from the function exercised by the school manager. Attitudes of "few decide and many obey without any resistance" are reinforced to students. The author also highlights that "it is a common attitude: to decentralize tasks to parents and students and centralize decisions to management, but with an air of participation (Idelbrando, 2021, p. 15).

This, to a certain extent, reminds us that the political and citizen education of the student does not take place with the participation of actions pre-defined by the school board and its team, and as Hora (2012, p. 109) points out that:

Learning, which comes from the participation of all in the administration of the educational process, enables each of the subjects, individually and all collectively, *the growth of the human person in all its aspects: dignity, performance, criticality, capacity for decision and action*, and must be respected in its individuality and sociability (emphasis added).

In view of what we found in the analysis of the PPPs, the understanding is reaffirmed that in order to exercise democracy in the school environment, it involves degrees of participation, involvement and autonomy. Regarding this discussion, Lagares *et al.* (2022) emphasize that the autonomy of a school (and consequently of intercollegiate bodies, such as associations) does not occur involuntarily, but is built daily in a collective way and with the involvement of all. Soares, Azevedo and Ramos (2019, p. 228) also reinforce that:

Thinking about a citizen school requires thinking about democracy within the school, through a pedagogical project that aims to form active, thinking students, participants in a society and future professionals who are active and critical to face the confrontations and challenges of society. Participating actively and democratically is not a simple act, on the contrary, it is the result of a long process, of struggles and engagement of those who make the school [...].

In order for citizenship education to materialize in the implementation of an association, it is understood that there is a need for students to understand the exercise of citizenship as resulting from involvement in decisions that affect their peers and the community to which they belong. In this way, the opening of mechanisms for participation and the effectiveness of democracy within the school environment must be occupied by the *gremistas* in an integral way, given that democracy is not complete if there is no representation (Muñoz, 2004). In the same vein, Brito, Miranda, and Sousa (2023, p. 327) reinforce that "when talking about the democratic aspect of public schools, it is necessary that democracy simply transcends the creation of student unions as an end in itself".

Thus, the political and citizen education provided by an association is only possible to be achieved with the active participation of students in decision-making moments. Student participation does not take place only during the period of election of the *Grêmios* slates or in the pedagogical activities established collectively or individually by the school management. Democracy is effective when students become aware of the needs and problems of the school and, through dialogue, are able to collaborate with the school management in order

to change reality in a joint effort for change (Muñoz, 2004). The two PPPs taken as objects of investigation, present important points for us to continue discussing the importance of student unions in public schools, especially those in Tocantins, which are still little researched, both from the municipal and state perspectives.

4 FINAL CONSIDERATIONS

As presented in this article, the Pedagogical Political Project of a school unit is a guiding document and epicenter of the pedagogical, financial, and administrative actions that will be taken by the school board with a focus on the implementation and strengthening of democracy in the school environment (Dourado, 2020).

The effectiveness of democratic principles and their mechanisms in the school includes primarily the creation and strengthening of intercollegiate bodies, especially student unions. The promotion of an association must occur from the initial stages of schooling, as established in the legislative actions enacted and in force in all federated entities and cited in the course of the arguments brought by this text, and it is also pointed out that the creation and implementation of this intercollegiate body in the school units can become a powerful space for integral formation, citizen and student policy demands time and collective effort from the entire school unit (Brito, Miranda and Sousa, 2023).

The PPP of an educational institution is the document that guides and guides the actions of the school, and discussed in this work, it is also a gateway to the existence of actions that guarantee student performance in order to consolidate the participation of students in an active, engaging, representative way and with a view to the practice of an education socially referenced in the rights and duties of Brazilian citizens guaranteed in the 1988 Constitution, the much vaunted "Citizen Constitution".

The investigative study exposed in this article led to the identification of elements and actions present in Pedagogical Political Projects (PPP) of two public schools in the interior of the State of Tocantins, leading to the realization that these still do not guarantee the effective participation and performance of students autonomously, in the school's decision-making process or even its representative organization untethered from bureaucratic and centralizing management. Therefore, it is crucial that the PPP, when reviewed and implemented in 2026, seeks to establish actions aimed at student participation in a participatory and consistent way.

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BEYOND INCLUSIVE SALVATIONISM: EDUCATIONAL MANAGEMENT AND THE CAPTURE OF DIFFERENCE IN THE CONTEMPORARY SCHOOL

PARA ALÉM DO SALVACIONISMO INCLUSIVO: GESTÃO EDUCACIONAL E A CAPTURA DA DIFERENÇA NA ESCOLA CONTEMPORÂNEA

MÁS ALLÁ DEL SALVACIONISMO INCLUSIVO: LA GESTIÓN EDUCATIVA Y LA CAPTURA DE LA DIFERENCIA EN LA ESCUELA CONTEMPORÁNEA



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ABSTRACT

This article analyzes school inclusion as an imperative of contemporary educational policies, problematizing its effects on the production of difference within the school. Using a genealogical approach, inspired by Foucaultian studies in education, it examines how school inclusion, articulated with neoliberal rationality, operates less through explicit exclusion and more through the capture of difference in the form of manageable diversity. The study focuses on the centrality attributed to educational management in public inclusion policies, highlighting how principles such as democratic management, co-responsibility, and the training of inclusive managers function as mechanisms for governing difference. It argues that, when taken as diversity, difference loses its political power and comes to exist as an object of intervention, monitoring, and regulation. In this arrangement, Special Education is repositioned as technical knowledge supporting the governance of inclusion, risking the emptying of its critical dimension. By challenging the naturalization of inclusion as an inherent good, this article proposes conceptual shifts that allow us to think about educational management, Special Education, and difference beyond inclusive salvationism and the logic of capture, betting on the possibility of another Special Education, committed to difference as a human potential.

Keywords: School Inclusion. Special Education. Difference. Diversity. Educational Management.

RESUMO

Este artigo analisa a inclusão escolar como imperativo das políticas educacionais contemporâneas, problematizando seus efeitos na produção da diferença no interior da escola. A partir de uma abordagem genealógica, inspirada nos estudos foucaultianos em educação, examina-se como a inclusão escolar, articulada à racionalidade neoliberal, opera menos pela exclusão explícita e mais pela captura da diferença sob a forma da diversidade administrável. O estudo toma como foco a centralidade atribuída à gestão educacional nas políticas públicas de inclusão, evidenciando como princípios como gestão democrática, corresponsabilização e formação do gestor inclusivo funcionam como dispositivos de

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governo da diferença. Argumenta-se que, ao ser tomada como diversidade, a diferença perde sua potência política e passa a existir como objeto de intervenção, acompanhamento e regulação. Nesse arranjo, a Educação Especial é reposicionada como saber técnico de apoio à governabilidade da inclusão, correndo o risco de esvaziar sua dimensão crítica. Ao tensionar a naturalização da inclusão como um bem em si mesma, o artigo propõe deslocamentos conceituais que permitam pensar a gestão educacional, a Educação Especial e a diferença para além do salvacionismo inclusivo e da lógica da captura, apostando na possibilidade de outra Educação Especial, comprometida com a diferença como potência humana.

Palavras-chave: Inclusão Escolar. Educação Especial. Diferença. Diversidade. Gestão Educacional.

RESUMEN

Este artículo analiza la inclusión escolar como un imperativo de las políticas educativas contemporáneas, problematizando sus efectos en la producción de la diferencia dentro de la escuela. A través de un enfoque genealógico, inspirado en los estudios foucaultianos en educación, examina cómo la inclusión escolar, articulada con la racionalidad neoliberal, opera menos a través de la exclusión explícita y más a través de la captura de la diferencia en forma de diversidad gestionable. El estudio se centra en la centralidad atribuida a la gestión educativa en las políticas públicas de inclusión, destacando cómo principios como la gestión democrática, la corresponsabilidad y la formación de gestores inclusivos funcionan como mecanismos para gobernar la diferencia. Argumenta que, al ser entendida como diversidad, la diferencia pierde su poder político y pasa a existir como un objeto de intervención, monitoreo y regulación. En este arreglo, la Educación Especial se reposiciona como conocimiento técnico que sustenta la gobernanza de la inclusión, con el riesgo de vaciar su dimensión crítica. Al cuestionar la naturalización de la inclusión como un bien inherente, este artículo propone cambios conceptuales que nos permiten pensar la gestión educativa, la Educación Especial y la diferencia más allá del salvacionismo inclusivo y la lógica de la captura, apostando por la posibilidad de otra Educación Especial, comprometida con la diferencia como potencial humano.

Palabras clave: Inclusión Escolar. Educación Especial. Diferencia. Diversidad. Gestión Educativa.

1 INTRODUCTION

This text is born of an insistence. Insistence on continuing to think about what, for about two decades, has been repeatedly presented as an unquestionable solution to contemporary educational dilemmas, school inclusion. It is also born from the refusal to accept that time or the succession of policies, programs and discourses has exhausted the need to problematize the ways in which inclusion has become an imperative, especially when articulated with the training of managers for inclusive education. In this meander, it is understood that there is still a current need to think about the political and pedagogical effects of the inclusion discourses that constitute schools, as it is understood that "*inclusion policies* are not, by themselves, neither good nor necessary" (Veiga-neto, 2008, p. 11, emphasis added), so it is necessary to stress the naturalization of inclusion. Veiga-Neto (2008, p.14) states that this brings "the understanding that inclusion is an imperative, that is, both an unquestionable, indisputable, self-evident truth, and – and for this very reason [...] – a self-justifying need".

For almost twenty years, Brazil has been systematically investing in the training of managers as central agents in the implementation of school inclusion policies. From the consolidation of the discourse of democratic management, through the centrality attributed to leadership, participation and collective accountability, to the current ways of governing the school through the logic of performance, effectiveness and social risk management, the figure of the inclusive manager has been produced as a strategic subject to make the inclusive school work. It is this rationality, which makes inclusion an imperative and management its privileged operator, that this article proposes to problematize.

The writing presented here assumes a genealogical character, it is a study that is inspired by Foucaultian studies in education. It is not a matter of updating documents, nor of comparing policies in an evolutionary or linear logic. It is about operating with the archive composed of official documents, academic productions and the master's dissertation itself³ defended in 2016, as a historical materiality that allows us to follow the emergence, the permanence and the updating of certain regimes of truth. The interest is not in what has changed, but in what continues to operate, especially with regard to capturing difference in the inclusive school.

Throughout these years, school inclusion has been progressively naturalized as a good in itself, an incontestable right, an absolute truth. In this movement, Special Education was captured, reconfigured and, many times, emptied as an area of critical knowledge, of

³ Available at: https://www.ufsm.br/app/uploads/sites/373/2019/04/Disserta%C3%A7%C3%A3o_Carolina-Noya.pdf

knowledge production, starting to function only as a technical-pedagogical support of the inclusive school. Difference, in turn, is no longer taken as a problem to be eliminated and has started to be celebrated, as long as it is manageable, measurable and compatible with the principles of neoliberal governmentality. It is at this point that inclusion ceases to operate only as an educational policy and starts to function as a technology for the governance of conduct.

This article is based on the understanding that inclusion and exclusion do not constitute opposite poles, nor processes that cancel each other out. On the contrary, they operate in an intertwined way, as parts of the same rationality. As in the studies developed by Lunardi (2001), Lopes (2013), the term in/exclusion is more appropriate, understanding that they are two sides of the same coin. For Lunardi (2001):

[...] inclusion/exclusion are two sides of the same coin, that is, they operate simultaneously, they are not dialectically resolved, they are part of the same system of representation, that is, they are part of the same matrix of power (2001, n.n.).

School inclusion, when taken as an imperative, does not eliminate exclusion; rather, it re-inscribes it in new forms, producing different modes of participation, belonging and visibility. Thus reaffirming the concept of in/exclusion, with Lopes (2010), when he argues that:

With the erasure of the historical processes that previously contributed strongly to the recognition of the excluded and the included, the fragile conditions of the present remain so that we can look, always in a provisional way, at those who live under the tension of in/exclusion. For this reason, in our studies, we created the expression in/exclusion, to show what is peculiar to our time, that is, to attend to the provisionality determined by the relations guided by the market and by a neoliberal State from the perspective of the market (LOPES et al, 2010, p. 6).

It is understood that in this context, educational management, especially under the discourse of democratic management, assumes a central role in the conduct of these plots. The training of managers for inclusive education is understood, here, as a privileged strategy for governing difference within the inclusive school. By shifting the emphasis from administration to management, subjects are produced that are called upon to lead, involve, mobilize and hold the school community accountable for the inclusion of all. This call, apparently democratic and participatory, operates a dilution of the responsibilities of the State and intensifies the centrality of the manager as an entrepreneur of himself, manager of people and manager of difference.

Inclusion thus becomes a collective task, however, marked by the logic of risk, performativity, self-regulation and, as far as we are interested in thinking here, with the

responsibility of capturing difference, since according to Sardagna (2013, p.58) it is not a matter of replacing spaces and placing those who were outside the school, it is "much more the result of a repositioning of the subjects, requiring new control procedures, through the new forms of governmentality that are presented in times of school inclusion". It is in this game of reciprocal exchanges that educational management becomes central, as it starts to operate precisely in the administration of these mobile boundaries between inclusion and exclusion.

2 THE EXERCISE OF SUSTAINING QUESTIONS AS A METHODOLOGICAL MOVEMENT

The writing presented in this text is not born from the security of a previously defined method, nor from the expectation of offering conclusive answers to complex and historically produced problems. It is born of a persistent restlessness, of a discomfort that refuses to be appeased by the well-intentioned discourses that surround school inclusion and democratic management. It is in this movement, closer to problematization than to proof, that the investigative paths of this writing are configured.

By assuming this position, we move away from a methodological conception that understands research as the application of techniques or as a linear path oriented to previously desired results. What is at stake here is not to demonstrate the effectiveness or insufficiency of inclusion policies, nor to evaluate training programs for managers. Rather, it is a question of questioning the regimes of truth that made possible certain ways of thinking, saying and doing school inclusion and, especially, the training of managers as privileged agents of this process.

The post-structuralist inspiration that runs through this writing is not presented as an identity affiliation, but as a way of thinking and placing oneself in front of the world. A way that distrusts universal truths, that refuses to operate through binary oppositions of inclusion/exclusion, good/bad, success/failure, and that is interested in limits, borders, and zones of indeterminacy. As Williams (2012) points out, post-structuralism does not seek to replace one truth with another, but to affirm the productive power of limits. Thinking by the limits means, in this work, refusing the idea that school inclusion can be taken as the final solution to contemporary educational problems.

It is in this horizon that genealogy, inspired by the thought of Michel Foucault, presents itself as an analytical and political strategy. Unlike a history of origins or an evolutionary analysis of educational policies, genealogy operates as an exercise in denaturalization. She does not ask "when it began", but how it became possible; it does not look for ultimate causes,

bad emergency conditions; it is not interested in linear continuities, but in power plays, ruptures and permanences.

Genealogy, as mobilized in this article, is not a method in the classical sense, but a gesture of writing. A gesture that refuses neutrality, that assumes the implication of the researchers and that recognizes the historical and contingent character of the discourses analyzed. As Foucault (2014) reminds us, the will to truth does not cease to be reinforced, becoming increasingly deep and unavoidable. It is precisely this desire for truth that runs through the discourses of school inclusion, often presented as evident, necessary and morally unquestionable.

The archive that sustains this writing is composed of different materialities, from official documents, public policies, training programs, academic productions and, centrally, the master's thesis defended in 2016. This archive is not mobilized as a closed set of empirical data to be updated or compared, but as a field of visibility from which it is possible to follow the production and circulation of certain discourses over approximately twenty years. The dissertation, here, is not taken up as a point of arrival, but as a condition for the possibility of this new writing.

By treating the archive in this way, we move away from the idea that the documents speak for themselves. They are taken as discursive practices that produce effects on the ways of thinking about school, Special Education, management and difference. As Foucault teaches us, discourses do not only describe the world; they produce it. It is in this sense that the proposed analysis does not focus on updating recent norms, but on identifying the discursive regularities that cross different periods and are re-updated under new guises. Discourse is a practice related to language that brings together elements that, by producing and adjusting discourses, produce knowledge (Foucault, 2000). In addition to determining functions and forms of behavior at a given time, they also define a way of thinking. Events are not understood by a game of causes and effects to establish "the diverse, intersecting, often divergent series, but not autonomous, which allow us to circumscribe the "place" of the event, the margins of its contingency, the conditions of its appearance" (Foucault, 2014, p. 53, emphasis added). In this sense:

If discourses are to be treated, rather, as sets of discursive events, what status should be given to this notion of event that has been so rarely taken into account by philosophers? Certainly the event is neither substance nor accident, nor quality, nor process; The event is not of the order of bodies. However, it is not immaterial; it is always in the realm of materiality that it is actualized, that it is effect; it has its place and consists of the relation, coexistence, dispersion, cutting, accumulation, selection of material elements; it is neither the act nor the property of a body; it is produced as an effect of and in a material dispersion. (Foucault, 2014, p. 54)

By defining what is (what should be and what cannot be) a management for inclusion and/or an inclusive school, in a relationship of knowledge, which is already an operation of power, school inclusion in Contemporaneity is taken as a regime of truth. Therefore, school inclusion is understood, in this writing, as a historically produced and progressively naturalized discourse. When taken as a self-evident right and as a solution, it starts to operate as an imperative. As Veiga-Neto (2008) problematizes, inclusion, when it becomes an imperative, is no longer subject to questioning, becoming a self-justified necessity. In this movement, exclusion does not disappear; it re-inscribes itself in other, more subtle and often more effective ways.

Special Education, in turn, is captured in this discursive arrangement. When it is repositioned as the technical support of the inclusive school, it starts to function as an area of knowledge that manages difference, that makes it visible, nameable and governable. Difference is no longer taken as a problem to be eliminated and starts to be celebrated, as long as it is regulated, accompanied, monitored and compatible with the objectives of the contemporary school. It is at this point that difference is converted into captured power, celebrated as diversity.

The training of managers for inclusive education emerges, in this scenario, as a privileged governance strategy. The shift from administration to management, widely discussed by Klaus (2011) is understood here as a political movement that responds to the demands of neoliberal governmentality. Democratic management, by calling on everyone to participate, co-responsibility and engagement, produces subjects who govern themselves and others. Everyone becomes a manager; everyone becomes responsible for inclusion; Everyone must circulate the difference without interrupting the operation of the school machine. Klaus (2014, p. 10-11) argues that "the shift in emphasis from administration to management is completely linked to these new ways of life that are related to neoliberalism and the reform of the State". We need to manage the school institution in a new way, and this new conception concerns the change of emphasis from a conception of school administration to that of management.

In times of collective disengagement and new forms of engagement in communities, the school is a great place for social risk management. In order for the school community to manage the school and promote mutual governance actions, a new conception of management is necessary (Klaus, 2011, p. 73).

In addition to the capture of managers by the discourse of democratic management, the discourses that circulate in public inclusion policies are productive because they put into operation the logic of everyone's participation and that we are all responsible for inclusion.

Thus, school inclusion is put into operation through school management in school, giving meaning to the productive alliance between educational management and school inclusion. We share with Lopes (et al, 2010, p. 26) when he points out that:

We understand that school management mobilizes certain strategies to govern the conduct of school subjects. Educational management can be defined as a field of knowledge that uses certain discourses, including educational and business, to, within a neoliberal logic of education entrepreneurialization, mobilize certain strategies, make certain devices work that would be responsible for leading an entire school community to a certain end. In this sense, the inclusion of everyone in the school becomes a principle put into operation through management, mobilizing governance and self-regulation strategies that will lead the conducts of school subjects towards the production of inclusive subjectivities, which will be useful not only within the school, but throughout the social fabric.

Neoliberalism is taken, in this work, not only as an economic policy, but as a way of life. A rationality that crosses practices, discourses and modes of subjectivation, producing self-enterprising subjects, permanently summoned to invest in their capacities and to remain in the game of competition (Gadelha, 2013). In this logic, being out of school, the market, the network is a sign of failure. School inclusion thus operates as a strategy for permanence in the game.

The methodological movement that sustains this writing consists of tensioning this alliance between educational management and school inclusion, questioning its effects on capturing difference. It is not a matter of denouncing inclusion as a mistake, nor of proposing alternative management models. It is a matter of placing under suspicion that which has become excessively natural, consensual and protected by the promise of salvation. It is about sustaining the question as responsibility, as Larrosa (2017) proposes.

To take this investigative path implies accepting the risk of not offering ready-made answers, of remaining in tension and of producing a writing that bothers us. To think genealogically is to refuse both uncritical adherence and easy denunciation. It is to recognize that, if there are captures, there are also possibilities of resistance, not as a denial of inclusion, but as the production of other meanings for it, and especially for Special Education.

More than describing policies or analyzing programs, this text seeks to produce shifts in thought. Displacements that allow us to think about school inclusion beyond salvationism, Special Education beyond the function of technical support and difference beyond the logic of capture. It is in this sense that the genealogy undertaken here asserts itself not only as a methodological strategy, but as an ethical, political and epistemological gesture, committed to the possibility of making another Special Education exist.

3 THE PRODUCTION OF GOVERNABLE DIFFERENCE IN THE INCLUSIVE SCHOOL

School inclusion has been consolidated, in recent decades, as one of the main truths of the contemporary educational field. Its strength lies not only in the legal status of law, but, above all, in the way it began to operate as moral and political evidence. Inclusion has become synonymous with justice, ethical commitment and modernization of the school. In this scenario, questioning inclusion is not just disagreeing with an educational policy. Presented as a right, moral duty and pedagogical solution, it has come to occupy such a place of evidence that any questioning tends to be quickly interpreted as a defense of exclusionary practices. It is precisely in this place of naturalization of concepts that this analytical axis proposes to tension.

It is understood with Thoma (2017, p. 13) that inclusion can also be taken as a strategy for controlling and regulating the subjects:

as a form of government of differences, which operates on the conduct of each and every one of us. It is in this last sense that inclusion is placed as an imperative of our time, that is, as an unquestionable practice that must be put into effect because it is good and necessary for everyone.

When taken as an imperative, inclusion ceases to be one political possibility among others and starts to function as a self-justified need. As Veiga-Neto (2008) problematizes, the imperative of inclusion produces a curious inversion, because the more inclusion is affirmed as an unavoidable truth, the less it becomes capable of being thought. Inclusion in this register is not discussed; it is implemented. He does not question himself; it is operationalized. It is at this point that it ceases to operate only as an educational policy and starts to function as a government technology.

The inclusive school thus emerges as a privileged space for the production and management of difference. It is no longer a matter of excluding or segregating, but of including in a productive way. Including here does not only mean guaranteeing physical access or enrollment in common classes, but producing conditions for everyone to remain, circulate and participate, even if in different ways. The difference does not disappear; it is re-inscribed in new, now manageable forms. Therefore, with Thoma (2017, p. 13), it is understood that:

Inclusion, as a governance strategy, articulates a series of procedures, statistical calculations and knowledge aimed at social organization and the conduct of the population's life. Therefore, inclusion is neither good nor bad, but necessary to put into operation a type of society like the one we live in.

In this movement, the difference is named, classified, followed and monitored. It is made visible through continuous diagnoses, reports, plans, adaptations and evaluations. At the same time that it is celebrated in the discourses of diversity, it is carefully regulated so as not to interrupt the functioning of the school. The inclusive school, in this way, does not eliminate the norm; it multiplies it. An expanded, flexible normativity is produced, capable of accommodating different ways of learning, behaving and being in school, as long as these modes remain within limits considered acceptable/normal.

It is at this point that inclusion is closely linked to neoliberal rationality. By taking neoliberalism not only as an economic policy, but as a way of life, as suggested by authors such as Gadelha (2013) and Lopes (2009), it becomes possible to understand why inclusion operates as a strategy of permanence in the game. In neoliberal governmentality, the rule is not to exclude, but to keep everyone in circulation. Being out of school, the market, the network, becomes a sign of failure.

School inclusion, in this sense, works as a device that guarantees the continuous participation of the subjects, even if in an unequal way. Difference, when captured by this logic, is transformed into capital to be managed. It is no longer seen as an insoluble problem or as a threat to the order, but as a pedagogical challenge, an opportunity for innovation, and an index of institutional quality. The inclusive school thus becomes a space for the production of subjects capable of managing their own limitations. Disability, difficulty and uniqueness are resignified as conditions to be worked on, overcome or compensated for through appropriate pedagogical strategies.

Special Education occupies a central place in this arrangement. When it is repositioned as a support area for inclusive schools, it starts to function as technical knowledge responsible for making difference governable. Their practices of assessment, intervention, guidance and monitoring are mobilized to ensure that inclusion happens without compromising the objectives of the contemporary school. In this process, Special Education runs the risk of losing its critical and political power, being captured as a technology for adjusting difference to the expanded norm of inclusion.

This movement does not take place in an imposing and authoritarian way. On the contrary, it operates through positive, convening and apparently emancipatory discourses. Inclusion is presented as a civilizational achievement, as an ethical advance and as a collective commitment. The responsibility for inclusion is distributed among teachers, managers, families and students, producing a co-responsibility that dilutes the boundaries between institutional obligation and personal engagement. Everyone is called upon to make inclusion work; Everyone must be involved in the success of the inclusive project.

This alliance between educational management and inclusion is powerful, precisely because it is housed in the contemporary neoliberal rationality, which seeks to put everyone in the game of competition, which creates the feeling that we are autonomous, free and that we can make choices, that we can and should invest in ourselves to become competitive and be included. In this sense, we become subjects of a given time, captured by the neoliberal rationality that positions inclusion and promotes the circulation and permanence of subjects in the game of being responsible for inclusion (ours and that of others), and thus, we circulate to compete and circulate so that there is competition. Thus, everyone needs to circulate in the 'nodes of the network', in this logic, being excluded is also failure, and in relation to the development of society:

(...) It must be achieved through management, which involves entrepreneurship, the entrepreneur subject himself, the creation of numerous short-term projects and innovation. Now, how would free competition work if subjects thought about long-term projects, fostering stability and routine? In neoliberal governmentality, it is necessary to circulate through the nodes of the network, and standing still is a sign of failure (Klaus, 2009, p. 201).

The register of the discourse of school inclusion is in this matrix of intelligibility that allows us, in different movements, to produce ourselves as subjects of a given time, a given time and a certain culture. And this matrix is neoliberal. We take neoliberalism as a way of life, according to Lopes (2009), anchored in the studies of Foucault (2008b), we understand the existence of a common point between the economic and the social as a rule of non-exclusion, and the possibilities of inclusion being taken as a neoliberal imperative, because, in this order, it seeks to keep everyone within the school and the market. It goes like this:

(...) the current policies of inclusion become a strategy of control and regulation of the subjects to put into operation a State that is characterized as neoliberal. By conducting conduct, both of individuals and of the population, the State employs strategies to minimize the risks produced by social exclusion, seeking greater security for the population (Thoma, 2017, p. 13).

The production of governable difference, therefore, is not carried out by explicit exclusion, but by regulated inclusion. It is not a matter of denying difference, but of making it fit. Fit into the curriculum, fit into school time, fit into assessments, fit into pedagogical projects. The difference that escapes, that interrupts, that resists being translated into acceptable pedagogical terms, tends to be quickly brought back to the devices of specialized support, accompaniment and intervention. Inclusion, in this sense, works as a strategy to contain excess, to capture difference as a human power, since "in a way, we can say that the

concept of difference present in the discourses that speak of the inclusive school ends up reducing difference to diversity" (Santos, 2010, p. 39).

The production of governable difference is understood as the set of discursive practices, specialized knowledge and management strategies that not only recognize difference, but constitute it as a legitimate object of intervention, monitoring and regulation within the inclusive school. It is a process in which difference is made visible, nameable, measurable and manageable, coming to exist as a synonym for diversity. The production of governable difference is inscribed in the field of governmentality, understood as the set of techniques and rationalities that aim to guide the conduct of the subjects, not by direct coercion, but by the organization of the ways of living, learning and participating in school life. The production of governable difference does not occur in spite of inclusion, but through it. It is precisely because inclusion is affirmed as an imperative that difference needs to be made manageable, in the logic of diversity.

By problematizing the production of governable difference in inclusive schools, this axis does not intend to deny the historical advances associated with the discourse of inclusion, nor to defend segregating practices. It is a matter of placing under suspicion the naturalization of inclusion as a good in itself and of questioning the political and pedagogical effects of this imperative. Thinking about inclusion beyond salvationism implies recognizing that it also produces captures, regulations, and normalizations. The production of governable difference operates within a regime of in/exclusion, in which inclusion does not eliminate exclusion. Thinking about the production of governable difference allows us to shift school inclusion from the field of salvationism to the field of government practices; to shift Special Education from the function of technical support to that of knowledge implied in truth regimes; and to shift the difference from the condition of human power to that of an object captured by management rationalities.

In public policies for school inclusion, diversity begins to operate as a central discursive category, often mobilized as a synonym for difference. However, this semantic shift is not neutral. By transforming difference into diversity, policies produce a specific form of visibility that neutralizes conflict, dilutes power asymmetry, and makes difference manageable. Excerpts from the documents analyzed in the dissertation that made such problematizations possible can be read in full in the original document file⁴. The centrality attributed to diversity in public policies for school inclusion does not represent an expansion of the recognition of difference, but a strategic shift that makes it manageable. By talking about diversity, the

⁴ File available online at:

https://www.ufsm.br/app/uploads/sites/373/2019/04/Disserta%C3%A7%C3%A3o_Carolina-Noya.pdf

documents produce a difference that can be managed, monitored and evaluated, emptying their political power.

The production of governable difference, as analyzed in this work, finds in the notion of diversity one of its central operators. By converting difference into diversity, public policies for school inclusion make it possible to manage, measure and normalize it, moving it from the field of political conflict to the field of pedagogical administration.

It is in this terrain marked by the production of governable difference that educational management emerges as a strategic element. If difference is converted into diversity and inclusion needs to function as an imperative, it becomes necessary to have an operator capable of organizing, monitoring and regulating these differences within the school. Educational management does not emerge, therefore, as a neutral response to a technical problem, but as a technology for the governance of diversity, responsible for making the rationalities of inclusion operate in the school routine. It is to this centrality of educational management in capturing difference, when taken as diversity, that the next analytical axis is directed.

4 EDUCATIONAL MANAGEMENT, DIVERSITY AND THE CAPTURE OF DIFFERENCE IN SCHOOL INCLUSION POLICIES

If, in the previous axis, the production of governable difference was problematized as an effect of the imperative of school inclusion, in this second axis the gaze shifts to a central operator of this process, which is educational management. It is about understanding how difference, when converted into diversity in public policies for school inclusion, starts to be activated, organized and regulated through management devices. It is not, therefore, a matter of analyzing management as a neutral instance of policy execution, but of questioning it as a government technology that makes it possible to make inclusion work and, with it, the capture of difference. It is necessary to consider intentionality in the change of emphasis from a conception of school administration to that of management, because:

In times of collective disengagement and new forms of engagement in communities, the school is a great place for social risk management. In order for the school community to manage the school and promote mutual governance actions, a new conception of management is necessary (Klaus, 2011, p. 73).

The mapping of the documents that make up the school inclusion policy in Brazil can be easily found on the internet, including in the excerpts that made the aforementioned master's research possible. From the Inclusive Education Program: Right to Diversity (BRASIL, 2005), through the Political-Legal Frameworks of Special Education in the

Perspective of Inclusive Education (BRASIL, 2010) and the National Curriculum Guidelines for Basic Education – Diversity and Inclusion (BRASIL, 2013), it is observed that diversity is activated as a guiding principle that demands institutional responses. These answers, in turn, are attributed primarily to educational management.

In these documents, diversity rarely appears as a tension or as a destabilizing force of the traditional school format. On the contrary, it is presented as a positive value, as a right to be guaranteed and as a challenge to be faced through appropriate practices. The school is called upon to review its pedagogical projects, reorganize curricula, mobilize resources and articulate intersectoral actions, always under the coordination of the management. Thus, diversity becomes a legitimate object of educational management, shifting the difference from the field of political conflict to the field of pedagogical administration.

This movement is visible in the teacher and management training materials produced within the scope of inclusion policies and listed in general above. Collections, fascicles and programs such as Educating in Diversity (Brasil, 2005), teach not only to recognize diversity, but, above all, to know how to deal with it. Diversity becomes formative content, professional competence and an indicator of institutional quality. Thus, the profile of the inclusive manager is produced, as one capable of leading teams, articulating partnerships, managing human and pedagogical resources and ensuring that diversity is incorporated into the school daily life without compromising the functioning of the institution.

By being activated in this way, diversity operates as a discursive technology for capturing difference. Instead of sustaining difference as a political power, as that which escapes, interrupts and puts the norm in crisis, public policies for school inclusion translate it into diversity, that is, into something that can be recognized, classified, monitored and evaluated. For Lopes (2007, p. 20):

The concept of difference present in the discourses that speak of the inclusive school, especially those commonly conveyed by public policies, reduces difference to diversity. In the specific case of legal discourse, difference presupposes a materiality that ends in itself; in other words, it presupposes something negative that the subject carries and that needs to be corrected/normalized.

Therefore, diversity does not negate difference, but re-inscribes it in manageable terms. It is in this sense that it is affirmed that the production of governable difference finds in educational management one of its main operators. The centrality of educational management in this process is not accidental. It is inscribed in the neoliberal rationality that runs through contemporary politics, in which governing means conducting conduct through accountability, participation, and self-regulation. By calling on managers, teachers, families,

and students to get involved in inclusion, policies produce a diffuse co-responsibility that blurs the boundaries between institutional obligation and personal engagement. Everyone must make inclusion work; everyone must manage diversity; everyone must answer for the results.

In this scenario, Special Education is once again repositioned. Instead of operating as a critical field capable of tensioning the limits of the inclusive school, it is often called upon to advise management, offering technical subsidies for the management of diversity. Assessments, guidance, adaptations and follow-ups are now part of a set of practices that aim to ensure that the difference, now named diversity, remains within the limits of what is acceptable. Educational management, supported by this specialized knowledge, becomes responsible for keeping the difference in circulation without it interrupting the functioning of the school machine.

It is from this articulation between educational management and diversity that this analytical axis develops. By problematizing how school inclusion policy documents trigger diversity via management, we seek to highlight inclusion as a sophisticated governance strategy. Educational management thus emerges as a privileged instance of capturing difference, operating in the production of an inclusive school that recognizes diversity, as long as it can be organized, monitored and governed.

This analytical displacement allows us to advance in the problematization proposed by this text, which is to think about school inclusion beyond salvationism, Special Education beyond the function of technical support and difference beyond the logic of capture. By bringing educational management to the center of the analysis, it does not seek to blame subjects or delegitimize practices, but to make visible the political effects of a regime of truth that transforms diversity into an object of management and difference into a governable power.

4.1 DEMOCRATIC MANAGEMENT AND INCLUSION IN OPERATION

Democratic management occupies a central place in public policies for school inclusion, appearing as an organizing principle capable of sustaining the effectiveness of diversity in contemporary schools. Presented as a political advance in relation to authoritarian and technicist models of school administration, democratic management is repeatedly associated with the participation, dialogue and co-responsibility of the different subjects that make up the school community. However, when analyzed genealogically, this association demonstrates effects that go beyond the promise of democratization of the school.

In the documents of the school inclusion policy analyzed and widely circulated, democratic management is activated as a condition of possibility for diversity to be

incorporated into the school routine. By calling on managers, teachers, families and students to actively participate in the construction of inclusive schools, policies produce an important shift in which inclusion is no longer just a responsibility of the State and becomes a collective commitment. This movement, apparently emancipatory, dilutes institutional responsibilities and intensifies the accountability of the subjects, because "in school, techniques of self-governance and of the governance of others are put into action, with the self-management of the communities becoming extremely productive and economical" (Klaus, 2009, p. 203).

In neoliberal rationality, it is necessary that each one becomes able to participate in the social and economic game governed by the market, while investing in others, since no one can fail to participate. To ensure the inclusion of each and every one, it is necessary to create spaces that allow self-investment, self-management and self-entrepreneurship of the subjects. Co-responsibility thus emerges as a central governance strategy. By distributing the task of inclusion among all, policies produce subjects permanently involved in the success of the inclusive project. Democratic management ceases to operate only as a political principle and starts to function as a device for regulating conduct. Everyone must participate, everyone must collaborate, everyone must answer for the diversity present in the school.

Within neoliberalism, as a way of life of the present, certain norms are instituted not only with the purpose of positioning subjects within a network of knowledge, but also of creating and preserving interest in each one in particular, so that it remains present in social and market networks. We are all, in a way, being led by certain implicit practices and rules that lead us to enter and remain in the economic game of neoliberalism (Lopes, 2009a, p. 155).

This call to participation does not take place in a political vacuum. It is inscribed in the neoliberal rationality, as already highlighted in this text, in which to govern means to make subjects govern themselves and each other. By assuming inclusion as a collective responsibility, democratic management contributes to the production of subjects who internalize the obligation to make diversity work. It is no longer a matter of questioning the structural conditions of the school, but of finding local, creative and efficient solutions to manage differences (taken as a synonym for diversity).

In this sense, democratic management does not break with the logic of control; it reconfigures it. Instead of imposing norms in a centralized way, it mobilizes strategies of engagement, participation and consensus, making the government of differences more capillary and, therefore, more effective. Diversity is welcomed, as long as it can be organized through participatory and co-responsible practices.

4.2 THE PROFILE OF THE INCLUSIVE MANAGER: LEADERSHIP, DIVERSITY AND GOVERNANCE

It is in this scenario that the profile of the inclusive manager is produced, a central figure in school inclusion policies. Far from being just a resource manager or a conflict mediator, the inclusive manager is constituted as a strategic subject, responsible for articulating policies, pedagogical practices and discourses in the name of diversity. The training of this manager appears repeatedly in official documents as an indispensable condition for the effectiveness of inclusion.

In the texts of the Inclusive Education Program: Right to Diversity (BRASIL, 2005), for example, the manager is called upon to lead processes of cultural change in the school, mobilizing teachers, families and the community for the commitment to diversity. This leadership is presented as an essential competency, associated with the ability to plan, organize, monitor and evaluate inclusive actions. The inclusive manager must be able to identify demands, articulate resources and ensure that diversity is incorporated into the school's political-pedagogical project.

This discursive production of the inclusive manager is not neutral. By emphasizing skills such as leadership, proactivity, flexibility and mediation capacity, policies produce a subject aligned with the logic of self-entrepreneurship. The manager is called upon to continuously invest in his training, to innovate, to solve problems and to answer for the results of inclusion. Diversity thus becomes a challenge to be managed, a problem to be solved through good management practices.

In addition, Lopes (et al, 2010, p. 26) points out that:

We understand that school management mobilizes certain strategies to govern the conduct of school subjects. Educational management can be defined as a field of knowledge that uses certain discourses, including educational and business, to, within a neoliberal logic of education entrepreneurialization, mobilize certain strategies, make certain devices work that would be responsible for leading an entire school community to a certain end. In this sense, the inclusion of everyone in the school becomes a principle put into operation through management, mobilizing governance and self-regulation strategies that will lead the conducts of school subjects towards the production of inclusive subjectivities, which will be useful not only within the school, but throughout the social fabric.

In this movement, the difference is translated into terms of diversity precisely so that it can be managed. The inclusive manager is not the one who sustains the conflict or the indeterminacy of difference, but the one who manages to transform it into an object of planning and intervention. Inclusion needs to work for society in general, and the manager is the subject called to ensure this functioning.

When mapping the central documents of the school inclusion policy, it is observed that diversity appears systematically associated with the need for institutional organization. In the Political-Legal Frameworks of Special Education in the Perspective of Inclusive Education (BRASIL, 2010), diversity is presented as the foundation of the policy, but immediately linked to the school's ability to ensure access, permanence and learning through coordinated management actions.

Similarly, the National Curriculum Guidelines for Basic Education – Diversity and Inclusion (BRASIL, 2013) emphasize the need for education systems to organize themselves to meet diversity, calling on school management to review curricula, pedagogical practices and forms of evaluation. Diversity, here, does not appear as a force that puts the school form in crisis, but as an element that must be incorporated into it through adjustments and reorganizations.

This recurrence shows that diversity functions as a discursive category that legitimizes the expansion of management practices. When talking about diversity, the documents produce a difference that can be known, classified and monitored. Educational management appears, then, as the instance responsible for translating diversity into concrete actions, ensuring that it does not become disorder or threat to the functioning of the school.

From this point of view, with genealogical inspiration, it is possible to affirm that diversity operates as a technology for capturing difference. When it is named, celebrated and organized, difference loses part of its disruptive power and begins to exist as a pedagogical variable. Diversity makes difference visible, but only to the extent that it can be governed.

4.3 SPECIAL EDUCATION, MANAGEMENT AND THE PRODUCTION OF GOVERNABLE DIFFERENCE

Special Education, in this arrangement, occupies an ambiguous position. On the one hand, it is recognized as a fundamental area for the effectiveness of inclusion; on the other hand, it is progressively captured as technical knowledge to support diversity management. Evaluations, guidance, curricular adaptations and follow-ups are now mobilized to ensure that the difference remains within the limits of what is acceptable.

By supporting educational management, Special Education contributes to the production of governable difference. It is not a matter of denying its historical importance or its pedagogical contributions, but of questioning the effects of its repositioning in school inclusion policies. It is a question of asking what Special Education do we defend? By functioning as a technical support for management, this area runs the risk of emptying its

critical and political dimension, becoming part of the apparatus that regulates and normalizes difference.

Educational management, supported by this specialized knowledge, takes on the task of ensuring that diversity circulates without interrupting the functioning of the "normal" of the inclusive school. The difference is welcomed, as long as it can be accompanied, monitored and adjusted. What escapes these devices tends to be quickly redirected to the support and intervention mechanisms.

By analyzing the articulation between educational management, diversity and school inclusion, this analytical axis seeks to show that the production of governable difference is not an effect of the inclusion policy, but a condition of its functioning. Educational management emerges as a central operator of this capture, making diversity manageable and inclusion possible in terms of public policies.

Thinking about this movement allows for important shifts, which are: shifting democratic management from the field of moral evidence to the field of governance practices; shifting diversity from the field of recognition to the field of administration; and to shift Special Education from the function of technical support to that of knowledge implied in truth regimes. These displacements are fundamental to sustain the possibility of another Special Education, committed not to the capture of difference, but to the maintenance of its political power.

5 FOR THE PURPOSE OF PROVISIONAL CLOSURE

5.1 THE DEFENSE OF DIFFERENCE, MANAGEMENT AND THE POSSIBILITY OF OTHER SPECIAL EDUCATION

By problematizing the ways in which school inclusion has been consolidated as an imperative, this work sought to shift the gaze from inclusion as a redemptive promise to inclusion as a government practice. It was not a question of denying the historical advances associated with inclusive policies, nor of defending the return to segregating models, but of questioning, of asking about the effects produced when inclusion is affirmed as unquestionable evidence and when difference comes to exist only in the form of what can be managed.

The analysis developed along the analytical axes allowed us to understand that the production of governable difference constitutes one of the central gears of the contemporary inclusive school. Difference is not suppressed, but captured; it is not denied, but translated; it is not eliminated, but made functional. When it is re-inscribed as diversity, difference loses its power of interruption and begins to operate as a pedagogical category, as a management variable, as a legitimate object of institutional intervention.

In this scenario, educational management emerges as a strategic operator. The centrality attributed to democratic management, co-responsibility and the profile of the inclusive manager is not only explained by a concern with participation or with the improvement of the school, but by the need to make inclusion work. Diversity needs to be organized, monitored, evaluated. Inclusion needs to produce results. Management appears, then, as an instance capable of articulating discourses, practices and knowledge in the name of the governability of difference.

This movement is not imposed through coercion, but through adherence. Inclusion summons, mobilizes, engages. Managers, teachers, families and students are questioned as co-responsible for the success of the inclusive project. Democratic management, in this register, operates less as a rupture with the logics of control and more as a refinement of governance strategies, distributing responsibilities and internalizing norms in the form of ethical commitment.

Special Education, by being repositioned as a technical support of the inclusive school, actively participates in this process. Their knowledge and practices are mobilized to make difference adjustable to the expanded norm of inclusion. Evaluations, plans, adaptations and interventions start to function as technologies that guarantee the permanence of difference without interrupting the functioning of the school. By occupying this place, Special Education runs the risk of being captured as an instrument of normalization, losing its critical and political power.

It is at this point that this text bets on the need for a displacement. Thinking about inclusion beyond salvationism implies recognizing that it also governs, regulates, and captures. Thinking about educational management beyond democratic evidence implies questioning it as a practice of conducting conduct. Thinking about diversity beyond recognition implies understanding its normalization effects. And, above all, thinking about difference beyond the logic of capture implies repositioning it as human power, as that which resists being fully translated, measured or managed.

Defending the possibility of another Special Education does not mean denying its insertion in the field of public policies, but refusing its reduction to the function of technical support of inclusive governance. It is about sustaining a Special Education ethically implicated with difference, capable of tensioning the limits of the school form, of sustaining the discomfort, the excess and what does not easily fit into the management devices.

By shifting the analysis of inclusion from the field of consensus to the field of government practices, this study seeks to contribute to the production of fissures in the hegemonic discourse of school inclusion. Fissures that do not offer immediate solutions, but

that open space for thought. To think, here, not as an abstract gesture, but as a political act. To think of school, management, Special Education and difference not as natural data, but as historical productions crossed by power relations. It is in this exercise of thought that the bet of this work is inscribed to keep alive the possibility that difference is not only included, but that it can produce other ways of being, learning and existing in school.

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THE TEACHER'S SOCIOEMOTIONAL COMPETENCIES IN ASSESSMENT PRACTICE AND SCHOOL MANAGEMENT: A MULTIFACETED PERSPECTIVE

AS COMPETÊNCIAS SOCIOEMOCIONAIS DO PROFESSOR NA PRÁTICA DA AVALIAÇÃO E NA GESTÃO ESCOLAR: UMA VISÃO MULTIFACETÁRIA

LAS COMPETENCIAS SOCIOEMOCIONALES DEL DOCENTE EN LA PRÁCTICA DE LA EVALUACIÓN Y EN LA GESTIÓN ESCOLAR: UNA VISIÓN MULTIFACÉTICA



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ABSTRACT

Several authors have emphasized the importance of affectivity in the teaching and learning process, as well as its influence on creativity, motivation, sense of belonging, and memory. But what if we talked about benevolence? Is there room in the school context for this approach? Care for students' well-being includes preparing them to be honest, helpful, responsible, loyal, respectful, and harmonious within the group. We use the term benevolence to represent care for the learning climate, the organizational climate, and the creation of interpersonal relationships based on respect and kindness in the school environment. It is important to remember that socioemotional competencies cannot be measured quantitatively; therefore, assessment is predominantly qualitative, observed through self-assessment, self-report, interviews (individual, group, narrative, and episodic), discussion circles, online questionnaires, and other tools that support the development of students' learning. We must not lose sight of the perspective that assessment is a continuum that should occur at multiple moments during the class and cannot be viewed in a compartmentalized way. This premise is essential so that assessment methodologies come as close as possible to the reality of student learning and, based on this, teachers can choose the most appropriate recovery strategy, if necessary.

Keywords: Teacher–Student Relationship. Continuous Assessment. Care for Learning. Technical and Socioemotional Assessment Instruments.

RESUMO

Vários autores têm enfatizado a importância da afetividade no processo de ensino e de aprendizagem, sua interferência na criatividade, motivação, pertencimento e memorização. E se falássemos em benevolência? Há espaço no contexto escolar para essa abordagem? O zelo com o bem-estar dos alunos inclui sua preparação para ser honesto, útil, responsável, leal, respeitoso e harmonioso com o grupo. Utilizamos o termo 'benevolência' com o escopo

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de representação do cuidado com o clima de aprendizagem, com o clima organizacional e criação de relações interpessoais de respeito e afabilidade no ambiente escolar. Parece importante lembrar que as competências socioemocionais não podem ser mensuradas, logo a avaliação predominante é a qualitativa, observada pela autoavaliação, autorrelato, entrevistas (entrevistas individuais, coletivas, narrativas e episódicas), rodas de conversa, questionários online e outros que apoiem a evolução da aprendizagem dos alunos. Não podemos perder de vista a perspectiva de que a avaliação é um continuum que deve ocorrer em plurais momentos durante a aula, e não pode ser enxergada de forma compartimentada. Essa premissa é essencial para que as metodologias de avaliação aproximem-se, tanto quanto possível, da realidade do aprendizado do aluno e, a partir disso, o docente possa optar pela melhor estratégia de recuperação, se necessária.

Palavras-chave: Relação Professor-Aluno. Avaliação Contínua. Zelo pela Aprendizagem. Instrumentos Avaliativos Técnicos e Socioemocionais.

RESUMEN

Varios autores han enfatizado la importancia de la afectividad en el proceso de enseñanza y aprendizaje, así como su influencia en la creatividad, la motivación, el sentido de pertenencia y la memorización. ¿Y si habláramos de benevolencia? ¿Hay espacio en el contexto escolar para este enfoque? El cuidado del bienestar de los estudiantes incluye su preparación para ser honestos, útiles, responsables, leales, respetuosos y armoniosos con el grupo. Utilizamos el término benevolencia con el propósito de representar el cuidado del clima de aprendizaje, del clima organizacional y la creación de relaciones interpersonales basadas en el respeto y la afabilidad en el entorno escolar. Es importante recordar que las competencias socioemocionales no pueden medirse cuantitativamente; por lo tanto, la evaluación es predominantemente cualitativa, observada a través de la autoevaluación, el autorreporte, las entrevistas (individuales, colectivas, narrativas y episódicas), los círculos de diálogo, los cuestionarios en línea y otros instrumentos que apoyen la evolución del aprendizaje de los estudiantes. No debemos perder de vista la perspectiva de que la evaluación es un continuo que debe ocurrir en múltiples momentos durante la clase y no puede ser entendida de forma compartimentada. Esta premisa es esencial para que las metodologías de evaluación se aproximen, en la medida de lo posible, a la realidad del aprendizaje del estudiante y, a partir de ello, el docente pueda optar por la mejor estrategia de recuperación, si fuese necesario.

Palabras clave: Relación Docente–Estudiante. Evaluación Continua. Cuidado del Aprendizaje. Instrumentos de Evaluación Técnicos y Socioemocionales.

1 INTRODUCTION

Although the school's main function is to provide opportunities for the formal schooling of the individual, we cannot forget its significant contribution to the formation and strengthening of ethical, moral, emotional, behavioral and attitudinal knowledge. In fact, the well-known 'Report to UNESCO of the International Commission on Education for the 21st Century' describes the four pillars that should guide the educational process, they are: learning to know, learning to do, learning to live, and learning to be.

In view of this, there is no doubt that socio-emotional skills need to be mandatorily enshrined in the pedagogical practice of educational institutions around the globe. In this line of thought, the teacher's proximity to the student, the ability to listen, paying attention to the need for the content to be taught and how it should be taught, empathy, the quality of relationships, verbal and non-verbal communication, coherence between values and actions, can induce positive emotions, actions and feelings or restrict the development of students. And this impacts, in an indelible way, on this relational dynamic of double exchange between teacher and student.

Below we will talk in more detail about this exchange. Education is something that requires a permanent recovery of skills. And knowledge is not something palpable and the definition of instruments both to shape it and to prepare the soil for it to germinate is something that touches alchemy. An incredible mixture of my knowledge that is linked to yours so that it becomes yet another, with its own characteristics and that is capable of growing and multiplying indefinitely. Let us now turn our gaze to another no less challenging task: people management.

Individual experiences, expectations of the most diverse, degrees of maturity, levels and styles of learning that are articulated to generate the behavior of each one in the face of pleasant and conflictive moments, which we must face daily. Secondary professional education schools have as an essential characteristic the plurality of students, especially with regard to the age group of the students and the economic, social, among other characteristics. This human diversity is a rich source for the sharing of plural experiences, but it also generates, for school management, an intense challenge when trying to reconcile such different points of view.

Knowing how to align the construction of knowledge to this diversity of individuals who parade and interact with us is our most decisive task. It is very difficult to imagine professional training locked in the restricted space of the classroom. Other learning environments are called for. The company – the focus of our student – cannot be just the goal. It must be present in the school and the school becomes a living bridge that leads the student to perform

his professional duties with knowledge, responsibility and commitment. One of the tools that, for us, shows a lot of potential to strengthen the company-school relationship is the internship, whose regulation occurred through Federal Law No. 11,788/2008, according to which the "Internship is a supervised school educational act, developed in the work environment, which aims to prepare students for productive work [...]". Along with other tools, the internship brings together characteristics that, from the outset, indicate to the learner which skills and abilities should be mobilized for entry, permanence and ascension in the world of work.

In addition, we are not only talking about elements of formal learning, but also socio-emotional skills that are central to the individual's professional development. Skills such as the ability to solve problems, entrepreneurial attitude (beyond the idea of negotiation), openness to the new, ability to listen, emotional intelligence, among others, are essential to optimize the student's professional trajectory. All this speech can be interpreted as merely philosophical or we can materialize it, not without difficulties, so that the school effectively fulfills its mission.

In our opinion, in order to promote the practical application of these proposals, we indicate to the teacher attention to the following: 1) to favor the development of knowledge (theoretical knowledge, skills and socio-emotional competences; 2) to generate learning situations for the comprehension (understanding) of concepts and construction of meanings; 3) enable the application of the concepts studied in the resolution of contextualized problems; 4) allow analysis (unfolding of knowledge); 5) stimulate synthesis (combine new elements) and 6) create a climate of constant evaluation and feedback. We cannot, however, forget the teachers.

In fact, all these actions will only be possible if we are attentive to the socio-emotional competencies of teachers so that the organizational climate of the school allows these activities to germinate, flourish and bear fruit. We talk about intra and interpersonal relationships, intercommunication, self-management (self-knowledge, self-esteem, self-motivation), collaborative teamwork, empathy, assertiveness, openness to the new, self-regulation and a set of other skills or competencies that underpin all pedagogical practice. Often, teachers are understood as simple task executors, bringing together a set of determinations, rules, norms, obligations and responsibilities. And of course they exist and they are important.

However, it is not only that. We are people. We also cultivate our afflictions, dissatisfactions, fears and anxieties, although the phenomenon occurs that "when we step into the classroom" we are taken by enthusiasm, commitment, and the desire for our students to advance and surpass themselves. In order for us to meet expectations (ours and those of

others) it is urgent to be prepared. The simple call for the use of active methodologies, continuous evaluation and recovery, development of socio-emotional skills is insufficient, not because of the lack of will, despite rejection or resistance, but because of the need to be prepared. Everyone wants to develop a good job. No teacher leaves his home in the morning, with the intention of developing a somic work with his students.

Teachers need support materials, subsidies, teaching tools and practical examples that inspire them to create and extrapolate daily routines. We have become accustomed to compartmentalized work. The disciplines acquired a life of their own and independence. The ego so often encourages teacher competitiveness and the interconnectivity between the subjects covered ends up being a responsibility to be achieved by the student. For this deconstruction, there is an emerging need to recreate the interpersonal relationships between teachers, providing opportunities for them to interact, dialogue and reprogram their activities under an integrated, interdisciplinary and omnilateral focus.

Some say that the most productive part of a meeting is "coffee time", so why not provide these moments? Why not transform the meetings, which are merely informative, into moments of discussion and socialization, with techniques such as the World Café, Pedagogical Forums, Role Playing and not just a restricted moment with the use of a group dynamic to relax? So often, the Planning Meeting is made up of a series of situations, except time to plan. Teachers need to talk and this is not a useless and unproductive chat, even if it is interspersed with jokes, anecdotes and complaints. It is a moment of interaction. We need that. It is healthy, strengthens relationships, fosters the generation of ideas. The educator has to like people. There are some provocations that become important whether at the conclusion of a meeting, a meeting, a lecture or a class.

Regarding the assessment of socio-emotional skills, in students it should initially occur with the habituation of this process with the teachers. It is the process of self-knowledge. Knowing how the class becomes more dynamic, as the teacher mobilizes knowledge that he has mastered, resorts to strategies, techniques and resources that he is confident in using, identifies opportunities to explore learning and will not fear the new. After all, you don't manage what you don't know.

2 OBJECTIVE

Reflect on three variables to be orchestrated by the teacher: the appropriation of theoretical knowledge, its practical application and the personal interactions that take place in the educational process and its proactive development in the classroom.

3 MATERIALS AND METHODS

Considering the proposal of this article to provide the opportunity to reflect on pedagogical practice from the perspective of enhancing interpersonal relationships between teachers and students, understanding them as biopsychosocial beings, therefore subject to intellectual and emotional variables, oscillations in interactivity and introversion, the need for group belonging and the educational climate for the appropriation of knowledge, we resort to the Hypothetical-Deductive method. Thus, we start from common problems in the classroom, especially those common to the daily lives of teachers and students. In this way, we prioritize the hypothesis of the relevance of the construction of intercommunication and dialogue for the construction of learning. From this perspective, we promote a deductive reflection, aiming to validate and empirically structure our hypothesis.

4 RESULTS AND DISCUSSION

4.1 INTERCONNECTIVITY IN THE CLASSROOM: FOCUS ON INTERACTIVE TRAINING

The pedagogical management of the school must be supported by a structure that promotes communication, collaboration and belonging. Communication consolidated through dialogue, democratic and participatory management, interaction between students in learning situations associated with collaborative teamwork, interactivity and a sense of belonging tend to strengthen learning management. The social role of the student emerges as a significant element for the pedagogical work.

From this perspective, it is observed that didactic-pedagogical activities and interdisciplinary projects, in reality, constitute only the junction of fragments of each curricular component, modeled separately and gathered at the end, not allowing the student to perceive the connections and interrelations existing in the construction of knowledge. And because we are talking about social function, it is worth reflecting on the social function of the professional education school as a prelude to the world of work. The compartmentalized view of pedagogical practice – whether by teachers or school management – compromises the development of learning in an interdisciplinary way. And this will certainly culminate in the inability of the egress student to use the tools he acquired in the school benches in an integrated way when faced with the challenges of the executing routine of the chosen work activities.

There is no more room in today's world for maintaining the banking education brought to the Tupiniquin lands by the Jesuits at the time of the "discovery". There are many challenges. We find ourselves in the eye of an educational hurricane. The profile of our students is changing, society has several technological advances, the job market makes

demands on the professionals of the future, new generations emerge with their own characteristics. It is urgent to rethink teacher training and proposals for contemporary schools.

Dissatisfaction with the course tends to contribute to its demotivation or evasion, in view of the limitations of its contributions to the search and achievement of employability and workability. From this perspective, the continuous use of innovative methodologies tends to recreate the usual pedagogical scenarios in the school environment. Currently, with the expansion of access to ICTs, students tend to no longer be satisfied with the merely expository class in which there is no commitment of the teacher to promote the link between what he teaches and its practical applicability from the realities of the world of work.

Expository classes can be easily accessed on platforms such as Youtube and the student does not even need to leave his residence to access them. Their commute to school should be valued by the pedagogical work of the school, which should be aimed at stimulating the concomitant development of formal and socio-emotional skills that only the human tone of the teacher is capable of promoting. No artificial intelligence will be able to replace this teaching characteristic: humanity.

Generation Z is made up of people who were born around 1995, a connected generation, with a tendency to be well-informed and prepared for the use of new technologies. We could believe it, if we wanted that only this generation behaves this way. Just a look around and we will understand that behavioral changes are sensitive. This means that persisting in educational systems that were comfortable for us are innocuous in the face of this new reality. Naturally, there are social, cultural, political and economic, as well as school, factors that feed the school impermanence of students. In particular, in the latter, that is, with regard to intra-school issues, it must be recognized that many teachers have collaborated every day for the problem to worsen, through the use of outdated didactic strategies or a traditional practice or one touched by inexperience, they end up developing the content in a decontextualized way and without meaning for the student. unconcerned with the development of professional skills and abilities, in addition to the tenuous link with the professional environment that should welcome the student.

Learning has many variables that integrate learning styles, maturity, interest, types of intelligence, previous references that favor the association of ideas, among others, so that each of these aspects can trigger a myriad of analyses, in which one is intertwined with the other, producing the complexity of the human being, without referring to social issues, economic, emotional, psychological and empathetic. Learning, specifically in technical courses, is also linked to the development of competencies, skills and values associated with

professional training, associating itself with its practice and effective contact with the world of work.

There is a fundamental question here: how the student is led to get in touch with the future professional life, considering those who do not yet have employment contracts or other experiences that allow them to glimpse the dynamics of the world of work. How are these interactions built at the core of the classroom and how do these links go beyond the walls of the school? Therefore, the issue is not the mere responsibility of teachers for school failure, although it is the driving force for the pedagogical practice to be successful. Thus, we say that teacher training and development for work are essential. We reiterate essential elements for this: • integration and collaborative work; • frequent use of process indicators and performance results; • readiness for change; • entrepreneurship and innovation; • the art of making it happen. We have focused on the student, it's true. But, throughout this article, it is explicit that training is not exclusive to him. It encompasses teacher training and improvement and is suitable for training organized by a company's HR.

People want to be heard, share their experiences, present points of view, be for or against, in short, give their opinion on situations and integrate decision-making. It doesn't matter if teachers, students or parents, people are not content to listen and replicate the information. You hear that the students have changed, but the fact is that the people have changed. Whether due to technological advancement, global connections, we are currently living in a new mentality. In this context, there is no doubt that teacher training must be based on socio-emotional preparation.

The type of interpersonal relationship established by the teacher with his students can make a difference in the motivation to learn, in the manner and durability of learning, in the resolution of conflicts and the production of interpersonal relationships, in the willingness and acceptance of suggestions, in the curiosity to learn and advance in studies. Likewise, it is recognized that the faculty represents a model for students and that interest in their profession and professional challenges can contribute to their permanence in the course. In turn, we must consider that school culture also affects socio-emotional development, to the extent that the school establishes values and executes its norms. However, this knowledge cannot only be acquired by the teacher through experience, it is something that can be taught and learned by incoming teachers.

Teachers and students must be perceived and valued in their intellectual, physical, social, emotional and cultural dimensions, have their skills enhanced and opportunities for mobilization in intra and interpersonal relationships, in the joint solution of local problems, in

the exercise of collective decision-making, in collaborative teamwork. Below we reinforce the ten competencies that we propose to compose Pedagogical Management:

1. Value and use historically constructed knowledge about the physical, social, cultural, and digital world to understand and explain reality, continue learning, and collaborate to build a just, democratic, and inclusive society.
2. Exercise intellectual curiosity and use the approach of the sciences, including research, reflection, critical analysis, imagination and creativity, to investigate causes, elaborate and test hypotheses, formulate and solve problems and create solutions (including technological) based on knowledge from different areas.
3. To value and enjoy the various artistic and cultural manifestations, from local to global, and also to participate in diversified practices of artistic and cultural production.
4. Use different languages — verbal (oral or visual-motor, such as Libras, and written), body, visual, sound and digital, as well as knowledge of artistic, mathematical and scientific languages, to express and share information, experiences, ideas and feelings in different contexts and produce meanings that lead to mutual understanding.
5. Understand, use and create digital information and communication technologies in a critical, meaningful, reflective and ethical way in the various social practices (including school ones) to communicate, access and disseminate information, produce knowledge, solve problems and exercise protagonism and authorship in personal and collective life.
6. Value the diversity of knowledge and cultural experiences and appropriate knowledge and experiences that enable them to understand the relationships of the world of work and make choices aligned with the exercise of citizenship and their life project, with freedom, autonomy, critical awareness and responsibility.
7. Argue based on facts, data and reliable information, to formulate, negotiate and defend ideas, points of view and common decisions that respect and promote human rights, socio-environmental awareness and responsible consumption at the local, regional and global levels, with an ethical position in relation to the care of oneself, others and the planet.
8. To know oneself, appreciate oneself and take care of one's physical and emotional health, understanding oneself in human diversity and recognizing one's emotions and those of others, with self-criticism and the ability to deal with them.
9. Exercise empathy, dialogue, conflict resolution and cooperation, making oneself respected and promoting respect for others and human rights, welcoming and valuing

the diversity of individuals and social groups, their knowledge, identities, cultures and potentialities, without prejudice of any kind.

10. Act personally and collectively with autonomy, responsibility, flexibility, resilience and determination, making decisions based on ethical, democratic, inclusive, sustainable and solidary principles.

The management of a school is not an easy task and it is not easy because we are dealing with two complex tasks: the construction of knowledge, both for students and for each teacher. Education is something that requires a permanent recovery of skills. And knowledge is not something palpable and the definition of instruments both to shape it and to prepare the soil for it to germinate is something that touches alchemy. An incredible mixture of my knowledge that is linked to yours so that it becomes yet another, with its own characteristics and is capable of growing and multiplying indefinitely.

Another no less challenging task is the management of people: individual experiences, the most diverse expectations, degrees of maturity, levels and styles of learning that are articulated, generating the behavior of each one in the face of pleasant moments and countless conflicts that we must face on a daily basis. Knowing how to align the construction of knowledge to this diversity of individuals who parade and interact with us is our most decisive task. This issue is amplified when we deal with Professional Education.

It is very difficult to imagine professional training locked in the restricted space of the classroom. Other learning environments are called for. The company – the focus of our student – cannot be just the goal. It must be present in the school and the school becomes a living bridge that leads the student to perform his professional duties with knowledge, responsibility and commitment. All this speech can be interpreted as merely philosophical or we can materialize it, not without difficulties, so that the school effectively fulfills its mission.

5 FINAL CONSIDERATIONS

The compartmentalization of disciplines established over time has erected incommunicable walls, individualized knowledge and discouraged integrated work among teachers, dampening from time to time by some practice built by teachers who already have a more finely tuned personal relationship. This lack of communication not only amplifies the number of assessments applied to students, but also does not motivate their connectivity. The jurisdiction calls for the fall of the walls described above.

By its nature, competence aggregates the curricular components and proposes interdisciplinary work. It happens that interdisciplinarity only flourishes where there is dialogue and effective planning. In this vein, the need for the development of teachers' socio-

emotional skills is anticipated, based on their openness to new experiences, dialogue, teamwork, assertiveness and enthusiasm for learning. The elaboration of an interdisciplinary assessment intensifies learning, since it favors the perception of the meaning of what is learned and its location in our daily lives.

Interdisciplinary evaluation, in certain discourses, appears tainted by breaking with the individuation of curricular components, however practice not only reduces the number of evaluations applied, but also expands possibilities of knowledge exploration. It is indisputable that cognitive development is related to biological and behavioral factors, socialization capacity, among others, constituting a multifactorial mechanism, which encompasses social relations for effective learning. Integrated work, by itself, consolidates active methodologies, interdisciplinary assessments and willingness to perform better in tasks that require attention and memorization, curiosity and innovation. Therefore, the association of work involving technical and socio-emotional skills tends to enhance interest and ability to learn.

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ENVIRONMENTAL RISK ANALYSIS: A CASE STUDY OF THE MICROBIOLOGY LABORATORY OF A HIGHER EDUCATION INSTITUTION, MARABÁ, PARÁ, BRAZIL

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ANÁLISIS DE RIESGOS AMBIENTALES: UN ESTUDIO DE CASO DEL LABORATORIO DE MICROBIOLOGÍA DE UNA INSTITUCIÓN DE EDUCACIÓN SUPERIOR, MARABÁ, PARÁ, BRASIL



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ABSTRACT

In teaching and research institutions, where there is a high circulation of researchers, students, and technicians, various risks are evident due to the handling of biological materials, sharps, and/or chemical substances, as well as the use of different laboratory equipment. However, studies addressing risks in laboratories of teaching and research institutions and their associated factors are scarce in the scientific literature. In this context, this study aimed to analyze environmental risks in the Microbiology Laboratory of a Higher Education Institution in Marabá, Pará, Brazil. The research employed the deductive method, with a qualitative scope, applied nature, and exploratory procedure. The method was associated with bibliographic and documentary data collection, in which secondary data were obtained from specialized links and open-access databases, while primary data were obtained through visits to the laboratory, during which the activities carried out were observed over a period of three months. The data indicated the presence of the main groups of environmental risks in the laboratory, including physical, chemical, biological, ergonomic, and accident-related risks, with some presenting low risk potential. Nevertheless, ergonomic and accident-related risks were particularly significant, mainly due to chairs without backrests and exposure to UV light and autoclaves, respectively. In this regard, certain safety measures could reduce exposure to hazards, such as the acquisition of more ergonomic seating,

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enclosure of the UV light hood and autoclaves, expanded use of personal protective equipment (PPE) and safety signage, and the implementation of an Incident and Accident Log.

Keywords: Health and Safety. Safe Research. Occupational Accident. Risk Mapping.

RESUMO

Nas instituições de ensino e pesquisa, onde há grande circulação de pesquisadores, estudantes e técnicos, são perceptíveis os variados riscos, seja pela manipulação de materiais biológicos, perfurocortantes e/ou químicos, além do uso de diversos equipamentos em laboratório. Entretanto, os estudos de riscos em laboratórios de instituições de ensino e pesquisa e os respectivos fatores associados são escassos na literatura científica. Nesse sentido, este trabalho teve como objetivo analisar os riscos ambientais no Laboratório de Microbiologia de uma Instituição de Ensino Superior, em Marabá-Pa. A pesquisa empregou o método dedutivo, com abrangência qualitativa, natureza aplicada e procedimento exploratório. O método foi atrelado ao levantamento de dados bibliográficos e documentais, em que os dados secundários foram obtidos em links especializados e em banco de dados de acesso livre, e os dados primários foram obtidos pelas visitas realizadas ao Laboratório, em que foram observadas as atividades desenvolvidas por um período de três meses. Os dados obtidos indicaram a presença dos principais grupos de riscos ambientais no laboratório, incluindo riscos físicos, químicos, biológicos, ergonômicos e de acidentes, sendo que parte desses apresentou baixo potencial de risco. Todavia, apesar disso, os riscos ergonômicos e de acidentes foram bastante representativos, principalmente pelos assentos sem encosto e exposição à luz UV e autoclaves, respectivamente. Quanto a isso, algumas medidas de segurança poderiam reduzir à exposição aos perigos, como a aquisição de assentos mais ergonômicos, o enclausuramento da capela com luz UV e das autoclaves, a ampliação do uso de EPIs e sinalizações, e um Registro de Incidentes e Acidentes.

Palavras-chave: Saúde e Segurança. Pesquisa Segura. Acidente de Trabalho. Mapa de Risco.

RESUMEN

En las instituciones de enseñanza e investigación, donde existe una gran circulación de investigadores, estudiantes y técnicos, son perceptibles diversos riesgos derivados de la manipulación de materiales biológicos, objetos punzocortantes y/o sustancias químicas, además del uso de distintos equipos de laboratorio. Sin embargo, los estudios sobre riesgos en laboratorios de instituciones de enseñanza e investigación y sus factores asociados son escasos en la literatura científica. En este sentido, este trabajo tuvo como objetivo analizar los riesgos ambientales en el Laboratorio de Microbiología de una Institución de Educación Superior, en Marabá, Pará, Brasil. La investigación empleó el método deductivo, con un enfoque cualitativo, de naturaleza aplicada y procedimiento exploratorio. El método se articuló con el levantamiento de datos bibliográficos y documentales, en el que los datos secundarios se obtuvieron de enlaces especializados y bases de datos de acceso abierto, mientras que los datos primarios se obtuvieron a partir de visitas al laboratorio, durante las cuales se observaron las actividades desarrolladas durante un período de tres meses. Los datos obtenidos indicaron la presencia de los principales grupos de riesgos ambientales en el laboratorio, incluidos riesgos físicos, químicos, biológicos, ergonómicos y de accidentes, presentando algunos de ellos bajo potencial de riesgo. No obstante, los riesgos ergonómicos y de accidentes fueron bastante representativos, principalmente debido a asientos sin respaldo y a la exposición a la luz UV y a las autoclaves, respectivamente. En este sentido, algunas medidas de seguridad podrían reducir la exposición a los peligros, tales como la adquisición de asientos más ergonómicos, el enclausuramiento de la campana con luz UV y

de las autoclaves, la ampliación del uso de equipos de protección personal (EPP) y señalizaciones, así como la implementación de un Registro de Incidentes y Accidentes.

Palabras clave: Salud y Seguridad. Investigación Segura. Accidente de Trabajo. Mapa de Riesgos.

1 INTRODUCTION

The trade union movement was responsible for the development of the Risk Map, in Italy, between the 60s and 70s. However, in Brazil, it was only with Ordinance No. 5, of August 17, 1992, by the National Department of Occupational Health and Safety, of the Ministry of Labor, that the implementation in health services became mandatory, being modified by Ordinance No. 25, of December 29, 1994 (Monteiro; Silva; Oliveira, 2015).

The preparation of these risk maps must be done by the Internal Commission for Accident Prevention, as regulated by Regulatory Standard No. 5 (NR-5), in Annex IV. In addition, for the best guidance on how to identify and evaluate occupational exposures, as well as to apply prevention and control measures, NR-9 addresses these topics, which are included in the Risk Management Program (MTE, 2024).

From this perspective, the use of the Risk Map is based on the idea of exposing environmental risks – physical, chemical, ergonomic, accidents, and biological – of the work environment in a didactic way, since this is the employer's duty (Castro; Okawa, 2016). Also according to this author, the employer has a legal obligation to guarantee a service environment designed in such a way as to minimize risks to health and safety, since it is the right to reduce occupational risks through health, hygiene and safety standards.

Health and safety risks are present in various occupational environments, such as industries and companies, and also in the context of teaching and research institutions, where professors, students, researchers and interns are frequently exposed to dangers arising from the handling of biological materials, sharps and chemical substances, as well as the operation of different laboratory equipment. However, studies focused on risk analysis in laboratories of teaching and research institutions, as well as factors associated with hazards, are still scarce in the scientific literature, with greater emphasis on investigations carried out in hospital laboratories (Stehling et al., 2015).

And it is evident that the continuity and increase of research developed in educational institutions need to occur, because they are extremely important in the academic and social environment. This can be explained because scientific surveys and investigations are used as an active methodology in the practice of teaching and learning, and the studies carried out also have practical applications in the social, environmental and economic spheres, since the results found and published promote the dissemination of knowledge to society, especially regarding the explanation and resolution of local problems, a social feedback on public investments in education (Arantes; Peres, 2021).

It turns out that a large portion of the studies developed in educational institutions are carried out in the laboratories of these organizations. Research usually involves the handling

of many substances and equipment by researchers, professors, students, and even interns. However, in a considerable part of these institutions there is no tutor with extensive knowledge of the substances, equipment and how to use them, especially a professional available throughout the period necessary to carry out the research, considering that some experiments require hours and hours without interruptions, and inexperienced researchers are unaware of all the occupational risks (Santos et al., 2020).

At the State University of Pará (UEPA), for example, physical-chemical and microbiological research is carried out in the institutional laboratory. Only in one water analysis research did the scholarship holders of the scientific initiation program, advisor professor, laboratory technician and monitor participate in the experiments, and handled vertical autoclave, bacteriological and drying ovens, water bath, laminar flow hood with ultraviolet light, chemical substances (including culture media), and material containing thermotolerant coliforms (Bitencourt et al., 2019). In the environment, there was no identification and didactic exposure of risks.

From this angle, considering the presence of chemical substances, biological agents, laboratory equipment and, not infrequently, the lack of adequate supervision and collective and individual protection measures, it is observed that the environmental risks associated with the laboratories of educational institutions are significant. However, data related to the performance of systematic risk analyses and the elaboration of Risk Maps in these institutions are still scarce.

In view of this, the relevance of the present study is highlighted, both to foster the continuity of teaching and research activities in a safe way — contributing, consequently, to the socio-environmental and economic benefits arising from scientific production — and to ensure the protection of the health and safety of professors, students and other users of the laboratories.

In this context, the intertwining of the study permeates the following questions: What are the working conditions in the institutional teaching and research laboratory? Are teachers and students exposed to dangers related to materials and equipment? What are the possible damages linked to this exposure? Is there any form of health and safety protection, such as the use of protective equipment? And what actions could be implemented for improvements?

Thus, considering that few risk analyses are carried out in laboratories of teaching and research institutions, and that the health and safety of teachers and students can be negatively affected, this research aimed to analyze the basic conditions of the exercise of work activities related to the health and safety of researchers, identify environmental risks,

and develop a Risk Map of the Microbiology Laboratory of a Higher Education Institution in Marabá-Pa.

2 METHODOLOGICAL PROCEDURES

2.1 MODALITY OF RESEARCH

The research employed the deductive method (Matias-Pereira, 2016), in which two true premises generate a true conclusion: (1) institutional research spaces have dangers that are little analyzed; (2) the microbiology laboratory is an institutional research space; Then, the risks of the microbiology laboratory can be better analyzed.

The scope of the study was qualitative, because the data obtained related to laboratory risks were demonstrated by the descriptive approach. In addition, the research was also of an applied nature and exploratory procedure (Severino, 2017). The method in question was linked to the survey of bibliographic and documentary data, in the period from 2010 to 2025.

2.2 DATA COLLECTION

Secondary data were obtained from specialized links and from an open access database: Scientific Electronic Library Online (SciELO) and Coordination for the Improvement of Higher Education Personnel (CAPES). The time frame was between 2010 and 2025.

The primary data were obtained by visits to the Microbiology Laboratory of the Higher Education Institution, in which the activities developed for a period of three months were observed, as well as the physical structures, facilities, equipment of the study area and the substances present, in order to adequately characterize the work environment and identify the associated hazards.

3 THEORETICAL FOUNDATION

3.1 ENVIRONMENTAL RISKS

Working conditions, the types of activities carried out in organizations and the psychophysiological issues of employees are factors with a direct influence on the types and degrees of environmental risks in these places, and exposure to risks can lead to accidents with personal and material losses and losses (Rodrigues; Santana, 2010). Environmental risks are classified as physical, chemical, biological, ergonomic and mechanical (Table 1):

Table 1

List of laboratory risks

Physical risks	Physical risks are linked to the forms of energy, the particularities intrinsic to the work environment, as well as the equipment used, such as radiation, pressure, heat, noise and vibration (Rodrigues; Santana; Rodrigues, 2012).
Chemical hazards	Chemical risks refer to any particulates (chemical agents) that have the ability to enter the individual's body through respiration, in the cutaneous form or ingestion, such as smoke, dust, mists, mists and gases, which can remain suspended in the environment (Barros; Morais, 2017).
Biohazards	Biological risks are related to various microorganisms – fungi, bacteria, protozoa, viruses and parasites – and insects, in addition to material from living beings, such as blood and waste (Souza <i>et al.</i> , 2013).
Ergonomic Hazards	Ergonomic risks arise from man-work relationships, whether due to repetitive movements, accelerated rhythms, long working hours, inadequate postures, monotony, shift work or other forms of physical and psychic pressure, which cause musculoskeletal diseases (Araújo <i>et al.</i> , 2012).
Mechanical hazards	Mechanical or accident risks are characterized by inappropriate conditions of construction, installations and machinery, which may involve the operation of the company, for example, unprotected equipment, incorrect lighting, situations of possibility of fire and explosion, improper electrical installations and venomous animals (Clemente; Oliveira; Leite, 2017).

Source: Prepared by the authors (2024).

3.2 ENVIRONMENTAL RISKS IN MICROBIOLOGY LABORATORIES

In a basic research laboratory of a higher education institution, all environmental risks are observed, and the users exposed to the risks are professors and students, scientific initiation scholarship holders, master's students, doctoral students, researchers and laboratory technicians, who follow a schedule for the use of the laboratory. Included in the risk analysis are the registration of names and telephone numbers at the entrance, signage for the use of personal protective equipment (PPE), separate room to store personal items, risk symbology, floor, wall and ceiling conditions, electrical installations, lighting, countertops, sinks, standard operating procedure (SOP) of equipment and handling of biological and chemical agents (Vicente *et al.*, 2021).

In microbiology laboratories, the greatest concern is the possibility of exposure to pathogenic microorganisms. Many infections around the world were due to failures in biosafety protocols, both human and environmental structure failures, and caused hundreds of deaths, even by receiving contaminated material from another laboratory. The researchers and collaborators of the institutions, and others exposed in some way, were infected with smallpox, typhoid fever, spotted fever and severe acute respiratory syndrome, a fact that reinforces the lack of personnel training and insufficient supervision of laboratory activities (Câmara; Moreno, 2020).

In addition to microbiological exposure, other risks are also observed in microbiology laboratories, as there is the handling of sharps such as glassware, chemical products, the use of equipment for heating substances, sterilization and drying, such as autoclaves, ovens and laminar flow with ultraviolet (UV) light, in addition to the frequency of inappropriate postures in the exercise of tasks, repetitiveness and long periods in a single position (Figure 1). Therefore, there are risks of: accidents, due to the possibility of fires and explosions, falls and cuts; chemical, by the inspiration and ingestion of particulates; physical, by the heat, radiation and noise of the devices; ergonomic, due to the positions and behaviors of the researchers; and biological, for the reasons presented above (Souza et al., 2021).

Figure 1

Illustration of hazards in laboratories



Source: Exyge (2017).

It is worth mentioning that, in all the risks addressed, the health and safety of researchers can be impaired. A small cut with contaminated glassware can quickly cause severe illness to those exposed, the same can occur in case of inspiration or ingestion of a toxic substance, virus or bacteria. Sterilization equipment such as autoclaves can generate considerable burns, damage to vision (steam), and even cuts, due to the explosion of glassware that suffered thermal shock, for example. UV radiation can cause cellular changes and lead to skin cancer in exposed individuals. And also occupational diseases, which are associated with ergonomics.

3.3 RISK MAP

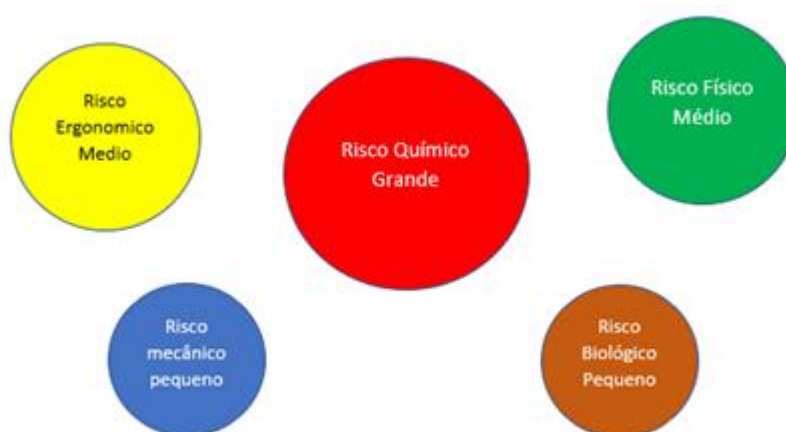
It is evident that in environments such as laboratories it is necessary to have didactic information about the risks of the place, such as the risk map. The risk map is the graphic

way that gathers information necessary to establish a diagnosis of operational safety and health (OHS), and allows the dissemination of preventive information of an organization (Silva, 2018).

Thus, it takes into account the outline of the floor plan of the site, and exposes the risks perceived in the area by the graph of circles with different diameters and colors (Figure 2), which represent the classification of the grade (small, medium and large) and the group (physical = green; chemical = red; biological = brown; ergonomic = yellow; and accident = blue), respectively (Rodrigues; Santana, 2010). To determine the risk and degree, the working conditions, production process, site structure, machinery, work period, cases of accidents and incidents, and the number of workers exposed to risks are considered (Assmann, 2016).

Figure 2

Graphical model of the classification of environmental risks



Source: Borges (2018).

4 PRESENTATION AND INTERPRETATION OF DATA

4.1 CHARACTERIZATION OF THE MICROBIOLOGY LABORATORY

The laboratory operates during business hours and has a coordinator, three scholarship monitors and a laboratory technician. The coordinator can schedule and authorize the days and times of the formally requested activities, but in some periods he is not present in the enclosure, even because he is a teacher and teaches classes. The monitors have a shorter workload than the laboratory shift, and, therefore, when the coordinator is not present, the operation of the area is interrupted before. The technician is not exclusive to the microbiology laboratory, in fact he is an employee of the chemistry laboratory and assists others who have knowledge.

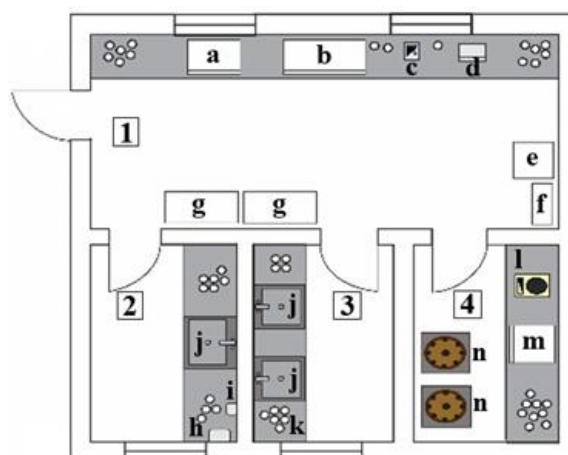
In order to have a better control of the activities developed and responsible, there is a record on the bench, so that all users of the space sign, with name, day and activity performed. Other restrictions are related to food, not allowed inside the place. When the laboratory is used for classes, personal items must also be kept in the room that precedes the place, but cell phones are authorized – a biological hazard (Rivero; Mariano, 2025). Everyone who enters the area must wear closed shoes and lab coats, with clothing of the appropriate length, but there is no signage for the use of PPE. And yet, there is no risk symbology at the entrance, and the equipment manuals are not available to everyone, because they are inside the locked cabinets.

In this context, it is notable that at numerous times the microbiology laboratory does not have a trained supervisor. The project advisors use the environment at different times, including weekends, when they carry out long experiments or do not have other free periods. However, even so, the advisees often develop practical activities without the presence of an experienced responsible person (due to the need to carry out research and meet deadlines), as well as do not always sign the record of activities, or respect the other guidelines, which represents an institutional failure regarding the safety of researchers and the area. for Santos et al. (2020) portrayed that this is one of the main causes of accidents.

The laboratory is subdivided into four rooms, with different functions, for the best development of activities, as follows: 1 – General microbiology room, where the experiments are developed; 2 – Distillation room; 3 – Asepsis room; 4 – Sterilization room. In each area there are materials and/or equipment (Figure 3).

Figure 3

Arrangement of equipment in the microbiology laboratory



Legend: A-sterilization oven; b- laminar flow hood with UV light; c- digital pH meter; d- heating plate; e- refrigerator; f- Cabinet of Substances and Culture Media; g- glassware cabinets and other materials; h- distiller; i- deionizer; J- pias; k- glassware; l- Centrifuge; m- bacteriological greenhouse; n- autoclaves.

Source: Prepared by the authors (2024).

The greatest flow and permanence of people is in the general microbiology room (1), since it is the most spacious and air-conditioned room, in addition to being the only place with benches and benches available for the development of experiments. In addition, a considerable portion of the activities need to be carried out in the chapel, to avoid contamination of the samples. The distillation room (2) is only entered when distilled water is needed for this or other laboratories of the institution. The asepsis room (3) has movement for almost all experiments, whether in washing the glassware before and after the tests, or for cleaning the researchers' hands. The sterilization room (4) is the least comfortable environment, as it is usually the warmest.

Laboratory activities include teaching classes and carrying out research projects. Physicochemical and microbiological analysis of water, analysis of the microbiota of air and soils, or even plants, and investigations into the microbial conditions of materials and environments are some of the themes of the work done in the area. For this reason, due to the exposure and possibility of contact with filamentous fungi and enterobacteria, for example, the indication is that the countertops be decontaminated whenever possible with 70% alcohol - a considerable reducer of microorganisms (Rodrigues et al., 2016), but there is no sign for this. There are also no alcohol and liquid soap dispensers (in the sinks). The waste generated, such as paper and plastic, is disposed of in a common trash can, and the waste from the tests is sterilized and disposed of in a sink.

Regarding the physical structures of the laboratory, the building is made of masonry and located on the ground floor. Water is available in two rooms. There are power outlets in all four rooms. The lighting meets the needs of researchers in all subdivisions of the space. The floor is flat, without elevations and unevenness, and covered in porcelain, for its ease of cleaning and resistance. The walls are clear. The countertops are made of granite, very resistant, with smooth and impermeable surfaces, conducive to laboratory activities (Hussin; Che Lah, 2023). The sinks are made of resistant material, of adequate depth, but without pedal activation. On the roof, despite having a polyvinyl chloride lining (a thermal, acoustic and electrical insulator), leaks were identified in the rainy season.

4.2 HAZARD IDENTIFICATION

Based on the observational visits, considering all the activities perceived, existing equipment, substances handled and the physical structure of the space, the hazards were listed according to the classification of environmental risks and for each room analyzed (Chart 2).

Table 2

Environmental hazards in the areas of the microbiology laboratory

Room	Risk	Danger	Activity/Situation
1	Physical	UV light, heat, cold, humidity and noise	Laminar flow handling, kiln and plate use, central air and gutters
	Chemical	Chemicals, dust, fumes and gases	Handling of culture media, acids, bases, and other liquid and powder substances
	Organic	Fungi and bacteria	Greenhouse and sample handling
	Ergonomic	Long working hours, repetitiveness, monotony and inadequate postures	Preparation of large quantities of tubes and plates for sample analysis, long sitting time on a backless bench
	Accident	Equipment without protection/ signalling, electricity, probability of fire or explosion, glassware	Laminar flow without frontal protection (UV), connection at the wrong voltage, poor maintenance of equipment, lack of masks and gloves, use of sharps
2	Physical	Heat and humidity	Low air circulation, irregular water distillation, leakage and waterlogging
	Organic	Fungi and bacteria	Environment connected to the handling room
	Ergonomic	Repetitive movements, inappropriate postures, monotony and physical exertion	Allocation of bottles to fill over the sink, long time to fill them, and load them later
	Accident	Electricity, probability of fire or explosion	Inadequate electrical installations, poor equipment maintenance, leakage
3	Physical	Humidity and noise	Constant use of water
	Chemical	Chemicals	Cleaning containers with chemicals
	Organic	Fungi and bacteria	Cleaning glassware with analysis material
	Ergonomic	Long working hours, repetitiveness, monotony and inadequate postures	Glassware washing by glassware, long standing time
	Accident	Glassworks	Handling of sharp material, lack of masks, aprons and gloves
4	Physical	Heat and noise	Greenhouse & Autoclaves Handling
	Organic	Fungi and bacteria	Material handling for sterilization and microbial growth in the greenhouse
	Ergonomic	Repetitive movements, inappropriate postures, monotony and physical exertion	Water supply in the autoclaves, disposal and removal of glassware from them, and pressing of the locks on the equipment
	Accident	Equipment without protection/ signalling, electricity, probability of fire or explosion, glassware	Autoclaves without a protective band, lack of thick gloves to handle autoclaves, handling sharps

Source: Prepared by the authors (2024).

The consequences of the researchers' exposure to the dangers analyzed range from photoaging to the possibility of developing skin cancer, in the case of UV light (Tang et al.,

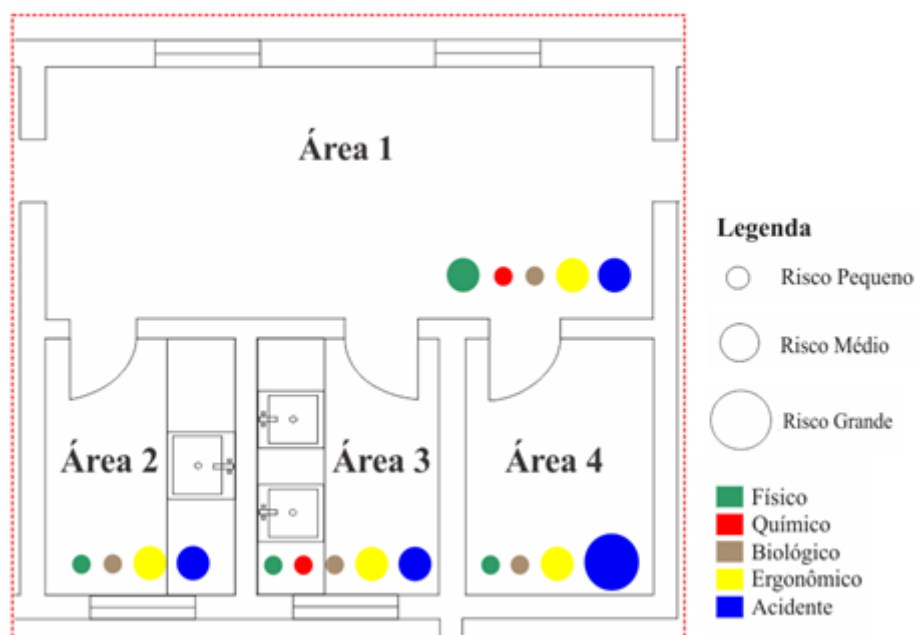
2024). In addition to possible burns in autoclaves, which can be serious, especially if the equipment is not well locked (explosion) and is not opened only after the pressure comes out (Milk et al., 2018). Probable cuts in glassware, being very dangerous due to the type and depth of cut, and if the material is contaminated, since microorganisms can reach the bloodstream and organs (Zuo et al., 2023).

Another possibility is the fall of people in the areas flooded by the leaks and leaks (Chew; Asmone; Lam, 2024). Contact with acids, bases, and other substances can be dangerous to the health of researchers, whether contact with the skin (absorption), inspiration (asphyxiation), ingestion, or even splashing in the eyes, with the risk of causing damage to the eyeball (Grace; Sarantopoulos; Horn, 2023). Electric shocks are also likely, especially if there is water nearby, with a possible short circuit (Princeton University, 2026). In addition, forgetting connected appliances can cause fires.

Regarding the posture of the researchers observed in the environments, there is a possibility of back pain, especially such as low back pain and development of deviations in the spine, because individuals spend a lot of time on the benches without backrests, and no matter how much they try to remain in good posture, they get tired and bent. These banks also do not favor the circulation of blood in the legs, because there is not enough support (Fikre et al., 2024).

4.3 MICROBIOLOGY LABORATORY RISK MAP

At this stage, to determine the intensity of the risk and the group, the production process was analyzed, taking into account the structural environment, machinery, work period, cases of accidents, incidents that occurred and the number of workers subjected to these risks (Assmann, 2016). After observing these conditions, the risk map was produced (Figure 4).

Figure 4*Microbiology laboratory risk map*

Source: Prepared by the authors (2024).

The flow of people in the laboratory is varied, in research projects it usually involves up to five researchers, but in the teaching of classes the number can reach 30 students. The most dangerous activities are carried out before classes, and students participate only in what is simplest. However, at times it happened that the autoclave was in operation at the time of a practical class. Therefore, considering that the number of people influences the degree of risk, this issue must be remembered.

Physical risk was perceived in all rooms, especially due to heat, cold or humidity, but the lack of Collective Protective Equipment (CPE) or Individual Protective Equipment (PPE) regarding UV light, indicated a higher degree (area 1 - medium), due to more harmful long-term consequences of exposure. The researchers also showed greater discomfort in relation to radiation.

The chemical risk, on the other hand, was observed only in two rooms, in which the glassware used in the experiments is handled and cleaned, and was considered to be of a small degree due to the low probability of accidents, and no incident or nuisance verified.

Regarding the biological risk, it was classified as small, since, in general, the manipulations of microbiological agents are carried out inside the safety hood, and the containers containing colonies of fungi and bacteria are opened only after the sterilization process in an autoclave. However, the occasional absence of continuous supervision during the execution of activities can favor failures in operational procedures, increasing the risk of cross-contamination and dissemination of microorganisms in the laboratory environment.

Ergonomic risk was verified in all subdivisions of the laboratory, to a medium degree, either due to the physical effort required in some tasks, long working hours, or even due to inadequate postures and monotony. The researchers showed discomfort in these situations and complained of pain, when opening and closing the autoclave locks, for example, or when sitting for longer on the benches.

Regarding the risk of accident, it was the only one indicated as large in one of the rooms (area 4). In the use of autoclaves, inexperience was verified by several users, who demonstrated doubts about the correct use of the equipment, such as the amount of water to be supplied before turning on, adequate pressure on the locks and sufficient waiting time to open the locks. More than once someone was burned while handling the autoclaves, and there was an explosion of a Petri dish removed from sterilization, possibly by thermal shock. In addition, it is important to note the possibility of explosion of the device due to improper closure.

5 CONCLUSION

Although half of the risks were considered small, the ergonomic and accident risks were quite representative. Some safety measures could reduce exposure to hazards, enclosing the chapel with UV light and autoclaves would limit access to these equipments, which proved to be more dangerous. The acquisition of other, more ergonomic seats would also be of great value to the protection of the health of researchers. The lack of Personal Protective Equipment is worrying, in the case of handling chemicals and biological material the use of gloves and masks is essential.

In structural terms, repairing the roof is paramount, as is sealing leaks in distillation. In the area there is also a lack of signs, indications of use and dangers, which could be solved with signs, even paper, due to the low cost. The risk map itself can be used in the guidance and prevention of existing risks.

The administrative issue of the laboratory needs to be improved, the control over the use of space is not adequate. There should be training of monitors and researchers, and full supervision of students in practical classes and experimental projects. A document that can help in future actions to prevent accidents is the implementation of the Incident and Accident Record.

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ENGLISH LANGUAGE TEACHING AND THE MULTILEVEL APPROACH

O ENSINO DE INGLÊS E A ABORDAGEM MULTINÍVEL

LA ENSEÑANZA DEL INGLÉS Y EL ENFOQUE MULTINIVEL



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ABSTRACT

The multilevel approach provides greater exposure to target-language practice by reproducing real-life situations from students' daily experiences in the classroom and encouraging the use of the second language as a tool for effective communication. By exposing learners to real and authentic language as it is spoken in the everyday lives of native speakers, teaching materials structured under the multilevel approach more effectively fulfill their role as educational tools in the construction of high-quality knowledge. It is necessary to improve students' academic performance as well as teaching efficiency, since the improvement and adaptation of instructional materials contribute to achieving the goal of fluency acquisition, benefiting cultural enrichment and expansion, the optimization of academic or school performance, and the professional success of those involved.

Keywords: Education. English. Multilevel.

RESUMO

A abordagem multinível oportuniza maior exposição à prática da língua-alvo, reproduzindo situações da realidade do cotidiano dos estudantes em sala de aula e estimulando o uso da segunda língua como instrumento para a comunicação efetiva. Ao expor os alunos à linguagem real e autêntica que é falada no dia a dia dos nativos da língua estrangeira, o material didático, estruturado sob a abordagem multinível, cumprirá mais efetivamente seu papel de ferramenta educativa na construção de conhecimento de alta qualidade. Faz-se necessário melhorar o rendimento escolar dos estudantes, assim como a eficiência docente, sendo que a melhoria e adequação dos materiais didáticos contribui para que o objetivo da aquisição da fluência seja atingido, beneficiando a obtenção e a expansão de cultura, a otimização do desempenho escolar ou acadêmico e o sucesso profissional dos envolvidos.

Palavras-chave: Ensino. Inglês. Multinível.

RESUMEN

El enfoque multinivel ofrece una mayor exposición a la práctica de la lengua meta, reproduciendo situaciones de la vida cotidiana de los estudiantes en el aula y estimulando el uso de la segunda lengua como instrumento para una comunicación efectiva. Al exponer a

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los alumnos a un lenguaje real y auténtico, tal como se habla en la vida diaria de los hablantes nativos de la lengua extranjera, el material didáctico, estructurado bajo el enfoque multinivel, cumple de manera más efectiva su papel como herramienta educativa en la construcción de conocimiento de alta calidad. Es necesario mejorar el rendimiento escolar de los estudiantes, así como la eficiencia docente, ya que la mejora y adecuación de los materiales didácticos contribuyen al logro del objetivo de la adquisición de la fluidez, beneficiando la obtención y expansión cultural, la optimización del desempeño escolar o académico y el éxito profesional de los involucrados.

Palabras clave: Enseñanza. Inglés. Multinivel.

1 INTRODUCTION

The globalized world is marked by a process of political, economic and cultural expansion, in which technology reduces distances and brings nations closer together. In this scenario, the English language has become the main language used for communication between peoples, whether in business, travel, personal or professional life. Almeida Filho (2007, p. 09) states that "we live in a time in which contact between languages and cultures has never been so intense and generalized", showing that the need to learn another language is explicit and indisputable.

The objective of this article is to discuss the multilevel approach to the teaching and learning of English in this scenario in which the English language is so necessary, as it is the lingua franca of today. In addition, a reflection on the pedagogical advantages and challenges when applying the multilevel approach in the classroom to the public of young people and adults in language schools is proposed, especially with regard to the acquisition of the long-awaited fluency, which is sometimes quite difficult to achieve. The proposal of suggestions for teaching performance under the multilevel focus with the student seeks to enrich the pedagogical praxis among peers.

The main theorists who offer bibliographic support to this article are: Almeida Filho; David Crystal; Jill Bell; Nathalie Hess; Roxane Rojo; Susan Gass, Jennifer Behney and Luke Plonsky; in addition to a survey on the percentage of Brazilians fluent in English, carried out by the British Council in partnership with the Data Popular Research Institute.

The methodological focus of this article is based on the descriptive qualitative type, in which the selected categories and the indicators defined for the analysis are the multilevel approach and the teaching of English.

The result of the analysis shows us that this pedagogical approach has advantages and challenges. The advantages are highly rewarding in terms of acquiring fluency and mastery of the English language, so there is enough motivation to overcome the challenges. To this end, I share here my successful experiences with students with the use of the multilevel approach to English language teaching.

2 THE MULTILEVEL APPROACH

The English language has long been seen as an international language, but the phenomenon of globalization and the arrival of the digital age have established English as the lingua franca in the contemporary world. David Crystal (2018) points out that:

The [English] language has been undergoing a process of appropriation and change, driven by the use by more than 890 million non-native speakers around the world, who use it in international relations, education, entertainment, tourism and the media, most of the time without a native interlocutor.

From the moment that the importance and need for learning the English language today is a matter of course, the question that takes our attention the most is *how to* acquire mastery and fluency in the English language for quality communication.

Almeida Filho (2007, p. 09) addresses this issue by inviting us to reflect on "how to move between languages and their cultures with the least possible obstacles and with the maximum enjoyment of this endeavor is what wants us to occupy today in the professionalized profession of teaching languages or language".

It can be seen, therefore, that the pedagogical process of teaching and learning languages, and in this case I address more specifically the English language, becomes a prominent point of unique importance in order to make this task pleasurable and effective. When I mention effectiveness, I refer, in particular, to the acquisition of fluency in the English language and the contribution of methodological approaches to achieve this goal.

Susan Gass, Jennifer Behney & Luke Plonsky (2020) state that learning a language goes beyond memorizing grammar rules, as it involves learning to express communicative needs. Therefore, it is concluded that methodologies with an emphasis on communication are the best choices to achieve mastery of the target language.

The authors cited above explain that the acquisition of a second language can be compared to pieces that fit together, integrating aspects of language. Information about the target language can be presented implicitly or explicitly to the learner; In any case, he needs to extract the information from the content that was presented to him and use this information in the grammatical construction to produce the target language.

Figure 1*Fluency in English*

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The success of the acquisition of fluency in English is more easily obtained when the pedagogical approach of teachers is focused on an authentic communicative practice, exposing students to the target language in a real and legitimate way, promoting a meaningful and relevant learning of the English language, avoiding the predominant structuralist and formal pedagogical focus, that is, in the domain of form, which focuses mainly on grammar and lexicon.

The British Council (2014), in partnership with the Data Popular Research Institute, conducted a survey on the level of fluency in English of the Brazilian population and the result was that only 5% of Brazilians speak English, and only 1% declare themselves fluent in the language. There are no indications that the scenario presented in this study has changed since then. Consequently, from these data, the urgent need for changes and improvement in the use of teaching methodologies becomes perceptible; in pedagogical practice; in the initial, continuous and reflective training of the teaching staff; student motivation and commitment; as well as in the elaboration or adaptation of didactic resources so that the process of teaching and learning English culminates in the formation of fluent speakers of the English language at the end of the course.

For this purpose, there is a need not only for didactic material that explores the exercise of orality and maximizes the student's authentic contact with the target language, but also for a pedagogical approach that allows conversational practice to the extreme, offering the necessary linguistic support for the construction of discourse in the target language.

The multilevel approach provides communication between students in a collaborative environment, in which the teacher is the facilitator in the process of teaching and learning the target language. According to Jill Bell (2014, p. 90), the need to deal with plurality is one of the most important characteristics in a multilevel environment, as it drives the active role of learning. The author states that:

Mixed-level or heterogeneous groups are much more useful for fluency acquisition work. Lower-level students are exposed to the richer vocabulary and broader syntax of the stronger students and get useful practice in listening ability, without being subjected to the often overwhelming fluency of the native speaker. More advanced speakers have the opportunity to speak a little more than their peers would allow and, depending on the activity, they may also be challenged to express themselves in different ways to stimulate the listener's understanding and be called upon to explain their own understandings, which is an excellent form of revision.

Jill Bell (2014, p. 91) points out that the multilevel approach provides opportunities for the acquisition of fluency because it maximizes the moments of interaction between students, enabling the development of linguistic construction and fluency. The author agrees that "there are ways to make the mixed-level class a satisfying learning experience for all involved, but they demand a lot from the teacher."

In mixed-level classes, Nathalie Hess (2001) explains that students are different from each other in several aspects: learning styles, linguistic aptitude, language proficiency, attitudes, motivation, self-discipline, age, etc. The author concludes that, therefore, "we can probably say that most language classes are multilevel", even if taught under any other methodology. They are usually highly heterogeneous because students belong to different genders, ethnicities, cultural levels, socioeconomic classes, professions, interests, personality, degree of maturity and their own way of seeing and understanding life and the world.

One of the differentials of the multilevel approach is the criterion for grouping students. In mixed-level classes, students of the same age group are grouped together to study together in the same classroom, regardless of the degree of their language proficiency, and this heterogeneity is welcome and is used as a learning tool in the target language. The level of proficiency of the activities and exercises are gathered in such a way that the students develop tasks, sometimes with colleagues from their own linguistic level, sometimes in partnership with colleagues from other linguistic levels, always with the guidance of the teacher in a collaborative environment.

Nathalie Hess (2001, pp. 02 - 03) explains that "teaching in such classes can, in fact, be very similar to teaching in all other situations. It may be more challenging, but it's also

infinitely more interesting." The author also points out that "both people who share the same mother tongue and people whose native languages differ generally adapt to the contexts in which they are", that is, most communicative interactions, in English or not, are basically multicultural and multilevel, such as when talking to people from cultural and social backgrounds who have different levels of language proficiency, knowledge of the world and life experience.

Students learn best when they interact with different levels in the same classroom, share knowledge, and collaborate with each other. As mentioned by Nathalie Hess (2001, p. 03) "such cooperative and interdependent learning will help our students to foster positive mutual trust and helps them to perform better in a highly complex and interdependent society."

The current world we live in has characteristics of the multilevel type, and this is one of the reasons why the approach of classes with a mixed language level is effective, because it exposes and prepares students for this reality. The multilevel experience will require students to have strategic competence, which will help them succeed in communicative interactions. In addition, classes should combine learning strategies as facilitating tools in language learning: blended learning; discourse analysis; Realia (real data); task-based language learning. In this way, the learner is exposed to the target language with much more authenticity. By practicing and exercising the language as much as possible in a contextualized scenario, the student correctly internalizes the language, thus providing the gain of fluency.

3 ADVANTAGES AND CHALLENGES

Naturally, there are benefits and challenges to classes in the mixed level format. According to Nathalie Hess (2001, pp. 02-04), the benefits consist in the fact that there will always be a sufficient number of students to interact; there will be a rich diversity of human content; there will be no boredom; Teacher professional development occurs naturally, as the teacher will need to be organized, creative and self-evaluative to ensure the effectiveness of the classes. In addition, another advantage is that the teacher is not the holder of knowledge, but the facilitator of the construction of knowledge with the student in a contextualized teaching and learning process, which takes into account the profile of the students, their needs and interests, in which linguistic development occurs naturally through real and authentic exposure to the target language, provided by Blended Learning, Discourse Analysis, TBL-Task-Based Learning, Realia and ICTs-Information and Communication

Technologies in language teaching, resulting in the acquisition of fluency in English more quickly and consistently.

The use of conventional material for language teaching, which does not mix activities of different levels of language proficiency in the same textbook, can stifle and make multilevel classes unfeasible. It is very rare to find textbooks, prepared under the multilevel approach, available for purchase in bookstores or the like. This type of material is usually developed by authors linked to school franchise networks for language teaching and is marketed within schools.

In this way, the language teacher, who teaches classes according to the mixed level approach, will need to produce the didactic material from a multilevel perspective for use in his classes. Due to the diversity of students in the classroom, the most recommended didactic material for multilevel classes is the SD – Didactic Sequence, which allows greater pedagogical adaptation of content to appropriately meet the different learning profiles of the students, as stated by Roxane Rojo (2013, p. 182) "the solution would be for the teacher to be, therefore, the author of his own DS – Didactic Sequences for his own students". According to the author, the DSs are more flexible, examining few teaching topics in a brief chapter, which is adapted by the teacher to his pedagogical needs and to the students' learning possibilities. In addition, they can be easily combined with other materials and content because they are modular (Rojo, 2013, p. 174). Technological and digital resources, combined with didactic sequences, bring authenticity of language and customization to the class.

Table 1

Advantages and Challenges of Using the Multilevel Approach

Use of the Multilevel Approach in English Language Teaching	
Advantages	Challenges
Communication	Creation of the didactic material
Wealth of human content	Lesson Management
Unbored	Maintaining student focus
Professional Development	Promote active participation of all and valid interactions
Teacher facilitator	Catering to different types of learning
Fluency Acquisition	Teacher appreciation

Source: The author, based on Nathalie Hess (2001) and Jill Bell (2014).

In addition to the need for teachers to create their own educational material, Nathalie Hess (2001, pp. 04-06) points out other obstacles to be overcome when using the multilevel

approach, which are: the need to manage the class in such a way that the focus is maintained and that all students interact and benefit from these interactions; ensure meaningful learning, respecting different learning styles; motivate quieter students to participate in conversational and interactive tasks in a satisfactory way.

Another aspect that deserves attention is the demerit of the teaching profession, which does not guarantee a satisfactory remuneration in relation to the time dedicated by the teacher to prepare classes and prepare/adapt didactic material, tasks that are generally developed outside the school. This sad and worrying reality is highlighted by Roxane Rojo (2013, p. 182) when she observes that the overload of the working day and the lack of time for planning and preparing classes are due to the devaluation of teachers.

Based on my own successful experiences throughout my professional career in English language teaching, my suggestions for overcoming the obstacles and overcoming the challenges presented by the use of the multilevel approach in the teaching and learning of English are explained below.

For the best management of the class with mixed levels, I suggest that all students already know in advance what the dynamics of the classes are from a multilevel perspective. I recommend that the methodology be exposed and clarified before enrollment in the course and that an explanatory class be taught as an initial class, before starting with the language content classes. Thus, the student will know what to expect from the teacher and classmates, as well as what others expect from him. Establishing the rules of operation of the class will help everyone to benefit from the smooth running of the class.

To encourage the participation of shy and quiet students, I suggest establishing a relaxed atmosphere in the classroom, in which the student feels comfortable and safe to participate more actively in the activities. Knowing the profile of the students facilitates the elaboration of tasks and exercises on subjects of their interest, motivating them. The variety of activities, sometimes aimed at individualization, sometimes focused on interaction, provides opportunities and favors different learning styles. The mix of activities allows students to work at their own pace, as well as express their opinions and ideas, feeling part of the group. Encouraging respect is an essential factor for everyone to express themselves harmoniously. Valuing the participation and positive contribution of students throughout the classes is also motivating: constructive guidance and well-deserved praise are always welcome.

The secret of success lies in the investment in the training of teachers and in the careful preparation or adaptation of the didactic material. A well-trained teaching team in both initial and continuing education will be able to overcome these challenges. It is up to the

pedagogical coordinator to instruct, monitor, guide and resolve the doubts of the team of teachers so that the pedagogical praxis is effective. Pedagogical meetings for the exchange of experiences, exchange of ideas, sharing of successes and challenges in the use of the multilevel approach, observation of classes and respective feedback are important for teacher (self) evaluation, for support and professional enrichment and for pedagogical success.

4 FINAL CONSIDERATIONS

The choice of the methodological approach, teacher training and the production or adequacy of the didactic material are basic factors to provide the student with the opportunity to master the foreign language.

The sociolinguistic aspect and discourse analysis are fundamental elements in the learning of a language and complement the acquisition of the four linguistic skills of reading, writing, listening and speaking in the target language, because the one who knows a language well, knows how to use it in order to communicate appropriately in different scenarios and contexts to achieve the purpose of communication.

One of the keys to acquiring fluency in English is the search for learning the language in a more natural and practical way. Some factors that hinder the acquisition of fluency are: little time for language practice during class, insufficient real and authentic exposure to the target language, lack of knowledge of the sociocultural and cognitive profile of students, inadequate choice and/or use of methodological approaches and didactic resources.

The multilevel approach, if well applied by trained teachers, greatly favors the acquisition of fluency in the target language.

The valorization of the teaching profession, the priority in the quality of teaching and the school investment in the initial and continuing training of the teaching team allow for a more reflected, solidified, motivated and constantly updated teaching action, ensuring the procedural effectiveness of teaching and learning.

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STRUCTURING A PREVENTIVE MAINTENANCE PLAN WITH A FOCUS ON OPERATIONAL RELIABILITY: A CASE STUDY IN THE METALLURGICAL SECTOR

ESTRUTURAÇÃO DE UM PLANO DE MANUTENÇÃO PREVENTIVA COM FOCO NA CONFIABILIDADE OPERACIONAL: UM ESTUDO DE CASO NO SETOR METALÚRGICO

ESTRUCTURACIÓN DE UN PLAN DE MANTENIMIENTO PREVENTIVO CON ENFOQUE EN LA CONFIABILIDAD OPERACIONAL: UN ESTUDIO DE CASO EN EL SECTOR METALÚRGICO



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ABSTRACT

Maintenance and reliability systems are relevant in all business sectors, as effective maintenance contributes to efficient operational performance, reducing risks and costs. The objective of this study was to identify quality tools applicable to maintenance planning and to support the proposition of a plan aimed at restructuring and optimizing existing processes. This descriptive research adopted an approach based on a bibliographic review, followed by its application in a case study conducted in a medium-sized company in the iron and steel sector, with 15 years of experience in the market. The company provides a wide range of products and services, including longitudinal and transverse cutting, flat steel, galvanized steel, and heavy plates, complying with strict industrial standards and maintaining a high level of quality. The results showed that the application of quality tools, such as the Pareto Diagram and the Ishikawa Diagram, is essential for identifying critical failure points and for developing a prototype preventive maintenance plan. Although the complete development of the plan was not possible within the scope of this study, the proposed prototype provides a solid basis for the future implementation of preventive actions, directing efforts toward the most critical components of the Slitter and allowing replication in other equipment and systems of the company.

Keywords: FMEA. Ishikawa. Pareto. Maintenance. Metalworking Industry.

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RESUMO

Os sistemas de Manutenção e Confiabilidade são relevantes em qualquer setor empresarial, pois uma manutenção eficaz contribui para uma execução eficiente na operação, com redução de riscos e custos. O objetivo deste estudo foi de levantar possíveis ferramentas de qualidade aplicáveis ao planejamento de manutenção e fundamentar a proposição de um plano que reestruture e otimize os processos existentes. Para o desenvolvimento deste trabalho, de natureza descritiva, adotou-se uma abordagem baseada em um levantamento bibliográfico, sucedido pela aplicação em um estudo de caso, desenvolvido em uma indústria de médio porte do setor de ferro e aço, com 15 anos de atuação no mercado, que fornece uma variedade de produtos e serviços, incluindo cortes longitudinais e transversais, aços planos, galvanizados e chapas grossas, cumprindo rigorosas normas industriais e mantendo um alto padrão de qualidade. Como resultado, as análises realizadas evidenciaram que a aplicação de ferramentas da qualidade, como o Diagrama de Pareto e o Diagrama de Ishikawa, é fundamental para a identificação dos pontos críticos de falhas e para a construção do protótipo do plano de manutenção preventiva. Embora o desenvolvimento completo do plano não tenha sido possível dentro do escopo deste estudo, o protótipo apresentado oferece uma base sólida para a implementação futura de ações preventivas, direcionando os esforços para os componentes mais críticos da Slitter, podendo ser replicados nos demais equipamentos e sistemas da empresa.

Palavras-chave: FMEA. Ishikawa. Pareto. Manutenção e Indústria Metalúrgica.

RESUMEN

Los sistemas de Mantenimiento y Confiabilidad son relevantes en cualquier sector empresarial, ya que un mantenimiento eficaz contribuye a una ejecución operativa eficiente, con la reducción de riesgos y costos. El objetivo de este estudio fue identificar posibles herramientas de calidad aplicables a la planificación del mantenimiento y fundamentar la propuesta de un plan orientado a reestructurar y optimizar los procesos existentes. Para el desarrollo de este estudio de carácter descriptivo, se adoptó un enfoque basado en una revisión bibliográfica, seguida de su aplicación en un estudio de caso realizado en una industria de tamaño medio del sector del hierro y el acero, con 15 años de actuación en el mercado. La empresa ofrece una amplia variedad de productos y servicios, incluyendo cortes longitudinales y transversales, aceros planos, galvanizados y chapas gruesas, cumpliendo estrictas normas industriales y manteniendo un alto estándar de calidad. Como resultado, los análisis evidenciaron que la aplicación de herramientas de calidad, como el Diagrama de Pareto y el Diagrama de Ishikawa, es fundamental para la identificación de los puntos críticos de falla y para la construcción del prototipo del plan de mantenimiento preventivo. Aunque el desarrollo completo del plan no fue posible dentro del alcance de este estudio, el prototipo presentado ofrece una base sólida para la futura implementación de acciones preventivas, orientando los esfuerzos hacia los componentes más críticos de la máquina slitter, pudiendo ser replicado en los demás equipos y sistemas de la empresa.

Palabras clave: FMEA. Ishikawa. Pareto. Mantenimiento e Industria Metalúrgica.

1 INTRODUCTION

In today's industrial landscape, marked by a highly competitive environment and continuous technological advancements, companies are constantly seeking to improve their operations to achieve greater efficiency and reduce operating costs. Globalization and the pressure for high quality products, offered at competitive prices, require industries to manage their resources and processes more strategically (KARDEC, 2004). In this context, the reliability of equipment plays a crucial role, as failures or unexpected downtime can result in high costs, compromising the production flow and the quality of products. Maintenance practices, traditionally seen as reactive activities, have been evolving into preventive and predictive approaches, focused on ensuring the availability and longevity of industrial assets (SANTOS et al., 2019).

Maintenance planning emerges, therefore, as a key piece for industries to reduce equipment downtime, optimize the use of resources, and maximize productivity. According to SANTOS et al. (2019), a well-structured approach to maintenance can significantly reduce operating costs and minimize the impact of unscheduled failures. An effective preventive maintenance plan is essential to protect machinery investments, decrease unexpected downtime and emergency costs, and consequently increase productivity. However, many companies still face challenges in implementing these practices due to disorganized processes and poor communication between maintenance and operation teams. Efficient maintenance management is essential to achieve continuous improvement and maintain competitiveness in today's industrial environment (SANTOS et al., 2019).

In this context, the present study aims to investigate quality tools that can support the creation of a more assertive preventive maintenance plan. For the development of this descriptive work, a methodology was adopted that combines bibliographic survey and practical application in a case study. The study was carried out in a medium-sized industry in the iron and steel sector, with 15 years in the market, which stands out for offering a range of products and services, such as longitudinal and transverse cuts, flat steel, galvanized steel, and heavy plates. This company adheres to strict industry standards while maintaining a high level of quality in its processes and products. Although the company has well-established maintenance procedures, such as work orders and performance indicators, the current process still has important gaps, particularly in aspects related to the organization and communication of preventive activities. Given the importance of equipment for the production line and the significant impact of any failures, the structuring of a more detailed preventive maintenance plan focused on critical points of improvement emerges as a necessity.

In summary, this case study aims to develop a prototype of a preventive maintenance plan for Slitter, a rotary shear used in the cutting and processing of materials in coils, based on a careful analysis of historical corrective maintenance data and the application of quality tools. The work uses the Six Sigma methodology as a structural basis and adopts the DMAIC process – Define, Measure, Analyze, Improve and Control – for the development of the steps and analyses. DMAIC is a data-based quality methodology, widely used in continuous improvement projects for problem solving and process optimization. An integral part of Six Sigma, this approach can be applied autonomously in quality improvement initiatives or integrated with other strategies, such as Lean, offering systematic ways to develop more robust and controlled processes (AMERICAN SOCIETY FOR QUALITY, 2024).

To enable the implementation of a future preventive maintenance plan, quality tools such as the Pareto Chart and the Ishikawa Chart can be used, which provide a reasoned analysis of the most recurrent failures and their possible causes. In addition, an Excel spreadsheet was prepared for the construction of the FMEA, *Failure Modes and Effects Analysis*, with the objective of assisting the company in the systematic analysis of the modes and effects of failures, promoting a more accurate and grounded approach. Although the practical application of FMEA has not been fully implemented within the scope of this work, its structuring represents an important step towards providing the company with an instrument that favors the continuity and expansion of preventive maintenance practices.

The present work is organized as follows: section 2 addresses the theoretical foundation and the quality tools applied; Section 3 presents the methodology used for the analysis and development of the maintenance plan; Section 4 exposes the results and discussions of the analyses; and, finally, section 5 brings the final considerations and recommendations for future work.

2 THEORETICAL FRAMEWORK

2.1 TYPES OF MAINTENANCE

The Industrial Maintenance of a company goes beyond the choice of intervention strategies in the equipment, encompassing organizational tools, planning techniques, professional qualification, quality indicators and a management system. The selection of maintenance strategies considers the manufacturer's recommendations, safety, environmental impact, equipment characteristics and economic viability, forming a solid basis for an effective maintenance policy (VIANA, 2002).

According to TEIXEIRA (2022), maintenance has undergone a continuous process of improvement, evolving in its approaches. At the beginning of the last century, still present in

some organizations, maintenance was predominantly corrective. However, as the years progressed, more proactive strategies emerged, giving way to preventive maintenance, and later, reaching more refined levels in the form of predictive maintenance. Industrial maintenance aims to ensure the functional availability of equipment and facilities, keeping the production process safe, reliable and within costs.

According to MOSCHIN (2015), the scheduled shutdown for maintenance of a process unit aims to restore and/or improve the conditions of equipment and facilities. The author states that, after a certain period of operations, production capacity is lost and product degradation and production losses may occur, compromising the safety of facilities and equipment reliability, resulting in the need for reconditioning. The shutdown is an especially important event in continuous processing plants, which operate 24 hours a day, seven days a week. Therefore, the importance of understanding the applications of the types of analysis and how the types of maintenance are divided into different sectors of the industry.

Within the scope of this study, different types of maintenance were considered. According to VIANA (2002), the types of maintenance refer to the various approaches to carrying out interventions in the equipment that makes up a production plant. Considering this definition, there is a consensus, with minimal variations, on the types of maintenance. For the author, the main types are:

2.2 CORRECTIVE MAINTENANCE

The Brazilian Association of Technical Standards ABNT (NBR 5462 – 1994) defines corrective maintenance as maintenance performed after the occurrence of a breakdown, aimed at putting an item back in a condition to perform a required function. In this case, the correction is carried out only after the equipment has broken down.

According to SANTOS (2018), corrective maintenance is a maintenance activity carried out to overcome failures or damages found during the preventive maintenance period. In general, this is not a scheduled maintenance activity, because it is done after a component is damaged and aims to restore the reliability of a component or system to its original state.

According to VIANA (2002), corrective maintenance can be divided into:

- **Unplanned Corrective Maintenance:** This maintenance occurs after the failure or loss of performance of a piece of equipment, with no prior time to prepare the services. Despite the inconvenience caused, this form of maintenance is still widely used today.
- **Planned Corrective Maintenance:** Refers to the correction of a lower than expected performance or a failure, by managerial decision. This can occur both through

predictive tracking and the decision to continue operating the equipment until a breakdown occurs.

2.3 PREVENTIVE MAINTENANCE

Preventive maintenance, defined by the ABNT standard (NBR 5462 – 1994), is carried out at predetermined intervals, or according to prescribed criteria, aimed at reducing the probability of failure or degradation of the operation of an item. This modality aims to eliminate or reduce the probability of failures through activities such as cleaning, lubrication, replacement, and checking at pre-planned intervals. For this reason, it is necessary that time intervals are properly defined in order to achieve efficient preventive maintenance (SLACK; CHAMBERS; JOHNSTON, 2009).

The definition of maintenance intervals must consider variables such as the criticality of the equipment and the history of failures. This approach, although initially costly, reduces the number of unexpected stops and increases production efficiency over time (VILLANUEVA, 2015).

2.4 PREDICTIVE MAINTENANCE

Predictive maintenance, according to the ABNT standard (NBR 5462-1994), consists of systematic analysis techniques that aim to ensure a desired quality of service. Using centralized supervision or sampling means to reduce preventive and corrective maintenance to the minimum necessary.

According to VIANA (2002), predictive maintenance is a type of preventive maintenance that is based on the actual condition of the equipment. This method allows continuous monitoring of the equipment through measurements taken during its normal operation, which provides greater availability, as the intervention occurs only when it approaches a limit previously established by the maintenance team. Predictive maintenance, therefore, predicts equipment failure, and repair intervention is actually configured as scheduled corrective maintenance.

The essential conditions for the implementation of this type of maintenance are: a) The equipment, system or installation must allow some type of monitoring; b) The choice for this type of maintenance must be justified by the costs involved; c) Failures must originate from causes that can be monitored and have their progression monitored (VIANA, 2002).

2.5 MAINTENANCE INDICATORS

Maintenance indicators can measure different aspects of performance, from downtime to the efficiency of the production process. As a future work, it is suggested that some of these indicators be used for daily monitoring and control of maintenance and as confirmation of the feasibility of the maintenance plan that will be built. It is worth mentioning that indicators are not only used to monitor maintenance challenges, but are also essential for the daily routine.

Maintenance ratios should reflect crucial aspects of the production process. For some companies, a certain indicator may be satisfactory, while for others, it may not be so applicable, being a matter of analysis and adaptation. Maintenance Planning and Control (PCM) must evaluate the best way to monitor its process (VIANA, 2002).

2.6 MEAN TIME BETWEEN FAILURES (*MTBF*)

According to VIANA (2002, p. 142), the mean time between failures "is defined as the division of the sum of the hours available of the equipment for operation (HD), by the number of corrective interventions in this equipment in the period (NC)".

The MTBF index is used to monitor the performance of machines in response to maintenance activities. An increase in the value of this indicator over time is a positive sign, as it suggests a reduction in corrective interventions and, therefore, an increase in available operating hours (VIANA, 2002).

Equation 1 presents the calculation used.

$$MTBF = \frac{HD}{NC} \quad (1)$$

2.7 MEAN TIME TO REPAIR (*MTTR*)

Mean time to repair (MTTR) is calculated by dividing the sum of hours of operational downtime due to maintenance (HIM) by the number of corrective interventions performed in the period (NC). It can be inferred that the lower the MTTR over time, the more effective maintenance management will be, since corrective interventions will have an increasingly smaller impact on production (VIANA, 2002).

Equation 2 represents the calculation of this maintenance indicator.

$$MTTR = \frac{HIM}{NC} \quad (2)$$

2.8 PHYSICAL AVAILABILITY (DF)

According to ABNT (NBR 5462 – 1994), availability is defined as the ability of an item to be in a position to perform a certain function at a given time or during a specific time interval. The formula for calculating availability can vary between different production sectors and even between competing companies.

In general, physical availability (FD) is defined as the percentage of the ratio between the total accumulated operating hours (HO) and the total elapsed hours. HO refers to the total time of operation, while HM corresponds to the time of stoppages, both preventive and corrective. Losses due to underspeed do not affect physical availability, but only impact productivity (VIANA, 2002).

This index is extremely important for maintenance, as the main objective is to maximize DF, that is, to provide the largest possible number of hours of equipment operation. In addition, the index should be used to monitor the operational performance of the equipment, identifying 'problem equipment', those that most negatively impact the plant's FD (VIANA, 2002).

Equation 3 represents the calculation of FD.

$$DF = \frac{HO}{HO + HM} \times 100\% \quad (3)$$

2.9 SIX SIGMA

According to WERKEMA (2006), Six Sigma is a management strategy characterized by its disciplined and analytical approach. This method aims to improve organizational performance and promote significant improvements in quality and customer satisfaction. As noted by the author, this strategy aims at the continuous optimization of processes and products, resulting in greater competitiveness and profitability for the organization.

MITCHELL (1992) describes Six Sigma as a Statistical Process Control approach, designed to achieve levels of excellence with only 3.4 defects per million opportunities in various areas, such as manufacturing, services and product development. This method is based on the principles of Total Quality Management and is differentiated by the intensive application of quantitative tools to identify and eliminate unwanted variabilities.

The Six Sigma structure is organized around the DMAIC cycle – Define, Measure, Analyze, Improve and Control – which guides the progress of improvements in each phase of the project (REVELLE, 2004). According to WERKEMA (2006), the stages of the cycle are briefly defined as follows:

- Define: define the scope of the project;
- Measure: determine the focus of the problem;
- Analyze: determine the causes of the priority problem;
- Improve: propose, evaluate and implement solutions to the priority problem;
- Control: ensure that the achievement of the goal is maintained in the long term.

According to ARNHEITER & MALEYEFF (2005), by applying the Six Sigma method and its principles, the organization can enjoy a series of benefits, including continuous improvement of processes, improvement of quality, optimization of workflow, increase in efficiency and productivity, reduction of cycle times, expansion of production capacity and reliability of products, reduction of defects, waste and costs, elimination of activities that do not add value and maximization of profits.

2.10 FAILURE MODES AND EFFECTS ANALYSIS (FMEA)

Failure Mode and Effects Analysis (*FMEA*) is a technique that aims to ensure the reliability of processes and products, with three main objectives: (i) to identify and evaluate possible failures that may occur in a product or process, (ii) to determine preventive or corrective actions to minimize the probability of these failures occurring, and (iii) document the study in order to create a technical reference that serves as a basis for future revisions and improvements in the process or project (FOGLIATTO and RIBEIRO, 2009).

Process FMEA, in particular, is an analytical approach applied by the process development team to ensure that potential failure modes, their causes and effects, are properly identified and discussed. In this FMEA modality, all steps, procedures, and process operations are thoroughly examined to identify possible failure modes that may compromise product quality. This study serves as a structured record of the team's discussions, based on the practical experience and accumulated knowledge of the professionals involved (FOGLIATTO and RIBEIRO, 2009).

Process FMEA can be used in both industrial and administrative settings, offering a systematic methodology that formalizes and documents team considerations throughout the planning and continuous process improvement stages. This technique contributes to the reduction of risks, allowing a more careful evaluation of the process requirements and ensuring that all potential modes of failure and their associated causes and effects are analyzed (FOGLIATTO and RIBEIRO, 2009).

For effective application of FMEA, it is recommended that the engineer in charge of the analysis include representatives from all areas related to the process. This usually

involves professionals in the areas of materials engineering, manufacturing, assembly, quality and technical assistance, in addition to the designers and engineers responsible for the processes directly involved, such as suppliers and customers. This interdisciplinary collaboration allows a broad and detailed view of possible failures, contributing to the robustness and reliability of the studied process (FOGLIATTO and RIBEIRO, 2009).

2.11 PARETO CHART

The Pareto Chart, or Pareto chart, is a quality tool represented by a vertical bar chart (columns), to order data in descending order of importance, with values presented as a percentage. Pareto usually includes a cumulative curve, making it easier to identify the most critical problems and help establish priorities for their resolution. The objective is to classify the causes of defects or non-conformities by frequency of occurrence, in order to direct efforts to the main causes (PEZZATTO et al., 2021).

Developed by Vilfredo Pareto in 1896, the diagram is based on the principle that most problems result from a small number of causes. These causes are divided into two groups: the "trivial" ones, which correspond to most occurrences, but with little impact, and the "essential" ones, which are less frequent, but have a very significant effect. This concept is also known as the "80-20 technique", in which 20% of the causes are responsible for 80% of the observed effects (PEZZATTO et al., 2021).

Joseph Juran adapted the Pareto diagram to apply it to quality problems such as machine failures, defective items, customer complaints, lost productivity, delivery delays, and workplace accidents. He classified the problems into "vital few", which are a few problems with a large impact, and "many trivial", which represent a large number of problems, but which do not cause significant impacts to the company. This adaptation demonstrates that most problems originate from a small number of causes, which, when identified and corrected, eliminate most defects. In this way, the Pareto Diagram separates the essential causes, which contribute to the 80% of the problems, from the trivial causes, responsible for 20% of the effects, explaining why this tool is known as the 80-20 technique (PEZZATTO et al., 2021).

2.12 ISHIKAWA DIAGRAM

The Ishikawa Diagram, also known as the Cause and Effect Diagram, was developed by Ishikawa in 1943 at the University of Tokyo. Its purpose was to demonstrate the interconnection between the various factors of a process. This diagram presents a set of causal factors associated with a quality effect, representing the relationship between an effect and all possible "causes" that can contribute to it.

This tool is widely used in quality management due to its simplicity and effectiveness in analyzing and identifying the main causes of variation in a process or the occurrence of problems. The diagram facilitates the understanding and search for solutions, by pointing out several influences that impact the process, allowing a systemic analysis of the whole. It is particularly useful for establishing relationships between opinions obtained in *brainstorming* sessions or other forms of data collection (PEZZATTO et al., 2021).

The Cause and Effect Diagram is a figure composed of lines and symbols that represent the relationship between an effect and its possible causes, facilitating the description of complex situations that could hardly be interpreted in words alone. Each effect is associated with several categories of causes, which can be subdivided into additional causes. The main categories are: method, labor, material, machine, environment, and measurements, known as the 6Ms (PEZZATTO et al., 2021).

3 METHODOLOGY

Following the parameters established by GIL (2002), this research regarding nature can be classified as an exploratory research.

The case study, according to the same author, is characterized by an in-depth analysis with specific objectives, providing a detail that would be difficult to obtain in studies with a greater number of variables. Considering that the objective of this research is specific and requires a detailed examination of the problem, this approach is adequate.

Due to the nature of the research, which involves both data collection and analysis, the results are presented in two forms: quantitative and qualitative. Quantitative analysis occurs through the collection, treatment, and analysis of operational data, with the support of Figures and pivot tables to organize and visualize information accurately. This approach allows the objective identification of failure frequencies and maintenance trends in the equipment. On the other hand, qualitative analysis focuses on the detailed observation of corrective maintenance processes and dialogues with the company's employees, with the aim of deepening the understanding of the underlying causes of failures and supporting the careful choice of the asset to be analyzed. This mixed approach provides a broad and grounded view of the practices and challenges present in the maintenance of the equipment under study.

Therefore, the method adopted in this research follows a mixed approach with an exploratory purpose. The theoretical foundation is based on bibliographic reviews on industrial maintenance, along with a specific case study, detailed in the introduction of this work. This methodological combination enables an in-depth analysis of the current

maintenance situation in the company, with the use of quality tools to identify and categorize the main causes of failures.

3.1 MATERIALS AND METHODS

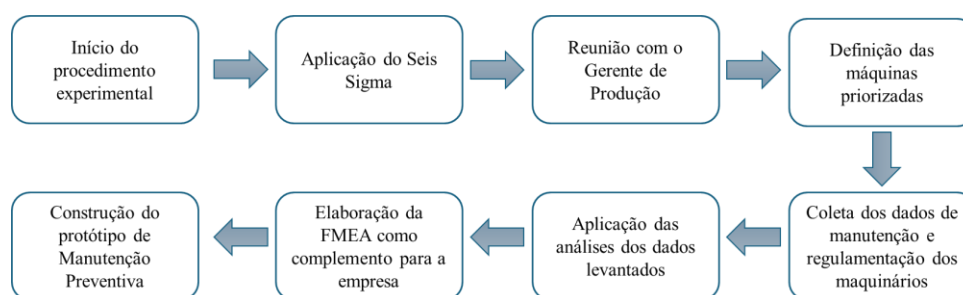
To ensure a systematic and efficient development of the analyses in this study, the methodology adopted was carefully planned to organize and guide each stage of the work with clarity and objectivity. The application of a structured method is essential in case studies, as it facilitates the understanding of the activities and contributes to the validation of the results (YIN, 2015).

The proposed methodology follows a set of logical steps, with the objective of establishing a sequence that ensures scientific rigor and allows the replicability of research, indispensable factors in projects aimed at optimizing industrial processes (GIL, 2002). Figure 1 presents the flowchart of the established steps, which serves as a guide in the execution of the work and provides an overview of the investigative process adopted.

In addition, each phase of the process is planned to capture essential information, identify patterns, and propose data-based interventions to impact the operational efficiency of the equipment studied. Thus, the methodology ranges from the careful choice of the asset, through the collection and analysis of operational data, to the proposition and validation of maintenance solutions.

Figure 1

Flowchart to identify the steps carried out in the Case Study



Source: The Author.

3.2 APPLICATION OF SIX SIGMA

The Six Sigma methodology, recognized for its rigor in continuous process improvement, uses the DMAIC cycle as a central analysis structure. This study fully applies this methodology, ensuring a systematic and well-structured approach. In the initial phase, of Definition, the equipment that makes up the scope of the analysis is identified, along with the main variables that justify its prioritization for this study.

In the Measurement phase, operational data is collected over a specific period, with strict attention to technical requirements, the recurrence of corrective maintenance, and the guidelines provided by the equipment manufacturers. To deepen the analysis of failure modes and their causes, quality tools such as the Ishikawa Chart and the Pareto Chart can be applied. Complementing this step, the Failure Modes and Effects Analysis (FMEA) tool is developed, in Excel, aiming to assist the company in standardizing and improving future maintenance routines.

In the Control phase, the focus is on the construction of a prototype preventive maintenance plan, designed for replication in other assets and for the improvement of the company's maintenance practices. This plan emphasizes the continuous monitoring and strategic management of maintenance activities, with the objective of reducing failures, increasing equipment reliability and ensuring the sustainability of operational performance.

3.3 DEFINITION OF THE ASSET STUDIED

To ensure a detailed and effective analysis, the development of the work is concentrated on a single asset. The selection of the asset to be studied takes place through a rigorous process, which involves meetings with the company's Production Manager. In these meetings, the main bottlenecks related to operational failures, intervention priorities and the impact on production are discussed. Based on a thorough analysis of the information collected, *the Slitter* equipment is defined as the main focus of this study.

3.4 DATA COLLECTION AND TABULATION

The data collection for this study occurs directly in the business environment, with the objective of subsidizing analyses in different stages of the process. In the data collection phase, the historical records of corrective maintenance performed over a specific period, the maintenance performance indicators monitored so far, and the characteristics of the asset under study, including regulations and standards provided by the equipment manufacturers, are considered. This approach is critical to understanding maintenance requirements and recommended timelines for performing repairs.

In the initial assessment, the descriptions of failures in each corrective maintenance are checked and grouped according to the type of service performed. This data is organized and presented in a Pareto chart, allowing a hierarchical visualization of the most relevant and frequent occurrences in the maintenance process. With this tool, the Pareto principle is applied, suggesting that 80% of problems stem from 20% of root causes, which makes it easier to prioritize efforts for improvement.

The most significant occurrences identified in the Pareto Chart serve as the basis for further analysis, using the Ishikawa Diagram (or Cause and Effect Diagram). This method makes it possible to identify the root causes of the most recurrent failures, providing a solid basis for implementing improvements in the maintenance process, with a focus on increasing operational efficiency and reducing equipment downtime.

3.5 PREPARATION OF THE FMEA

There are several versions and formats of forms for the application of FMEA, and the organization must select or design the one that best suits its specific needs and criteria. Despite this flexibility, the fundamental elements remain constant in all versions. These elements include: header, functions, failure modes, effects, severity, causes, occurrence, controls, detection, and recommended actions (PALADY, 2004).

FOGLIATTO and RIBEIRO (2009) suggest a form to accompany the FMEA process containing the following fields:

- Header: Includes identifying information for the study, such as the FMEA number, the process analyzed, the responsible department, the participants, and the date.
- Item/Function: Describes the operation or function under analysis, with the purpose or requirement to be met.
- Potential Failure Modes: Lists the possible non-conformities associated with the item studied.
- Potential Failure Effects: Defines the defects that arise as a result of failure modes.

- Severity (S): Qualitatively evaluates the impact of the failure mode on the system, on a scale of 1 to 10, so that 1 means a mild effect and 10 means a very severe effect.
- Classification: Can be used to classify any characteristic of the operation that may require special control.
- Potential Causes/Mechanisms of Failure: Specifies the causes or mechanisms that generate the failure mode, in a clear and detailed manner.
- Occurrence (O): Measures the probability of the cause occurring, also on a scale of 1 to 10, with 10 being the highest probability.
- Prevention and Detection Control: Records existing controls to prevent or detect failures.
- Detection (D): Evaluates the effectiveness of controls in detecting failures, on a scale of 1 to 10, where 10 indicates a lower chance of detection.
- Risk (R): The total risk of the failure mode is calculated as the product of severity, occurrence, and detection in order to prioritize corrective actions.
- Recommended Actions: Improvement actions are proposed based on the prioritization of the identified risks.
- Responsible and Date (for the action): The individual responsible for the recommended action is indicated, as well as the target date to complete the task.
- Actions Taken: Brief description of the corrective and improvement actions effectively implemented.
- Resulting Risk (R): Refers to the assessment of future risk based on severity, occurrence, and detection, after identifying corrective actions, but before implementing them.

The FMEA form is a dynamic document, that is, constantly evolving, that must incorporate the most recent versions of the project or process, as well as the actions taken, even after the start of production. In this way, a record of the implemented changes and an updated assessment of the risks related to the project or process in question are kept (FOGLIATTO and RIBEIRO, 2009).

4 DATA, RESULTS, ANALYSIS

This work aimed to structure the basis for the proposition of the development of a Preventive Maintenance Plan directed to *Slitter*, a critical machine in the operation of the company studied. Due to time constraints, priority was given to the elaboration of a prototype

of the plan, focusing on the analysis of historical corrective maintenance data and the application of quality tools to support decision-making.

4.1 CONTEXTUALIZATION OF THE COMPANY'S SCENARIO

The company subject to this case study faces significant challenges in its maintenance management, especially in relation to the *Slitter*, an imported machine with approximately 40 years of operation. Essential for the company's production process and revenue, *Slitter* is obsolescent in several electrical and electronic components, which, added to the difficulty of replacing parts in the market, raises the level of risk and worries management about the operational reliability of this equipment. Given *Slitter*'s strategic importance, a prolonged failure would have considerable impacts on production, which is why the company is currently seeking budgets for the modernization of electrical panels (*Retrofit*) from three specialized suppliers. This upgrade, however, requires high investments and an estimated downtime of 30 days, which poses an additional challenge to maintenance planning.

The company's maintenance sector, structured with strong *expertise* and composed of an electrical and electronic engineer and a mechanical maintenance technician with four decades of experience, follows the guidelines of the ISO 9000 Procedure (PQ 7.1.3). This protocol requires that all maintenance – whether preventive, corrective, or process improvements – be formalized via Service Orders (O.S.), ensuring the detailed record of activities and allowing the compilation of essential metrics, such as MTBF, MTTR, and DF. However, the reliability of these indicators is still below expectations due to the lack of a fully structured preventive process and a preventive maintenance schedule that aligns with production demands.

Currently, the preventive maintenance schedule faces difficulties in its execution, often hampered by the high volume of production, which reduces the time available for complex preventive interventions, carried out only quarterly, during inventories. Essential preventive actions, such as lubrication and bearing checks, are scheduled for times that minimize the impact on the operation, such as Saturdays and periods coordinated with production supervision. In parallel, spare parts inventory management represents another critical point, since the formation of a complete inventory is financially unfeasible, especially for imported parts. To mitigate downtime and ensure operational continuity, the company maintains a partial inventory of critical items, although this arrangement does not fully meet maintenance demands.

Given this scenario, the need for a preventive maintenance plan becomes evident, aiming to ensure the availability and continued performance of *Slitter* and other critical assets.

The development of this prototype, although it does not represent a finalized plan, establishes a solid basis for the implementation of preventive actions in the future, seeking to promote a cultural change in the company, directed to a more preventive and less reactive posture in the face of industrial maintenance challenges.

4.2 ACTIVE INGREDIENT STUDIED

To ensure a careful analysis and propose effective solutions, the study was directed to the evaluation of a specific equipment. In this context, meetings were held with the company's Production Manager, aiming to understand the main bottlenecks related to operational failures, as well as to define intervention priorities.

After analyzing the information collected, the *Slitter* equipment was selected as the main focus of this study. This choice is based on its relevance to the production process, in addition to its direct impact on the company's revenue, which makes the optimization of its operation essential for improving efficiency and competitiveness.

Slitter, also known as a slitting line or rotary shear, is a critical piece of equipment in the operations of the branch company studied. Manufactured in 1982 by Braner USA Inc. and equipped with General Electric propulsion engines, it performs the vital function of cutting steel coils into strips of different thicknesses and widths, accounting for approximately 80% of the cut steel production, with an average of 2,800 tons per month.

This equipment has significant capacities, with an input shaft supporting up to 14 tons and an output shaft with a capacity of 10 tons. Its maximum cutting speed is 300 meters per minute, with nominal cutting tolerances of ± 0.20 mm, which makes it essential to meet the strict quality standards required in the sector.

In addition, *Slitter* utilizes a set of specific knives that require regular maintenance, such as grinds, to ensure cutting efficiency. Given its central role in operations and the need for proper maintenance to avoid failures and interruptions, the preparation of a preventive maintenance plan becomes essential to optimize its performance and ensure the company's operational continuity. Figure 2 illustrates the *Slitter machine* in operation, performing its sheet metal cutting activities.

Figure 2

Slitter's working process



Source: The Author.

4.3 DATA COLLECTION AND PROCESSING

Initially, a meeting was held with the company's Production Manager to clarify the purpose of the study and align expectations in relation to the desired results. This meeting enabled a deep understanding of the corrective maintenance process applied in the production context.

From this meeting, historical data on maintenance carried out at *Slitter* between January 2023 and September 2024 were extracted. These data included both corrective and preventive maintenance, with the aim of understanding the distribution and frequency of each type of intervention. From this base, a percentage analysis was performed, revealing that only 11% of the maintenance was preventive, while 89% corresponded to corrective maintenance, which evidenced the predominance of corrective actions. As the focus of the work is on the analysis of corrective maintenance for the construction of the prototype, the data was treated using only the records of this type of maintenance.

After proper data treatment, 54 corrective maintenance were identified, of which 47 were valid for subsequent analyses. Of this total, 21 maintenance (44.7%) are of an electrical nature and 26 (55.3%) of a mechanical nature. The remaining 7 maintenances were excluded after alignment with the electrical and mechanical teams. This decision was made because some historical maintenance, because they are older, did not reflect the current reality of the

operation due to the replacement of equipment or changes in the process. Therefore, these maintenances were not relevant for the construction of a future preventive plan.

4.4 CORRECTIVE MAINTENANCE GROUPING

Subsequently, a meeting was held with those responsible for the Electrical and Mechanical areas, in order to understand in depth the failures corresponding to each intervention. With this information, maintenance was grouped into seven groups for Electrical and nine for Mechanical. This grouping facilitated analysis and allowed the identification of similar failures that could be addressed jointly in future corrective maintenance.

Chart 1 presents the classification of corrective maintenance services, divided between the areas of Electrical and Mechanical. The Electrical area is composed of 7 groups, which, together, include a total of 21 distinct faults. In turn, the Mechanics area covers 9 groups, adding up to 26 different failures. Thus, the total number of failures identified in the database for the period studied is 47, resulting from the sum of the failures of the two areas.

Table 1

Grouping of Corrective Maintenance

Manutenções Corretivas	Contagem de Descrição do Defeito/ Falha
Elétrica	21
Drive (acionamento do motor Conversor de corrente)	7
Fim de curso/ sensor	2
Placas de controle (amplificador)	4
Revisão elétrica	2
Revisão/ correção desgaste de cabo	4
Verificação de botões (hidráulico)	1
Verificação/ Substituição Contator	1
Mecânica	26
Lubrificar/ regulador (Conjunto pneumático)	4
Preventiva de mancal do rolo da mesa	1
Regulagem de corrente (Semanal)	5
substituição pino elástico	2
Troca de parafuso mandril	2
Verificação Cilindro Hidráulico	3
Verificação da mangueira e conexões	5
Verificação/ troca da Gaxeta da porca	2
Verificar nível dos tanques	2
Total Geral	47

Source: The Author.

4.5 APPLICATION OF THE PARETO CHART

From the grouped data, the Pareto Diagram was elaborated, separately for the groups of electrical and mechanical failures, in order to identify the most recurrent corrective maintenance services in each area. This analysis allowed us to highlight the most critical services, providing a basis for prioritizing future failure analyses.

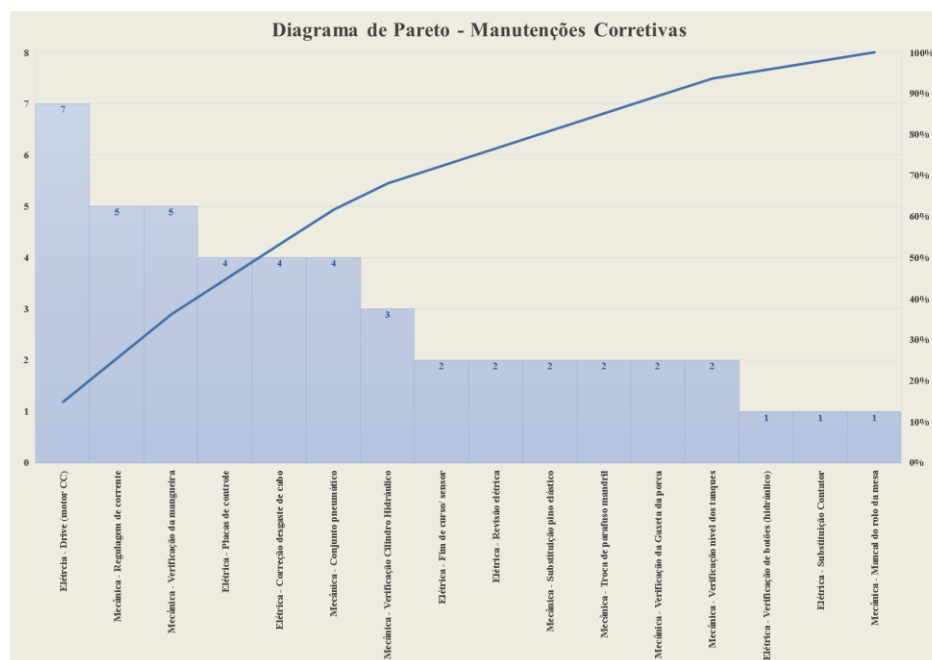
Figure 3 shows the Pareto Chart for the services in the Electrical and Mechanical areas. To construct the Figure, a bar Figure was used in which the X-axis shows all the corrective maintenance service groups listed in Chart 1. The members have been arranged in descending order, so that each maintenance group is represented by the number of defects/faults associated with it. On the Y-axis, there is the total failure count, which determines the height of each bar.

In addition to the bars, the chart includes the Pareto curve, visually highlighting the most significant problems. The curve indicates the cumulative percentage of failures, allowing the identification of the 20% of maintenance groups that correspond to approximately 80% of the problems, according to the Pareto principle.

Thus, it was identified that the most critical group in the Electrical area is the *Drive* (DC motor), with a total of 7 occurrences of failures in the analyzed period. In the area of Mechanics, the most critical groups are Current Adjustment and Hose Checking, both with 5 occurrences each. This data highlights the main points of attention to optimize maintenance and reduce recurring failures in the respective areas.

Figure 3

Pareto Diagram of Corrective Maintenance at Slitter



Source: The Author.

4.6 DOWNTIME ANALYSIS

In addition to evaluating the frequency of occurrences, an analysis of corrective downtime by service group was carried out, both for the Electrical and Mechanical areas.

This analysis made it possible to correlate the impact of each failure, considering not only its frequency, but also the time required for each intervention, which reinforces the criticality of certain services and guides prioritization in the development of preventive maintenance solutions.

Figures 4 and 5 show the relationship between the total corrective downtime and the services performed, each one specific to a maintenance area: Electrical and Mechanical. Both have the same purpose and format, differing only in terms of the specific data of each area. In each Figure, the bars represent the different groups of corrective maintenance services listed in Exhibit 1, and each percentage reflects the cumulative downtime of failures in that group relative to the total downtime of the entire area.

In the analysis of the Electrical area, it is observed that the total corrective downtime over the analyzed period was 25 hours and 55 minutes, distributed among 21 corrective interventions performed, corresponding to the 7 different groups of services. Among these groups, the most critical, in terms of impact on downtime, was *Drive*, related to the drive of the Current Converter motor. This group totaled 14 hours and 55 minutes of downtime, which represents 58% of the total corrective downtime of the Electrical area, thus standing out as the main point of attention for possible improvements and preventive actions. This percentage reflects the relevance of *Drive* not only because of the frequency of occurrences, but also because of the prolonged recovery time needed to restore the operation, characterizing it as one of the priority services in the search for optimizations in the maintenance plan.

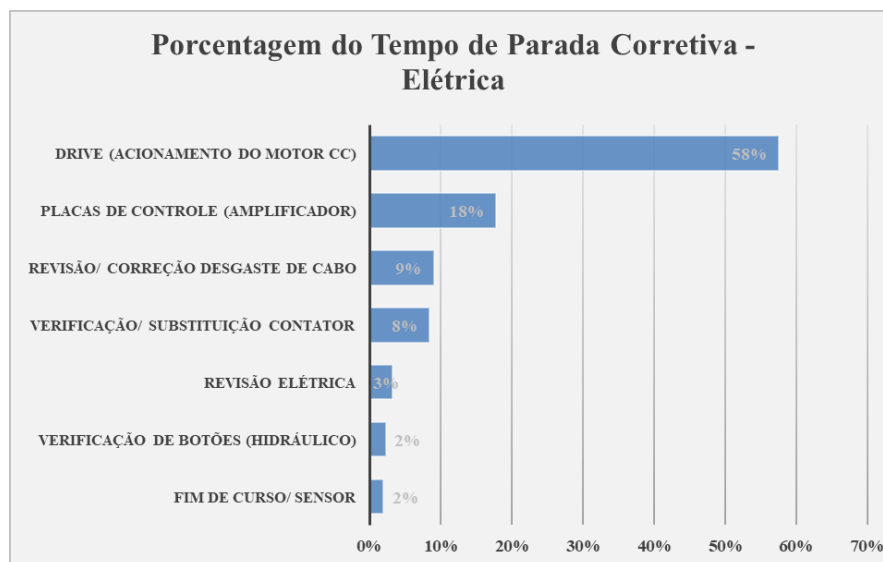
For the Mechanics area, the total corrective stop time in the period was 28 hours, encompassing 26 interventions distributed in 9 service groups. The analysis reveals that the group with the greatest impact on downtime was Elastic Pin Replacement, whose accumulated time was 9 hours and 20 minutes, representing 33% of the corrective downtime in the Mechanical area. This representativeness indicates that, although other groups also require attention, Elastic Pin Replacement is a critical activity that deserves specific planning to reduce downtime and mitigate future failures.

The comparative analysis between Figures 2 and 3 allows us to visualize, in a clear and segmented way, the differences in downtime between the Electrical and Mechanical areas, evidencing the groups that most impact operational continuity. Therefore, it can be seen that, in the Electrical area, the *Drive* group (Drive of the Current Converter motor) had the longest downtime in the period studied, representing 58% of the total and standing out as the most critical. In the Mechanics area, the Elastic Pin Replacement group had the longest

downtime, corresponding to 33% of the total. This data indicates the groups that deserve priority attention to optimize uptime and reduce disruptions caused by corrective failures.

Figure 4

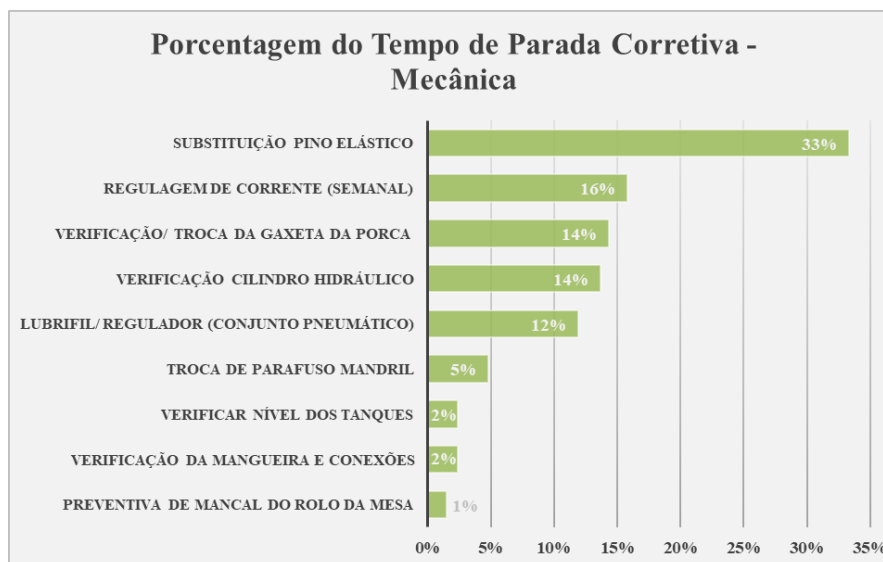
Percentage of Electrical Downtime



Source: The Author.

Figure 5

Percentage of Mechanical Downtime



Source: The Author.

4.7 IDENTIFICATION OF CRITICAL GROUPS

By relating the data on frequency and downtime, it was possible to identify the services with the greatest impact on the production process. In the case of the Electric Chain, the group related to the *Drive* (drive of the current converter motor) was chosen, as it represented 58% of the downtime of the electrical corrections, in addition to being the group with the highest number of failures (7 occurrences) in the analyzed period.

In the Mechanical area, two groups stood out: Chain Adjustment and Elastic Pin Replacement. These two groups together corresponded to 49% of the downtime of the mechanical correctives, totaling seven failures in the analyzed period. After discussion with the Production Manager, it was decided that the focus would be on Current Regulation, as it is a component of greater complexity and impact on the operation.

4.8 ROOT CAUSE ANALYSIS: ISHIKAWA DIAGRAM

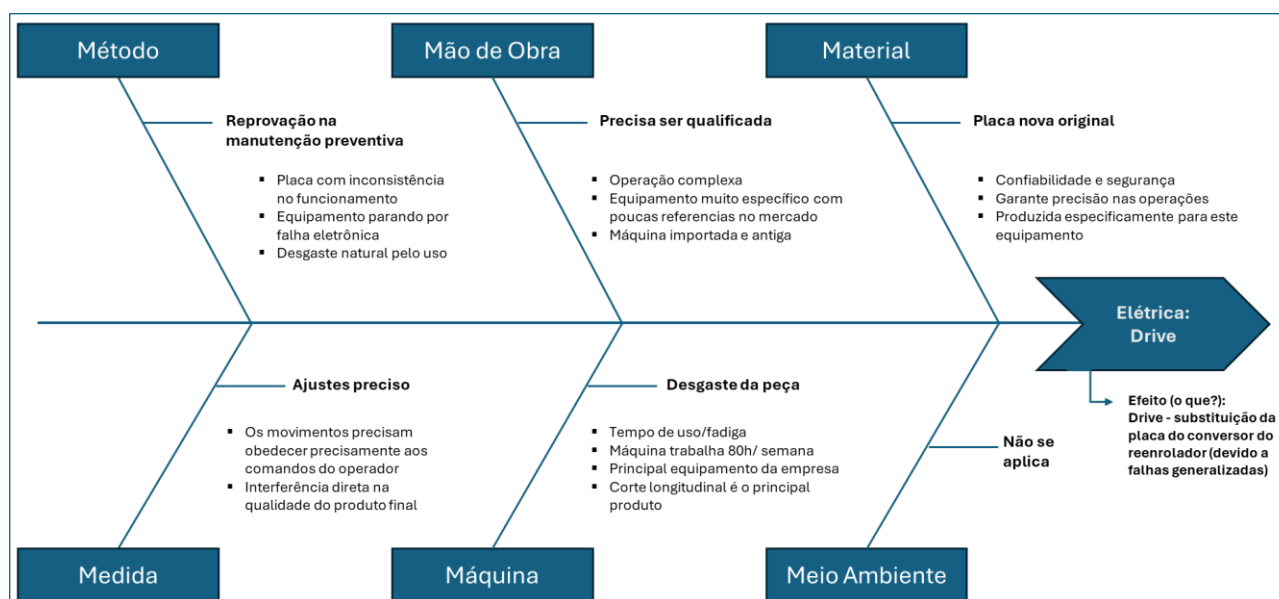
For each group of critical corrective services identified, an Ishikawa Diagram was developed, in order to analyze the main causes that led to the recurrent failures. The first diagram was prepared for the Electrical area, focusing on Drive (Drive of the Current Converter motor). The effect would be the replacement service of the rewinder converter plate. The causes identified involved factors such as wear and tear of the part, lack of effective preventive maintenance, need for qualified labor and specific material for replacement. Figure 6 shows the Ishikawa Diagram for the *drive*.

In the Mechanical area, the diagram was developed for the Chain Adjustment of the carriage transporter of the cut strips. The causes identified include deregulation of the traction system, the need for precise adjustments and technical qualification of the maintenance team. Figure 7 shows the Ishikawa Diagram for current regulation.

The Ishikawa Diagrams were prepared with the collaboration of the Production Manager, ensuring a more accurate analysis of the causes of failures. These diagrams serve as a fundamental tool for structuring a future preventive maintenance plan, as they identify not only the immediate causes, but also the underlying causes, allowing for effective corrective actions.

Figure 6

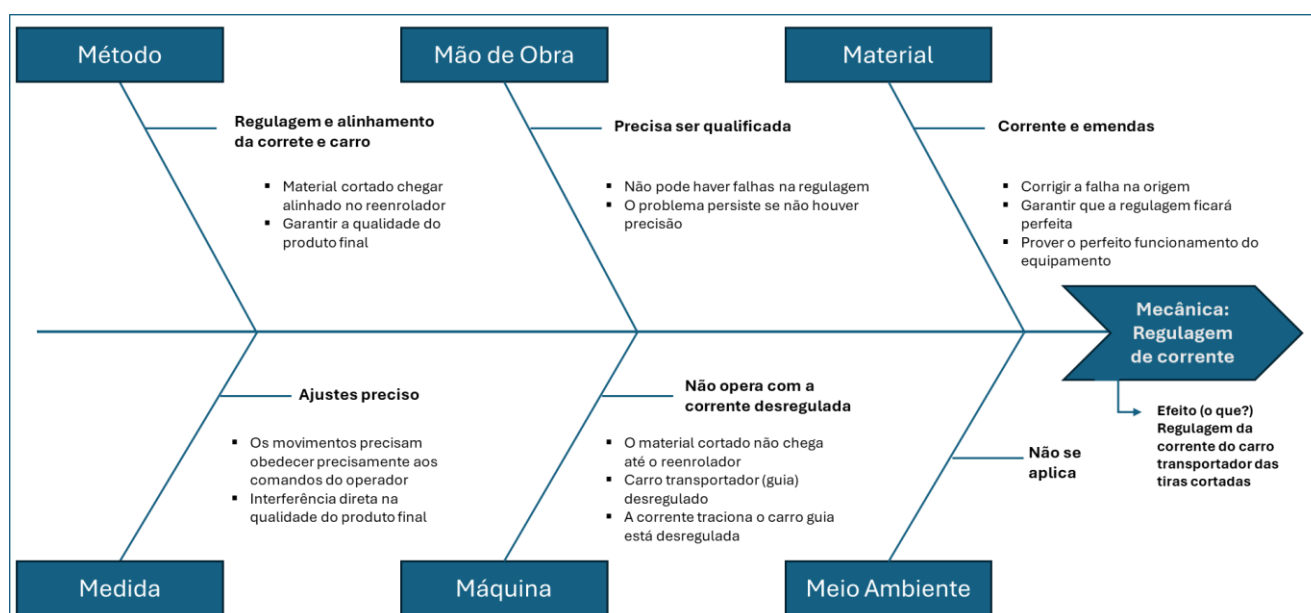
Ishikawa Electrical Diagram



Source: The Author.

Figure 7

Ishikawa Mechanics Diagram



Source: The Author.

5 FINAL THOUGHTS AND CONCLUSIONS

The present study reinforces the importance of structured maintenance planning to ensure greater assertiveness in interventions, reduction of operational failures, reduction of downtime and cost optimization. The formulation of a Preventive Maintenance Plan, based on rigorous data analysis methodologies, becomes essential for the continuity and efficiency of operations, especially when it comes to critical equipment, such as *Slitter*.

The use of quality tools, notably the Pareto Chart and the Ishikawa Chart, proved to be of great value for the identification and prioritization of critical points of failure. Such tools provided a detailed analytical approach, allowing the elaboration of an accurate diagnosis of the factors that negatively influence the performance of the equipment. Thus, the proposed solutions acquire a robust technical character and are based on empirical evidence, which favors the implementation of a more effective maintenance plan directed to the most relevant components.

Although the integral development of a Preventive Maintenance Plan was not feasible within the limited temporal scope of this study, the prototype elaborated establishes a consistent and replicable framework. The proposed methodology allows the analyses outlined here to be expanded to other areas and equipment of the company, promoting a systematic and comprehensive approach to maintenance management. Thus, it is expected that the present work will work as an initial model, enabling its later application in other contexts, in addition to contributing to the evolution of the company's internal practices.

In addition, an Excel spreadsheet was prepared for the construction of FMEA (*Failure Modes and Effects Analysis*), in order to complement the diagnosis of failures and expand the understanding of the underlying causes of corrective maintenance. Although FMEA has not been applied in the scope of this study, its inclusion offers a significant future step for the company. The systematic application of this tool will make it possible to identify potential failure modes and prioritize corrective actions in a more assertive way, with a focus on preventing failures in critical equipment. The adoption of FMEA as part of the maintenance analysis routine will facilitate the understanding of the severity and frequency of failures, promoting a process of continuous improvement and a culture oriented towards anticipating problems and mitigating risks.

The adoption of these practices highlights the need for a cultural change within the organization, with regard to maintenance management. The predominance of reactive approaches, which aim to correct failures only after they occur, proves to be ineffective in the long term, resulting in increased operating costs and longer downtime. In this sense, the transition to a preventive maintenance model, supported by quality tools, will enable more predictive and proactive management, in which potential failures can be identified and mitigated before they result in interruptions or significant damage.

In addition, the replication of the proposed methodology for the other equipment of the organization can promote an integrated and strategic management of maintenance, based on careful analysis and standardized processes. The continuity of this process depends, to a large extent, on the training of the maintenance team, which should be able to apply the

methods of analysis and investigation of failures developed throughout this study. Such training will ensure that the company can autonomously proceed in the execution and finalization of the Preventive Maintenance Plan, resulting in more assertive and reasoned decision-making.

After the implementation of the Preventive Maintenance Plan, it is recommended, for control and monitoring, the application of maintenance indicators mentioned in the theoretical framework — such as MTBF (*Mean Time Between Failures*), MTTR (*Mean Time to Repair*) and DF (Physical Availability). These indicators make it possible to evaluate the effectiveness of the process and identify possible bottlenecks in the plan. In the case of the company studied, which already has a historical basis of these indicators, it is planned, as a future work, to carry out a comparison of the results obtained in order to measure the impact of the new plan.

In conclusion, this work offers a significant contribution to the improvement of the company's maintenance management. The methodology developed proposes a clear path to reduce failures and costs, but also offers a strategic and long-term vision for asset management, which may result in greater competitiveness, operational efficiency and asset reliability.

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MEANINGFUL LEARNING IN CALCULUS TEACHING: THEORETICAL IMPLICATIONS FOR THE UNDERSTANDING OF THE CONCEPT OF DERIVATIVE

APRENDIZAGEM SIGNIFICATIVA NO ENSINO DE CÁLCULO: IMPLICAÇÕES TEÓRICAS PARA A COMPREENSÃO DO CONCEITO DE DERIVADA

APRENDIZAJE SIGNIFICATIVO EN LA ENSEÑANZA DEL CÁLCULO: IMPLICACIONES TEÓRICAS PARA LA COMPRENSIÓN DEL CONCEITO DE DERIVADA



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ABSTRACT

Considering the high failure rates in Differential and Integral Calculus courses in higher education, often associated with pedagogical practices centered on procedural memorization and repetitive exercise solving, it becomes necessary to discuss theoretical approaches that promote conceptual understanding. This article aims to discuss the foundations of the Theory of Meaningful Learning and to analyze its implications for the teaching of Differential and Integral Calculus, with emphasis on derivatives, mechanical learning, and assimilation processes. To this end, a theoretical study is conducted, characterized as a theoretical excerpt from a doctoral research developed by one of the authors, grounded mainly in the assumptions of Ausubel, Novak, and Hanesian, as well as contributions by Moreira. Thus, it is observed that meaningful learning, by prioritizing prior knowledge, hierarchical organization of concepts, and intentional pedagogical mediation, enables the overcoming of mechanistic practices and fosters conceptual understanding in Calculus teaching. The results indicate that pedagogical strategies aligned with this theory favor retention, transfer, and application of mathematical concepts in different contexts. It is concluded that the Theory of Meaningful Learning constitutes a consistent framework for re-signifying the teaching of Differential and Integral Calculus, contributing to more lasting, critical, and integrated learning in higher education.

Keywords: Meaningful Learning. Calculus Teaching. Derivatives. Mechanical Learning. Higher Education.

RESUMO

Considerando os elevados índices de reprovação no ensino de Cálculo Diferencial e Integral no ensino superior, frequentemente associados a práticas pedagógicas centradas na

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memorização de procedimentos e na resolução mecânica de exercícios, torna-se necessário discutir abordagens teóricas que favoreçam a construção de significados conceituais. Objetiva-se, neste artigo, discutir os fundamentos da Teoria da Aprendizagem Significativa e analisar suas implicações para o ensino de Cálculo Diferencial e Integral, com ênfase nos conceitos de derivadas, aprendizagem mecânica e processos de assimilação. Para tanto, procede-se a um estudo de natureza teórica, caracterizado como um recorte de uma pesquisa de doutorado desenvolvida por uma das autoras, fundamentado principalmente nos pressupostos de Ausubel, Novak e Hanesian, bem como em contribuições de Moreira. Desse modo, observa-se que a aprendizagem significativa, ao priorizar os conhecimentos prévios, a organização hierárquica dos conceitos e a mediação pedagógica intencional, possibilita superar práticas mecanicistas e promover a compreensão conceitual no ensino de Cálculo. Os resultados evidenciam que estratégias pedagógicas alinhadas a essa teoria favorecem a retenção, a transferência e a aplicação dos conceitos matemáticos em diferentes contextos. Conclui-se que a Teoria da Aprendizagem Significativa constitui um referencial consistente para ressignificar o ensino de Cálculo Diferencial e Integral, contribuindo para aprendizagens mais duradouras, críticas e integradas no ensino superior.

Palavras-chave: Aprendizagem Significativa. Ensino de Cálculo. Derivadas. Aprendizagem Mecânica. Ensino Superior.

RESUMEN

Considerando los elevados índices de reprobación en las asignaturas de Cálculo Diferencial e Integral en la educación superior, frecuentemente asociados a prácticas pedagógicas centradas en la memorización de procedimientos y en la resolución repetitiva de ejercicios, se hace necesario discutir enfoques teóricos que favorezcan la comprensión conceptual. Este artículo tiene como objetivo discutir los fundamentos de la Teoría del Aprendizaje Significativo y analizar sus implicaciones para la enseñanza del Cálculo Diferencial e Integral, con énfasis en las derivadas, el aprendizaje mecánico y los procesos de asimilación. Para ello, se desarrolla un estudio teórico, caracterizado como un recorte teórico de una investigación doctoral realizada por una de las autoras, fundamentado principalmente en los aportes de Ausubel, Novak y Hanesian, así como en las contribuciones de Moreira. De este modo, se observa que el Aprendizaje Significativo, al priorizar los conocimientos previos, la organización jerárquica de los conceptos y la mediación pedagógica intencional, permite superar prácticas mecanicistas y favorece la comprensión conceptual en la enseñanza del Cálculo. Los resultados indican que las estrategias pedagógicas alineadas con esta teoría contribuyen a la retención, transferencia y aplicación de los conceptos matemáticos en distintos contextos. Se concluye que la Teoría del Aprendizaje Significativo constituye un marco teórico consistente para resignificar la enseñanza del Cálculo Diferencial e Integral en la educación superior.

Palabras clave: Aprendizaje Significativo. Enseñanza del Cálculo. Derivadas. Aprendizaje Mecánico. Educación Superior.

1 INTRODUCTION

The learning of concepts involved in Differential and Integral Calculus, in higher education, has been marked by difficulties that result in high failure rates in this discipline. Such challenges are often associated with pedagogical practices centered on the memorization of procedures and techniques of derivation and integration, based on lists of repetitive exercises, little conceptually articulated and detached from previous knowledge and the students' reality. Intentional pedagogical mediation, combined with the conscious use of educational resources and technologies, has been pointed out as a fundamental element to promote more meaningful and contextualized learning in higher education, contributing to overcoming practices focused exclusively on the repetition of procedures (Veiga et al., 2025)

In this context, it is pertinent to discuss theoretical approaches that make it possible to understand and overcome this scenario, favoring meaningful learning and evidencing the versatility and potentiality of Differential and Integral Calculus. Among the theories that offer consistent subsidies for this reflection, the Theory of Meaningful Learning, proposed by David Ausubel, stands out, which emphasizes the importance of the learner's prior knowledge as an anchorage for new knowledge. By considering that the single most important factor for learning is what the student already knows, this perspective shifts the focus of teaching from the simple transmission of content to conceptual organization and intentional pedagogical mediation, recognizing that the assimilation of knowledge occurs in a structured and hierarchical way.

This article presents a theoretical excerpt from a doctoral research developed by one of the authors, in which the contributions of pedagogical strategies based on Meaningful Learning for the teaching of Derivatives in a Software Engineering course are investigated. The excerpt presented here aims to discuss the theoretical foundations of meaningful learning, contrasting it with mechanical learning, as well as to analyze its implications for the teaching of Differential and Integral Calculus.

Thus, the text is organized into four sections: initially, the theoretical foundation of Meaningful Learning is presented; then, the distinction between mechanical and meaningful learning in the context of the teaching of Calculus is discussed; then, the types of meaningful learning and the assimilation process are analyzed; finally, the pedagogical implications of this approach for the teaching of Differential and Integral Calculus are discussed, culminating in the final considerations.

2 MEANINGFUL LEARNING

Understanding the challenges related to the teaching of Differential and Integral

Calculus requires, initially, the explanation of the theoretical framework that supports the analyses developed in this study. In this sense, the Theory of Meaningful Learning offers consistent foundations to discuss how mathematical knowledge is organized, assimilated and mobilized by students. By prioritizing the cognitive processes involved in the construction of meaning, this theory enables a critical reading of traditional pedagogical practices and guides the proposition of didactic strategies that are more coherent with the conceptual nature of Calculus.

2.1 THEORY OF MEANINGFUL LEARNING

The Theory of Meaningful Learning, proposed by David Ausubel (1968, 1973), is part of the field of cognitivist theories and seeks to explain the way individuals acquire, organize and retain knowledge. For the author, learning occurs in a significant way when new information is related, in a substantive and non-arbitrary way, to preexisting concepts in the learner's cognitive structure, called subsumers.

Ausubelian conceptions distance themselves from mechanistic perspectives by understanding learning as a complex cognitive process, which is not limited to repetition or arbitrary memorization of contents. From this perspective, learning implies the substantive and non-literal interaction between new knowledge and that already present in the learner's cognitive structure. According to Ausubel, Novak and Hanesian (1998), this structure is organized in a hierarchical way, consisting of more general and inclusive concepts, which function as subsumers and enable the anchoring, assimilation and reorganization of more specific ideas.

In the teaching of Mathematics, and particularly in Differential and Integral Calculus, this perspective implies recognizing that the understanding of concepts such as limit, derivative and rate of variation depends on the existence of well-structured prior knowledge, such as functions, graphs and notions of variation. Thus, the role of the teacher shifts to the identification of this previous knowledge and to the organization of teaching in order to favor progressive and coherent conceptual relations. (Brim, 2024)

2.2 MACHINE LEARNING AND MEANINGFUL LEARNING IN CALCULUS TEACHING

The theory of meaningful learning has as its central focus cognitive learning, understood as the result of the organization and reorganization of information in the learner's cognitive structure. This structure is formed by a hierarchical set of concepts, ideas and propositions, which are modified as new information is incorporated in a non-arbitrary and non-literal way (Ausubel, 2003). In the context of teaching Differential and Integral Calculus,

this perspective becomes particularly relevant, since the concepts covered in this discipline require high levels of abstraction and depend heavily on previously consolidated mathematical knowledge.

As opposed to meaningful learning, Ausubel defines machine or automatic learning as that in which new information is stored in a literal, arbitrary manner and disconnected from relevant concepts already existing in the student's cognitive structure (Ausubel, 2003; Moreira, 2019). In the teaching of Calculus, typical examples of this type of learning can be observed when the student memorizes derivation rules, algebraic techniques or operational procedures without understanding the concepts that underlie them. The memorization of derivative formulas, the automatic application of the product or chain rule, as well as the mechanical resolution of integrals by substitution, without understanding the geometric, analytical meaning or real applications, configure recurrent situations of machine learning.

In addition, study practices based on "last-minute" learning, with an exclusive focus on performance in assessments, also configure rote learning. In these situations, the student can even reproduce procedures correctly in a short period of time, however, as pointed out by Ausubel (2003), it tends to be quickly forgotten, not contributing to the construction of a solid conceptual basis necessary for progression in more advanced contents of Differential and Integral Calculus.

However, rote learning should not be understood as completely dissociated from meaningful learning, but rather as one of the extremes of a *continuum* (PRAIA, 2000). In the initial process of appropriating new knowledge, especially in areas completely new to the learner, rote learning can play a provisional role. In the teaching of Calculus, for example, when coming into contact for the first time with limit notation, with the symbology of differential calculus or with certain formal definitions, it is natural for the student to initially carry out a more literal learning, until relevant concepts come into existence in their cognitive structure and can function as subsumers. (Novak, 1977; Moreira, 2019).

Meaningful learning, in turn, occurs when the concepts of Differential and Integral Calculus come to be understood in relation to existing previous knowledge, in a substantive and non-arbitrary way. A classic example is the learning of the concept of derivative, which acquires meaning when the student is able to relate it to previously constructed ideas, such as the concept of function, graphical interpretation, the average rate of change and the slope of a line. In this case, the derivative is no longer just an algebraic expression or an operational rule and is understood as the limit of the instantaneous rate of change, associated with the local behavior of the function. (Ausubel, 2003; Moreira, 2019).

Similarly, in the study of integrals, meaningful learning occurs when the student

understands the integral defined not only as the result of the application of a calculation technique, but as a measure associated with the area under the graph of a function, related to problems of accumulation, variation, and continuous sum. When these relationships are established, new knowledge begins to be anchored in relevant subsumers, promoting the assimilation and reorganization of the cognitive structure, which favors both the retention and the possibility of applying the concepts in different mathematical and interdisciplinary contexts.

In this sense, the role of the teacher in the teaching of Differential and Integral Calculus becomes central, since it is up to him to identify the students' previous knowledge, map the availability of relevant subsumers and organize teaching in order to favor the transition from rote learning to meaningful learning. As Moreira (2019) points out, learning only becomes effectively meaningful when the material is potentially meaningful and when the learner manifests a willingness to establish substantive relationships with what he or she already knows. Thus, the teaching of Calculus, based on the Ausubelian theory, requires pedagogical intentionality, conceptual planning and strategies that privilege understanding, and not only the reproduction of procedures, which raises an alert regarding the use of exercise lists as the only didactic resource, a practice that is still recurrent among teachers of this discipline.

2.3 TYPES OF MEANINGFUL LEARNING AND THE PROCESS OF ASSIMILATION

Within the scope of the Theory of Meaningful Learning, Ausubel, Novak and Hanesian (1980, 1983) establish important distinctions between the types of meaningful learning and the cognitive processes involved in the acquisition of knowledge, which allows us to understand, in greater depth, how mathematical concepts are structured and reorganized in the mind of the learner. These distinctions are particularly relevant in the teaching of Differential and Integral Calculus, an area in which highly abstract concepts require well-established cognitive relationships.

Ausubel (2003) defines three types of meaningful learning: representational, conceptual, and propositional. Representational learning consists of attributing meanings to symbols, being the most elementary form of meaningful learning. Although it comes close to memorization, it is not arbitrary, as the symbol comes to represent an object or idea with psychological meaning for the learner. In the context of Calculus, one can consider, for example, the initial familiarization with symbols such as $\int$, $\lim$, or $f'(x)$. These symbols, in isolation, do not constitute concepts, but acquire meaning as the student understands what they represent in the mathematical field, establishing a basis for later learning. $f(x) \lim f'(x)$

Concept learning, on the other hand, represents a more elaborate level and involves

understanding regularities, properties, and characteristics common to a class of objects or phenomena. In the teaching of Differential and Integral Calculus, this learning is manifested, for example, in the construction of the concept of function, which starts to act as a subsumer for the understanding of ideas such as limit, continuity, rate of variation and derivative. According to Ausubel (2003), the formation of concepts occurs through processes of progressive differentiation and generalization, in which the student formulates hypotheses, tests properties and cognitively reorganizes the meanings attributed to mathematical objects.

Propositional learning involves the understanding of ideas expressed through propositions, going beyond the simple sum of the meanings of the words or symbols involved. In this type of learning, the focus is on the relationship between concepts. A classic example in Calculus is the formal definition of derivative as the limit of the average rate of change. In order for this proposition to be learned meaningfully, the student needs to understand the concepts of function, variation, limit, and incremental ratio, establishing a non-arbitrary and non-literal relationship between them. According to Moreira (2019), propositional learning is central to higher education, as it is at this level that laws, theorems, and mathematical definitions are structured.

Regardless of the type, Ausubel (2003) points out that meaningful learning corresponds only to the first phase of a broader cognitive process, called the assimilation process. This process explains how potentially significant new ideas interact with relevant concepts already existing in the cognitive structure, called subsumers. Assimilation occurs when new knowledge is anchored in a subsumption, modifying it and making it more inclusive and differentiated.

In the teaching of Differential and Integral Calculus, this process can be clearly observed when the concept of limit, previously established, acts as a subsumer for learning the definition of derivative. Initially, the new information (definition of derivative) is anchored to the concept of limit, producing an emergent meaning that results from the interaction between both. This interactional product, according to Ausubel (2003), represents a fundamental stage of significant learning, as both the new concept and the subsumer undergo cognitive modifications.

With the advancement of learning, what Ausubel calls obliterating assimilation occurs, a natural process in which the specific details of the new knowledge become progressively less dissociable from the subsumer that gave it meaning. In the example of derivatives, as the student starts to use operative rules for the calculation of derivatives, the explicit use of the definition via limit tends to be abandoned. However, this does not characterize a learning loss, but a cognitive reorganization that favors the retention of more general and functional

ideas. According to Ausubel (2003), forgetting, in this context, is not total, but residual, allowing for rapid relearning when necessary.

In addition to the process of assimilation, Ausubel distinguishes three forms of meaningful learning: subordinate, superordinate, and combinatorial. Subordinate meaningful learning is the most frequent and occurs when new information is anchored in more general concepts that already exist. In calculus, the learning of derivatives of specific functions, such as exponentials or logarithmics, can be understood as derivative subordinate, as long as the general concept of derivative is well established. Correlative subordinate learning, on the other hand, occurs when the new concept expands or modifies the subsumption, as in the case of partial derivatives, which redefine and expand the previously constructed concept of derivative.

Superordinate meaningful learning manifests itself when a broader concept is constructed from more specific ideas already existing in the cognitive structure. In the context of Calculus, this can occur when the student understands that concepts such as rate of change, slope of the tangent line, growth and decrease of functions are subordinated to a more general concept of derivative. According to Moreira (2006), the cognitive structure is dynamic, allowing alternations between subordinate and superordinate learning throughout the educational process.

Finally, combinatorial meaningful learning occurs when new knowledge does not subordinate itself or pre-existing concepts, but relates to them at the same hierarchical level. Although more complex and difficult to learn initially, this form of learning is common in advanced Calculus content, such as the geometric and analytical interpretation of different integration techniques, which require the simultaneous articulation of multiple previously constructed concepts.

Thus, the types and forms of meaningful learning, articulated with the assimilation process, allow us to understand that the teaching of Differential and Integral Calculus demands more than the presentation of algorithmic procedures. It requires, above all, the conceptual organization of the contents, the identification of relevant subsumers and the creation of conditions for the student to establish substantive cognitive relationships, favoring the construction of lasting meanings.

3 IMPLICATIONS FOR THE TEACHING OF DIFFERENTIAL AND INTEGRAL CALCULUS

Considering the assumptions of the Theory of Meaningful Learning, the teaching of Differential and Integral Calculus cannot be understood as a process centered exclusively on the transmission of formulas and techniques. Knowing that in the Ausubelian perspective, the

learning of new knowledge occurs in a significant way when it relates, in a non-arbitrary and non-literal way, with relevant concepts already existing in the learner's cognitive structure, in the context of Calculus, this implies recognizing that concepts such as functions, limits and variation are indispensable subsumers for the understanding of more complex ideas, as derivatives and integrals. (Brim, 2024)

From this perspective, it becomes evident that pedagogical practices based predominantly on extensive lists of exercises, focused on the mechanical repetition of procedures, tend to favor machine learning. Although such practices can play a specific role in technical consolidation, they are insufficient when assumed as a central teaching strategy. As discussed by Ausubel (2003) and Moreira (2019), the reproduction of algorithms, dissociated from conceptual understanding, does not guarantee the construction of meanings and compromises the retention and transfer of knowledge to new situations.

In the teaching of Differential and Integral Calculus, the pedagogical intentionality is manifested, above all, in the conceptual organization of the contents and in the way they are presented to the students. Ausubel (2003) highlights progressive differentiation as an instructional principle, arguing that the most general and inclusive concepts should be introduced initially, being progressively differentiated in terms of specificity. Applied to calculus, this principle suggests that the approach to derivatives should start from broad ideas, such as rate of change and global behavior of functions, before moving on to formal definitions and specific calculus techniques.

In this sense, the previous organizers play a fundamental role in the process of teaching and learning Calculus. According to Ausubel, Novak and Hanesian (1998), these introductory materials work as cognitive bridges between the student's previous knowledge and the new content to be learned. Discussions on function graphs, growth and degrowth analysis, as well as the use of technological resources, such as graphic visualization software, can act as preliminary organizers for the study of derivatives, favoring the construction of meanings before mathematical formalization.

In addition, the implications of meaningful learning for the teaching of Calculus highlight the centrality of the teacher's role. According to Moreira (2019), it is up to the teacher to identify the subsumers available in the students' cognitive structure, diagnose conceptual gaps and plan strategies that favor the interaction between previous knowledge and new content. In the case of derivatives and integrals, this implies recognizing recurrent difficulties, such as the understanding of limits or the geometric interpretation of concepts, and proposing didactic situations that promote the integrative reconciliation of these meanings.

Another relevant aspect refers to the understanding of the process of obliterating

assimilation in the teaching of Calculus. According to Ausubel (2003), forgetting should not be understood as a failure of the educational process, but as a natural phenomenon of meaningful learning. In the context of derivatives, for example, it is expected that the student will no longer resort to the formal definition via limit to use consolidated operative rules. This process indicates that the concept has been assimilated and integrated into the cognitive structure, becoming functional for subsequent learning.

Thus, the implications of the Theory of Meaningful Learning for the teaching of Differential and Integral Calculus point to the need for pedagogical practices that value conceptual understanding, hierarchical organization of contents, and intentional teacher mediation. Teaching Calculus, in this perspective, means promoting conditions for the student to understand the meaning of mathematical concepts, establish relationships between them and use them critically and consciously, overcoming a fragmented and mechanistic view of mathematical knowledge.

4 FINAL CONSIDERATIONS

The discussion developed in this article shows that the Theory of Meaningful Learning constitutes a consistent theoretical framework to rethink the teaching of Differential and Integral Calculus, especially with regard to overcoming practices collected from mechanical learning and the promotion of conceptual, lasting and meaningful learning. By emphasizing the interaction between new knowledge and the student's previous cognitive structure, this approach highlights the role of intentional pedagogical mediation in the organization of teaching.

The distinction between mechanical and meaningful learning, as well as the understanding of the types of meaningful learning and the assimilation process, allow the teacher to critically analyze their practices and plan interventions that are more coherent with the formative objectives of higher education. In the context of Calculus, this implies valuing strategies that favor the conceptual understanding, visualization and contextualization of the contents and recognition of their potentiality and versatility.

Finally, by presenting a theoretical excerpt from a doctoral research, this work reinforces the relevance of Meaningful Learning as a foundation for investigations and pedagogical practices in the teaching of Mathematics. It is hoped that the reflections proposed here will contribute to the development of more effective didactic approaches and to the construction of truly meaningful mathematical learning.

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PEDAGOGICAL PRACTICES IN EARLY CHILDHOOD EDUCATION: REFLECTIONS ON TEACHER MEDIATION AND EDUCATIONAL POLICIES

PRÁTICAS PEDAGÓGICAS NA EDUCAÇÃO INFANTIL: REFLEXÕES A PARTIR DA MEDIÇÃO DOCENTE E DAS POLÍTICAS EDUCACIONAIS

REFLECTIONS ON TEACHER MEDIATION AND EDUCATIONAL POLICIES



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ABSTRACT

Early Childhood Education, as the first stage of Basic Education, plays a fundamental role in children's integral development, requiring pedagogical practices that are theoretically grounded and articulated with educational policies. In this context, teacher mediation is a central element in the organization of learning processes, the promotion of meaningful interactions, and the appreciation of children's multiple languages. This article aims to analyze pedagogical practices in Early Childhood Education based on reflections on teacher mediation and the influence of educational policies on the organization of pedagogical work. This is a theoretical-analytical study, grounded in academic literature in the field and in normative documents that guide Early Childhood Education in Brazil, such as the National Curriculum Guidelines for Early Childhood Education and the National Common Curricular Base. The reflections indicate that pedagogical practices are not isolated actions, but intentional and contextualized processes shaped by conceptions of childhood, learning, and teaching. It is concluded that the articulation between pedagogical practices, teacher mediation, and educational policies contributes to the qualification of pedagogical work in Early Childhood Education and to the guarantee of children's right to quality education.

Keywords: Early Childhood Education. Pedagogical Practices. Preacher Mediation. Educational Policies.

RESUMO

A Educação Infantil, enquanto primeira etapa da Educação Básica, desempenha papel fundamental no desenvolvimento integral das crianças, exigindo práticas pedagógicas fundamentadas teoricamente e articuladas às políticas educacionais. Nesse contexto, a mediação docente configura-se como elemento central na organização dos processos de

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aprendizagem, na promoção de interações significativas e na valorização das múltiplas linguagens infantis. Este artigo tem como objetivo analisar as práticas pedagógicas na Educação Infantil, a partir das reflexões sobre a mediação docente e a influência das políticas educacionais na organização do trabalho pedagógico. Trata-se de um estudo de natureza teórico-analítica, fundamentado em produções acadêmicas da área e em documentos normativos que orientam a Educação Infantil no Brasil, como as Diretrizes Curriculares Nacionais para a Educação Infantil e a Base Nacional Comum Curricular. As reflexões evidenciam que as práticas pedagógicas não se constituem como ações isoladas, mas como processos intencionais e contextualizados, atravessados por concepções de infância, aprendizagem e docência. Conclui-se que a articulação entre práticas pedagógicas, mediação docente e políticas educacionais contribui para a qualificação do trabalho pedagógico na Educação Infantil e para a garantia dos direitos das crianças à educação de qualidade.

Palavras-chave: Educação Infantil. Práticas Pedagógicas. Mediação Docente. Políticas Educacionais.

RESUMEN

La Educación Infantil, como primera etapa de la Educación Básica, desempeña un papel fundamental en el desarrollo integral de los niños, lo que exige prácticas pedagógicas fundamentadas teóricamente y articuladas a las políticas educativas. En este contexto, la mediación docente se configura como un elemento central en la organización de los procesos de aprendizaje, en la promoción de interacciones significativas y en la valorización de los múltiples lenguajes infantiles. Este artículo tiene como objetivo analizar las prácticas pedagógicas en la Educación Infantil a partir de reflexiones sobre la mediación docente y la influencia de las políticas educativas en la organización del trabajo pedagógico. Se trata de un estudio de naturaleza teórico-analítica, fundamentado en producciones académicas del área y en documentos normativos que orientan la Educación Infantil en Brasil, como las Directrices Curriculares Nacionales para la Educación Infantil y la Base Nacional Común Curricular. Las reflexiones evidencian que las prácticas pedagógicas no se constituyen como acciones aisladas, sino como procesos intencionales y contextualizados, atravesados por concepciones de infancia, aprendizaje y docencia. Se concluye que la articulación entre prácticas pedagógicas, mediación docente y políticas educativas contribuye a la cualificación del trabajo pedagógico en la Educación Infantil y a la garantía del derecho de los niños a una educación de calidad.

Palabras clave: Education Infante. Practices Pedagogical. Mediation Docent. Political Educative.

1 INTRODUCTION

Early Childhood Education is the first stage of Basic Education and plays a fundamental role in the integral development of children, comprising cognitive, affective, social and cultural dimensions. In this context, pedagogical practices assume centrality, since they organize the experiences lived by children in educational spaces and express conceptions of childhood, education and learning that guide the teaching work.

Pedagogical practices in Early Childhood Education are not configured as isolated or merely technical actions, but as intentional processes, historically situated and permeated by values, knowledge and political choices. Thus, teacher mediation emerges as an essential element in the construction of educational environments that promote meaningful interactions, sensitive listening to children and the valorization of play as a structuring axis of the curriculum, as guided by normative documents and theoretical productions in the area.

Within the scope of Brazilian educational policies, legal frameworks such as the National Curriculum Guidelines for Early Childhood Education and the National Common Curriculum Base have sought to guide the organization of pedagogical practices, reaffirming the right of children to quality education and the role of the teacher as a mediator of learning and development processes. However, the materialization of these policies in the daily life of educational institutions involves challenges and tensions, requiring critical reflections on their implementation and their impacts on teaching practices.

In view of this scenario, it is relevant to analyze how pedagogical practices in Early Childhood Education are constituted from teacher mediation and educational policy guidelines, considering the possibilities and limits present in the school context. Understanding this articulation contributes to the strengthening of theoretically grounded pedagogical practices, capable of ensuring the protagonism of children and qualifying the teaching work.

In this sense, this article aims to analyze pedagogical practices in Early Childhood Education, based on reflections on teacher mediation and the influence of educational policies in the organization of pedagogical work, seeking to contribute to the academic debate and to the improvement of practices in the field of Early Childhood Education.

2 PEDAGOGICAL PRACTICES IN EARLY CHILDHOOD EDUCATION

Pedagogical practices in Early Childhood Education constitute the structuring axis of educational work, as they organize the experiences lived by children in institutional spaces and reflect conceptions of childhood, learning and development. Unlike a reductionist understanding, which associates pedagogical practice with specific activities or technical

procedures, it is understood that such practices are social, cultural and political constructions, crossed by educational intentions and specific historical contexts.

From this perspective, pedagogical practices should be understood as planned and reflected actions, which articulate times, spaces, materials, interactions and languages, with the objective of promoting the integral development of children. Normative documents that guide Early Childhood Education in Brazil, such as the National Curriculum Guidelines for Early Childhood Education, emphasize that the curriculum should be organized based on interactions and games, recognizing children as historical subjects, with rights and producers of culture.

By considering children as protagonists of the educational process, pedagogical practices begin to value listening, attentive observation and respect for different ways of being, acting and learning. This understanding shifts the focus from practices centered on the anticipation of school content to proposals that favor exploration, curiosity, imagination and the construction of meanings, in line with the specificities of childhood.

The National Common Curriculum Base reinforces this conception by highlighting the learning and development rights of children and by guiding the organization of pedagogical practices based on fields of experience, which enable the integration between different types of knowledge and languages. In this context, pedagogical practices cease to be fragmented and begin to assume an integrative character, respecting the rhythms and interests of children and promoting meaningful experiences in everyday education.

However, the implementation of pedagogical practices consistent with these guidelines demands a continuous process of reflection and teacher training. Practices are not automatically constructed from legal prescriptions, but require interpretations, choices and adaptations on the part of teachers, considering the concrete conditions of educational institutions and the sociocultural contexts in which they are inserted.

Thus, discussing pedagogical practices in Early Childhood Education implies recognizing their complexity and their centrality in guaranteeing children's rights to quality education. By being theoretically grounded and articulated with educational policies, such practices contribute to the construction of more democratic, inclusive and sensitive educational environments for the multiple childhoods present in contemporary society.

2.1 TEACHER MEDIATION AND LEARNING PROCESSES IN EARLY CHILDHOOD EDUCATION

Teacher mediation in Early Childhood Education is a central element for the organization of pedagogical practices and for the promotion of children's learning and development processes. In this stage of Basic Education, the role of the teacher goes beyond the function of content transmitter, assuming the responsibility of creating educational contexts that favor meaningful interactions, sensitive experiences and the construction of meanings by children.

Teacher mediation is understood as an intentional and reflective process, in which the teacher acts as an interlocutor between children, knowledge and the social and cultural world. This mediation is expressed in pedagogical choices, in the organization of times and spaces, in the selection of materials and in the conduction of interactions, enabling children to explore, question, experiment and attribute meanings to their experiences in everyday education.

In Early Childhood Education, learning processes are intrinsically related to interactions and games, recognized as structuring axes of pedagogical work. In this sense, teacher mediation becomes fundamental to enhance these experiences, by ensuring that educational proposals respect the interests, needs and rhythms of children, without losing sight of the pedagogical intentionality that guides the curriculum.

2.2 TEACHER MEDIATION, INTERACTIONS AND MULTIPLE LANGUAGES

Teacher mediation in Early Childhood Education is manifested, in a significant way, in the interactions established between children, adults and the educational environment. These interactions are privileged learning spaces, in which children build knowledge, express emotions, elaborate hypotheses and develop their multiple languages. In this context, the teacher's role as a mediator is fundamental to enhance the experiences lived, expanding the possibilities of learning.

The multiple languages — body, oral, visual, sound and symbolic — are configured as legitimate forms of expression and communication for children. Teacher mediation, by recognizing and valuing these languages, contributes to the construction of pedagogical practices that are more inclusive and sensitive to the specificities of childhood. By carefully observing the children's manifestations, the teacher can plan proposals that dialogue with their interests and needs, promoting meaningful learning.

Pedagogical listening, in this sense, assumes a central role in teacher mediation. Listening to children implies recognizing their voices, their gestures and their productions as constitutive elements of the educational process. This listening enables the teacher to

interpret the experiences lived by the children and reorganize the pedagogical planning in a flexible and contextualized way, strengthening the educational intentionality of the practices.

In addition, teacher mediation in interactions favors the construction of relationships of trust, respect and cooperation in the educational environment. By promoting situations of dialogue, negotiation and conflict resolution, the teacher contributes to the social and emotional development of children, fundamental aspects for the learning processes in Early Childhood Education. Thus, teacher mediation is not limited to the monitoring of activities, but involves the creation of conditions for children to learn in the relationship with others and with the world.

The teacher's role as a mediator implies a posture of attentive listening and continuous observation, allowing the identification of the learning possibilities that emerge from the situations experienced by the children. By mediating, the teacher does not anticipate answers or conduct the processes in a directive way, but creates conditions for children to appropriate knowledge through interaction with peers, adults and different elements of the educational environment.

In addition, teacher mediation contributes to the articulation between children's experiences and the fields of experiences proposed by the National Common Curricular Base, favoring an integrated approach to the curriculum. By promoting situations that involve language, movement, expression, thought and coexistence, the teacher expands the possibilities of learning and strengthens the integral development of children.

Thus, teacher mediation in Early Childhood Education is configured as a pedagogical practice that requires continuous training, critical reflection and sensitivity to understand the multiple dimensions of child development. By assuming this role, the teacher contributes to the construction of educational environments that value the protagonism of children and ensure the right to learning in a democratic and inclusive perspective.

2.3 EDUCATIONAL POLICIES AND PEDAGOGICAL PRACTICES IN EARLY CHILDHOOD EDUCATION

Educational policies play a fundamental role in the organization of pedagogical practices in Early Childhood Education, by establishing principles, guidelines and guidelines that aim to guarantee children's right to quality education. In the Brazilian context, normative documents such as the National Curriculum Guidelines for Early Childhood Education and the National Common Curriculum Base are configured as regulatory frameworks that guide the pedagogical work and teaching performance in this stage of Basic Education.

These documents reaffirm the conception of the child as a subject of rights, historically

and socially situated, and highlight the centrality of interactions and games as structuring axes of the Early Childhood Education curriculum. By guiding the organization of pedagogical practices based on the fields of experience, educational policies seek to promote an integrated approach to the curriculum, respecting the different rhythms, interests and ways of learning of children.

However, the relationship between educational policies and pedagogical practices is not established in a linear or automatic way. The implementation of legal guidelines in the daily life of educational institutions involves processes of interpretation, negotiation and resignification by teachers and pedagogical teams. In this sense, pedagogical practices result from the articulation between what is prescribed by public policies and the concrete working conditions, the sociocultural contexts and the pedagogical conceptions that guide the teaching action.

Educational policies also attribute centrality to teacher training, recognizing the teacher as a fundamental agent in the effectiveness of curricular proposals. Initial and continuing education is, therefore, a strategic element for the qualification of pedagogical practices, since it enables teachers to critically appropriate the theoretical and normative references that sustain the educational work in Early Childhood Education.

However, challenges persist in the process of implementing educational policies, especially with regard to ensuring adequate working conditions, professional appreciation and pedagogical monitoring. Such challenges can directly impact the quality of pedagogical practices, highlighting the need for public policies that consider the specificities of Early Childhood Education and promote the strengthening of teaching work.

2.4 TENSIONS BETWEEN PRESCRIBED POLICIES AND PEDAGOGICAL PRACTICES IN EVERYDAY SCHOOL LIFE

Although educational policies establish important guidelines for the organization of pedagogical practices in Early Childhood Education, their implementation in daily school life reveals tensions and challenges that deserve to be problematized. The distance between what is prescribed in normative documents and what is concretized in educational institutions highlights the complexity of the process of implementing public policies.

The guidelines present in the National Common Curriculum Base and in the National Curriculum Guidelines for Early Childhood Education presuppose material, structural and formative conditions that are not always assured in educational contexts. The absence of adequate resources, the overload of teaching work and the fragility of continuing education processes can limit the implementation of pedagogical practices consistent with the principles

established by educational policies.

In this scenario, teachers assume a central role in the resignification of policies in the context of practice. By interpreting the normative guidelines in the light of their experiences and institutional realities, teachers produce pedagogical practices that dialogue with public policies, but also reveal adaptations, resistances and reinventions. This movement shows that educational policies are not applied mechanically, but mediated by the teaching action.

The understanding of these tensions contributes to a critical analysis of educational policies, avoiding simplified readings that make the teacher exclusively responsible for the challenges faced in Early Childhood Education. Recognizing the structural and institutional limits allows us to problematize the need for more articulated public policies, which consider the real working conditions and promote the strengthening of pedagogical practices.

Thus, the relationship between educational policies and pedagogical practices should be understood as a dynamic process, in which teacher mediation plays a fundamental role in the translation of normative guidelines into meaningful educational experiences. By considering these tensions, the understanding of the challenges and possibilities of Early Childhood Education in the context of contemporary public policies is expanded.

Thus, reflecting on educational policies and their relationship with pedagogical practices in Early Childhood Education implies recognizing both their advances and their limitations. By being understood in a critical and contextualized way, educational policies can contribute to the construction of more coherent, inclusive pedagogical practices committed to the integral development of children.

2.5 IMPLICATIONS OF PEDAGOGICAL PRACTICES AND TEACHER MEDIATION FOR TEACHER TRAINING

The analysis of pedagogical practices in Early Childhood Education, articulated with teacher mediation and educational policies, evidences the centrality of teacher training as a structuring element for the effectiveness of an education committed to the integral development of children. Pedagogical practices are not only constituted from normative prescriptions, but are produced in the school routine, demanding from the teacher critical capacity, pedagogical sensitivity and theoretical mastery.

In this sense, the initial and continuing training of Early Childhood Education teachers plays a fundamental role in the construction of pedagogical practices consistent with the principles established by educational policies. An education that favors reflection on practice, the study of theoretical references of childhood and dialogue with the experiences lived in the school context contributes to the teacher's understanding of his role as a mediator of the

learning and development processes of children.

Teacher mediation, as an intentional practice, requires the teacher to be able to observe, listen and interpret the multiple languages of children, transforming these observations into meaningful pedagogical proposals. To this end, it is essential that teacher training promotes spaces for study and reflection that enable teachers to reframe their practices and overcome reductionist conceptions of teaching, still present in some contexts of Early Childhood Education.

In addition, educational policies have emphasized the importance of continuing education as a strategy for the qualification of teaching work. However, the effectiveness of these policies depends on the way they are implemented in the education systems, considering working conditions, the time allocated to training and professional development. The absence of institutional spaces for training can limit the critical appropriation of normative guidelines and compromise the quality of pedagogical practices.

Thus, reflecting on the implications of pedagogical practices and teacher mediation for teacher training implies recognizing the need for public policies that guarantee continuous training processes, contextualized and articulated with the real demands of educational institutions. By investing in teacher training, the possibility of strengthening pedagogical practices that are more conscious, reflective and aligned with children's rights to quality education is created.

3 METHODOLOGY

This article is characterized as a study of a theoretical-analytical nature, based on the analysis of academic productions and normative documents that guide Early Childhood Education in the Brazilian context. The option for this methodological approach is justified by the intention of discussing conceptions, principles and guidelines that sustain pedagogical practices, teacher mediation and educational policies, without conducting empirical field research.

The methodological path involved a survey and analysis of reference works in the area of Early Childhood Education, with emphasis on studies that address pedagogical practices, teacher mediation, teacher training and educational policies. Academic productions published in recent years were prioritized, in order to ensure the theoretical updating and relevance of the discussions, without disregarding classic authors who underpin the educational field.

In addition, legal and normative documents were analyzed, such as the National Curriculum Guidelines for Early Childhood Education and the National Common Curricular

Base, as it is understood that such documents exert a direct influence on the organization of pedagogical work in Early Childhood Education institutions. The analysis of these documents allowed us to understand the principles and guidelines that underlie pedagogical practices and the role of teacher mediation in the educational routine.

The analysis of the theoretical and documentary material occurred in an interpretative and critical way, seeking to articulate the theoretical references with the orientations of educational policies. This movement made it possible to identify convergences, tensions and challenges related to the implementation of pedagogical practices in Early Childhood Education, as well as to reflect on their implications for teacher training and for the guarantee of children's rights to quality education.

4 RESULTS AND DISCUSSIONS

The theoretical and documentary analysis carried out in this study shows that pedagogical practices in Early Childhood Education have been progressively resignified from conceptions that recognize the child as a historical, social and rights subject. The references analyzed point to the overcoming of welfare or schooled models, highlighting the centrality of interactions, games and multiple languages in the educational process.

The results of the analysis indicate that the pedagogical practices guided by the National Curriculum Guidelines for Early Childhood Education and by the National Common Curriculum Base have contributed to broaden the understanding of the role of the Early Childhood Education school as a space for meaningful experiences, in which care and education are inseparably constituted. Such documents reinforce the need for practices that respect the times, rhythms and singularities of children, promoting integral development in their physical, emotional, social and cognitive aspects.

With regard to teacher mediation, it is observed that the teacher assumes a fundamental role in the organization of the educational environment and in the proposition of experiences that favor learning and child development. The literature analyzed shows that mediation is not limited to the transmission of content, but involves sensitive listening, attentive observation and pedagogical intentionality, allowing children to build knowledge from their own experiences and interactions.

Another relevant result refers to the relationship between educational policies and pedagogical practices. Although the normative documents present significant conceptual advances, the analysis points out challenges in the implementation of these guidelines in the daily life of Early Childhood Education institutions. Among these challenges, the conditions

of teaching work, the organization of pedagogical time and space, and the gaps in the processes of initial and continuing training of teachers stand out.

The discussion of the results shows that the quality of pedagogical practices is directly related to the investment in public policies that ensure not only consistent curricular guidelines, but also concrete conditions for their implementation. In this sense, teacher training emerges as a central element for the consolidation of pedagogical practices consistent with contemporary conceptions of childhood and learning.

Finally, the results of this study reinforce the understanding that pedagogical practices in Early Childhood Education must be continuously reflected and resignified, considering the specificities of educational contexts and contemporary social demands. The articulation between theory, practice and educational policy is indispensable for the construction of an Early Childhood Education committed to guaranteeing children's rights and promoting meaningful educational experiences.

5 CONCLUSION

The reflections developed throughout this article show that pedagogical practices in Early Childhood Education play a central role in guaranteeing children's right to quality education, configuring themselves as intentional, contextualized actions deeply related to the conceptions of childhood, learning and development. By understanding such practices as social and cultural constructions, it becomes possible to overcome reductionist perspectives that limit Early Childhood Education to the anticipation of school contents.

The analysis of teacher mediation allowed us to highlight the teacher as a fundamental agent in the organization of learning processes, acting as a mediator of interactions, multiple languages and experiences lived by children in the educational routine. This mediation, by being based on pedagogical listening, attentive observation and the appreciation of interactions and games, contributes to the construction of more democratic, inclusive educational environments that are sensitive to the specificities of childhood.

With regard to educational policies, it was observed that normative documents such as the National Curriculum Guidelines for Early Childhood Education and the National Common Curriculum Base present significant advances in recognizing children as subjects of rights and guiding pedagogical practices based on interactions and experiences. However, the implementation of these policies in the context of educational institutions reveals challenges and tensions, especially when adequate working conditions, teacher training and pedagogical monitoring are not ensured.

In view of this scenario, it becomes evident that the qualification of pedagogical practices in Early Childhood Education depends, in an inseparable way, on the strengthening of the initial and continuing training of teachers. Investing in training processes that promote critical reflection on practice, the dialogue between theory and school daily life, and the conscious appropriation of educational policies is a fundamental strategy for the consolidation of an Early Childhood Education committed to the integral development of children.

Finally, this article seeks to contribute to the academic debate by highlighting the importance of pedagogical practices theoretically grounded and mediated by educational policies sensitive to the realities of educational contexts. As perspectives for future research, the need for investigations that deepen the relationship between teacher training, pedagogical mediation and implementation of public policies in Early Childhood Education is pointed out, expanding knowledge about the challenges and possibilities of this field of action.

FINAL NOTE

Declaration of use of Artificial Intelligence tools: Generative artificial intelligence tools were used to support textual organization, linguistic revision and adaptation to academic standards. The intellectual authorship, the theoretical analysis and the conclusions presented are the sole responsibility of the author.

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ORLAFOG – AN EXPERIENCE IN TEACHING, RESEARCH AND OUTREACH

ORLAFOG – UMA EXPERIÊNCIA DE ENSINO, PESQUISA E EXTENSÃO

ORLAFOG – UNA EXPERIENCIA EN DOCENCIA, INVESTIGACIÓN Y EXTENSIÓN



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ABSTRACT

The use of educational rockets as a pedagogical resource stands out as an effective strategy for scientific dissemination and for stimulating logical reasoning at different educational levels. This work shows how a project was able to spark the interest of students and teachers and generate learning from the construction and launch of experimental educational rockets, an activity that requires the application of the scientific method, aerodynamic and stability calculations, the choice of appropriate materials, and the organization of teamwork. The proposal brings young people closer to science in a playful and practical way, addressing the growing interest in the subject and the importance of integrating school, community, and scientific culture. The development of the activities took place through the offering of workshops, reception of students, and participation in dissemination events, with emphasis on the two editions of ORLAFOG (Rocket Olympics of the Lakes Region), organized by the IFRockets team, and made possible by approval in a CNPq call for proposals. The results obtained demonstrated a strong engagement of the participants, reflected in the formation of new rocket teams, increased participation in competitions, and the intensification of scientific reasoning in the classroom. Furthermore, there was significant participation from the school community of different institutions, including families, reinforcing the project's potential as a bridge between science and society. Thus, the experience proved that the use of didactic rockets goes beyond mere entertainment, establishing itself as a teaching tool capable of sparking vocations, consolidating interdisciplinary practices, and contributing to the dissemination of science.

Keywords: Experimental Rockets. Physics Teaching. University Extension. ORLAFOG.

RESUMO

A utilização de foguetes didáticos como recurso pedagógico se destaca como estratégia eficaz para a divulgação científica e para o estímulo ao raciocínio lógico em diferentes níveis de ensino. Este trabalho mostra como um projeto foi capaz de despertar o interesse dos

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estudantes e professores e gerar aprendizado a partir da construção lançamento de foguetes didáticos experimentais, atividade que exige a aplicação do método científico, cálculos de aerodinâmica e estabilidade, escolha de materiais adequados e organização do trabalho em equipe. A proposta aproxima os jovens da ciência de forma lúdica e prática, atendendo ao interesse crescente pela temática e à importância de integrar escola, comunidade e cultura científica. O desenvolvimento das atividades ocorreu por meio de oferta de oficinas, recepção de alunos e participação em eventos de divulgação, com destaque para as duas edições da ORLAFOG (Olimpíada da Região dos Lagos de Foguetes), organizada pela equipe IFRockets, e possibilitada por aprovação em edital do CNPq. Os resultados obtidos demonstraram um forte engajamento dos participantes, refletido na formação de novas equipes de foguetes, no aumento da participação em competições e na intensificação do raciocínio científico em sala de aula. Além disso, observou-se grande adesão da comunidade escolar de diferentes instituições, incluindo familiares, o que reforça o potencial do projeto como ponte entre ciência e sociedade. Dessa forma, a experiência comprovou que o uso de foguetes didáticos vai além do caráter lúdico, configurando-se como ferramenta de ensino capaz de despertar vocações, consolidar práticas interdisciplinares e contribuir para a difusão da ciência.

Palavras-chave: Foguetes Experimentais. Ensino de Física. Extensão Universitária. ORLAFOG.

RESUMEN

El uso de cohetes educativos como recurso pedagógico se destaca como una estrategia eficaz para la divulgación científica y la estimulación del razonamiento lógico en diferentes niveles educativos. Este trabajo muestra cómo un proyecto logró despertar el interés de estudiantes y docentes, generando aprendizaje a partir de la construcción y el lanzamiento de cohetes educativos experimentales, una actividad que requiere la aplicación del método científico, cálculos aerodinámicos y de estabilidad, la elección de materiales apropiados y la organización del trabajo en equipo. La propuesta acerca a los jóvenes a la ciencia de forma lúdica y práctica, abordando el creciente interés por la materia y la importancia de integrar la escuela, la comunidad y la cultura científica. El desarrollo de las actividades se llevó a cabo mediante talleres, la recepción de estudiantes y la participación en eventos de difusión, con especial énfasis en las dos ediciones de ORLAFOG (Olimpiadas de Cohetes de la Región de los Lagos), organizadas por el equipo IFRockets y posibilitadas por la aprobación en una convocatoria del CNPq. Los resultados obtenidos demostraron un fuerte compromiso de los participantes, reflejado en la formación de nuevos equipos de cohetes, una mayor participación en competencias y la intensificación del razonamiento científico en el aula. Además, se contó con una importante participación de la comunidad escolar de diferentes instituciones, incluyendo familias, lo que reforzó el potencial del proyecto como puente entre la ciencia y la sociedad. De esta forma, la experiencia demostró que el uso de cohetes didácticos va más allá del mero entretenimiento, consolidándose como una herramienta didáctica capaz de despertar vocaciones, consolidar prácticas interdisciplinarias y contribuir a la difusión de la ciencia.

Palabras clave: Cohetes Experimentales. Enseñanza de la Física. Extensión Universitaria. ORLAFOG.

1 INTRODUCTION

Taking place at the Fluminense Federal Institute *Cabo Frio campus*, the *IFRockets project* articulates knowledge at a theoretical and practical level, presenting scientific processes to society, seeking to facilitate the process of transforming wise knowledge into taught knowledge. In this way, it provides inclusion in access to knowledge, ensuring new possibilities and opportunities for the popularization of Science. The team is composed of higher education students and technical high school students and has as one of the principles the strengthening of interdisciplinarity inside and outside the team. The project promotes knowledge exchanges from various areas, being an alternative for cooperative work in search of an improved development of activities, from team management to the application of technical knowledge presented in the classrooms. In the community, it plays an important role in extension, in scientific dissemination for students and teachers in the context of continuing education.

According to the National Plan for Space Activities 2022-2031 (PNAE 2022-2031), in its Strategic Objective for Space 05 (OEE.5), part of the strategy is "to foster the development of scientific, technological and innovation skills for the space sector":

Technical training, higher education and postgraduate courses - specialization, master's and doctorate - are the instruments for the materialization of this potential. The space production chain is of high added value, which catalyzes the generation of income and the economic development of the country. However, success in this market depends on professionals qualified to deal with the specificities of this niche. Thus, the continuous promotion of professional training and academic training becomes a priority agenda for the growth of space activities in Brazil. (GOV.BR - 2022)

The alignment of the *IFRockets project* in relation to national demands is verified, adding value of innovation and entrepreneurship to this work, which also corroborates with the PNAE: "Also, the availability of labor needs to be in the set of factors to be considered. In this aspect, the identification of thematic groups capable of promoting scientific and technological development in the country becomes essential". The project works by developing mastery of technology and disseminating the need, justified by a set of factors, for social and financial investment in this area that becomes comprehensive and strategic for the national economy. In addition, the activities developed arise from the legal requirement of the curricularization of extension in higher education courses presented in CNES/CES resolution No. 7, of December 18, 2018, which says in its article 3:

Art. 3 Extension in Brazilian Higher Education is the activity that is integrated into the curricular matrix and the organization of research, constituting an interdisciplinary,

political, educational, cultural, scientific, and technological process, which promotes the transformative interaction between higher education institutions and other sectors of society, through the production and application of knowledge. in permanent articulation with teaching and research. (MEC-2019)

Therefore, it is noted that the academic group *IF Rockets* has the potential to articulate Teaching, Research and Extension which, according to the objectives of the Federal Institute of Education, Science and Technology of Rio de Janeiro, guarantees "a continuous and permanent dialogue between the local community and the curricular project of the courses involved". The project has reached elementary school students with a more playful presentation proposal and teachers from municipal and state schools, offering technical training and exchanging experiences of teaching strategies in the areas of Science and Mathematics.

2 PROJECT AND TEACHING-LEARNING

Active learning methods make students participate in the teaching-learning process in a collaborative way, being the protagonists in the production of knowledge. The project does not advocate any specific method, but, in fact, some methods can be used as a reference for the development of learning, as presented below. The project enables challenges scaled by levels, respecting the previous knowledge of the participants and the teacher acts as a mediator in new discoveries, provides inclusion and learning of different subjects.

2.1 PROJECT-BASED LEARNING (ABP)

The whole approach during the process of building the rockets seeks to pass on responsibilities to the student and that success will depend on their dedication and commitment. It is always reinforced that success, in this case, will not mean victory over competitors and that the important thing is to evolve with your project. In this context, Bender (2014), in his studies on this methodology in modern education, says:

PBL can be defined as the use of authentic and realistic projects, based on a highly motivating and engaging question, task or problem, to teach academic content to students in the context of cooperative work for problem solving. [...] Students' inquiry is deeply integrated into project-based learning, and because they generally have some discretion regarding their group's project and the methods to be used to develop them, they tend to have a much greater motivation to work diligently on problem-solving (BENDER, 2014, p. 15).

Thus, the rocket construction project fully connects with this methodology and presents all the criteria for the development of solid and non-mechanical learning.

2.2 MAKER CULTURE

Maker Culture is a movement that gained strength in Brazil from 2010 and has a line of action along the lines of "hands-on" or "do it yourself". Nowadays, a good number of schools have received the Makers or LabMakers spaces with equipment and tools for services such as laser cutting, modeling and 3D printing. These spaces stimulate creativity and enable the construction and innovation of parts for the rockets. In addition, authors such as Duque (2023), argue that:

Maker culture can be a valuable tool for specialized educational care, since it is based on the idea that everyone can learn and create, regardless of their abilities and limitations. Through maker culture, students with educational needs can explore different approaches to learning, experiment with new forms of communication and expression, and work on projects that are experimenting for them. (DUKE, p. 155)

Students participating in the project can choose a subsystem of the project. They can work in the development of parts for aerodynamics, recovery and avionics (electronic sensors and parachutes), they can develop propulsion systems, develop launch bases, can articulate the team's marketing by recording and publishing activities on social networks or can be responsible for scheduling visits and external events (extension).

2.3 MULTIDISCIPLINARITY AND STEAM EDUCATION

The project presents demand in several disciplinary areas and demonstrates potential for practical application of many theories of Physics (all dynamics for rocket flight), Chemistry (physical-chemical reactions for propulsion), Biology (environmental preservation issues and Astrobiology), Engineering (design of parts and study of materials), Electronics (use of sensors) and can also be support for discussions in Geography (geopolitics and geolocation), History (cold war), Informatics (modeling software), among other possibilities, so the multidisciplinary characteristic of the project is very clear.

One of the pedagogical approaches that we have defined as a basis for developing multidisciplinary is the STEAM methodology, which stands for *Science, Technology, Engineering, Arts and Mathematics*, respectively. The methodology allows for active, dynamic, and creative learning, as indicated by MAIA (2021)

STEAM Education is not characterized as a teaching methodology, but a pedagogical approach that is linked to different proposals for active learning. As Riley (2020, p.1) emphasizes: it is about "(...) an approach to learning that uses Science, Technology, Engineering, Arts and Mathematics as access points to guide student inquiry, dialogue and critical thinking". By exploring skills such as problem-solving, creativity, and collaboration, models of active methodologies such as Problem-Based Learning or

Project-Based Learning (PBL) align with the way the approach is developed. Thus, STEAM Education favors creative and hands-on learning (maker), which provides students with opportunities to learn through the development of projects, with their peers, with engagement and experimentation (RESNICK, 2014). This conception is in line with what Blikstein, Valente and Moura (2020) highlight and call STEM-amplified or STEM-rich. (MAIA, 2021, p. 71)

3 METHODOLOGY

The project execution methodology consists of the development of integration work and deepening of content for the students who are part of the project at the IFF *Campus* Cabo Frio. Another aspect of the methodology is the strong performance in extension activities, through visits to basic education schools, predominantly public schools, in addition to participation in educational events and scientific dissemination for the community in general, such as fairs, festivals and actions of the Science Caravan program – IFF Cabo Frio.

In the internal activities, the members of the project, organized into subsystems, develop and design components of the experimental rockets developed by the team. In addition, several types of rockets are also produced, from the most playful levels that aim not only at scientific learning, but also at motor-cognitive stimulation - to more elaborate levels, promoting logical thinking and the scientific method. This practice allows the student to take an applied and in-depth look at the contents studied, in a multidisciplinary way, with a view to the operation of different areas of knowledge. The students who are part of the project are from various courses at the institution and participate in the subsystems they choose, being encouraged to make periodic exchanges even though they know that integration happens all the time.

The extension subsystem is the one that brings demands from external events where the team makes exhibitions, demonstration launches, participates and organizes competitions. In the years 2024 and 2025, the team was responsible for the Olympics of the Rocket Lakes Region, an event that had the support of city halls, teacher training and training workshops and distributed approximately one thousand awards. The event is developed during the year with dissemination, meetings with city halls, visits to schools, offering workshops in teacher training meetings and the culmination takes place at the end of the year with the award ceremony, where the entire process is valued by delivering medals to students and teachers, respecting the classification of the measurements of the launches, but distributing medals and certificates to all participants. Later we will talk a little more about the impact of this event.

3.1 DIDACTIC ROCKETS

Rockets are transport vehicles that work by propulsion. This propulsion can be a mass of gas or liquid expelled from the back of the rocket or by transferring energy in some other way.

To have good rockets, two points deserve attention: the body, divided into a hood, fins and payload compartment; and the base, which guides and stabilizes the rocket during initial propulsion, a phase of more turbulence. The most interesting thing is that all levels of rockets, in varying dimensions, always have these parts that are fundamental for the rocket to have a stable flight.

Figure 1



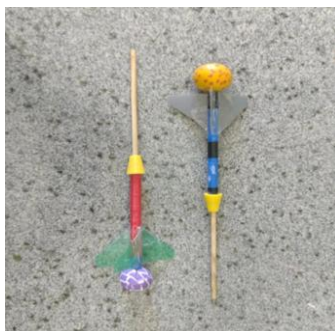
Source: A.I.-generated (<https://g.co/gemini/share/3de5212af2f5>).

For the development of this extension work, rockets were selected that were easy to assemble, but that scaled levels of technical difficulty and that increasingly offered possibilities for personal adjustments that could improve the performance of the rocket. The activities developed have always had a bias of competition and exchange. All teams seek improvements and innovations, but always sharing results with those who are interested, building an environment of mutual growth. Below, we describe the rocket models used for the presentations and competitions.

3.1.1 Shock rocket (collision)

Figure 1

Rocket with pogo stick, barbecue stick and pen tube



Source: prepared by the authors.

This rocket is our first to be presented, made of very accessible material, with a very low cost and very playful. It is assembled with a "pogo stick" ball and a barbecue stick for the launch base and the rocket body made with a school marker tube and pieces of plastic in the shape of a hood. Its launch can be done in any space and just hold the stick vertically and abandon the set. When the ball collides with the ground, there is a transfer of energy from the ball to the rocket, which launches it in the opposite direction of the fall, that is, upwards. In this throw, the launcher needs to use the pincer grip with his fingers and concentrate so as not to create turbulence when leaving the system. With it it is possible to work on concentration, development or maintenance of fine motor coordination, being an excellent activity for children in the early years and the elderly.

Figure 2

Shock rocket launch (collision)



Source: Prepared by the authors.

3.1.2 Paper and compressed air rocket (blowing)

Figure 3

Blow rocket construction



Source: Prepared by the authors.

Figure 4

Blow rocket presentation



Source: Prepared by the authors.

This rocket presents, at a very safe level, the opportunity for the student to seek techniques and/or innovations to improve the result of the launch of their rocket and already brings them the awareness of launch control. Initially, this model can be assembled based on a pet bottle with a piece of pipe attached and the rocket made of sulfite paper. However, they usually soon realize that they can achieve a higher propulsion speed if they change the pet bottle base for a base made of pipe and "PVC" connections, as illustrated in the following images.

3.1.3 Pet Bottle and Compressed Air Rocket

The PET bottle and compressed air rocket offers many possibilities for improvement and already provides more sophisticated challenges that require participants to study some theory, define processes to reduce risks and damage. This rocket cannot be launched and worked without a *safety checklist*. The base of this rocket already needs to have a depressurization valve, launch lock and guarantee of a safe distance for launch. In this type

of rockets, elementary school children already have direct contact with more specific content, such as Newton's Laws and Aerodynamics concepts - and this happens in a light and natural way.

Figure 5

Rocket pet bottle with its PVC base

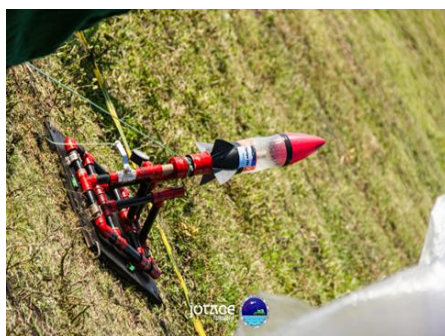


Source: Prepared by the authors.

3.1.4 Rocket with propulsion through the reaction of vinegar and bicarbonate

Figure 6

Rocket participating in ORLAFOG 2025 at the Campos Novos farm – Cabo Frio RJ



Source: Prepared by the authors. Photographer: @eu_jotage.

Figure 7

Rocket propulsion in competition ORLAFOG 2025



Source: Prepared by the authors. Photographer: @eu_jotage.

Rocket also made of pet bottle, with a base structure equal to that already worked in the final years of Elementary School, but this type of rocket is indicated and worked only with High School students. Controlling the launch is more difficult, because the previous rocket, with compressed air, was pressurized by an air pump and now the students need to set up a procedure in which vinegar and bicarbonate come into contact only inside the rocket with it already locked at the base. There is a need to determine the right amounts of vinegar and bicarbonate so that enough gases are generated to culminate in a satisfactory internal pressure for the rocket to reach the greatest possible distance. Aerodynamics are key and they can already use simulators to design their rockets. They are already encouraged to use 3D modeling and printing to build their rockets and other improvements can be made, following some safety standards, such as, for example, the prohibition of using metal in the body of the rocket.

3.1.5 Paper rocket with solid propulsion

This rocket transitions from basic to college level. On this rocket, several tests are already necessary before launch. This rocket has a paper body, but it already begins the studies of electronics and recovery for the rockets launched. The students, in addition to having to design an engine, usually mixing potassium nitrate-based fertilizer with sugar, already receive the difficult challenges of attaching parachutes and sensors to the rockets, distributing the mass and taking care not to lose the stability of their rocket.

Figure 8

Solid propulsion rocket launch



Source: Prepared by the authors.

Figure 9*Paper rockets and solid propulsion at their launch bases*

Source: Prepared by the authors.

3.1.6 University Rockets

These rockets have several categories according to the intended apogee, among them, 500 meters, 1 kilometer, 3 kilometers. For this, it is necessary to size the engine, do burn-in tests and static tests. For all university categories, sensors such as an altimeter, and a recovery system with parachutes and, if possible, GPS are mandatory. In fact, university rockets enable a lot of practical application of the knowledge presented in the classroom of various courses: Mathematics, Physics, Engineering, Chemistry, Biology, mainly.

Currently the team is working on the design and testing of the Genesis rocket, its aerodynamics are being prepared for 500m and 1km apogee flights, for this two engines are being sized to have the necessary thrust without failure or explosion. For everything to go well, several static burning tests are being carried out to determine the impulse generated, associated with the thermal resistance of the materials. In parallel, all avionics and recovery systems are being prepared. Only after these tests can the rocket actually be launched. It is a process of a lot of disciplined work, but very rich. In the three years of development of the team, higher education students have already produced research presented at the National Congress of Mechanical Engineering (CONEM – 2024) on the treatment of fin materials, Course Completion Work (TCC) research of the bachelor's degree course in Mechanical Engineering on hydraulic machine for propellant compaction and sizing and virtual simulation of rocket engines and a TCC of the Physics Degree course on student learning regular classes through the application of the project to the 1st year of High School.

Figure 11

Genesis rocket projected by the team to an apogee of 1km



Source: Prepared by the authors.

3.2 EXTENSION ACTIVITIES

In activities outside the Institute, the project serves, in particular, the seven municipalities of the Lakes Region, but also the other neighboring cities. The Project team has participated in educational events. The extension actions also have rocket development workshops, working as a mini-course, in order to include the community in general in the production of rockets. The project has been in contact with partner schools, city halls in the region, secretariats and education coordinators, with a view to the extension work together with public agencies, which enabled the planning of the Olympics of the Rocket Lakes Region (ORLAFOG), organized and carried out by the *IF Rockets project*, with support from the Institution and CNPq/MCTI, through approval in a public call, in an action to popularize Science.

3.2.1 ORLAFOG in Numbers

The activities developed in educational and scientific dissemination events demonstrated a strong demand for interest from young people in the development of rockets, a fact clearly perceived in the testimonies, in interactions in digital communication vehicles, such as Instagram (@ifrocketscf), and in the great interaction of the public with the project's activities. The Rocket Lakes Region Olympics (ORLAFOG) had its first edition in October 2024, on the 17th and 25th.

Two moments of the ORLAFOG Teachers' Meeting were planned and implemented, an event that aimed to train, qualify and support the faculty responsible for coordinating the participating teams. At first, we had the participation of 40 teachers working in State Schools. In the second moment, we were with 80 teachers from the municipal network. Everyone was able to participate in Modeling, 3D Printing and Rocket Workshop training and discuss new active teaching-learning approaches through the didactic rocket project. There were

moments of great interaction and exchanges that resulted in 72 teams of students enrolled for ORLAFOG.

The Olympiad took place on a farm provided with the support of the city of Armação de Búzios RJ and the participants were able to experience all the emotion of competing and see the result of the work developed in their schools. There were schools representing 14 municipalities in the state of Rio de Janeiro and the award was a moment of great celebration for everyone.

Figure 12

ORLAFOG 2024 competition - Búzios RJ



Source: Prepared by the authors.

Figure 10

ORLAFOG 2024 Award Ceremony, in the IFF Cabo Frio RJ campus auditorium



Source: Prepared by the authors.

In 2025, the organizing team focused on publicizing and encouraging municipalities that had not yet participated, while still supporting schools that were excited to improve their participation. On average, the participating schools increased their participation and new schools came to participate and develop projects in their schools. A great example was the municipality of Cabo Frio, which had 5 teams in the first edition and in the 2025 edition, it increased to 66 registered teams, such was the repercussion within schools and the education network. At the end of registration, a total of 212 registered teams were reached, representing 19 municipalities in the state.

The ORLAFOG event in these two editions moved approximately 200 teachers, with more than 1000 students participating, with approximately 80% of the participants being first-time in didactic rocket competitions. It provided an opportunity for interaction between society and undergraduates, offering practical experience both in the area of the degree and in the area of engineering.

Figure 11

Teacher and students from the public school system of Búzios RJ in action at ORLAFOG 2025



Source: Prepared by the authors. Photographer: @eu_jotage.

Figure 12

ORLAFOG 2025 award ceremony, in the auditorium of the IFF campus Cabo Frio RJ



Source: Prepared by the authors. Photographer: @eu_jotage.

4 RESULTS AND DISCUSSIONS

In fact, developing the didactic rocket activity proved to be a multidisciplinary tool of great scope and impact. The activity offers the possibility of working at various levels of difficulty and discussing various subjects in various areas of knowledge. The activity provides the student with protagonism and engagement, and places the teacher in a situation of mediator of knowledge, with students being the main actors in the process.

Figure 13*Competitor interaction with his fans - ORLAFOG 2025*

Source: Prepared by the authors. Photographer: @eu_jotage.

At first, the teacher thinks he cannot handle the activity. They are afraid of the school calendar of their schools, imagine difficulties with the number of students and show concern about the safety and commitment of students. In the training meetings, however, we explained that the organization and the idea of orderly procedures, with a weekly *check-list*, does not allow any lack of control of the activities. Of course, some teams may not finish the process and not all students may want to launch their rockets, the minority, but even these students get involved studying theory, helping the teams in their class and cheering.

We have always defended the idea that the project is not just to launch rockets, but to provide an experience of coexistence, project management, teamwork that develops skills for modern life. The fact is that the teacher needs to build knowledge in agreement and together with the student. The result is always the embrace, on the one hand, the happiness of the success achieved by the effort and dedication of your student or the reception for an unexpected result. On the other hand, the student's hug of gratitude for the support, for the opportunity to be living a very learning and pleasurable activity.

Figure 14*Teacher-student interaction at ORLAFOG 2025*

Source: Prepared by the authors. Photographer: @eu_jotage.

For university extension students, it is a unique opportunity to apply technical knowledge, work in project management, sharing experiences with their peers, add autonomy to their training, enable their condition to deal with others, experience an activity that often requires leadership and problem solving.

Figure 15

Undergraduate students working in the organization of ORLAFOG 2025



Source: Prepared by the authors. Photographer: @eu_jotage.

5 CONCLUSIONS

The project, started in 2022, today has volunteers, and its organizational structure is composed of the Coordinating Professor, CEO, subsystem managers and its members. This organization promotes a greater direction of activities and focus on the development of each sector. Although it is separated into subsystems (avionics, recovery, propulsion, marketing, extension), there is an exchange of knowledge, ideal for team integration. In addition to the partnerships formed during the construction and execution of the project (schools, city halls, integrated projects of the institution, partner events) and the help of the Institute's employees, there is also an exchange with other more experienced experimental rocket teams. This collaborative environment contributes to an exchange of experiences from different perspectives, from the "school floor", making the participating public know everything from playful rockets made with very simple materials to university rockets. In the context of teaching, the project works on the fundamentals of Project-Based Teaching, the *STEAM* approach, the *Maker Culture*, based on the principle of having the student as the protagonist, with the application of active learning methods and presenting various levels of participation, facilitating school inclusion respecting the previous knowledge and the level of initial knowledge of each student. The project presents an excellent and viable tool for university courses to implement as an extension curriculum option, currently required by the MEC and contributes to the national plans for the development of activities in the aerospace sector.

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THE PLACE OF TEACHING PRACTICE, EXTENSION AND SUPERVISED INTERNSHIP IN MATHEMATICS TEACHING

O LUGAR DA PRÁTICA DE ENSINO, DA EXTENSÃO E DO ESTÁGIO SUPERVISIONADO NO ENSINO DE MATEMÁTICA

EL LUGAR DE LA PRÁCTICA DOCENTE, LA EXTENSIÓN Y LAS PRÁCTICAS SUPERVISADAS EN LA EDUCACIÓN MATEMÁTICA



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ABSTRACT

This article aims to discuss possibilities for curricularizing extension programs associated with mathematics teaching practices. This perspective is grounded in current educational legislation and has been suggested by researchers linked to the fields of Education and Mathematics Education, who view student participation in teaching, research, and extension projects related to the pedagogical practice of school mathematics as essential to teacher training. As a research procedure, an analysis was carried out regarding the vision of Supervised Curricular Internship present in the current curricular pedagogical project – PPC of the Mathematics Degree course at the Federal University of Acre – UFAC, with the intention of showing that this important curricular component should not be restricted to simply fulfilling bureaucratic and academic requirements, but should in fact constitute an opportunity for personal and professional growth and as an instrument of integration between the institutions responsible for training – university, school and community. The results of this research, guided by a reading and analysis of current legislation and based on reflections by theorists in the field of didactics, point to the possibility that student participation in teaching, research, and extension projects focused on the teaching and learning processes, as a pedagogical practice in mathematics, can be valued, including contributing to the construction of a professional identity focused on teaching mathematics in basic education schools.

Keywords: Extension Curricularization. Teaching Practice. Supervised Internship. Mathematics.

RESUMO

Esse artigo tem por objetivo discutir possibilidades da curricularização da extensão associada a pesquisa e a prática de ensino em Matemática. Essa perspectiva está fundamentada na legislação educacional vigente e vem sendo sugerida por pesquisadores vinculados a Ciência da Educação e da Educação Matemática que veem a participação dos alunos em projetos de ensino, pesquisa e extensão, relacionados com a prática pedagógica

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da Matemática escolar como indispensáveis a formação docente. Como procedimento de investigação foi realizado uma análise a respeito da visão de Estágio Curricular Supervisionado presente no atual projeto pedagógico curricular – PPC do curso de Licenciatura em Matemática da Universidade Federal do Acre – UFAC, com a intenção de mostrar que esse importante componente curricular não deve ficar restrito a simples cumprimento de exigências burocráticas e acadêmicas, mas constituir-se de fato como oportunidade de crescimento pessoal e profissional e como instrumento de integração entre as instituições responsáveis pela formação – universidade, escola e comunidade. Os resultados desta investigação pautada pela leitura e análise da legislação atual e fundamentada em reflexões de teóricos do campo da didática, apontam para a possibilidade de que a participação dos alunos em projetos de ensino, pesquisa e extensão, voltados para os processos de ensino e aprendizagem, enquanto prática pedagógica da matemática, sejam valorizados, inclusive contribuindo para construção de uma identidade profissional voltada para uma prática docente do ensino de Matemática nas escolas de Educação Básica.

Palavras-chave: Curricularização da Extensão. Prática de Ensino. Estágio Supervisionado. Matemática.

RESUMEN

Este artículo tiene como objetivo discutir las posibilidades de curricularizar las actividades de extensión asociadas a la investigación y la práctica docente en Matemáticas. Esta perspectiva se basa en la legislación educativa vigente y ha sido sugerida por investigadores vinculados a las Ciencias de la Educación y a la Educación Matemática que ven la participación de los estudiantes en proyectos de enseñanza, investigación y extensión relacionados con la práctica pedagógica de la matemática escolar como indispensable para la formación docente. Como procedimiento investigativo, se realizó un análisis sobre la visión de la Pasantía Curricular Supervisada presente en el actual proyecto pedagógico curricular – PPC de la carrera de Licenciatura en Matemáticas de la Universidad Federal de Acre – UFAC, con la intención de mostrar que este importante componente curricular no debe restringirse simplemente al cumplimiento de requisitos burocráticos y académicos, sino que debe, de hecho, constituir una oportunidad de crecimiento personal y profesional y un instrumento de integración entre las instituciones responsables de la formación – universidad, escuela y comunidad. Los resultados de esta investigación, guiados por la lectura y el análisis de la legislación vigente y fundamentados en las reflexiones de teóricos del campo de la didáctica, apuntan a la posibilidad de valorar la participación estudiantil en proyectos de docencia, investigación y extensión centrados en los procesos de enseñanza y aprendizaje, como práctica pedagógica en matemáticas, contribuyendo incluso a la construcción de una identidad profesional orientada a la práctica docente de matemáticas en escuelas de educación básica.

Palabras clave: Curricularización de la Extensión. Práctica Docente. Prácticas Supervisadas. Matemáticas.

1 INTRODUCTION

This article aims to discuss the development and place of Teaching Practice, Extension and Supervised Internship in the teaching of Mathematics, initially understanding that these three curricular components have a fundamental role in the formation of the Mathematics teacher, as they integrate theory with practice, provide experiences in the school environment and allow the development of pedagogical skills and critical reflections, inserting the future teacher in the reality of the school community. The activities planned in these components have the fusion of equipping the licentiate with practical and innovative knowledge, making him safer and able to deal with the challenges of teaching and to transform the educational reality.

Extension, for example, in Mathematics Degree courses has been recommended in the reforms of pedagogical projects in order to comply with CNE/CP resolution No. 4, of May 29, 2024, which provides for the National Curriculum Guidelines for Initial Training at Higher Level. This resolution points out the possibility of linking extension actions, projects and programs to teaching practice, integrating extension activities to the Pedagogical Political Project (PPP) of the courses so that students put into practice knowledge in real experiences with the school community, as required by resolution CNE/CES 7/2018 of December 2018 that *Establishes the Guidelines for Extension in Brazilian Higher Education and regulates the provisions of Goal 12.7 of Law No. 13,005/2014, which approves the National Education Plan – PNE*, determining that 10% of the workload of undergraduate courses is extension. This inclusion seeks to bring the university closer to society, valuing teacher training and the return of academic knowledge to the community.

This debate points to some difficulties, but also possibilities for transformations in the daily lives of these professionals, as there seems to be a consensus in the academy that the development of the supervised internship is a particular moment in the training in which the student can experience a diversity of experiences and get to know his field of activity better. According to Pimenta and Lima (2004) "the internship is the central axis in teacher training, because it is through it that the professional knows the indispensable aspects for the formation of the construction of identity and day-to-day knowledge". For this, it is reasonable that the training school offers a diversity of possibilities aiming at the full development of the trainee.

Silva (2005) argues that in the academic routine it is noticeable that undergraduates get involved with great willingness and enthusiasm when the university provides them with the participation in which they can put theoretical knowledge into practice, accompanied by a supervising professional or when they have an associated institution that they are in

permanent contact with the university. In this way, the intern can learn to observe and identify problems, always absorb and seek information, questioning what he found, in addition to exchanging information with more experienced professionals. According to Francisco and Pereira (2004), the internship emerges as a fundamental process in the training of the intern, as this is the way to make the transition from student to teacher. This is a moment of training in which the undergraduate student can live experiences, getting to know his area of expertise better.

For Guerra (1995) "the Supervised Internship consists of theory and practice with a view to a constant search for reality for a joint elaboration of the work program in the educator's training", enabling the student in the training process to develop a researcher's posture through observation and moments of reflection that can contribute to reorganize actions that can reorient practice when necessary. Thus, part of the Supervised Internship curricular component can be considered, which, as established by Resolution CNE/CP 04/2024, should start from the student's entry into the course, with the observation of the school environment and participation in teacher planning groups at the school, to be developed also in teaching, research and extension projects linked to research groups and extension programs, which has as its object of study and investigation the pedagogical practice of Mathematics.

This is in accordance with the thinking of several educators in the educational field, including Silva (2007), Carvalho (1985), Cury (2004), Lima (1986), Pimenta (2004) and Gomes (1992) and meets the recommendations prescribed in the available federal legislation, especially after the advent of the Law of Guidelines and Bases of National Education, law 9394/96, and in the normative acts resulting from it, because in most of the projects that focus on the training of Mathematics teachers, it is necessary for their participants to be present in Basic Education schools, either to obtain information that will constitute data for carrying out these researches, or to test, in the classroom environment, proposed curricular subjects in order to favor a better quality of teaching and student learning, or to carry out communications of the results of research carried out with a focus on the knowledge of the school, especially what happens in the classroom.

Particularly, we understand that teacher training takes place in multiple ways and the performance of graduates in teaching, research and extension projects are, above all, privileged forms of teacher training. This, in our view, contemplates what is recommended by CNE/CP resolution No. 4, of May 29, 2024, when it establishes that the supervised curricular internship must be carried out in basic education schools and experienced during the training course with enough time to address the different dimensions of professional performance.

For this, we agree with Silva (2007) and defend that it is necessary that there is an internship project planned and evaluated jointly by the initial training school and the internship field school, with clear objectives and tasks and that the two institutions help each other, which presupposes formal relations between the educational institution and the units of the Basic Education systems. These "times at school" should be different and according to the objectives of each moment of formation. Therefore, the internship cannot be under the responsibility of a single teacher of the training school, but involve a collective action of the trainers, since a single teacher may find it difficult to manage the number of interns (on average 50) who enter the course every year.

In this way, we understand that the teaching, research and extension activities developed by students in projects linked to study groups aimed at teacher training and addressed to the Basic Education school, under the responsibility of qualified professionals, constitute moments of professional training, either by direct exercise in loco, or by participatory presence in environments specific to the professional area.

We understand, therefore, that the process of curricularization of extension can be part of the disciplines of Mathematics Teaching Practices, articulated with the Supervised Internship, associating Teaching, Research and Extension to the formative context, since teaching alone "cannot be alone responsible for the professional qualification of the teacher" (PICONEZ 1998, p.30). Thus, we agree with Pimenta and Lima (2004) when they argue that one of the purposes of the internship is to integrate the student's training process, in order to consider the field of action as an object of analysis, investigation and critical interpretation, based on the connections with the other disciplines of the course. In view of the above, it is worth questioning **how should the offer of teaching, research and extension in Mathematics Degree courses be organized in order to meet the demands of current legislation?**

2 METHODOLOGICAL ASPECTS

Within the scope of the Federal University of Acre (UFAC), Resolution No. 026, of October 27, 2020, approved the rules, procedures and criteria that regulate extension activities, considering the "National University Extension Policy, the Institutional Development Plan (PDI); The need to update the regulation of extension activities, vital for the academic process and its inseparability between Teaching, Research and Extension", aiming to:

- I – To enhance and expand the quality levels of the proposed actions, projecting their nature and the social commitment of Ufac, in line with teaching, research and social demands. II – To stimulate the social development and critical spirit of students, with a

view to professional performance based on citizenship, on the social and transformative function of higher education, focusing on public policies, as well as providing opportunities for the exchange of academic and popular knowledge. (Art. 4 of Resolution No. 026, of October 27, 2020).

Apparently, the registration and mandatory inclusion of extension activities in the curricula of undergraduate courses was regulated, implying a new curricular configuration. While the mandatory participation of students in the development and applications of extension projects was instituted, this caused concerns regarding the way it would be implemented in the mathematics degree course at UFAC:

... mainly in the possibility that, by carrying out the curricularization of extension only to satisfy legal requirements, the power that extension may have in itself is destroyed. In this way, it is feared that their dialogicity and ability to capture different realities, in order to contribute to the constitution of new contours of research and teaching, will be undermined (COSTA, 2019, p. 112)

In view of the possible effects and impacts of this new curricular configuration on the academic training of subjects in initial training, we seek to understand how the offer of teaching, research and extension in mathematics degree courses should be effectively organized, in order to meet the demands of the current legislation?

As mentioned in the introduction of this study, the issue that seems to be most recurrent in terms of the efforts mobilized in teacher training is in the various forms of relationship between theory and practice, which is in fact what underpins training, however, it is also the object of many doubts as to its form of structure, organization and constitution. Recent studies such as those mentioned above and reflections carried out within the scope of training institutions point to the need for the Supervised Internship to go beyond the limit of the way it has been mostly practiced, usually through isolated actions with the apparent objective of fulfilling the workload. In this context, the Supervised Internship starts to have a fundamental function that should not only be restricted to taking theoretical knowledge to the field of practice, but understanding it, re-elaborating it, thinking about the reality experienced by the future teacher. Thus, it is up to the agents involved to reflect on the implications that this new posture can bring to the work of the Supervised Internship teacher and how this can be effective.

The university, according to Pimenta and Lima (2004), is par excellence the formative space for teaching, even if it is not simple to train for the exercise of quality teaching. The expectation is that in this space there will be interaction with the Basic Education school. Thus, it is essential that research and extension as spaces for investigation and exhibition of

knowledge constitute possibilities for intervention in teacher training. For this, some procedures are necessary to prove this interaction, such as the return of what was researched, elaborated and re-elaborated from the presence of the intern in the Basic Education school, in proposals for continuing education for this school and the presence of this in the university in significant proposals for reporting experiences, for example, or even in the internship classes with the presentation and discussion of pedagogical themes and class study (*Lesson Study*) which is characterized as a collaborative professional development methodology where teachers plan, observe and analyze a class together to improve student learning and their own practice.

This possibility involves the creation of a group of teachers who meet to study and perfect a class, which is then taught and observed by colleagues. The analyses are focused on the students' reactions and the teaching-learning process, generating a continuous cycle of reflection and improvement. The Classroom Study is a professional development process based on the main learning difficulties of the students perceived by the participating teachers. This process provides teachers with a deeper understanding of student learning and how to promote it in the classroom, is the subject of research in the study and research group on teacher training that teaches mathematics.

The legitimacy of the university as a space for training is materialized, therefore, from these procedures, both for the trainee student and for that education educator, who receives the trainee student, as both are "formed" in practice. Therefore, in the investigation about the school and in the school, in all its performances, there is a conception and a concrete possibility as a referral to the supervised curricular internship. In other words, conceiving it as research presupposes a direct clash with the classroom, with the daily life of the school and with the legitimation, confirmation and/or transformation of theoretical aspects constructed in specific training disciplines.

The insertion of the intern in the school in research activities can follow a theoretical-practical approach that will certainly make the pedagogical practice more qualitative, more dynamic and transformative. This can also collaborate with all the aspects that make up the entire school: management, intra- and extra-school relationships, planning, etc. It is in this context that the collegiate of the Mathematics Course must contemplate in its Pedagogical Political Project, part of the curricular component Supervised Internship, as a possibility of insertion of the intern in the basic school through extension and research activities linked to projects that have been developed by teachers who teach in the course. Interpreting what is recommended by the current legislation, it can be understood that Class Regency presupposes professional initiation as a knowledge that seeks to be guided by teaching-

learning theories to respond to the demands posed by the pedagogical practice to which it is directed.

Extension projects can structure activities in the form of seminars, mini-courses and workshops for teachers, students and other school communities or even non-formal education groups on specific themes of each degree course. Research projects can favor a set of proposals on educational research about "concerns" specific to the teaching-learning process and its specificities. Following this logic, the interns of the Mathematics Degree Course may, during the development of the Supervised Internship curricular component, develop monitoring activities and seminars aimed at monitoring the work of educators who work in special education groups, youth and adult education, senior citizen groups, etc. Developing activity reports, thematic seminars and other possibilities of the situational reality of the university and school units.

Thus, the curricular component Supervised Internship covers, in our view, teaching, research and extension and in this we agree with several thinkers in the educational field, among them Cury (2004), who argues that the Supervised Internship should provide the intern with the opportunity to articulate between the moment of knowing and the moment of doing, because "the moment of knowing is not separate from the moment of doing, and vice versa, but each one has its own epistemological dimension. Learning to be a teacher, therefore, is recognized as a professional knowledge intended for a teaching action in the education systems" CURY (2003, pp. 113-122).

The supervised curricular internship is the discipline in which the intern must experience various practices and various ways of being a teacher. According to LDB 9394/96 in its article 13, education professionals must experience school life in general, from activities of elaboration of the school's pedagogical proposal, to the preparation and fulfillment of work plans, followed by activities, such as zeal for student learning, establishment of recovery strategies for students with lower performance, participation in periods of planning, evaluation and professional development, and collaboration in activities of articulation of the school with families and the community.

3 TEACHING, RESEARCH AND EXTENSION: PROPOSAL FOR THE PPCs

CNE/CP Resolution No. 4, of May 29, 2024, which deals with the processes of formulation and reform of the Pedagogical Projects of Teaching Degree Courses, brings relevant contributions with regard to supervised internship and the extension curricularization process. Hence two issues are posed as challenges that can substantially change the way in which Undergraduate Courses are currently offered. On the one hand, it is possible to

conceive the curricularization linked to the disciplinary curricular competences, on the other hand the Supervised Internship must be offered throughout the development of the Course. The offer of these curricular components must be associated with the tripod Teaching, Research and Extension, as highlighted in article 12 and its sole paragraph:

Article 12. Initial training is intended for those who intend to teach basic school education in its stages and modalities of education and in other situations in which pedagogical, theoretical and practical knowledge is foreseen. **Sole Paragraph.** The activities of the teaching profession also include the performance and participation in the organization and management of Basic Education systems and their educational institutions, encompassing: I - planning, development, coordination, monitoring and evaluation of projects, teaching, pedagogical dynamics and educational experiences; and II - production and dissemination of scientific-technological knowledge in the areas for which he or she received training and those in the educational field. (CNE/CP RESOLUTION NO. 4, OF MAY 29, 2024)

Article 13 of the aforementioned resolution establishes that the initial training courses, respecting the national diversity and the pedagogical autonomy of the institutions, will consist of nuclei I, II, III and IV, with special emphasis on Nucleus I – General Training Studies - EFG: composed of scientific, educational and pedagogical knowledge that underlies the understanding of the educational phenomenon and school education and forms the common basis for all licenciates, Articulating:

... scientific, educational and pedagogical knowledge that underlies the understanding of the educational phenomenon and school education and forms the common basis for all teaching degrees, articulating: a) sociological, philosophical, historical and epistemological principles and foundations of education; b) principles, values and attitudes committed to social justice, recognition, respect and appreciation of diversity, promotion of participation, equity and inclusion and democratic management; c) observation, analysis, planning, development and evaluation of educational processes, pedagogical experiences and teaching and learning situations in Basic Education institutions; d) multidimensional and interdisciplinary knowledge about the human being and educational practices, including knowledge of the development processes of children, adolescents, young people and adults, in the physical, cognitive, affective, aesthetic, cultural, playful, artistic, ethical and biopsychosocial dimensions; e) diagnosis and analysis of the needs and aspirations of the different segments of society, related to education, being able to identify different forces and interests, to capture contradictions and to consider them in pedagogical plans, in teaching and, consequently, in learning processes; f) research and study of educational legislation, the processes of organization and management of the work of professionals in the teaching of basic school education, financing policies, evaluation and curriculum; g) research and study of the relations between education and work, education and diversity, education and communication, human rights, citizenship, environmental education, among other central problems of contemporary society; h) studies of ethical, didactic and behavioral aspects in the context of professional practice, articulating academic knowledge, research, extension and educational

practice; and i) knowledge about different strategies for planning and evaluating learning, centered on the full development of Basic Education students (CNE/CP RESOLUTION NO. 4, OF MAY 29, 2024).

Nucleus II is presented in Resolution CNE/CP No. 4, of May 29, 2024 as learning and deepening of the specific contents of the areas of professional activity - ACCE: composed of the specific contents of the areas, components, thematic units and objects of knowledge defined in a national document of curricular guidance for Basic Education and the knowledge necessary for the pedagogical mastery of these contents. In Nucleus III it is about the Academic Activities of Extension - AAE, which according to the aforementioned resolution should be carried out in the form of practices linked to the curricular components: they involve the execution of extension actions in Basic Education institutions, with guidance, monitoring and evaluation of a teacher trainer of the HEI.

Finally, Nucleus IV is presented referring to the Supervised Curricular Internship – ECS, characterized as a mandatory component of the curricular organization of the licentiate degrees, and must be carried out in a Basic Education institution and having as its main objective the performance in the training of the licentiate, being planned to be the bridge between the academic curriculum and the space of professional action of the future teacher. The intern, defends Resolution CNE/CP No. 4, of May 29, 2024, should be offered "numerous opportunities so that progressively the licentiate student can connect with the theoretical aspects of his training, with his practical applications, initially through observation and progressively through his direct performance in the classroom.

Therefore, we present a proposal for the participation of students from the Mathematics Degree courses in programs, projects and extension and research actions that focus on the pedagogical practice of school Mathematics. For this, we consider that Supervised Internship is an integrating element, associated with teaching, research and extension, not being restricted to the simple fulfillment of bureaucratic and academic requirements, but constituting itself as an opportunity for personal and professional growth and as an instrument of integration between the institutions responsible for training – university, school and community, favoring the construction of a professional identity focused on a practice teacher who can effectively contribute to the improvement of the teaching of Mathematics in Basic Education schools.

3.1 HISTORICAL VIEW

During the twentieth century, the logic of the Mathematics teacher training courses, as well as the logic of the other educator training courses, was based on the epistemological

assumptions of technical rationality, in which theory has little connection with practice, that is, practice is subordinated to theory. In this conception:

The curricula are normative, with the sequence of knowledge of the relevant scientific principles, followed by the application of these principles and a practicum, whose objective is to apply the principles of the science studied in daily practice. Within the technical rationality, the development of professional competencies must therefore be placed after basic and applied scientific knowledge, since it is not possible to learn competencies and application skills before applicable knowledge [PEREZ GOMES, 1992, p. 98].

Thus, the Supervised Internship as a discipline, argues Piconez (1998), has been defined in the curricula of the teaching degree courses as a complementary discipline, with the objective of putting into practice what was theoretically learned by the student to complement his training. The dichotomy between theory and practice, in this conception, is evident even in the disposition of the discipline in the curricular matrix.

The debate on issues related to theory and practice in the discipline of Supervised Internship became, from the 1980s of the twentieth century, an object of study in the educational field. Authors such as Azevedo (1980), Candau & Lellis (1983), Carvalho (1985), among others, suggest in different ways the unification of theory and practice. In their reflections, these authors argued that the guidelines for the referral of the Supervised Internship did not privilege discussions between educator and student about the daily life of the classroom, the school and the community. Thus, the knowledge of the school reality through the internships did not favor reflections on a creative and transformative practice, nor did it enable the reconstruction or definition of theories that would support the teacher's work.

From the 1930s onwards, concerns with the Supervised Internship intensified, especially with the institution of the Didactics course in 1939, whose conception involved, as Silva (2007) argues, studies related to the Teaching Methodology, related to planning, the execution of the teacher-student relationship and the verification of learning, leading to a possibility of Teaching Practice, where the intern could also learn explanatory techniques that would allow him to identify and dimension community resources, as well as to intern in institutions that developed activities related to his future qualification. However, it is from the end of the twentieth century that the Supervised Internship began to be conceived as a privileged space in the struggle for the improvement of teacher training, especially in the training of Mathematics teachers, where the discourse for the improvement of the quality of the teaching of this discipline became frequent and the search for overcoming the dichotomy between theory and practice that became an instrument of struggle for the quality of teaching and for the transformation of the role of the discipline Supervised Internship, which for a long

time conformed to the traditional script marked by the planning of teaching activities, observation and classroom management.

In the field of teacher training for the area of Mathematics, this debate has been driven, in the last 20 years, by the reflections promoted by the orientations of educators and mathematical educators based on a new paradigm determined by the advancement of technologies and the so-called knowledge society, pointing out the need to review old concepts and new practices for teacher training. It is in this context that we must, as a teacher and researcher involved with issues related to professional development, identity, teacher training and knowledge that articulate theory and practice, seek new paths and possibilities that can lead our interns to a more comprehensive training, with a focus on improving the quality of teaching in Basic Education.

3.2 PROPOSAL FOR THE PPCs

The proposals for pedagogical political projects of the Mathematics Degree Courses must present in an articulated way, teaching, research and extension strategies, contemplating, above all, the issue that is presented at the moment, linked to actions, projects and extension programs to the Teaching Practice and the Supervised Internship, thus integrating extension activities to the Pedagogical Political Project (PPC), so that students put into practice the knowledge in real experiences with the school community, as required by the legislation that determines that 10% of the workload of undergraduate courses is extension.

This inclusion seeks to bring the university closer to society, valuing teacher training and the return of academic knowledge to the community, ensuring the conception, guidelines and principles present in Article 3 of Resolution No. 7, of December 18, 2018 when it describes that:

Extension in Brazilian Higher Education is the activity that is integrated into the curricular matrix and the organization of research, constituting an interdisciplinary, political, educational, cultural, scientific, and technological process, which promotes the transformative interaction between higher education institutions and other sectors of society, through the production and application of knowledge, in permanent articulation with teaching and research.

In addition, it is proposed that the curriculum should be articulated with Centers I, II, III and IV, established by Resolution CNE/CP No. 4, of May 29, 2024, particularly in relation to Centers III and IV.

3.3 CURRICULAR COMPONENTS

Specifically, we propose the following curricular components that involve nuclei I, III and IV present in Resolution CNE/CP No. 4, of May 29, 2024 to be developed from the first academic period:

Table 1

Curricular components

DISCIPLINES	MENU	C/H	CREDIT S
Initiation to Teaching, Research and Extension.	Historical evolution, conceptual construction, principles and guidelines of teaching, research and extension in public universities. The principle of inseparability between teaching, research and extension, aiming at the approximation between the university and society, critical self-reflection, the theoretical and practical emancipation of students and the social meaning of academic work. Teaching, research and university extension policies. Teaching, research and extension projects and actions, curricular insertion of teaching, research and extension projects and actions. Applicable methodologies, presentations and approximation with the teaching, research and extension actions of the Academic Units of UFAC.	60	2-1-0
Teaching Practices and Methodologies of Special/Inclusive Education	Inclusive education in the school system: curriculum, evaluation and didactics. Inclusive methodologies, assistive technology, universal design for learning, UDL Planning, pedagogical experiences, situations and experiences of teaching and learning in basic education institutions.	60	2-1-0
Teaching, Research and Extension Practice in Mathematics I	Mathematics Teaching addressing aspects of content and methodologies. Study and Analysis of Curricular Materials for the Teaching of Mathematics. História das Leis e Documentos Oficiais da Educação Básica. The National Common Curricular Base and State Curriculum Proposals. Organization of the contents of Basic Education in the Official Documents of Education. Teaching Planning: theoretical discussion and practical implementation through Acex. Critical reflection on Textbooks and Paradidactics. Didactic Materials Elaborated in Mathematics Teaching Laboratories. Participation in extension actions in public schools.	60	2-1-0
Teaching, Research and Extension Practice in Mathematics I	Mathematical Pedagogical Knowledge: the Mathematics that is learned and taught. The new high school and the training itineraries. Mathematical games for teaching and learning Mathematics. Theoretical and practical reflection on Problem Solving. History of Mathematics in the teaching and learning of Mathematics. Ethnomathematics and social contexts. Experimental classes relating mathematical contents of Basic Education developed through Extension Actions in public schools.	60	2-1-0
Teaching, Research and Extension Practice in Mathematics II	Discussion on the different teaching modalities and reflection on didactic materials for specific teachings: Youth Education; Adults and the Elderly; Special Education; Quilombola Education; Indigenous Education; Rural Education; and Technological Education. Discussion and reflection addressing aspects of specific teaching contents and methodologies. Inclusive Mathematics Education. Interdisciplinary Projects...	60	2-1-0
Teaching, Research and Extension	Theoretical and practical reflection on pedagogical approaches: Information and Communication Technology, Modeling, and Critical Mathematics Education. Experimental classes relating	60	2-1-0

Practice in Mathematics III	topics of Arithmetic, Algebra, Geometry, Information Processing, Combinatorial Analysis, Probability, Statistics or Financial Mathematics.		
Teaching, Research and Extension Practice in Mathematics IV	Teaching and learning of mathematics from: the relationship between man and nature; Technologies and environmental degradation; methodological and practical approaches to environmental education. Methodological organization in the form of projects; research and extension. Problem solving; Mathematical Modeling, use of concrete materials; games and technological resources, which allow for didactic structuring of the concepts present in school mathematics. The teaching of mathematics valuing differences and diversity, through the promotion of inclusive mathematics education. Extension actions developed in public schools.	60	2-1-0
Mathematics Education, Social Practices and Extension Actions	Teaching and learning of mathematics from: the relationship between man and nature; Technologies and environmental degradation; methodological and practical approaches to environmental education. Methodological organization in the form of projects; research and extension. Problem solving; Mathematical Modeling, use of concrete materials; games and technological resources, which allow for didactic structuring of the concepts present in school mathematics. The teaching of mathematics valuing differences and diversity, through the promotion of inclusive mathematics education. Extension actions developed in public schools.	60	2 – 1 - 0
Mathematics Education, Cultural Practices and Extension Actions	Teaching and learning of mathematics based on: the historical and cultural identity of the Brazilian people; in ethnic-racial relations; in the history of Afro-Brazilian and African culture; in the fight against racism and valuing ethnicity; in the black, Afro-descendant and indigenous cultures in Brazil; in the debate on employability, human rights and the new poles of power. The teaching of mathematics valuing differences and diversity, through the promotion of inclusive education based on human rights; in assistive technologies and inclusive practices. (Re) Construction of pedagogical practice in the teaching and learning of mathematics for visual and intellectual disabilities. Extension actions developed in public schools.	60	2 – 1 - 0
Digital Technologies in the Teaching of Mathematics and Extension Actions I	Mathematics teacher training and pedagogical practice with media integration. Teaching planning with technologies for Regular Education, Quilombola Education, Indigenous Education, Technological Education, Inclusive Mathematics Education. Digital Technologies and Assistive Technology. Mathematics Teaching using: information and communication technologies focused on Problem Solving, History of Mathematics, Modeling and Mathematical Games. Interdisciplinary projects. Experimental classes using digital technologies. Extension actions developed in public schools.	60	2 – 1 - 0
Digital Technologies in Mathematics Teaching and Extension Actions II	Mathematics teacher training and pedagogical practice with media integration. Planning of Mathematics teaching in High School, Youth and Adult Education and Special Education. Teaching Mathematics using: information and communication technologies, Problem Solving, History of Mathematics, Modeling and Mathematical Games. Interdisciplinary projects. Experimental classes with the use of information and communication technologies relating topics of Arithmetic, Algebra, Geometry,	60	2-1-0

	Information Processing, Combinatorial Analysis, Probability, Statistics or Financial Mathematics. Extension actions developed in public schools.		
History, Philosophy and Mathematics Education	History of Mathematics in Egypt, Mesopotamia, Greece, China, India, Europe and the Americas. Discussions and reflections on historiographical and epistemological issues and some relations between History of Science and History of Mathematics and between History and Mathematics Education. To epistemologically situate the theoretical-methodological bases that they use in research on Mathematics Education. An overview of the Philosophy of Mathematics, in view of some of the main questions in the history of mathematics. Discussions about the nature of mathematical thought, involving philosophical currents such as positivism, logicism, constructivism, naturalism, formalism, intuitionism, etc. Extension actions on the history of mathematics as a tool to give meaning to teaching, contextualizing learning and arousing the interest of students.	60	2-1-0
Supervised internship in Mathematics Teaching I	Participation in research and extension projects aimed at the training of teachers who teach Mathematics. Observation of the school environment of the public school and participation in the planning of Elementary School II Education.	60	1-0-1
Supervised internship in Mathematics Teaching II	Participation in research and extension projects aimed at the training of teachers who teach Mathematics. Observation of the school environment of public high schools. Participation in High School planning.	60	1-0-1
Supervised Internship in Mathematics Teaching III	Observation of the school environment and the Mathematics classroom with participation in the planning of teaching activities, organization of teaching and learning situations and didactic material in Youth and Adult Education, or Professional and Technical Education at the high school level, Special Education, Indigenous School Education, Rural Education, Quilombola School Education or Distance Education.	60	1-0-1
Supervised Internship in Mathematics Teaching IV	Organization of teaching and learning situations and didactic material; evaluation and development of teaching activities; regency of the Mathematics classroom in schools that offer Elementary School II.	60	1-0-1
Supervised Internship in Mathematics Teaching V	Organization of teaching and learning situations and didactic material; evaluation and development of teaching activities; regency of the Mathematics classroom in schools that offer regular high school.	60	1-0-1
Supervised Internship in Mathematics Teaching VI	Organization of teaching and learning situations and didactic material; evaluation and development of teaching activities; regency of the Mathematics classroom in schools that offer High School in Youth and Adult Education, or Professional and Technical Education at the High School Level.	60	1-0-1
Supervised Internship in Mathematics Teaching VII	Organization of teaching and learning situations and didactic material; evaluation and development of teaching activities; regency of the Mathematics classroom in schools that offer High School in Special Education, Indigenous School Education, Rural Education, Quilombola School Education or Distance Education.	60	1-0-1

Supervised Internship in Mathematics Teaching VIII	Reflections on the internships carried out in the school environment. Drafting and submission of reports for stages I, II, III, IV, V, VI and VII	60	1-0-1
WORKLOAD T: 470 + P: 360 + E: 360		1,200 HOURS	32-13-8

Source: Authors of the proposal, 2025.

In this way, the curricularization of Extension, in the PPC of the Mathematics Degree course, will be associated with Teaching and Research during the student's academic and professional training process, either through participation in activities related to these three pillars of the university, which, according to the Brazilian Constitution, are inseparable and complementary, or throughout the development of the curriculum, in which students can engage in projects to apply theoretical knowledge (Teaching), generate new knowledge (Research) and interact with society (Extension). This participation aims to enrich the curriculum, develop practical skills and competencies, and contribute to social and cultural development.

4 FINAL CONSIDERATIONS

In the context presented, the Supervised Curricular Internship may take place in public education institutions: municipal and state, and there is also the possibility of taking place in non-formal educational institutions when in extension and research activities. Considering the possibilities presented and what is contained in the legal provisions, the activities to be planned for this curricular component should take into account the accumulated discussions and the experiences lived in alternatives present in teaching, research and extension projects, triggering a process of continuous reflection on how the development of these curricular components may happen in practice and, especially what is its current conception, as it is no longer appropriate to repeat modalities that legitimize the separation between theory and practice and/or to conceive it as a complement to the contents of specific training.

Teachers who work in this curricular component will therefore have the challenge of going beyond what has mostly been interpreted and practiced in order to train Mathematics teachers for the totality of Basic Education. It must, above all, consider teaching and learning processes, contents legitimized by the academic and school community, management, planning, relationship with the community, with educators and students, which presupposes alternative directions to the traditional way, guided by the paradigm of technical rationality. For this, it is necessary that the training institution make clear in its internal legislation and in its administrative structure, mechanisms that enable the regulation of these important curricular components based on alternatives presented and that can actually strengthen the

training of its students, contributing to the improvement of the teaching of Mathematics in basic school.

We also believe that the involvement of interns in programs developed by the University, such as the Tutorial Education Program – PET, whose purpose is to promote a broad training of students at the undergraduate level, encouraging them to develop a conscious and voluntary control of their training process, appropriating scientific and/or technological knowledge of a high academic level, developing their autonomy, establishing epistemological, ethical and social commitments that are present in their action as a student and in their future professional performance, thus contributing to the formulation of new strategies for the development and modernization of education, seeking to reduce, above all, school dropout.

Another example can be sought in the Interinstitutional Program for Teaching Initiation – PIBID, which according to Medeiros, Carvalho and Grando (2012) combines initial training, school teachers and University teachers who use this training space to develop practices and research on teacher training. From this perspective:

The school's teachers assume the supervision and coordination of undergraduate students in order to provide them with knowledge about the school in its different spaces, rhythms, times and culture. The undergraduate student, on the other hand, contributes to these professors in the sense of bringing them discussions, often theoretical, arising from their studies at the University and together, professors and students seek in the school reality possibilities to rethink pedagogical practices, or even innovate. This partnership marked by future teachers and school teachers is completed by the University's professors who, together with students and teachers, assume the role of pedagogically organizing the actions and projects developed in the school environment. In this sense, we can say that the PIBID Program contributes to the constitution of a teacher learning community, in which everyone benefits from multiple learnings [MEDEIROS, CARVALHO AND GRANDO, 2012, p. 67-68].

These programs, among others, are privileged forms of students' relationships with the knowledge of teaching, so these experiences can and should be valued within the scope of the course, including the possibility of exemption from part of the Supervised Internship, according to current legislation, which establishes that "extension, monitoring and scientific initiation activities in higher education, developed by the student, can only be equated to the internship in case of provision in the pedagogical project of the course". Finally, it should be clarified that we understand regular teaching activity as going beyond classroom regency, which is only a constitutive part of the Supervised Internship carried out in the traditional way. In this case, the current legislation also provides for these possibilities:

Art. 4 - Extension activities must make up at least 10% (ten percent) of the total student curricular workload of undergraduate courses, which must be part of the curricular

matrix of the courses; Art. 5 - The conception and practice of the Guidelines for Extension in Higher Education are structured: I - the dialogical interaction of the academic community with society through the exchange of knowledge, participation and contact with complex contemporary issues present in the social context; II - the citizenship education of students, marked and constituted by the experience of their knowledge, which, in an interprofessional and interdisciplinary way, is valued and integrated into the curricular matrix; III - the production of changes in the higher institution itself and in other sectors of society, based on the construction and application of knowledge, as well as by other academic and social activities; IV - the articulation between teaching/extension/research, anchored in a single, interdisciplinary, political, educational, cultural, scientific and technological pedagogical process. (RESOLUTION NO. 7, OF DECEMBER 18, 2018)

In this way, we propose extension, associated with teaching and research, consolidating what characterizes the Brazilian university and daily practice. Finally, it should be noted that this integration has already been put on the agenda with article 207 of the Brazilian Constitution (BRASIL, 1988), which proposed the integration of teaching, research and extension activities in the university context, through the articulation between theory and practice.

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FROM THEORY TO PRACTICE: RESILIENCE, FORMAL CURRICULUM, AND NURSING EDUCATION IN EDUCATIONAL SCIENCES

DA TEORIA À PRÁTICA: RESILIÊNCIA, CURRÍCULO FORMAL E FORMAÇÃO EM ENFERMAGEM NAS CIÊNCIAS DA EDUCAÇÃO

DE LA TEORÍA A LA PRÁCTICA: RESILIENCIA, CURRÍCULO FORMAL Y FORMACIÓN EN ENFERMERÍA EN LAS CIENCIAS DE LA EDUCACIÓN



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ABSTRACT

This chapter examines resilience within the context of nursing education, integrating theoretical foundations from Educational Sciences with empirical evidence from higher education in health. Adopting a from theory to practice perspective, resilience is understood not merely as an individual trait, but as an educational competence developed throughout the academic trajectory and shaped by curricular, pedagogical, and institutional factors. The study is based on a longitudinal quantitative design conducted with undergraduate nursing students, enabling the analysis of changes in resilience levels over time. The findings indicate that resilience is a dynamic and multidimensional construct, positively associated with psychological well-being, reduced academic stress, and student retention. Factors such as social support, supervised clinical experiences, intentional pedagogical practices, and adaptive coping strategies were identified as central to strengthening student resilience. The discussion highlights the role of the formal curriculum, in conjunction with the hidden curriculum, in fostering socio-emotional competencies. It is concluded that integrating theory and practice through the lens of resilience significantly enhances nursing education and contributes to the advancement of Educational Sciences, emphasizing the importance of institutional policies and pedagogical strategies aimed at promoting healthier, more inclusive, and sustainable learning environments in higher education.

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Keywords: Resilience. Nursing Education. Educational Sciences. Curriculum. Higher Education.

RESUMO

Este capítulo examina a resiliência no contexto da formação em Enfermagem, integrando fundamentos teóricos das Ciências da Educação com evidências empíricas do ensino superior em saúde; adotando uma perspectiva da teoria à prática, a resiliência é compreendida não apenas como um traço individual, mas como uma competência educacional desenvolvida ao longo da trajetória acadêmica e moldada por fatores curriculares, pedagógicos e institucionais; o estudo baseia-se em um delineamento quantitativo longitudinal realizado com estudantes de graduação em Enfermagem, permitindo a análise das mudanças nos níveis de resiliência ao longo do tempo; os resultados indicam que a resiliência é um construto dinâmico e multidimensional, positivamente associado ao bem-estar psicológico, à redução do estresse acadêmico e à permanência estudantil; fatores como apoio social, experiências clínicas supervisionadas, práticas pedagógicas intencionais e estratégias adaptativas de enfrentamento foram identificados como centrais para o fortalecimento da resiliência estudantil; a discussão destaca o papel do currículo formal, em conjunto com o currículo oculto, na promoção de competências socioemocionais; conclui-se que a integração entre teoria e prática sob a ótica da resiliência potencializa significativamente a formação em Enfermagem e contribui para o avanço das Ciências da Educação, enfatizando a importância de políticas institucionais e estratégias pedagógicas voltadas à promoção de ambientes de aprendizagem mais saudáveis, inclusivos e sustentáveis no ensino superior.

Palavras-chave: Resiliência. Formação em Enfermagem. Ciências da Educação. Currículo. Ensino Superior.

RESUMEN

Este capítulo examina la resiliencia en el contexto de la formación en Enfermería, integrando fundamentos teóricos de las Ciencias de la Educación con evidencia empírica de la educación superior en salud; adoptando una perspectiva de la teoría a la práctica, la resiliencia se entiende no solo como un rasgo individual, sino como una competencia educativa desarrollada a lo largo de la trayectoria académica y moldeada por factores curriculares, pedagógicos e institucionales; el estudio se basa en un diseño cuantitativo longitudinal realizado con estudiantes de grado en Enfermería, lo que permite analizar los cambios en los niveles de resiliencia a lo largo del tiempo; los resultados indican que la resiliencia es un constructo dinámico y multidimensional, asociado positivamente con el bienestar psicológico, la reducción del estrés académico y la permanencia estudiantil; factores como el apoyo social, las experiencias clínicas supervisadas, las prácticas pedagógicas intencionales y las estrategias adaptativas de afrontamiento fueron identificados como centrales para fortalecer la resiliencia estudiantil; la discusión destaca el papel del currículo formal, en conjunto con el currículo oculto, en la promoción de competencias socioemocionales; se concluye que la integración entre teoría y práctica desde la perspectiva de la resiliencia potencia significativamente la formación en Enfermería y contribuye al avance de las Ciencias de la Educación, enfatizando la importancia de políticas institucionales y estrategias pedagógicas orientadas a promover entornos de aprendizaje más saludables, inclusivos y sostenibles en la educación superior.

Palabras clave: Resiliencia. Formación en Enfermería. Ciencias de la Educación. Currículo. Educación Superior.

1 INTRODUCTION

Social, scientific, and technological transformations over recent decades have profoundly reshaped higher education training processes, particularly in the health sciences. The expansion of access to universities, the diversification of student profiles, and the increasing complexity of health systems have demanded new competencies from future professionals, extending well beyond the strictly technical dimension of knowledge (BREWER et al., 2019; SANDERSON; BREWER, 2017; TUR PORCAR et al., 2020).

Within the context of nursing education, these transformations manifest with particular intensity. Nursing is a professional field characterized by high cognitive, emotional, and practical demands, in which students are progressively exposed to human suffering, ethical responsibility, academic pressure, and institutional requirements. National and international studies indicate that these factors contribute to elevated levels of stress, anxiety, and emotional vulnerability among nursing students, with direct repercussions for academic performance, mental health, and student retention (SOUZA et al., 2020; RODRIGUES; RODRIGUES; CARVALHO, 2020; TUR PORCAR et al., 2020).

Within this context, resilience has emerged as a central construct for understanding processes of positive adaptation in the face of adversities encountered throughout the educational trajectory. Far from being understood as an innate or exclusively individual characteristic, resilience is conceptualized as a dynamic process, developed over time and shaped by multiple factors, including personal, social, educational, and institutional dimensions (BRANDÃO; MAHFOUD; GIANORDOLI-NASCIMENTO, 2011; STACEY; COOK, 2019).

The literature indicates that students with higher levels of resilience tend to demonstrate greater emotional balance, enhanced capacity to cope with academic stress, and stronger engagement in the learning process. Conversely, low levels of resilience are associated with an increased risk of psychological distress, academic dropout, and difficulties in adapting to the demands of higher education in the health sciences (LI; HASSON, 2020; TUR PORCAR et al., 2020).

From the perspective of Educational Sciences, conceptualizing resilience as an analytical category entails shifting the focus beyond the exclusively individual level toward an approach that acknowledges the role of the curriculum, pedagogical practices, and institutional culture in student development. The formal curriculum, as articulated in pedagogical projects and course syllabi, as well as the hidden curriculum composed of implicit values, relationships, and practices, constitute privileged spaces for either the

promotion or the undermining of resilience throughout undergraduate education (BREWER et al., 2019; SANDERSON; BREWER, 2017; TUR PORCAR et al., 2020).

Thus, this chapter proposes a reflection that integrates theory and practice, aligning with the aims of the book *From Theory to Practice: A Modern Approach to Educational Sciences*. It is grounded in the assumption that resilience constitutes a relevant educational competence within Educational Sciences, particularly in the context of nursing education, as it brings together human development, meaningful learning, and preparation for professional practice in complex and challenging settings (BRANDÃO; MAHFOUD; GIANORDOLI-NASCIMENTO, 2011; STACEY; COOK, 2019).

1.1 HEALTH EDUCATION AND CONTEMPORARY CHALLENGES

Health education within the context of higher education faces challenges that reflect transformations in the contemporary world, such as the intensification of professional demands and changes in student profiles (BREWER et al., 2019; WALSH et al., 2020).

From the perspective of Educational Sciences, it becomes essential to rethink teaching and learning processes by recognizing students as active agents in their own educational trajectories. In this regard, health education must incorporate pedagogical strategies that promote not only the acquisition of technical knowledge but also the development of socioemotional competencies, which are fundamental for qualified and humanized professional practice (MEJIA, 2018; YESENIA, 2023; CRISTINA, 2023).

1.2 RESILIENCE AS AN EDUCATIONAL AND PSYCHOSOCIAL CONSTRUCT

Resilience, originally discussed within fields such as psychology and sociology, has gained increasing prominence in educational discourse, particularly in the context of health professional education (BRANDÃO; MAHFOUD; GIANORDOLI-NASCIMENTO, 2011; STOFFEL; CAIN, 2018).

Within the educational field, resilience should not be understood as an innate or exclusively individual characteristic, but rather as a dynamic process influenced by personal, social, and institutional factors. Consequently, pedagogical practices, interpersonal relationships, curricular organization, and institutional support emerge as central elements in the promotion of student resilience (SILVA, 2017; MEJIA, 2018; MORAES FILHO et al 2020; SOUZA et al 2020; CRISTINA, 2023; YESENIA, 2023).

1.3 NURSING EDUCATION BETWEEN THEORY AND PRACTICE

Nursing education is characterized by the continuous articulation between theoretical knowledge and practical experiences, requiring students to demonstrate a high capacity for adaptation and coping. The transition between classroom instruction, laboratory activities, and real-world care settings imposes challenges that directly affect students' academic trajectories and emotional well-being. Within this context, understanding how the formal curriculum contributes to the development of resilience becomes essential, as the curriculum embodies pedagogical intentions and institutional values that directly shape student formation. By intentionally and reflectively integrating theory and practice, nursing education can foster the construction of healthier, more coherent academic pathways that are aligned with the contemporary demands of health education (SILVA, 2017; MEJIA, 2018; MORAES FILHO et al 2020; SOUZA et al 2020; CRISTINA, 2023; YESENIA, 2023).

2 THEORETICAL FOUNDATIONS OF RESILIENCE IN HIGHER EDUCATION

2.1 CONCEPTS AND THEORETICAL MODELS OF RESILIENCE

Resilience has been extensively investigated in the fields of health and education, particularly through psychological and educational approaches applied to professional training. From a conceptual standpoint, resilience is understood as a dynamic process involving the capacity for positive adaptation in the face of adverse situations. It is not limited to an individual trait, but rather emerges from the interaction among personal, social, and contextual factors (BRANDÃO; MAHFOUD; GIANORDOLI-NASCIMENTO, 2011; STACEY; COOK, 2019).

Within the context of nursing education, studies demonstrate that resilience plays a central role in coping with the academic and emotional demands experienced by students throughout undergraduate training (BREWER et al., 2019; SANDERSON; BREWER, 2017). Contemporary theoretical models emphasize that the presence of protective factors, such as social support, coping strategies, and supportive educational environments, contributes significantly to the strengthening of student resilience (LI; HASSON, 2020).

Furthermore, systematic reviews and scoping studies indicate that structured educational interventions embedded within the curriculum can foster the development of resilience among health sciences students, reinforcing the notion that resilience constitutes a competence that can be taught and learned (DIFFLEY; DUDDLE, 2022; WALSH et al., 2020).

2.2 RESILIENCE, MENTAL HEALTH, AND EDUCATIONAL PROCESSES

The relationship between resilience and mental health has received increasing attention in the scientific literature, particularly within the context of nursing education. Evidence indicates that students in this field experience high levels of stress, anxiety, and psychological distress, arising both from academic demands and from experiences encountered in clinical practice settings (SOUZA et al., 2020; RODRIGUES; RODRIGUES; CARVALHO, 2020).

Empirical studies demonstrate that higher levels of resilience are associated with more favorable indicators of psychological well-being, a lower incidence of academic burnout, and greater persistence throughout the course of study (CHOW et al., 2018; RÍOS-RISQUEZ et al., 2018). In this regard, resilience functions as a mediating factor between academic stressors and students' mental health, contributing to healthier educational trajectories (LI; HASSON, 2020).

The literature further indicates that educational strategies aimed at promoting self-care, social support, and emotional development exert positive effects on resilience and student well-being, reinforcing the need for intentional pedagogical approaches in higher education health programs (HIGGINS et al., 2024; MOORE; MONTGOMERY; COBBS, 2021).

2.3 THE FORMAL CURRICULUM AND THE HIDDEN CURRICULUM IN HEALTH EDUCATION

The curriculum, as a structuring element of university education, exerts a direct influence on the development of academic and socioemotional competencies. Within the context of health education, the formal curriculum, as expressed through pedagogical projects, course syllabi, and curricular activities, defines the content, objectives, and methodologies that guide the educational process (WALSH et al., 2020).

However, beyond the formal curriculum, the hidden curriculum, constituted by interpersonal relationships, institutional practices, and implicitly conveyed values, plays a significant role in student formation. Studies indicate that experiences encountered within academic environments and clinical practice settings significantly influence the development of resilience, either positively or negatively (DIFFLEY; DUDDLE, 2022; STACEY; COOK, 2019).

In nursing education, the articulation between the formal and hidden curricula becomes particularly relevant given students' exposure to situations of high emotional complexity. Accordingly, understanding the curriculum as a potential space for the promotion

of resilience contributes to strengthening the integration between theory and practice, in alignment with the contemporary demands of Educational Sciences (SILVA, 2017; MEJIA, 2018; MORAES FILHO et al 2020; SOUZA et al 2020; CRISTINA, 2023; YESENIA, 2023).

3 STUDY METHODOLOGY

3.1 STUDY DESIGN AND METHODOLOGICAL APPROACH

This chapter is based on a longitudinal study employing a quantitative approach, conducted with undergraduate nursing students, with the aim of analyzing changes in resilience levels throughout the educational trajectory. The choice of a longitudinal design is justified by its capacity to capture changes over time, thereby allowing resilience to be understood as a dynamic process, in accordance with the relevant literature (RÍOS-RÍSQUEZ et al., 2018; LI; HASSON, 2020).

The quantitative approach proved appropriate for the objective measurement of resilience and its dimensions, as it has been widely employed in research involving nursing students and other health sciences populations (TUR PORCAR et al., 2020; CHOW et al., 2018).

3.2 STUDY CONTEXT AND PARTICIPANTS

The study was conducted at a public higher education institution located in the interior of the state of São Paulo, Brazil, which offers a full-time undergraduate nursing program. The participants comprised 40 regularly enrolled students, all of whom entered the program in 2021 and were reassessed in 2022 and 2023, being followed from the time of entry into the course through the subsequent years of training.

The sample composition followed previously established inclusion criteria, encompassing students aged 18 years or older who were formally enrolled in the program, in line with similar investigations conducted within the context of nursing education (RUAS et al., 2019; SOUZA et al., 2020).

3.3 DATA COLLECTION INSTRUMENTS

Resilience was assessed using a validated psychometric scale that has been widely employed in studies involving nursing students and health professionals. The selection of this instrument was based on evidence of its validity, reliability, and cultural appropriateness, as documented in national and international studies (WAGNILD; YOUNG, 1993; PESCE et al., 2005).

In addition to the resilience scale, sociodemographic and academic data were collected, including age, sex, stage of the program, and information related to students' academic trajectories, given the relevance of these factors for the analysis of student resilience (MORAES FILHO et al., 2020).

3.4 DATA COLLECTION AND ANALYSIS PROCEDURES

Data collection was conducted at different points throughout the educational trajectory, allowing for a comparative analysis of resilience levels over time. The procedures adopted followed ethical and methodological protocols consistent with research involving university students (SILVA, 2017).

The data were analyzed using appropriate statistical techniques with the aid of the R software, current version, which is widely recognized for scientific data analysis (R Core Team, 2023). To assess data normality, the Shapiro–Wilk test was applied, in accordance with classical methodological recommendations (SHAPIRO; WILK, 1965).

These analyses enabled the identification of trends, associations, and variations in resilience levels throughout the training process, thereby contributing to an understanding of the role of the formal curriculum and academic experiences in the development of resilience among nursing students.

3.5 ETHICAL CONSIDERATIONS

This study was duly submitted to the Research Ethics Committee of the São José do Rio Preto School of Medicine (CEP–FAMERP) and constitutes an integral part of the parent project entitled Social and Human Sciences in Health Sciences Programs: Evaluation of the Impact of Nursing, Medicine, and Psychology Curricula on the Development of Professionalism. The project received approval under CAAE number 41220020.8.0000.5415, Ethics Committee opinion number 4,543,158, and was approved on February 17, 2021.

All necessary measures were and will continue to be taken to ensure the confidentiality and anonymity of the research participants.

4 RESULTS AND DISCUSSION

4.1 SOCIODEMOGRAPHIC AND ACADEMIC PROFILE OF THE STUDENTS

The findings indicate that the sociodemographic profile of the nursing students analyzed exhibits characteristics similar to those reported in the national and international literature, particularly with regard to the predominance of female students, a young adult age range, and full-time dedication to the program. Studies suggest that these characteristics

directly influence students' academic experiences and the levels of stress encountered throughout their training (SOUZA et al., 2020; RODRIGUES; RODRIGUES; CARVALHO, 2020).

Factors such as age, socioeconomic conditions, and early clinical experiences may function both as risk factors and as protective elements in the development of resilience, as indicated by studies conducted with health sciences students (MORAES FILHO et al., 2020; PERRY et al., 2023).

4.2 LEVELS OF RESILIENCE AND ITS DIMENSIONS ACROSS THE TRAINING PROCESS

The sample comprised 40 nursing students from FAMERP, predominantly female (85%), with a mean age of 19.5 years (SD = 1.8). Table 1 presents the descriptive statistics for the resilience dimensions across the three years of the study, revealing moderate to high resilience levels among the participants.

Table 1

Descriptive analysis of resilience factors over three years (2021–2023). (n = 40, FAMERP, 2025)

Resilience Factor	Year		
	2021	2022	2023
Self-Sufficiency	28.15 (3.85)	28.43 (4.22)	27.13 (4.72)
Meaning of Life	27.95 (2.19)	26.33 (3.42)	26.75 (2.84)
Equanimity	24.55 (4.38)	25.25 (4.62)	23.33 (4.15)
Perseverance	30.40 (3.37)	27.95 (4.70)	27.85 (4.68)
Existential Singularity	27.83 (4.45)	27.10 (4.88)	27.23 (5.20)

Results are presented as mean (standard deviation).

Table 1 presents the descriptive statistics for resilience factors, indicating moderate to high levels of resilience among students, particularly in Self-Reliance and Perseverance.

To understand how the resilience factors changed over time, a repeated measures ANOVA was conducted. Table 2 summarizes the results of this analysis, highlighting the statistical significance and effect sizes for each factor.

Table 2

Comparative analysis of resilience factors over three years (2021–2023). (n = 40, FAMERP, 2025)

Resilience Factor	Year			Valor p*	TDE†
	2021	2022	2023		
Autossuficiência	28.15 (3.85)	28.43 (4.22)	27.13 (4.72)	0.3857	0.0241
Meaning of Life	27.95 (2.19)	26.33 (3.42)	26.75 (2.84)	0.1200‡	0.0927
Equanimity	24.55 (4.38)	25.25 (4.62)	23.33 (4.15)	0.1148	0.0540
Perseverance	30.40 (3.37)	27.95 (4.70)	27.85 (4.68)	0.0131	0.1051
Existential Singularity	27.83 (4.45)	27.10 (4.88)	27.23 (5.20)	0.7851	0.0062

Results are presented as mean (standard deviation).

* Repeated measures ANOVA; † Effect size = partial eta squared. ‡ Estimated mean p-value after applying bootstrapping technique due to non-normal distribution of residuals. Bold formatting = Significant p-value.

Given the significant finding for the Perseverance factor, post-hoc tests were performed to pinpoint where the differences occurred. Table 3 details these comparisons between the years, providing adjusted p-values and Cohen's d effect sizes.

Table 3

Post-hoc comparisons for perseverance factor (2021–2023). (n = 40, FAMERP, 2025)

Resilience Factor	Pairwise Comparisons					
	2021 x 2022		2021 x 2023		2022 x 2023	
	p-Value	TDE (IC 95%)	p-Value	TDE (IC 95%)	p-Value	TDE (IC 95%)
Perseverance	0.027	0.570 0.147; 0.994	0.021	0.594 0.171; 1.016	1.000	0.023 - 0.479 ; 0.525

ES, Effect Size = Cohen's d; CI, Confidence Interval; Bold formatting = Significant p-value.

While the decrease in Perseverance was statistically significant, it is important to consider the practical implications of this change. A decrease of 2.55 points on the scale may indicate a reduced capacity to cope with academic stress and pressure, potentially affecting performance and well-being.

To illustrate the trend in Self-Sufficiency, which remained relatively stable over the study period, Figure 1 presents the scores for this factor across the three years. In contrast to Self-Reliance, the Perseverance factor showed a significant decline. To further emphasize the importance of this finding, we have added a more detailed explanation of the observed decrease in Perseverance scores. Specifically, the Perseverance scores decreased significantly from 2021 ($M = 30.40$, $SD = 3.37$) to 2022 ($M = 27.95$, $SD = 4.70$) and 2023 ($M = 27.85$, $SD = 4.68$), as revealed by repeated measures ANOVA ($p = 0.0131$). Post-hoc comparisons indicated significant differences between 2021 and 2022 ($p = 0.027$) and between 2021 and 2023 ($p = 0.021$). Figure 2 visually represents this decrease in Perseverance scores from 2021 to 2022 and 2023, highlighting the impact of academic progression on this aspect of resilience.

Figure 1

Self-Reliance scores across the three years of the study (2021–2023) demonstrate the stability of this resilience factor. ($n = 40$, FAMERP)

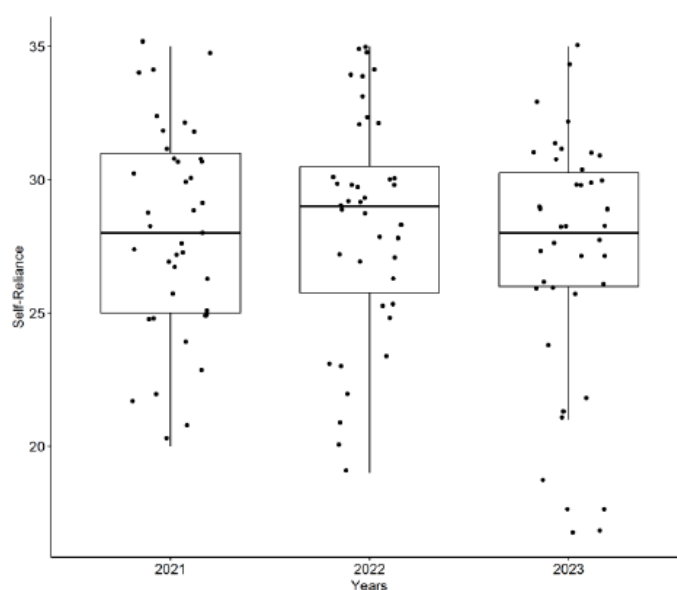
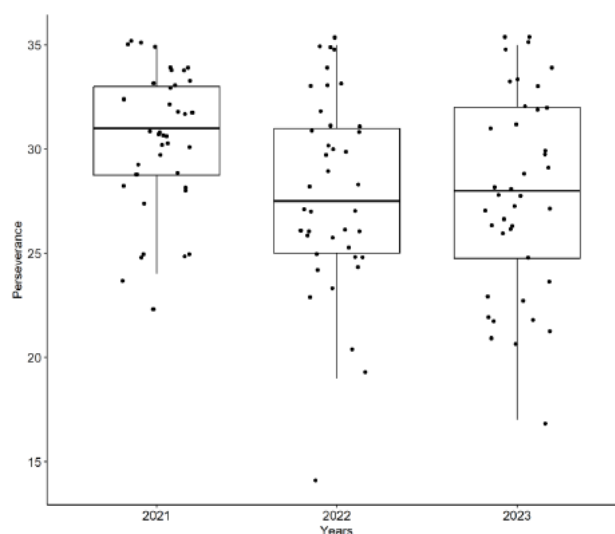


Figure 2

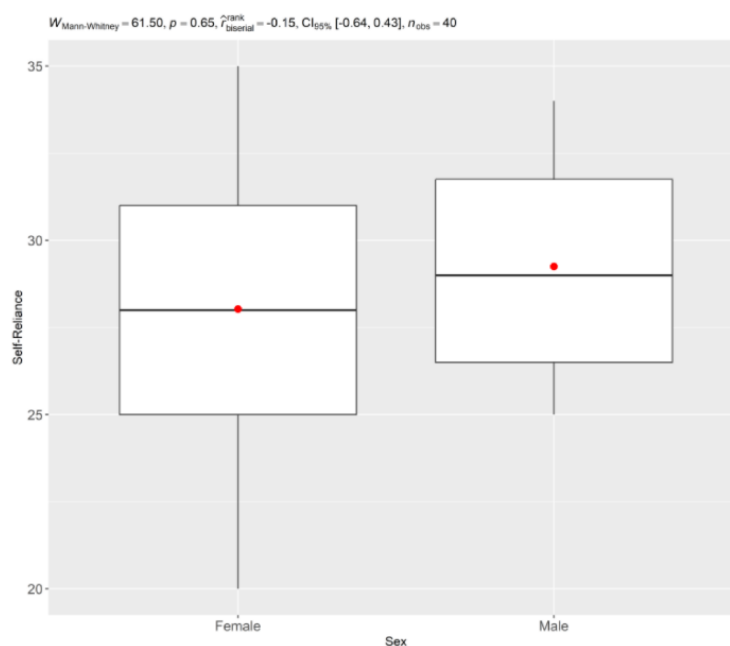
Comparison of Self-Reliance by Sex, indicating no significant differences between groups. (n = 40, FAMERP, 2025)



To explore whether sociodemographic factors influenced resilience, comparisons were made between different groups. Figure 3 presents the comparison of A Self-Reliance by sex, showing that there were no significant differences between male and female students in this resilience factor.

Figure 3

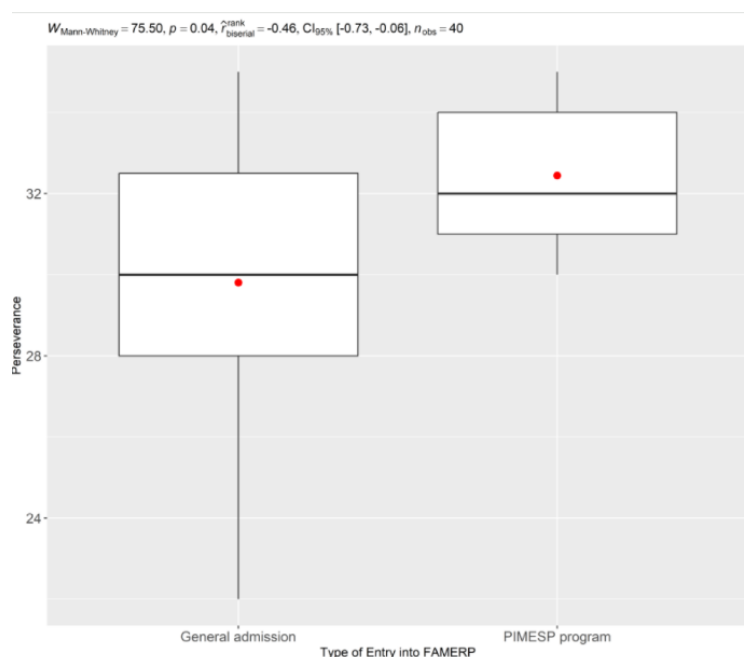
Comparison of Self-Reliance by Sex, indicating no significant differences between groups. (n = 40, FAMERP, 2025)



Finally, Figure 4 presents a comparison of Perseverance scores based on the type of entry into FAMERP, revealing that students entering through the PIMESP program (Inclusion Program with Merit in Public Higher Education of São Paulo State) exhibited higher scores in Perseverance compared to those entering through general admission.

Figure 4

Comparison of Perseverance by Type of Entry into FAMERP, demonstrating higher scores for students entering through the PIMESP program (Inclusion Program with Merit in Public Higher Education of São Paulo State). (n = 40, FAMERP, 2025)



Independent samples t-tests were conducted to determine if there were statistically significant differences in Perseverance scores based on sex and type of entry into FAMERP. The t-tests comparing Perseverance scores by sex were not significant for any of the time points (2021, 2022, and 2023). However, the t-test comparing Perseverance scores by type of entry into FAMERP revealed a significant difference in 2021 ($t = 2.5$, $p < 0.05$), with students entering through the PIMESP program exhibiting higher Perseverance scores. This difference was not significant in 2022 or 2023.

These results indicate that while nursing students at FAMERP begin their course with promising resilience levels, there is a notable decline in the Perseverance factor over time. Additionally, the type of entry into the university appears to influence students' perseverance levels.

The analysis of resilience levels revealed moderate to high values among the students, corroborating evidence that resilience constitutes a competence progressively developed

throughout nursing education (CHOW et al., 2018; AMSRUD; LYBERG; SEVERINSSON, 2019). Validated psychometric instruments have demonstrated consistency in the measurement of this construct across different educational contexts (TUR PORCAR et al., 2020; PESCE et al., 2005).

Dimensions related to perseverance, emotional balance, and sense of purpose proved to be particularly relevant, aligning with studies that associate these factors with reduced academic stress and the promotion of psychological well-being (RÍOS-RÍSQUEZ et al., 2018; SMITH; YANG, 2017).

4.3 RESILIENCE, STRESS, AND PSYCHOLOGICAL WELL-BEING

The results indicate a positive association between higher levels of resilience and more favorable indicators of psychological well-being, including lower perceived stress and greater satisfaction with academic life. Similar evidence is widely documented in the literature, which identifies resilience as a mediating variable between academic stressors and mental health outcomes (LI; HASSON, 2020; ZHANG et al., 2024).

In addition, social and institutional support emerges as a central factor in strengthening resilience, operating in an integrated manner with individual coping strategies (BUTTON; FALLON; FOWLER, 2023; AVELAR; FARINA, 2024).

4.4 PEDAGOGICAL IMPLICATIONS: FROM THEORY TO EDUCATIONAL PRACTICE

The findings highlight the need to intentionally incorporate pedagogical strategies aimed at fostering resilience within undergraduate nursing curricula. Educational interventions grounded in mindfulness, emotional intelligence, and self-care have demonstrated positive effects on strengthening resilience and enhancing student well-being (SILVA, 2017; CLEARY et al., 2018; MORAES FILHO et al., 2020; SOUZA et al., 2020; VEIGH et al., 2021; YEO; SO; CHAE, 2023).

These strategies reinforce the articulation between theory and practice within Educational Sciences by recognizing students' holistic development as a central axis of the educational process. Structured resilience-promotion programs have shown positive impacts on both students' mental health and the quality of future professional training (MOORE; MONTGOMERY; COBBS, 2021; DIFFLEY; DUDDLE, 2022).

5 FINAL CONSIDERATIONS

This chapter aimed to analyze resilience within the context of nursing education by articulating foundations from Educational Sciences with empirical evidence derived from

studies conducted in higher education in health. By adopting a theory-to-practice perspective, resilience was examined not merely as an individual attribute, but as an educational competence developed throughout the training trajectory and influenced by curricular, pedagogical, and institutional factors.

The findings discussed indicate that resilience exhibits a dynamic and multidimensional character, manifesting progressively throughout undergraduate nursing education. Elements such as social support, intentional pedagogical practices, supervised clinical experiences, and adaptive coping strategies emerged as central to strengthening students' psychological well-being and academic persistence, in line with the specialized literature (LI; HASSON, 2020; BREWER et al., 2019).

From the perspective of Educational Sciences, these findings reinforce the relevance of curricula that explicitly integrate the development of socioemotional competencies with technical and scientific content. Educational interventions aimed at promoting resilience, self-care, and emotional intelligence demonstrate strong potential to enhance professional training, contributing to the preparation of nurses who are better equipped to cope with contexts of high complexity and emotional pressure (WALSH et al., 2020; DIFFLEY; DUDDLE, 2022).

In addition, this study advances knowledge by demonstrating that resilience can be fostered through intentionally structured pedagogical practices and institutional policies. This understanding broadens the role of higher education institutions, assigning them an active responsibility in creating healthy and inclusive learning environments aligned with the contemporary demands of health education.

As a limitation, the study is confined to a specific institutional context, which may restrict the generalizability of the findings. Nevertheless, the evidence presented offers valuable insights for future research and for the implementation of educational strategies aimed at strengthening resilience across diverse educational settings.

In conclusion, integrating theory and practice through the lens of resilience represents a promising pathway for enhancing nursing education and strengthening Educational Sciences. By recognizing resilience as an essential educational competence, this chapter contributes to critical reflection and to the development of more humane, sustainable, and context-responsive educational practices in contemporary higher education.

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EDUCATION IN EUROPE IN THE EIGHTEENTH CENTURY AND ITS INFLUENCE ON FEMALE EDUCATION IN BRAZIL

A EDUCAÇÃO NA EUROPA NO SÉCULO XVIII E A SUA INFLUENCIA NA EDUCAÇÃO FEMININA NO BRASIL

LA EDUCACIÓN EN EUROPA EN EL SIGLO XVIII Y SU INFLUENCIA EN LA EDUCACIÓN FEMENINA EN BRASIL



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ABSTRACT

The chapter analyzes the introduction of education, from the eighteenth century onward, as a right and a social necessity aimed at the formation of citizens, examining its development in Europe — especially in Germany, England, and France — and the thought of authors such as Rousseau, Mary Wollstonecraft, and Olympe de Gouges. Initially, it highlights the role of the Protestant Reformation, particularly Lutheranism and Calvinism, in expanding female literacy. Women's education was mainly intended to enable the reading of the Scriptures and to strengthen religious and family life, while still maintaining notions of female inferiority and domestic roles. With the Enlightenment, the French and Industrial Revolutions, and the advance of secularization, education came to be understood as an instrument for forming the modern citizen, linked to the State and grounded in scientific principles. Public school systems, teacher training, and the idea of universal instruction were consolidated. Rousseau occupies a central place in this debate, especially through *Emile*. Although considered the father of modern pedagogy, he proposed distinct educational models: *Emile* is prepared for citizenship, autonomy, and public life, whereas *Sophie* is educated for domesticity, submission, and service to her husband, reinforcing the division between male and female spheres. Feminist thinkers criticized this conception, denouncing women's exclusion from citizenship and the social contract. The text concludes that, despite Enlightenment ideals of equality and freedom, education also served to legitimize gender inequality and sustain patriarchal domination for centuries.

Keywords: Female Education. Citizenship. Rousseau. Feminism. Enlightenment.

RESUMO

O capítulo analisa a introdução da educação, a partir do século XVIII, como um direito e uma necessidade social voltada à formação dos cidadãos, observando seu desenvolvimento na Europa — especialmente na Alemanha, Inglaterra e França — e o pensamento de autores como Rousseau, Mary Wollstonecraft e Olympe de Gouges. Inicialmente, destaca-se o papel da Reforma Protestante, sobretudo do luteranismo e do calvinismo, na ampliação da alfabetização feminina. A instrução das mulheres visava principalmente à leitura das

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Escrituras e ao fortalecimento da vida religiosa e familiar, ainda que mantivesse a ideia de inferioridade feminina e sua função doméstica. Com o Iluminismo, as Revoluções Francesa e Industrial e o avanço da laicização, a educação passou a ser entendida como instrumento de formação do cidadão moderno, vinculada ao Estado e fundamentada em princípios científicos. Consolidaram-se sistemas escolares públicos, formação docente e a noção de instrução universal. Rousseau ocupa posição central nesse debate, sobretudo com a obra *Emílio*. Embora considerado pai da pedagogia moderna, propôs modelos educacionais distintos: *Emílio* é preparado para a cidadania, a autonomia e a vida pública, enquanto *Sofia* é educada para a domesticidade, a submissão e o serviço ao marido, reforçando a separação entre os espaços masculino e feminino. Pensadoras feministas criticaram essa concepção, denunciando a exclusão das mulheres da cidadania e do contrato social. O texto conclui que, apesar do discurso iluminista de igualdade e liberdade, a educação também serviu para legitimar a desigualdade de gênero e sustentar a dominação patriarcal por séculos.

Palavras-chave: Educação Feminina. Cidadania. Rousseau. Feminismo. Iluminismo.

RESUMEN

El capítulo analiza la introducción de la educación, a partir del siglo XVIII, como un derecho y una necesidad social orientada a la formación de ciudadanos, examinando su desarrollo en Europa — especialmente en Alemania, Inglaterra y Francia — y el pensamiento de autores como Rousseau, Mary Wollstonecraft y Olympe de Gouges. Inicialmente, destaca el papel de la Reforma Protestante, en particular del luteranismo y del calvinismo, en la expansión de la alfabetización femenina. La educación de las mujeres estaba dirigida principalmente a posibilitar la lectura de las Escrituras y a fortalecer la vida religiosa y familiar, manteniendo, sin embargo, nociones de inferioridad femenina y de roles domésticos. Con la Ilustración, las Revoluciones Francesa e Industrial y el avance de la secularización, la educación pasó a ser comprendida como un instrumento para la formación del ciudadano moderno, vinculada al Estado y fundamentada en principios científicos. Se consolidaron los sistemas públicos de enseñanza, la formación docente y la idea de instrucción universal. Rousseau ocupa un lugar central en este debate, especialmente a través de *Emilio*. Aunque es considerado el padre de la pedagogía moderna, propuso modelos educativos distintos: *Emilio* es preparado para la ciudadanía, la autonomía y la vida pública, mientras que *Sofía* es educada para la domesticidad, la sumisión y el servicio al marido, reforzando la división entre las esferas masculina y femenina. Las pensadoras feministas criticaron esta concepción, denunciando la exclusión de las mujeres de la ciudadanía y del contrato social. El texto concluye que, pese a los ideales ilustrados de igualdad y libertad, la educación también sirvió para legitimar la desigualdad de género y sostener la dominación patriarcal durante siglos.

Palabras clave: Educación Femenina. Ciudadanía. Rousseau. Feminismo. Ilustración.

1 INTRODUCTION

The objective of this chapter is to discuss the introduction of education in the eighteenth century as a right and a necessity of society, for the formation of citizens. To this end, I analyze how the theme of education spread in Europe, especially in Germany, England and France, through some authors such as: Mary Wollstonecraft, Olympe de Gouges, Madame Gacon-Dufon, Madame Clément-Hémery and Jean-Jacques Rousseau. In the case of Germany, I intend to verify how the Calvinist movement identified, in women's literacy, the possibility of disseminating the Holy Scriptures.

I will also highlight how the idea of using education to form new citizens for city life and the adaptation of these people to the new social order that was being born after the French Revolution and the Industrial Revolution was introduced.

It is worth mentioning that in Germany Martin Luther defended, in the sixteenth century, education for boys and girls. Cambi (1999) informs us that Luther's pedagogical conception was based on the idea of universal education for all, in order to form good rulers and women who knew how to lead their homes. Through the Lutheran church and the public authorities, the first school organization under the responsibility of the state was born. So for Cambi:

Lutheranism in Germany relaunches the social function of instruction through the establishment of schools and the valorization of the national language as a means of personal approximation to the texts of Sacred Scripture; Also with the other Reformed Churches the educational problem is seen in close relation to religious renewal. (CAMBI, 1999, p. 251)

It should be noted that, in sixteenth-century Germany, there was already thought of using literate women to disseminate religious principles in the family. In this way, Holy Scripture would be a means of guiding and instructing them religiously and socially, starting from the icon of Mary.

For Silva (1998), Calvinist thought would have a distinction in relation to Luther's thought, by advocating that men and women are the image and likeness of God. Despite this consideration, Calvin believed in female inferiority, because it was through her that the balance of humanity would remain.

The important thing in this new point of view, for Silva (1998), is the list of possibilities that open up for women, among them access to reading and writing and a more affective participation in religious life, the opposite of what the Catholic tradition preached. The author evaluates that the Reform will reach the female public that was prone to the search for spaces of sociability. For women, tired of domestic life, the Protestant church appears as a space capable of satisfying such desires. Thus,

Reading and Bible study, in the vernacular, as a necessity of the Protestant faithful, allowed many women access to reading and a strong motivation for them to become literate, often having their own husbands as teachers. Congregational singing, where male and female voices mixed in praise of God in public services, was in fact a great novelty for lay women who began to participate in the liturgy of Protestant religious communities, despite the jocular criticism of Catholic priests, who, in addition to being strange, minimized the feminine capacity for understanding biblical mysteries and liturgical practice. (SILVA, 1998, p.263)

As can be seen, in relation to female education, it is within the Protestant church that the first experience of female literacy will be born with the objectives of social control and so that women could seek, in the Holy Scriptures, the answers to their doubts and the best way to lead the home.

2 FEMALE EDUCATION IN THE EIGHTEENTH CENTURY

In the eighteenth century, education will have in Rousseau its main representative. For this reason, it will be of fundamental importance, in this article, to analyze his works *Emile* and *Social Contract*, in order to understand how the dominant conception of education was elaborated in the following century and, in this context, what conception was elaborated about female citizenship.

In this sense, from the analysis of chapter V, *Sofia*, of the book *Emile* (1995), from the perspective of gender studies, we found that Rousseau had a perception of female education that was different from the education that should be offered to men.

The counterpoint to her conceptions will come with the advent of the struggles for women's emancipation in the French Revolution, around 1789, through the mobilizations of French women, in addition to the writings of Olimpes de Gouges and the publication, in England, of the book "Vindicación de los derechos de la Mujer" by Mary Wollstonecraft published in 1792. Certainly, from the nineteenth century onwards, other authors opposed Rousseau's view of women's education. The eighteenth century, in Europe, can be considered as the one that put an end to only religious education, giving way to a secular education. The new winds that swept Europe, transforming not only political society, but also its values, brought with them the demand for an education disconnected from religious principles, linked to public affairs and based on scientific foundations.

Cambi states that the eighteenth century can be defined as the century of emancipations: political, economic, religious and geographical. For him,

The effect of all these processes – also accompanied by an increasingly incisive and broader role assumed by the birth and diffusion of the book, by the expansion of literacy (at first for religious, then civil and economic reasons), by the maturation of a

new profile of intellectual (the modern intellectual), no longer an emissary of religious and political power, but characterized by autonomy and a more incisive and dynamic social role – it was a process of secularization, of greater freedom on the part of social classes and individuals (freedom of action and judgment) who became independent of univocal and binding models and now valued precisely for their independence. (CAMBI, 1999, p. 324)

This century will definitively detach itself from the *Ancien Régime*, creating new agents, or rather, independent, free, conscious social actors, in short, citizens of modern society. It is worth asking, from now on: What is the role of education in this new society? What importance would the intellectual have in the new order that was being established? What is the place of women? Would the modern citizen have sex? When thinkers spoke of citizens, were they referring to both sexes?

According to Cambi (1999), education, in addition to homogenizing society and socializing individuals, will build the figure of the active, emancipated, responsible citizen, resident of the city. His task would be to forge this new being. For the author, from the eighteenth century onwards, a school system was implemented with a teaching program and with methods and techniques supported by scientific principles. *Comenius'* Didactics² reveals the new status that education has gained since the seventeenth century.

Surrounded by the belief that, if there is a way of learning, there must also be a specific way of teaching, teacher training schools began to appear in Europe. Cambi (1999) says that, from 1760 onwards, in Austria, education was organized as a responsibility and instrument of the state, with the purpose of training citizens and employees. Thus, not only the provincial normal schools – the Normalshulen, lasting four years – but also the national and state education system were created (Cambi, 1999, p. 333). Thus, the author concludes:

The contemporary school, with its public, state and civil characteristics, with its systematic structure, with its dialogue with the sciences and knowledge in transformation, was born in the eighteenth century, already involving confidence in literacy and in the dissemination of culture as a process of collective democratic growth that remained for a long time, until yesterday (or, perhaps, to this day) as a belief without uncertainties of contemporary society, (CAMBI, 1999, p. 328)

It is these new airs that will create a new dynamic in European society, from the diffusion of books, printed materials, the circulation of theatrical plays and, consequently, the formation of readers. It is through the book that ideas are disseminated and it is in this context that Rousseau publishes, in 1762, *Emile*, with a proposal for education for the free man.

² Publication of the seventeenth century, which advocated the need for methods for teaching and the construction of an adequate space for education to take place, in this case, the school.

The central point of the book is the way in which society begins to gestate the model of education for the free citizen and what place women occupy in this formulation. What does it mean for Rousseau, for example, who also wrote the *Social Contract*, *to be a citizen*? Why, in his proposal, does he differentiate the education that should be adopted for *Emile* and the education of Sofia? How could an author, who is considered the father of contemporary pedagogy, conceive of two types of education? Was your goal to train for the differentiated exercise of citizenship?

Cambi (1999) states that Rousseau is the father of modern pedagogy, as it was he who "operated a copernican revolution in pedagogy, placing the child at the center of his theorizing" (p. 343). His theory is built on the basis of educational models of man and citizen, complementary and alternative models, according to Cambi.

In chapter V of the book *Émile*, according to Cambi (1999), Rousseau will deal not only with the love between man and woman, but also with the construction of a hierarchically subordinate model of female education. Rousseau only highlights, in women, traits such as virtue, wisdom and submission, leaving aside the feminist claims that are already on the agenda in this century of emancipations. In this sense, I think that the role of education should be questioned. For Rousseau, if Sofia was reserved for the function of preparing the modern citizen, how to conceive different models of education? Would the objective be the formation of second-class citizens?

It is no coincidence that the great debate of this period revolved around the conceptions of citizenship and universality. Who was considered a citizen, in the formulation of theorists? French feminists, including Olympe de Gouges, were already demanding the elimination of the political exclusion to which women were subjected.

Mary Wollstonecraft (1994) rebels against the proposition of Rousseau and other authors regarding the type of education that should be offered to women. In this same period, Madame Staël speaks of the need to educate women, because, according to her, education would make them citizens and change the state of fragility and dependence, considered as a feminine characteristic.

To answer these questions, I analyzed the view of these authors who thought about what type of education would be used for the training of new generations of teachers, to verify how they think about models of men and women, based on the historical configurations of behavior considered as feminine and masculine.

3 EMILIO AND SOFIA OR THE WOMAN IN ROUSSEAU

In an attempt to understand how philosophers and scientists, considered classics, discussed the issue of women, feminist scholars have proposed to reread their texts. Some focused on the philosopher Rousseau, to study his proposal for female education.

Authors such as Célia Amarós³, Carole Pateman, Andréa Nye and Rosa Cobo dedicated themselves to the study of some texts of philosophy to understand, for example, how the Enlightenment thought, elaborated and systematized a democratic and liberal society and, in it, what is the role assigned to women.

Andréa Nye (1995), for example, in her book *Feminist Theory and the Philosophies of Man*, states that "Locke, Rousseau, and the utilitarians had modeled a world in which men could be free and equal, a civil society in which men would determine their own destinies." (p.15). For Nye, such ideas were not thought of and applied to women. These are elaborations that constituted the basis of the modern world, such as, for example, Rousseau's thought. For him, women would be accustomed to male command and their nature directed only to the reproduction of the species. According to Nye,

... Women should be educated to please men and be mothers. They must be educated in the sexual seclusion and chastity that legitimize fatherhood. They must learn to stimulate male desire and at the same time prevent men's lust. Seduction is proper to their nature, they are desirous of pleasing, modest, tolerant of injustice, cunning, vain, and artists to a lesser degree. In the family, men are to rule over these frivolous creatures. (NYE, 1995, p.20)

Carole Pateman⁴ (1993) also observes that women were not included in the theory of the Social Contract, since the main assumption was civil liberty, based on patriarchal law. For her, the woman was excluded from the Social Contract through marriage, which she calls the sexual contract.

According to Pateman, the classical theorists did not discuss the issue of women or their relationship with civil society. The new civil society, which emerged more systematically in the seventeenth and eighteenth centuries, was explained through the Social Contract, based on a patriarchal system, presupposing the previous existence of a pact, which she calls the "original contract".

For the aforementioned author (1993), the "original contract creates two differentiated situations, freedom and domination. The freedom of man and the subjection of woman" (p.17 and 18). The original contract, therefore, cannot be understood without involving the woman.

³ A group of feminist scholars articulated in the "feminism and enlightenment seminars", given by the philosopher Célia Amaros, from the Complutense University of Madrid, in the late 80s and early 90s

⁴ Later I will develop Pateman's theory of woman and the sexual contract.

The sense of civil liberty reveals how man, through patriarchal law, can dominate the other half of society. For the same author, the original contract generates a situation of freedom and subjection, as it has, at its base, two types of contract: the social contract for men, on the one hand, and the sexual contract for women on the other. Exactly the parameters of this "social contract" guided Western political thought, both from a democratic and liberal perspective, demarcated by a patriarchal perspective.

Rousseau will be revered as the great democratic thinker. His elaboration regarding the State, according to Bobbio (1992), is original and consequential, since when, for this Enlightenment theorist, the solution would reside in the fact that the social contract, as it is presented, is also a collective act of renunciation of natural rights, but – and here is the fundamental difference that leaves Rousseau as the most consequent theorist of the democratic state – the renunciation is not made in favor of a third party, *but by each one in favor of all*, that is, by each individual (considered individually) for himself (as a member of a totality) (BOBBIO, 1992, p.46)

In the natural state, men are born free and are equal to each other, that is, they are human beings. They give up their freedom, through an agreement or contract, to live in security, which would be expressed in the will to live in freedom, on behalf of everyone in the community. Thus, Bobbio (1992) concludes, in Rousseau's theoretical construction, man, by renouncing his natural freedom, would actually be opting for a broader freedom, freedom in the State.

Perhaps this fact was the theoretical trap into which women fell. In this agreement, women were not included, since they were already outside the "pact", because they had previously contracted another contract, which, according to Pateman (1993), is (sexual) marriage. In this formulation, the idea of individuality is embedded, an issue addressed by Joan Scott (2002).

When reflecting on the position of the theoreticians of the revolution regarding citizenship and what constituted the natural right of men – which made them equal, similar and universal – the aforementioned author concluded that it would be linked to the idea of individualism. For this conception, individuality would be the common trait of all human beings, that is, what makes them human is exactly the possibility of being completely different from the other. So, how to build a theory of equality, if the basis is difference? The strategy, according to Scott (2002), was the creation of an abstract identity, based on the elimination of differentiating categories, such as class origin, status and beliefs.

If the strategy was to eliminate difference and create an abstract equality, how then to conceive the formulation of educational models that take difference as a principle? How can

we also accept the idea of the existence of political equality among beings, if what we saw, during the two centuries that followed, after the French Revolution, was the emphasis on social inequality? Gender, race, ethnicity, themes that emerged at the end of the twentieth century, were suffocated by the ideas of the revolution that preached equality, liberty, fraternity, because the following reading was made: we are equal, brothers and free, at least in the political arena.

It is worth asking: how are the concepts of freedom and individuality presented? In this society, is freedom universal? Who is freedom for? Does everyone enjoy the same civil status?

For Rousseau, according to Pateman (1993), social life begins with the patriarchal family. Women could not be present in this agreement, because they certainly would not be able to control their impulses, their desires, their excesses. How to make a contract with beings so imperfect that, depending on their mood, they can go back on a decision?

In this context, Rousseau elaborates a treatise on the adequate education of these incomplete beings, through Sofia, the fiancée of Émile. According to Cobo (1995), *Emile* is a treatise on education for men and a set of rules of conduct for women. The goal is to describe the ideal woman, the right companion for the character Emílio.

Cobo's (1995) study aims to articulate the pre-social state, the sexual contract and marriage as Rousseauian places, *symbolic* and *real* at the same time. Thus, the work *Emile*, according to the same author, can be observed as much more than a treatise on education, but, above all, an exposition of models of behavior that should be followed by men and women. Thus, *Emilio* should also be analyzed as a text that has a political, philosophical and ideological nature.

According to the author (1995), "Rousseauian man can only exercise his public functions in such an intense way, if he has someone to assume the tasks of reproduction proper to the private space." (p. 210). If we think about the models we have for the division of family tasks, we see how these ideas are still present.

So, what would Sofia's education be like? What education would be able to meet all these needs? I will highlight some points considered by Cobo (1995):

- Sofia's education has a teleological objective, which is the search for her subjection, that is, the construction of the new model of the woman of the bourgeois family that emerged at that time.
- Feminine nature is defined by its sexual and procreative function; thus, she can only be a wife and mother.
- Each gender will have its space to reign. The woman will be responsible for the space

of the house, physical and private space, the home, which involves love and affection. Man will have the space of the street, the public, the realm of violence, indifference, selfishness. In this division, do we get the best part?

- The role of reason – via preceptor – is to guarantee freedom and autonomy for Emile, it is to bring out his qualities. In Sofia, reason will be used for its subjection.
- According to Rousseau, women are endowed with pleasant and delicate intelligence. In this way, she must learn enough to create an environment of love and virtue, accepting these notions of family, not by force, but by consent.
- All women's education must be guided by men. The children and the husband should be the objects that will guide their learning.
- Every difference between man and woman lies in only one aspect: procreation. From there, Rousseau states that there are different types of reasons for men and women. Thus, man is defined by his humanity, and woman is defined by her sexuality. The masculine terrain is the social construction; that of women is marriage, motherhood, family life.

Thus, for Cobo (1995), Sofia's education is based on three axes: chastity, domesticity and subjection to opinion. It can be seen that, from the proposition of this philosopher regarding the education of Emile and Sophie, one can derive the idea that Emile – the man – would be formed for society, and Sophie – the woman – would be formed to serve him, being identified and determined by her nature as a woman and mother.

The man would be formed to live in society, and the woman would be bound to her nature as a reproducer. This type of thinking is often based on biological differences between the sexes. The woman would have an education for the family and the husband, and the man would be raised to live free in society. This type of construction reflects exactly the way Western society bases its foundations of thought: on dichotomy and asymmetry.

From *Emile* and many other philosophical texts, principles, values and models of behavior were built, followed and disseminated. We can then think about how, in Western society, biological differences were constituted into social and cultural differences and how women were imprisoned in the imaginary limits of the home, that is, in the private world.

It took women at least two centuries to break away from such models. Reflecting, analyzing, and theorizing on issues of this nature can shed new light on the origin of female oppression and thus offer new ways to understand the situation and condition of women in contemporary society.

4 ROUSSEAU'S FORMULATION REGARDING THE EDUCATION AND CITIZENSHIP OF MEN AND WOMEN

Rousseau's *Emile* (1995) has been considered, over the years, as an important treatise on education. Studied in teaching schools, without the slightest critical concern, it is presented as an important reference for the education of teachers. Most of the time, the teacher of teaching, and even of pedagogy and licentiate courses, forgets to warn that the philosopher has an exclusive chapter on the education of women. It is exactly chapter V, entitled *Sophie*, that will be detailed throughout the article. Because, from it, Rousseau described how the education of *Emile's* companion should be.

The book consists of five chapters, which describe the trajectory of the young man – from his childhood to adulthood. At the moment when *Emilio* matures, the philosopher decides to talk about the young woman who would be his companion, under the initial argument that "it is not good for man to be alone." (ROUSSEAU, 1995, p.423). Throughout the text, he begins to develop the reasons for this recommendation, because, for him, the woman is the central figure that allows men to exercise or experience public life, that is, their citizenship.

Understanding Rousseau's formulation regarding the education of women necessarily involves his understanding of what woman is. In this sense, he states:

Sophia must be a woman as Emilio is a man, that is, have everything that befits the constitution of her species and her sex to take her place in the physical and moral order. [...] in everything that is not linked to sex, women are men: they have the same organs, the same needs, the same faculties; the machine is built in the same way, the parts are the same, the play of both is the same, the aspect is similar; and from whatever angle we consider them, they differ only by more or less. (ROUSSEAU, 1995, p. 423)

The first assumption to be drawn from such a statement is that, for Rousseau, there would be no distinction between men and women, because physically and biologically they are almost similar, they differ only in small details. For him, each and every organ found in one has a correspondent in the other. So, why are there so many differences? We could affirm that these oppositions do not reside in the field of anatomy, they would be in the social. Then for Rousseau (1995):

In everything that concerns sex, woman and man have relations and differences in everything: the difficulty of comparing them comes from determining, in their constitution, what is of sex and what is not. By comparative anatomy, and even by simple inspection, we find between them general differences which do not seem to arise from sex; they belong to sex, however, but through connections that we cannot

perceive: we do not know how far such connections can extend. (ROUSSEAU, 1995, p.424)

However, although there are so many similarities between men and women, there are many differences that come from sex, which, according to him, cannot be perceived. He concludes by stating that everything in common comes from the species, and everything that is difference comes from sex.

The only thing we know for sure is that everything that is common is of the species and what is different comes from sex. From this double point of view, we find between them so many relations and so many oppositions that it is perhaps one of the wonders of nature to have made two beings so similar and constituted themselves so differently. (ROUSSEAU, 1995, p.424)

This is the secret of life: so similar and, at the same time, extremely different. Thus, even with so many similarities, it is the difference that, for the philosopher, will interfere with morals. In your logic, since sex has established the differences, why spend so much time discussing equality between the sexes, if sex, is the differentiating element and promoter of all the existing distinctions between men and women?

From this understanding, the author will develop his *logic of difference*. For him, the first of them would be related to strength, "one must be active and strong, the other passive and weak: *"it is necessary that one wants and can; it is enough for the other to resist little."* (emphasis added) (ROUSSEAU, 1995, p. 424)

Thus, Rousseau (1995) believes that women were made to please men and, within this dichotomy, one attacks and the other defends himself, one is bold and the other is shy. In this politics of opposition, women and men build their gender identities, understood as the characteristics that are established by society, historically and culturally, based on biological sex, which end up defining women and men.

European society in the eighteenth century, for example, limited public spaces for women. Algranti (1993), in his studies on convents and retreats in the sixteenth and seventeenth centuries, states that the first female congregations had the purpose of inviting women to propagate the Catholic faith. That is, in the absence of a possible marriage and the consequent raising of children, the alternative that remained would be to follow the Catholic faith. For the women of those centuries, the reserved places were the home, next to their husband and children, or, in the impossibility of marriage, the convent or retreat, a possible alternative to regulate their sexuality and their actions. Her subjection to the masculine would be via the church, through the image of Jesus: husband, provider and protector.

From this logic is born the second Rousseauian assumption: the woman was made to be subject to the man, but not everything is submission, because, for him, the "weaker sex" would have in its favor modesty and modesty, weapons necessary to dominate the strong. This opposition policy would be expressed in the following formulation:

The supreme being wished to give primacy to the human species in everything: by giving man immeasurable inclinations, he has at the same time given him the law that regulates them, so that he may be free and master of himself; giving him over to immoderate passions, with them the reason to govern them; surrendering the woman to unlimited desires, along with these desires the modesty to contain them. (ROUSSEAU, 1995, p. 426)

It can be inferred from this statement that opposition is the necessary tool for the individual to situate himself and build his identity; the man has passion and reason, and the woman desire and modesty; nature and culture, man forges, woman contains. And it is from this situation that the third and final assumption of the formation of the sexes arises: the man depends on the woman: it is not known, according to the author, whether it is the force that surrenders to fragility, or the reverse. The fact is that, for Rousseau, the man only becomes male at certain moments of life, and the woman remains in the condition of female for her entire life. The opposition between nature and culture is all the time present in the philosopher's formulation. Regarding women's complaints about the type of education offered to them, which produces dependent women, he says:

Women do not cease to shout that we have brought them up to be vain and coquettish, that we often amuse them with puerilities in order to remain more easily masters; they accuse us of being guilty of the defects we have reproached them with. What madness! And then, since when are men taking care of the education of young women? What prevents mothers from educating them as they please? They have no schools: great disgrace! I wish there weren't any for the boys! They would be more sensible and honestly educated. Do you force your daughters to waste their time in foolishness? Do you make them, against their will, spend half their lives adorning themselves, following your example? Do they prevent you from instructing them or having them instructed according to your will? Are we guilty of being pleased when they are beautiful, of their mannerisms seducing us, of the art they learn from you attracting and making us proud, of liking to see them dressed with gusto, *of allowing them to quietly sharpen the weapons with which they subjugate us?* Take the side of educating them as men; they will gladly consent. The more you want to resemble them, the less you will govern them, and then they will really be masters. (ROUSSEAU, 1995, p. 431)

As an initial argument, education can develop attitudes, behaviors, values and, ultimately, build gender identities. Thus, offering a similar education to men and women would be the same as making them equal. For him, would the difference be linked to sex or

education? And, in this sense, the author states that, from the feminine fragility, the man is dominated by futility and frivolity, because it seduces him. Educating her in any other way would be the same as losing such power.

As for other cultures, in which women are strong and do not need so much protection to conceive and bear their children, Rousseau counter-argues that, in them, beings are in a human condition close to the natural world. In this sense, there is a certain *civil promiscuity*, defined as a confusion between the two sexes. From this understanding, the "civilized" man and woman do not have the same constitution and, therefore, cannot have the same education and the same behavior. The interesting thing is that Rousseau considers the good savage a pure being, not corrupted by society. So why is the model, when it refers to women, not valid?

Rousseau also recommends that women should not be educated, should not have a job and should not be, ultimately, a man, because in this way, they would be going against the designs of nature and, as a consequence, would be devaluing themselves as women. He proposes, therefore, that she should know only what is appropriate for her sex. So, what would be, in Rousseau's formulation, a suitable education for women?

According to him, the woman is responsible for the education of the family and, especially, for the education of the children. How can one hand over such responsibility to someone without the slightest notion of what it is to instruct? How would this education be offered to women? What would be its purpose? Through Cobo (1995), one can perceive the objective of female education in Rousseau: chastity, domesticity and subjection to opinion. Thus, they would be educated to serve men exclusively, whether they were their husbands or their sons. The following thought reveals exactly this opinion:

Wherever this first lesson reaches the girls, it is good. If the body is born, so to speak, before the soul, the first culture must be that of the body: this order is common to both sexes. *But the object of this education is different*; in one the aim is the development of *the forces*, in the other it is that of *seduction*. [...] By the extreme softness of women begins that of men. *Women should not be robust like them, but for them*, so that the men who are born of them will be as well. (ROUSSEAU, 1995, p.434)

As was highlighted earlier, sex makes all the difference. From it must come the kind of education offered to men and women. While men are oriented to exercise their citizenship, as a resident of the city, women would have to receive an education for home, and, according to the teaching of Rousseau (1995), the objective of this education is the man, that is, to free him for public life. For him, "woman is made to please and be subjugated, *she should make herself pleasing* to man instead of provoking him." (p.424). In other words, female education

is presented by Rousseau as one that will develop, in women, the idea that they must subjugate themselves to men, in order to serve him. Thus, she proposes, in the chapter on Sofia, how the education of women should be carried out. Let us see, then, some of his lessons, which were systematized from chapter V of *Émile*:

1st lesson – Teach domestic gifts, such as sewing, embroidery and lace. For him, these first tasks would be extremely pleasant – because the girl learns to read and write with great sacrifice – since they will send her to the possibility of adorning herself in the future.

Lesson 2 : The girl should learn to draw, but the landscape should be avoided; the goal is to make her decorate a card or something else she likes.

Lesson 3 – Exercise girls to master their fantasies and submit to the will of others.

Lesson 4 – Accustom the young woman to be interrupted in her leisure and guided to do other activities; this will make her more docile and accustomed to living subject to the will of others.

Lesson 5 – Teach him to resign himself so that he becomes accustomed "from an early age to suffer even injustice and to bear the mistakes of his husbands without complaining." (ROUSSEAU, 1995, p. 440)

Lesson 6 – The girl should learn to dance and sing, so that, in the future, her home will be happy and pleasant.

Lesson 7 – Teach him a religion. Initially, she must follow her mother's instructions; when married, she must embrace her husband's religion.

Lesson 8 – Educate women to provide with reason. In this regard, Rousseau states that there is a distinction between male and female reason. The latter is understood as a practical reason, applicable to the demands of everyday life.

Lesson 9 – Teach her to be faithful and to honor her husband. She must be grateful to have been chosen by him and, in return, she must know how to organize herself socially and intellectually to serve him.

Lesson 10 – Your studies should be focused on practice. The exercise of abstraction is more suitable for men; it will only be up to them to organize the lives of others.

In the face of so many lessons, it is clear that, for Rousseau, women must be molded to dominate their instincts and that their formation must be surrounded by duties and obligations. It suggests that, because it is close to the realm of nature, it should be castrated and removed from this infantilized and (or) almost animal state. Thus, the feminine reason is useful for her to have discernment to accept her husband's orders and to lead the house in

his absence, because her condition is established by nature and the man detaches himself from such a relationship.

It is interesting to note that, among the points highlighted by the philosopher, are those related to the behavior associated with women. Currently, it is considered that these behaviors are stereotypes linked to the female figure, which aim to impose a fixed idea around women: dissimulation, lies and falsehood. Such views contribute to making people believe that women are, in fact, frivolous and futile and, therefore, should be watched and discredited. The example offered by the philosopher regarding these capacities is very eloquent:

You want to see a character on hot coals, place a man between two women with whom he has secret connections, then observe the sad figure he will make. Place in the same case a woman between two men, and that will certainly be no less common: you will be amazed at the skill with which she will deceive both, and make each of them laugh at the other. (ROUSSEAU, 1995, p.460)

In a single example, Rousseau shows how much women are inclined to hide their feelings, demonstrating that, even in a delicate situation, they can disguise it well. Would such behavior be the result of an education that stimulates the development of these skills, or is this behavior innate to women? The author's proposal goes towards the existence of a certain essentialism, especially with regard to women, that is, "the essential thing is to be what nature made us". (ROUSSEAU, 1995, p. 463). In this sense, he says:

The search for abstract and speculative truths, principles, axioms in the sciences, everything that tends to generalize ideas, is not the province of women, their studies must be turned to practice; it is up to them to apply the principles that man has found, and it is up to them to make the observations that lead man to the establishment of such principles. [...] they do not have enough precision and attention to shine in the exact sciences and, as for physical knowledge, it is up to those who of the two are more active, more active and see more objects; it is up to those who have more power and exercise it more in judging the relations of sensible beings and the laws of nature. (ROUSSEAU, 1995, p. 463)⁴

From all these considerations, the philosopher goes on to introduce Sofia, Emilio's companion, who, according to him, is a girl of little beauty, modest, simple and well-behaved. His education is similar to what the author proposes: he knows how to sew, embroider, sing, dance, play the piano, knows the work of pantry and kitchen. In addition to these skills developed within her own home, the girl is virtuous and religious. Her parents raised her so that she could choose her future husband on her own.

Of these notions proposed by Rousseau, still in the eighteenth century, regarding female education, what was in the public domain and what was elaborated as a

presupposition of his remain as questions. It is known, however, that such teachings are present in the education of many women, at least until the twentieth century.

The author of the Social Contract, in fact, considers women to be second-class citizens, in a typical view of nineteenth-century European society and of the first steps in the formulation of modern society. Many of these teachings were followed for many generations in the nineteenth and twentieth centuries.

In Rousseau's elaboration, in the book *Emilio* (1995), there is a distinction between the state of nature and the social. The first is the kingdom where everyone is equal and lives in a stage similar to savagery, in which there would be no room for an education differentiated by sex. In the second, the institutions would be developed, there would be class distinctions, and the order of this society would be based on patriarchal power, that is, the "family is only attached to society by its head, it is the condition of this head that regulates that of the whole family." (ROUSSEAU, 1995, p. 489)

Based on a patriarchal assumption, Rousseau will affirm that the woman owes obedience to her husband. This would be the most appropriate organization for society, as she would reign in the home, and the husband in public life. According to him, the happiest families are those in which women have authority but do not take power from their husbands. Therefore, a tailor-made education for women must pay attention to some issues. Is it possible for a woman to educate without knowing how to reflect? Without mastering this skill, how will she discern what is best for her and her children? And how will you guide them without discernment? Considering these aspects, Rousseau advises:

It is not becoming, therefore, for a man who has education to take a woman who does not have one, nor, consequently, in a class in which he does not have her. But I would still prefer a hundred times more a simple and coarsely educated young woman to a *cultured and infatuated young woman, who would come to establish in the home a court of literature of which she would be president. A woman like this is a scourge of her husband, her children, her friends, her servants, everyone. From the height of her genius, she disdains all her duties as a woman*, and always begins by becoming a man in the manner of Mlle. de l'Enclos. *Outside the home it is always ridiculous and very justly criticized, because it cannot be otherwise. When you get out of your condition* and are not made for the one you want to have. All these women of great talents impress only fools. (ROUSSEAU, 1995, p. 491)

The woman who ventures into the domain of reading and writing moves away from her condition. She must be subject to the desires of her husband and to the designs of nature: wife and mother, prey to the species, without dreams, with castrated desires and with the will submitted to the will of the other. To be a woman, until the advent of the feminist movement,

was exactly to be like that. As for Emil's wife, Rousseau introduces us to Sophie, who complied with these recommendations. He tells us

an education is neither brilliant nor negligent; He has taste without study, talent without art, common sense without knowledge. Your spirit does not know, but it is cultivated to learn; It is a well-prepared land that only waits for the seed to produce. [...] she will not be her husband's teacher, but his disciple; Far from wanting to enslave him to her own tastes, she will adopt his. (ROUSSEAU, 1995, p. 492)

Thus, Rousseau introduces the figure of Sofia in the novel, and, throughout the text, Emile will give her lessons in philosophy, physics, mathematics, history, among other subjects. The author adds that "the art of thinking is not foreign to women, but they should be only slightly interested in the sciences of reasoning. Sofia conceives everything, but retains little" (ROUSSEAU, 1995, p. 512). It should be noted that a woman needs to have a little idea about all things, but she should not delve into any of them. Despite the "capacity" she has to think, certainly elaborating and discerning distances herself from her condition as a woman. She should not venture into areas other than taking care of the house, her husband and the children.

In the eighteenth century, therefore, in the same period in which Rousseau spoke about female education, Algranti (1993) identifies, in his studies, a concern with the way of educating a woman. For her, education appeared as an alternative for those women who did not marry. According to the author, during this period, the spaces for the enclosure of women were expanded, as well as lay women's institutions. Both the retreats and the convents will have as their central proposal "to guard women" and educate them to conduct a straight, chaste and subjective posture, and instruction appears as an instrument for this education. It is no wonder that the texts used for female education are religious texts such as the Bible.

As far as Emile is concerned, after introducing him to Sofia and perceiving him in love, Rousseau suggests that he go on his journey, because as a husband and head of the family, he becomes a member of the State and, as such, he must know what government, laws and homeland are, he must know, in short, what it is to be a citizen. From the realization that he does not know civilian life, Emilio and his preceptor set off on a journey that aims to teach him what politics is.

Rousseau states that the purpose of the trip is to find a good government, not to publish books, but to have references to establish human rights and not "to court the powerful" (ROUSSEAU, 1995 p. 553). Emilio sets out to learn what civil life is, and Sofia awaits his return to exercise her domestic life. Emilio's tutor pledges his word and says to Sofia: "I answer for her beloved, or rather, for her husband: let her keep the same fidelity that

he will have for her and in two years he will be her husband, I swear to it." (ROUSSEAU, 1995, p.542). That is, for Sophia, everything that had to be known had already happened: now she had to wait for Emilio to become more illustrious, so that he could marry her, and thus each one could occupy their kingdoms.

So how can we think of the rights of humanity, if, throughout Rousseau's treaty, we have seen the suggestion of subjecting half the world's population? How can an Enlightenment author, who believed in reason, equality and human freedom, suggest that half of humanity is outside the exercise of citizenship?

From a question elaborated for Emile regarding the government, his preceptor begins to elaborate a series of questions around the principles of politics: "whether men are born slaves or free, associated or independent; whether they meet voluntarily or by force; if one day the force that brings them together can form a permanent right..." (ROUSSEAU, 1995, p. 553) and continues with the following consideration:

Passing next to the right of slavery, we shall examine whether a man can legitimately alienate himself from another, without restriction, without reservation, without any kind of condition; whether he can in short renounce his person, his life, his reason, *his ego*, any morality in his actions, and finally cease to exist before death, notwithstanding the nature which immediately burdens him with his own preservation. and in spite of his conscience and his reason that prescribe to him what he should do and what he should abstain from (ROUSSEAU, 1995, p. 555)

The above statement leads us to the following question: what does Rousseau suggest to women, if not the acceptance of a regime of slavery? In the text, the author highlights *his self*. However, its lessons – as we have seen earlier – suggest exactly that the woman abandons this self, and that she leaves her fate to another. Who is the citizen, for the philosopher? Who will have the right to the laws established in modern society? The reference to man, in the passage quoted above, assumes the literal content of the word. It refers exclusively to the male of the human species. Considering the aspect related to slavery, certainly male, Rousseau argues that this type of institution is only possible through an agreement, a contract, even if tacit.

5 CONCLUSION

Therefore, the basis of all civil society, for Rousseau, is based on the social contract. What about women? Were they included in this contract? Carole Patemam (1993) warns that the female contract is marriage; therefore, prior to the articles of association. In this way, this fact justifies, for women, according to him, the situation of subjection to the other, which

means that the woman can "renounce her person, her life, her reason, *her self*, any morality in her actions, and finally cease to exist before death." (p. 555)

At the end of her text, Sophia "is delivered" to Emilio in marriage, and her preceptor advises her: "By becoming your husband, Emilio became your boss; it is up to you to obey, as nature wanted" (p. 579). Through this advice, he concludes:

You who have so well made the charms of domestic life reign in the paternal house, make them also reign in yours. Every man who delights in his house loves his wife. Remember that if your husband lives happily at home, you will be a happy woman. (p. 580)

Thus, female happiness depends on male happiness, and women have been led to believe in this maxim. Elucidating such formulations, considerations and advice helps us to propose a critical education, based on equity and fairer social values for all.

It is evident that, although he argues that, in sex, all the differences between men and women reside, Rousseau uses education as the element that promotes such distinctions. In other words: even if he builds his argument based on sexual differences, his proposal will present education as the instrument that will form men and women different from each other.

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EMERGING TECHNOLOGIES AND ACTIVE METHODOLOGIES: THE NEW PARADIGM OF MEDICAL EDUCATION IN THE 21ST CENTURY

TECNOLOGIAS EMERGENTES E METODOLOGIAS ATIVAS: O NOVO PARADIGMA DA EDUCAÇÃO MÉDICA NO SÉCULO XXI

TECNOLOGÍAS EMERGENTES Y METODOLOGÍAS ACTIVAS: EL NUEVO PARADIGMA DE LA EDUCACIÓN MÉDICA EN EL SIGLO XXI



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ABSTRACT

To investigate the challenges of emerging technologies in 21st century medical education, describing teaching methods and pedagogical strategies in educational environments. Methods: This is a study with a qualitative-exploratory approach that analyzed scientific articles in the Medline (39,078 records), Scielo (2,040 records) and Science Direct (151 records) databases from 2021 to 2023. The research identified two main methodologies: competency-based learning and interaction between mentor and mentee. Results: The results indicate that students' active participation in reflective processes strengthens their understanding of medical practice. The integration of different methodologies, such as student-centered learning and peer mentoring programs, is a promising trend for medical education, expanding learning opportunities and promoting students' personal and emotional development. Conclusion: Competency-based learning stands out for its focus on developing technical and practical skills, while interactive learning environments between mentor and mentee involve activities focused on sharing knowledge and experiences. These approaches strengthen mutual trust, stimulate critical thinking and encourage student reflection.

Keywords: Medical Education. Technical Skills. Emerging Technologies. Pedagogical Mentoring.

RESUMO

Investigar os desafios das tecnologias emergentes na educação médica do século XXI, descrevendo métodos de ensino e estratégias pedagógicas em ambientes educacionais. Métodos: Trata-se de um estudo com uma abordagem qualitativa-exploratória que analisou artigos científicos nas bases de dados Medline (39.078 registros), Scielo (2.040 registros) e Science Direct (151 registros) no período de 2021 a 2023. A pesquisa identificou duas metodologias principais: aprendizagem baseada em competências e interação entre mentor

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e aprendiz. Resultados: Os resultados indicam que a participação ativa dos estudantes em processos reflexivos fortalece a compreensão da prática médica. A integração entre diferentes metodologias, como as aprendizagens centradas no aluno e os programas de mentorias entre pares é uma tendência promissora para o ensino médico, ampliando as oportunidades de aprendizagem e promovendo o desenvolvimento pessoal e emocional dos estudantes. Conclusão: As aprendizagens baseadas em competências destacam-se pelo foco no desenvolvimento de habilidades técnicas e práticas enquanto que os ambientes de aprendizagem interativos entre mentor e aprendiz envolvem atividades focadas na troca de conhecimentos e experiências. Essas abordagens fortalecem a confiança mútua, estimula o pensamento crítico e incentiva a reflexão dos alunos.

Palavras-chave: Educação Médica. Competências Técnicas. Tecnologias Emergentes. Mentoria Pedagógica.

RESUMEN

Investigar los desafíos de las tecnologías emergentes en la educación médica del siglo XXI, describiendo métodos de enseñanza y estrategias pedagógicas en entornos educativos. Métodos: Se trata de un estudio con un enfoque cualitativo-exploratorio que analizó artículos científicos en las bases de datos Medline (39.078 registros), Scielo (2.040 registros) y Science Direct (151 registros) en el período de 2021 a 2023. La investigación identificó dos metodologías principales: aprendizaje basado en competencias e interacción entre mentor y aprendiz. Resultados: Los resultados indican que la participación activa de los estudiantes en procesos reflexivos fortalece la comprensión de la práctica médica. La integración entre diferentes metodologías, como el aprendizaje centrado en el estudiante y los programas de mentoría entre pares, es una tendencia prometedora para la enseñanza médica, ampliando las oportunidades de aprendizaje y promoviendo el desarrollo personal y emocional de los estudiantes. Conclusión: El aprendizaje basado en competencias se destaca por su enfoque en el desarrollo de habilidades técnicas y prácticas, mientras que los entornos de aprendizaje interactivos entre mentor y aprendiz involucran actividades centradas en el intercambio de conocimientos y experiencias. Estos enfoques fortalecen la confianza mutua, estimulan el pensamiento crítico y fomentan la reflexión de los estudiantes.

Palabras clave: Educación Médica. Competencias Técnicas. Tecnologías Emergentes. Mentoría Pedagógica.

1 INTRODUCTION

Recent pedagogical approaches such as student-centered, humanistic training with an emphasis on practical disciplines, mentoring, active methodologies, including simulations, teamwork, are fundamental to change students' perspective on their academic experience and their future role as doctors. These methodologies help transform students' perceptions of their undergraduate journey and medical practice (Acherman *et al.*, 2021; Ahmad; Page; Goodsman, 2023; Albuquerque; Botelho; Caldato, 2021; Asunción, 2021; Hvidt *et al.*, 2022; Lisboa *et al.*, 2021).

According to the 2014 National Curriculum Guidelines (DCNs), undergraduate studies in Medicine aim to offer critical, comprehensive and reflective training. The objective is to train students for an ethical, psychological and humanistic understanding of the doctor-patient relationship, prepare them to work at all levels of health care and carry out promotion, prevention and rehabilitation actions (MINISTRY OF EDUCATION, 2014).

The DCNs in the medical area aim to train students with skills in Comprehensive Health Care, Health Education and Health Management, preparing them to face challenges in Brazilian society and public health. They highlight the importance of adapting to the needs of the Unified Health System (SUS) and implementing essential programs, such as the National Primary Care Policy (Meireles; Fernandes; Silva, 2019).

In addition, the DCNs emphasize the importance of respecting the rights of citizenship and the dignity of the patient, ensuring a medical practice that values the humanization of care and professional integrity.

The need for a review of teaching methods and pedagogical strategies is a constant challenge. This study aims to shed light on the current trends and challenges affecting medical education in the twenty-first century, as well as to identify pedagogical strategies that are being used in Higher Education Institutions that can help shape the training of health professionals for the future.

In this sense, the objective of this study is to investigate contemporary challenges and emerging opportunities in medical education, using an integrative literature review. The work emphasizes the importance of studying health education in the twenty-first century, highlighting the need to adapt professionals so that they are more prepared to face the challenges of the profession.

2 METHODOLOGY

This study is characterized as an integrative review, carried out according to the *Preferred Reporting Items for Systematic Reviews and Meta-Analyses* – PRISMA protocol

(Moher *et al.*, 2009). Records from the Medline (39,078 records), Scielo (2,040 records) and Science Direct (151 records) databases were examined, integrating 40,968 records. The free bibliographic reference manager software EndNoteWeb (CLARIVATE, 2024) *was used*.

The search for articles was carried out in August 2023, including qualitative and quantitative studies, published in the periods of 2021, 2022 and 2023, published in English and/or Portuguese. The following descriptors ("medical education"; "mentoring"; "technology in medical education"; "medical educational innovation" and "educational medical skills").

The selection of articles was carried out through the application of different filters: in the Scielo database there was a filter to select the complete articles, the review articles and the time period; in the Medline database the main themes were selected, such as "medical education" and "undergraduate education in medicine" and, in Science Direct, only the filter relating the time period. In this selection stage, duplicate records were excluded.

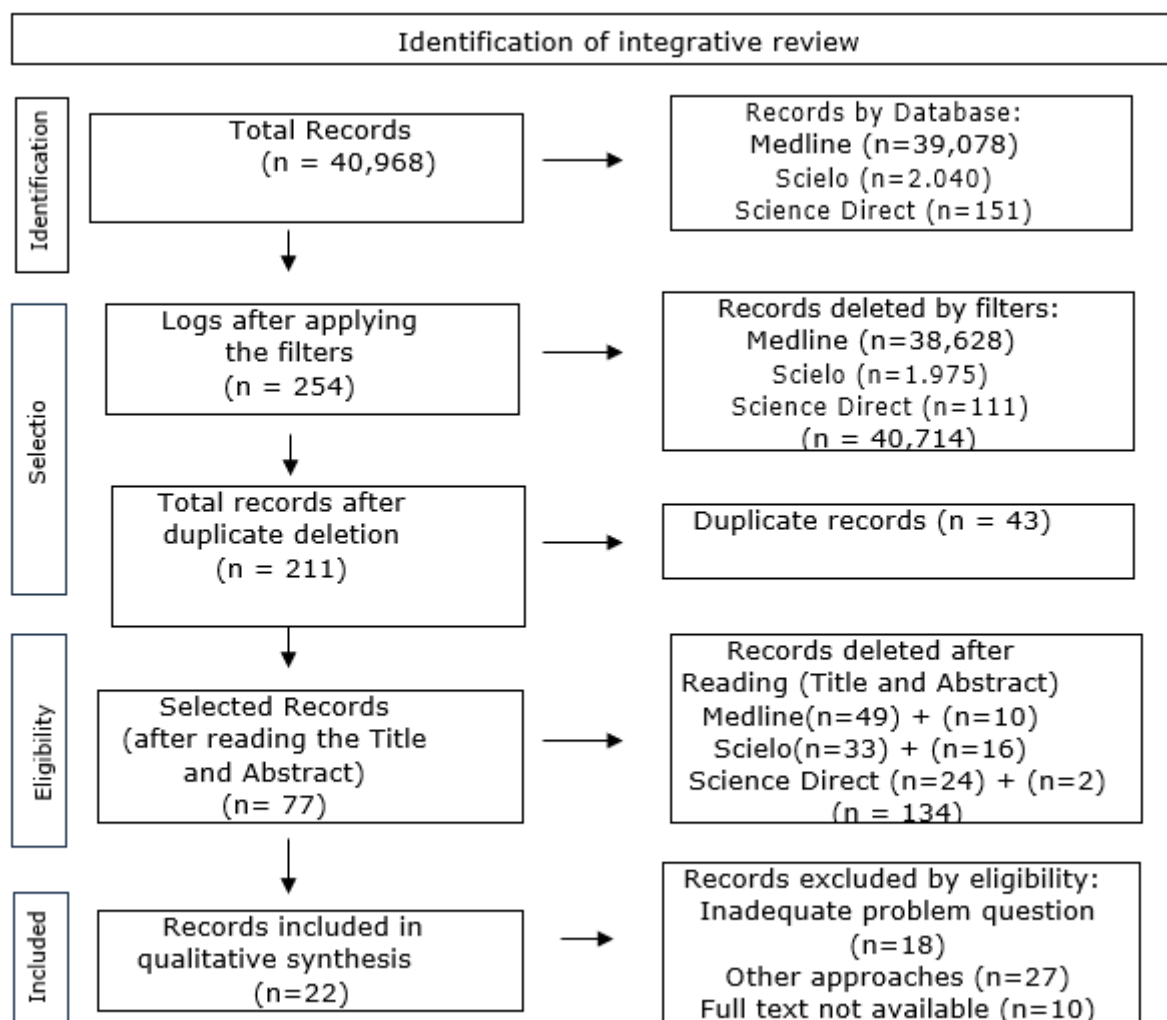
The criteria used for the selection of articles were applied progressively, starting with the reading of the title, followed by the reading of the abstract and, finally, the complete reading of the article. Records considered ineligible during the reading of the titles (such as those dealing with elementary and secondary education, basic health units (UBS), hospitals, health centers, licentiate courses, technological education, articles from systematic reviews, scoping, integrative and meta-analyses, medical education in graduate studies and educational evaluation) were excluded; ineligible during the reading of the abstract, as they are not related to medical education; and those that did not meet the requirements because they were incompatible with the problem-question, full text not available, and other applicability approaches. After this process, all records that met the criteria were exported to the EndNote software. The information extracted from the records included: author, year, place of study, objectives, methodology, and main results.

The research was delimited with the objective of answering the following question: "What are the characteristics of the learning methodologies applied to medical students that aim to improve the teaching and learning process?". This question will guide the investigation in a systematic way, being structured based on the PICO strategy.

After applying the filters and eligibility criteria, 22 records with different learning approaches applied in medical education were included in a qualitative synthesis, as shown in the flowTable described in Figure 1.

Figure 1

Search and eligibility strategy for records consulted in the Medline, Scielo, and Science Direct databases in August 2023, with studies published from the 2021, 2022 and 2023 periods, published in English and/or Portuguese



Source: Adapted from the flow diagram provided by Moher *et al.* (2009). Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. BMJ, 2009; 339:B2535.

3 RESULTS

From the selected records, the highest concentration was with interactive learning methodologies between mentor x mentee (n=12), followed by competency-based methodologies (n=10).

Interactive learning environments between mentor and mentee involve activities focused on the exchange of knowledge and experiences. This approach strengthens mutual trust, encourages critical thinking, and encourages reflection. The exchange enables continuous learning, in which both mentor and mentee benefit from a collaborative relationship. The learner becomes more prepared to apply what he or she has learned in

practical situations, while the mentor improves his or her skills by sharing his or her knowledge, according to Table 1.

Table 1

Result of the integrative review in the Scielo, Science Direct, and Medline databases, including author, year, country, study objective, methodology(s), and main results, collected in August 2023, regarding interactive learning between mentor x mentee (n=12)

Author, year, country	Objective of the study	Methodology	Main results
1 - Acherman <i>et al.</i> , 2021, Brazil	Identify strong and weak areas in the educational environment through peer mentoring .	This was a cross-sectional study with data collected from 1,470 students in the first level. The Satisfaction with Social Support Scale and the Dundee Ready Education Environment Measure Scale were used.	The results revealed statistically significant differences in relation to the course cycle, sexual orientation, collection of aid bags and regular practice of physical activity. This indicates that peer mentoring programs can benefit students' perceptions of social support and the academic environment.
2 - Brondani <i>et al.</i> , 2021, Brazil	Implement a mentoring program to prevent emotional overload and improve the quality of teaching.	Elective course of 16 hours with up to 12 students and monthly meetings, where the student chooses the workshops he wants to participate.	The program has seen an increase in student enrollment, with positive <i>feedback</i> related to freedom of choice and diversity of workshops. The mentors addressed topics previously defined or suggested by the students, including topics such as academic stress, competition versus cooperation, quality of life, social networks, meditation, yoga and self-massage.
3 - Cruz <i>et al.</i> , 2023, Brazil	Assess perception among students through peer mentoring to provide <i>insights</i> into the learning process.	Cross-sectional study with 129 students. The Dundee Ready Education Environment Measure scale was applied to assess the perception of the educational environment.	The most commonly used study techniques included the practice of summaries (88.4%), reading (77.5%), questions and exercises (71.3%), schemes (65.9%) and the Pomodoro method (63.6%). Weaknesses were identified, such as teaching that is not very student-centered and the lack of clarity in the objectives of the course, which does not stimulate the development of skills.
4 - Couto <i>et al.</i> , 2021, Brazil	Report the results of the mentoring program in supporting the personal and professional development of students.	This is a descriptive, qualitative study with interviews with students to assess the conformity of humanistic disciplines in relation to the National Curriculum Guidelines for Medical Courses.	The mentoring program proved effective in offering emotional and academic support. The study facilitated the exchange of experiences and reflection on topics related to humanistic, critical and ethical education. The program proved to be a model to help students

			overcome difficulties, contributing to their personal and professional development.
5 - Fidelis, Ribeiro e Rocha, 2021, Brazil	Discuss the challenges encountered in the mentoring program , highlighting the importance of this support and proposing solutions. This includes continuing education suggestions and supervision for mentors.	The study used a phenomenological approach to gather perceptions and challenges from the students who participated in the mentoring program. These challenges include issues related to mentor participation, understanding the program's objective, and the needs for curricular changes.	The study revealed mixed feelings of the students in relation to the orientation program. Some have found the program beneficial, while others have questioned its relevance and effectiveness in medical training. The main criticisms included the mandatory nature of the program and the inadequacy of some advisors. In addition, challenges such as excessive workload, department-specific demands, and lack of recognition of mentorship as a valuable activity have resulted in some mentors leaving after training.
6 - Kaji <i>et al.</i> , 2021, Brazil	Encourage the creation of peer mentoring programs aimed at welcoming freshmen by "veterans" in a more holistic way.	Vertical mentoring by pairs with 14 mentors (seniors between the third and eighth period) and 14 freshmen (students entering the first and second period).	It was observed that the bond generated between freshman and veteran favored the integration of freshmen with the university community. The activities included: construction of material and recording of training for mentors; selection of freshmen and veterans; Development of mentoring with subsequent collection and analysis of <i>feedback</i> .
7 - Lauterjung, Ehlers and Guntinas-Lichius, 2021, Germany	Evaluate the last practical year of medical education, adding mentoring and feedback in the training of students.	Online questionnaire applied to 201 students to compare the learning progress between students who participated in the project and those who did not.	The group that participated in the project (n = 92) reported greater satisfaction with their practical training, feeling more prepared for the work compared to the control group (n = 165). The mentoring and <i>feedback</i> developed helped to improve the students' medical skills and practices.
8 - Menezes <i>et al.</i> , 2021, Brazil	Assess learners' perceptions of peer mentoring for personal, academic, and mental health development among students.	Exploratory research with a descriptive and qualitative approach, conducting interviews with 20 learners.	The results revealed positive experiences, highlighting emotional and social support, as well as study planning as key categories. The study contributed to the personal and academic growth of the learners, reducing <i>stress</i> and anxiety, promoting their adaptation and integration into the academic environment.
9 - Nascimento <i>et al.</i> , 2021, Brazil	Promote gender equity by ensuring equal opportunities for men, women, and gender minorities through a mentoring program .	Qualitative research through the training of small heterogeneous groups of mentors, with follow-up sessions in the area of surgical,	There was an exchange of knowledge between the groups, highlighting the need to, in addition to supporting women (cisgender, transgender) and gender non-binary people, educate society

		anesthetic and obstetric care.	about gender identities beyond the binary perspective. The program encourages other students to pursue careers in these fields, promoting gender equity.
10 - Secchi and Vieira, 2021, Brazil	Describe the evolution of a mentoring program to promote students' professional and personal development.	The program has become an extension project where weekly discussions are held on practical, moral, and ethical aspects of the medical profession.	The program showed high levels of commitment, attendance, and positive <i>feedback</i> , contributing to the training of students and physicians. The participants reported positive points about their reflections from the mentoring sessions, based on individual <i>feedback</i> .
11 - Senger <i>et al.</i> , 2021, Brazil	Incorporate a practical mentoring module with topics related to the need for students and teachers to take ownership of the Course's Pedagogical Project (PPC).	Topics included in the syllabus: reflection on the learning process; self-assessment; professional identity; interpersonal, educational and professional development.	The study emphasized the importance of mentors in offering individualized support to mentees, suggesting that individual activities ensure greater privacy. The practice of mentoring must be structured in a way that is aligned with educators, adapting to the particularities of each course and the objectives of the PPC.
12 - Sotto-Santiago, Mac and Genao, 2023, USA	Understand how Black and Latino teachers are being mentored in the use of mentoring programs .	The study used the Culturally Engaging Campus Environments (CECE) model, emphasizing the importance of creating inclusive and equitable environments that promote the academic and personal well-being of all, regardless of their backgrounds and identities.	The study revealed a connection between mentorship and cultural familiarity. Mentors must have a deep understanding of students' cultural perspectives in order to provide effective guidance. Participants reported benefits from receiving academic support and also valuing their cultural heritage.

Source: Prepared by the authors.

Competency-based learning stands out for its focus on the development of technical and practical skills. Among the main aspects addressed are activities centered on students' skills, health communication, *feedback* and early introduction to clinical practice. In addition, this approach promotes personalized training, adapted to the needs of each student, encouraging autonomy and critical thinking. In the context of the medical field, it is essential to prepare professionals to deal with complex situations and make decisions, focusing on the patient's well-being, according to Table 2.

Table 2

Result of the integrative review in the Scielo, Science Direct, and Medline databases, including author, year, country, study objective, methodology(s), and main results, collected in August 2023, regarding competency-based learning (n=10)

Author, Year, Country	Objective of the study	Methodology	Main results
1 - Day <i>et al.</i> , 2023, Canada	Understand how resident physicians experience medical education centered on students' abilities to develop future interventions.	Semi-structured interviews with 16 residents from seven residency programs, with a constructivist approach.	Residents were receptive to student-centered medical education, but pointed out disadvantages in evaluation and <i>feedback</i> , such as anxiety about performance, lack of clarity in evaluations, and generic <i>feedback</i> .
2 - Ewnte and Yigzaw, 2023, Africa	Observe how medical students react to early introduction to clinical practice in the problem-solving process.	Cross-sectional research with quantitative (questionnaire) and qualitative (group discussions) methods including 358 medical students.	This medical methodology helped solve problems, increased students' motivation and active learning, and promoted their involvement with the community. However, it faces challenges such as work overload, disconnection between academic and health institutions, and lack of guidance in implementation.
3 - Kataoka <i>et al.</i> , 2022, Japan	Evaluating the effectiveness of Evidence-Based Medicine (EBM) involves the entire process, from searching for and evaluating evidence to its practical application. This includes analyzing the patient's clinical case, integrating the evidence with the patient's clinical experience and history for a more informed and personalized approach.	This is a qualitative study with semi-structured interviews with professors and physicians, including the problem question, search for clinical evidence, selection and understanding of the case.	In EBM, it is essential that students participate in clinical practice, identifying problem issues. By developing skills in information retrieval and critical evaluation, along with understanding the patient's history, students realize the relevance of EBM, which increases their motivation to learn this methodology.
4 - Hashim <i>et al.</i> , 2023, United Arab Emirates	Evaluate the effectiveness of student-centered learning , allowing them to take a more active role in the learning process.	Use of the <i>LecturePlus technique</i> , with lectures and problem-solving activities based on real cases and final discussion.	The learning outcomes were evaluated and compared to the previous school year. A multiple-choice test, performed before and after the learning process, indicated a significant improvement in the application of knowledge ($p < 0.001$). The technique was considered satisfactory by 95% of the participants.
5 - Mandia and Teixeira, 2023, Brazil	Understand patients' personal stories to improve the doctor-patient relationship by exploring narrative-based health communication between patient health professionals.	Apply the Balint group technique, through the patient-centered clinical method , with discussions centered on real cases.	Communication is fundamental in medical practice, but it has been neglected in the training of health professionals. This insight underscores the importance of effective communication in patient care. The disease goes beyond symptoms and diagnoses,

			profoundly affecting the patient's life.
6 – Ottenhoff-de Jonge <i>et al.</i> , 2021, The Netherlands	Understand teacher-centered (knowledge transmission) and student-centered (learning facilitation) educational beliefs.	Qualitative study with 26 teachers on teaching-learning based on the original framework of Samuelowicz and Bain. Model that classifies educators' beliefs about teaching and learning.	The educator should focus on the student and essential competencies, such as clinical reasoning and collaboration, as well as promote effective communication in small groups. The physician must act as a collaborator, identifying the student's interests and stimulating their motivation to maximize learning.
7 - Pereira, Santos and Caldas, 2021, Brazil	Identify the use of information and communication technologies (ICT) in teaching and research.	This is an analytical, cross-sectional observational study with 216 students with data collection through an online form.	Remote communication highlighted the need for teacher and student training. The smartphone was the most used medium (68.1%), followed by text messaging applications (99.5%) and internet browsers (96.8%). In contrast, the use of medication apps was lower (48.1%), as well as that of specialized calculators (31%).
8 - Pricinote <i>et al.</i> , 2021, Brazil	Evaluate students about feedback-based learning and the frequency with which they receive it in the teaching-learning process.	Qualitative research with case study and content analysis to improve interactions between health professionals and patients.	The study found that there was a gap between theory and practice regarding the restricted use of <i>feedback</i> . The students emphasized that the teacher should point out mistakes and guide them for improvements and not just show the results of the tests.
9 - Rusiecki <i>et al.</i> , 2023, USA	Explore health communication skills , through the construction of interactions/bonds with patients.	Descriptive and qualitative research, conducted through virtual workshops and interviews, included a workshop with 37 students focused on advancing health equity.	The results showed positive <i>feedback</i> , highlighting that the theatrical exercises led to improvements in listening and observation skills, greater understanding of systemic inequalities, as well as improved interpersonal skills, personal growth, and responsiveness to unexpected situations in patient care.
10 - Zainal <i>et al.</i> , 2023, Singapore	Identify gaps in teaching with the use of digital competencies in health , seeking to standardize the objectives of learning and collaboration among medical schools.	Qualitative research through individual interviews with 19 participants, including professors, physicians and vice-rectors of universities.	Need for formal training in digital health, data management and application of digital technologies in clinical practice. Patient safety and the integration of these concepts into the curriculum should be prioritized. In addition, it is critical that there is collaboration between medical schools and the health system to align the current curriculum with clinical practice.

Source: Prepared by the authors.

4 DISCUSSION

Contemporary medical education has evolved by integrating various pedagogical approaches, adopting varied methodologies to improve the training of future health professionals. From the results found, two main forms of learning emerge: the interaction between mentor and apprentice, and competency-based learning, which will be described below.

Class 1 - Interactive learning between mentor x mentee

Acherman *et al.* (2021) explore the importance of mentoring and mentees in the academic environment, highlighting that mentoring is essential to help new students adapt to the course. Experienced mentors answer questions and provide emotional support, creating a welcoming environment in the early years of the course, preventing mental health problems among students. In the same logic, Brondani *et al.* (2021) address the positive impact of mentoring activities through meditation and yoga. These programs help students meet the challenges of the course, which is often marked by a competitive and lonely environment.

Cruz *et al.* (2023) revealed that peer mentoring and participation in study groups can improve students' perception of the educational environment. The authors suggest a continuous evaluation of teaching environments, essential to promote the academic and professional development of students. The authors Couto *et al.* (2021) highlight the effectiveness of mentoring in reducing academic stress and integrating students and professors with greater adherence to academic activities. The approach was considered effective in promoting the health and integral development of students.

Fidelis, Ribeiro and Rocha (2021) describe the evolution of a mentoring program started in 2001 which was interrupted due to the lack of adherence of teachers. It was later reestablished in response to student demands. There was criticism about the adequacy of teachers and the mandatory nature of mentoring. However, the advantages of the program were recognized. Another mentoring model, described by Kaji *et al.* (2021) where veteran students guide freshmen, using their own experiences to help new students, promoting integration between different academic phases. Both authors highlight that mentoring proved to be beneficial, reinforcing its importance. Similarly, Menezes *et al.* (2021) highlighted the benefits of mentoring, showing a positive impact on integration and adaptation to the academic environment. The proximity and empathy between mentors and apprentices creates a fertile environment to share feelings and insecurities, in addition to helping the student in self-management, communication, planning, stress and anxiety reduction skills.

Lauterjung, Ehlers, and Guntinas-Lichius (2021) investigated the lack of preparation of medical students in the last years of training, especially in relation to patient care. The

disparity between academic theory and hospital practice is a common concern. The introduction of mentoring in the last year of training proved to be effective in increasing the student's confidence to face professional challenges.

Nascimento *et al.* (2021) explored how mentoring can promote gender equity in surgical specialties, which have historically been dominated by one sex. Research has shown that mentoring, by integrating health education, helps reduce prejudice and improve the mental health of physicians and students, especially in areas such as surgery, anesthesia, and obstetrics. Mentoring was valuable in promoting gender equality.

Secchi and Vieira (2021) highlight the difficulty in finding volunteer mentors, due to the lack of specific qualities and time constraints. Additionally, the effectiveness of mentoring may vary among students, suggesting that participation should be optional. To be successful, mentoring must be based on a genuine, long-term relationship between mentor and mentee. While Senger *et al.* (2021) report the creation of a mentoring program for the first three years of the course with physicians acting as mentors. The focus is on the acclimatization, adaptation of students and preparation for internship. The studies highlight the need for continuous training of mentors, which is considered a valuable support for the integral development of students.

Sotto-Santiago, Mac, and Genao (2023) highlight the importance of mentoring programs to promote student diversity and inclusion. The survey shows that African Americans face difficulties in achieving academic stability. Using the *culturally engaging campus environments* (CECE) method with high school classes, the study reveals that mentoring conducted by black and Latino teachers is more effective in promoting inclusive support, due to shared cultural knowledge.

It is perceived, through these different mentoring approaches, that they can complement each other, providing a diversified learning experience. In the medical curriculum, mentorships are especially important, as they allow mentor and mentee to learn together.

Class 2 - Competency-based learning

Day *et al.* (2023) highlight the potential of competency-based medical education (CME) to improve the quality of medical education, assessment, and *feedback*. The study identified that faculty support was instrumental in improving the resident experience by promoting medical education centered on students' abilities. Following a similar approach, Hashim *et al.* (2023) evaluated the effectiveness of the *LecturePlus* technique, which promotes student-centered learning. In this experience, students participated in lectures followed by problem-solving activities, in small groups, concluded with discussions

moderated by teachers and students. The results showed an improvement in short-term learning, indicating that *LecturePlus* is effective in teaching knowledge and facilitating practical application. In turn, Ewnte and Yigzaw (2023) investigated medical students' perceptions of early clinical exposure (DBS). The study showed that DBS has a positive impact on academic development and problem-solving skills. However, challenges such as heavy workload, faculty training, effective team collaboration, and lack of integration between academia and health institutions were identified. DBS is beneficial for familiarizing students with the clinical setting. These three studies highlight the need for teachers to be updated for the success of the techniques, which will reflect on the quality of teaching, creating an effective learning environment.

Kataoka *et al.* (2022) conducted a qualitative study with physicians working with the evidence-based medicine (EBM) technique. The authors identified five main themes: identifying issues, observing models, active learning, understanding patients' context, and motivation to learn EBM. They concluded that EBM is more effective when students actively participate in clinical practice and relate learning to the patients' context.

Mandia and Teixeira (2023) point out that, despite the importance of health communication, it receives less attention in medical education compared to technological and biomedical aspects. The study used the Balint method to reveal several approaches to communication in medicine. The Balint method influenced the development of the Patient-Centered Clinical Method (MCCP) and Narrative Medicine (NM). While the MCCP remained stable, the MN continues to evolve, incorporating elements of the Balint method. The authors emphasize the importance of these approaches to improve patient therapy. In the same vein, Rusiecki *et al.* (2023) organized a *workshop* with students to develop communication skills with a focus on the doctor-patient relationship, equity, and racism. The *workshop* improved the students' communication skills. It can be seen that both Mandia and Teixeira (2023) and Rusiecki *et al.* (2023) have in common the focus on the importance of communication skills in medical practice and highlight the need to improve these competencies to improve the doctor-patient relationship.

Ottenhoff de Jonge *et al.* (2021) conducted a study with professors from two medical schools and described a matrix of educational beliefs to integrate the role of the professor and the student, listing the main objectives of medical education. The study confirmed the relevance of the original structure, identifying new beliefs in the areas of student motivation, origin of knowledge and professional development. The research resulted in a proposal to adapt the teaching plan to align pedagogical practices.

The authors Pereira, Santos and Caldas (2021) analyzed the use of information and communication technologies (ICT) by students. A preference for messaging apps and internet browsers was observed, while the use of medication apps and specialized calculators by students was lower. They highlighted that the main benefit of ICTs is distance communication. Whereas, in the study by Zainal *et al.* (2023) three gaps were identified in the teaching of digital competencies in health: digital health skills, data management, and application of technologies in clinical practice. Qualitative research points to the global need to integrate these areas into the medical curriculum, with a focus on patient safety. In both studies, specific training is required for teachers and students.

Pricinote *et al.* (2021) conducted a qualitative study with students, revealing that they have a limited understanding of *feedback*. Students reported low understanding of the use of *feedback* and a weak connection with professors, subjects, and course time. Despite this, they recognize the positive impact of *feedback* on medical learning. It is perceived that *feedback* helps students to understand their progress, creating a constructive learning environment.

Competency-based mentor-learner interaction learning is essential in medical education, especially in a context where emerging technologies are increasingly present. The mentor-apprentice relationship provides a direct exchange of knowledge and skills, which are fundamental for the training of health professionals who are better prepared to face the professional challenges of the future. This type of interaction allows the learner to develop critical thinking, learn to make clinical decisions based on medical practice. Additionally, the presence of an experienced mentor offers support and guidance, contributing to the learner's confidence and resilience in an environment that can be challenging and demanding.

The integration between mentor-learner interaction and competency-based learning provides medical training that combines technical knowledge with practical skills, necessary for effective health care.

This study was limited in its content analysis in relation to some aspects: (a) selection bias, i.e., the limited number of themes may introduce bias in the research, as the themes found may not be representative of all aspects of teaching-learning in medical education; (b) the search for records was carried out in August 2023, in the periods of 2021, 2022, and 2023, which means that the search was limited to these periods, allowing the inconclusiveness of the literature review and (c) the search restricted to some databases may have hidden studies available in unconsulted databases.

As a suggestion for future studies, the application of these learning methodologies in specific clinical contexts, such as pediatrics, geriatrics, surgery, among others, can be mentioned, aiming to identify particular adaptations and benefits of each approach.

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ENVIRONMENTAL EDUCATION IN EARLY CHILDHOOD EDUCATION AS A TOOL FOR RAISING AWARENESS FOR THE PRESERVATION OF THE CERRADO BIOME IN TOCANTINS

EDUCAÇÃO AMBIENTAL NA EDUCAÇÃO INFANTIL COMO INSTRUMENTO DE SENSIBILIZAÇÃO PARA A PRESERVAÇÃO DO CERRADO TOCANTINENSE

LA EDUCACIÓN AMBIENTAL EN LA EDUCACIÓN INFANTIL COMO HERRAMIENTA DE CONCIENTIZACIÓN PARA LA PRESERVACIÓN DEL BIOMA CERRADO EN TOCANTINS



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ABSTRACT

The intensification of the socio-environmental crisis and the increasing anthropogenic pressures on the Brazilian Cerrado, especially in the state of Tocantins, highlight the need for educational strategies capable of fostering environmental awareness from the earliest stages of schooling. Environmental Education (EE), when integrated into Early Childhood Education, emerges as a structuring, for shaping values, attitudes, and affective bonds with nature, contributing to biome conservation and to the development of a critical and context-based socio-environmental awareness. The problem addressed was to understand how Environmental Education, developed in Early Childhood Education, can serve as an instrument to sensitize children toward the preservation of the Tocantins Cerrado, considering childhood pedagogical foundations, official policy documents, and the valorization of territory

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and local knowledge. This article aimed to analyze the contributions of Environmental Education in Early Childhood Education to environmental sensitization and to the formation of values oriented toward Cerrado preservation in the Tocantins context. Methodologically, this is a qualitative study of a theoretical and exploratory nature, conducted through a systematized literature review based on national and international scientific publications, normative documents, and public policies related to Environmental Education, Early Childhood Education, and the Cerrado. The bibliographic search was carried out in databases such as Scopus, Google Scholar, and ScienceDirect, with selection guided by the PRISMA protocol and interpretive analysis grounded in Content Analysis. Data analysis was conducted interpretively, in light of Critical Environmental Education. The results show that Environmental Education in Early Childhood Education, when grounded in playful practices, concrete experiences with nature, and the valorization of territory, promotes the construction of affective bonds, a sense of belonging, and the development of ethical and sustainable values. However, challenges were also identified regarding teacher education, school infrastructure, and the effective implementation of legal guidelines in everyday pedagogical practice. It is concluded that Environmental Education in Early Childhood Education is an essential strategy for preserving the Tocantins Cerrado, as it promotes contextualized, critical, and socially grounded education, contributing to the formation of sensitive, participatory subjects committed to sustainability from early childhood.

Keywords: Educational Practices. Cerrado Biome. Citizenship Education. Early Childhood.

RESUMO

A intensificação da crise socioambiental e o avanço das pressões antrópicas sobre o Cerrado brasileiro, especialmente no contexto tocantinense, evidenciam a necessidade de estratégias educativas capazes de promover a sensibilização ambiental desde as etapas iniciais da escolarização. A Educação Ambiental (EA), quando inserida na Educação Infantil, apresenta-se como eixo estruturante para a formação de valores, atitudes e vínculos afetivos com a natureza, contribuindo para a preservação dos biomas e para a construção de uma consciência socioambiental crítica e contextualizada. O problema consistiu em compreender de que maneira a Educação Ambiental, desenvolvida na Educação Infantil, pode atuar como instrumento de sensibilização para a preservação do Cerrado tocantinense, considerando os fundamentos pedagógicos da infância, os documentos oficiais e a valorização do território e dos saberes locais. O objetivo deste artigo foi analisar as contribuições da Educação Ambiental na Educação Infantil para a sensibilização ambiental e a formação de valores voltados à preservação do Cerrado no contexto do Tocantins. Metodologicamente, trata-se de uma pesquisa de abordagem qualitativa, de natureza teórica e exploratória, desenvolvida por meio de revisão de literatura sistematizada, com base em produções científicas nacionais e internacionais, documentos normativos e políticas públicas relacionadas à Educação Ambiental, à Educação Infantil e ao Cerrado. O levantamento bibliográfico foi realizado em bases como Scopus, Google Acadêmico e ScienceDirect, com seleção orientada pelo protocolo PRISMA e análise interpretativa fundamentada na Análise de Conteúdo. A análise dos dados foi realizada de forma interpretativa, à luz da Educação Ambiental crítica. Os resultados evidenciam que a Educação Ambiental na Educação Infantil, quando fundamentada em práticas lúdicas, experiências concretas com a natureza e na valorização do território, favorece a construção de vínculos afetivos, o sentimento de pertencimento e o desenvolvimento de valores éticos e sustentáveis. Contudo, também se identificam desafios relacionados à formação docente, à infraestrutura escolar e à efetivação das diretrizes legais no cotidiano pedagógico. Conclui-se que a Educação Ambiental na Educação Infantil constitui uma estratégia essencial para a preservação do Cerrado tocantinense, ao promover uma educação contextualizada, crítica e socialmente referenciada, capaz de contribuir para a formação de sujeitos sensíveis, participativos e comprometidos com a sustentabilidade desde a primeira infância.

Palavras-chave: Práticas Educativas. Bioma Cerrado. Formação Cidadã. Primeira Infância.

RESUMEN

La intensificación de la crisis socioambiental y las crecientes presiones antropogénicas sobre el Cerrado brasileño, especialmente en el contexto de Tocantins, resaltan la necesidad de estrategias educativas capaces de promover la conciencia ambiental desde las primeras etapas de la escolarización. La Educación Ambiental (EA), al integrarse en la Educación Infantil, se presenta como un eje estructurante para la formación de valores, actitudes y vínculos afectivos con la naturaleza, contribuyendo a la preservación de los biomas y a la construcción de una conciencia socioambiental crítica y contextualizada. El problema consistió en comprender cómo la Educación Ambiental, desarrollada en la Educación Infantil, puede actuar como un instrumento de sensibilización para la preservación del Cerrado de Tocantins, considerando los fundamentos pedagógicos de la infancia, los documentos oficiales y la valorización del territorio y los saberes locales. El objetivo de este artículo fue analizar las contribuciones de la Educación Ambiental en la Educación Infantil a la conciencia ambiental y la formación de valores orientados a la preservación del Cerrado en el contexto de Tocantins. Metodológicamente, se trata de una investigación cualitativa, de carácter teórico y exploratorio, desarrollada mediante una revisión sistemática de la literatura basada en publicaciones científicas nacionales e internacionales, documentos normativos y políticas públicas relacionadas con la Educación Ambiental, la Educación Infantil y el bioma del Cerrado. El levantamiento bibliográfico se realizó utilizando bases de datos como Scopus, Google Scholar y ScienceDirect, con selección guiada por el protocolo PRISMA y análisis interpretativo basado en el Análisis de Contenido. El análisis de datos se realizó de forma interpretativa, a la luz de la Educación Ambiental crítica. Los resultados muestran que la Educación Ambiental en la Educación Infantil, cuando se basa en prácticas lúdicas, experiencias concretas con la naturaleza y la valoración del territorio, favorece la construcción de vínculos afectivos, el sentido de pertenencia y el desarrollo de valores éticos y sostenibles. Sin embargo, también se identifican desafíos relacionados con la formación docente, la infraestructura escolar y la implementación efectiva de las directrices legales en la práctica pedagógica diaria. Se concluye que la Educación Ambiental en la Educación Infantil constituye una estrategia esencial para la preservación del bioma del Cerrado en Tocantins, al promover una educación contextualizada, crítica y socialmente referenciada, capaz de contribuir a la formación de personas sensibles, participativas y comprometidas con la sostenibilidad desde la primera infancia.

Palabras clave: Práticas Educativas. Bioma del Cerrado. Educación Ciudadana. Primera Infancia.

1 INTRODUCTION

The intensification of the contemporary socio-environmental crisis, marked by the advance of anthropogenic pressures on Brazilian biomes, has highlighted the urgency of educational strategies capable of promoting profound changes in the relations between society and nature (Santos; Muller; Mendes, 2024). The Cerrado, the second largest biome in the country and predominant in the State of Tocantins, stands out both for its high biodiversity and for the growing vulnerability resulting from agricultural expansion, deforestation, fires and fragmentation of ecosystems (Nogueira et al., 2011; Segura-Garcia et al., 2025). In this context, Environmental Education emerges as a strategic field for the formation of values, attitudes, and practices committed to sustainability and socio-environmental justice (Dias et al., 2026).

Early Childhood Education, as the first stage of Basic Education, occupies a central position in this formative process, as it constitutes a decisive period for the cognitive, affective, social and ethical development of children. It is in this phase that perceptions, affective bonds and senses of belonging are consolidated that guide the subject's relationship with the environment throughout life. Thus, the insertion of Environmental Education from early childhood presents itself as a concrete possibility of environmental awareness, especially when based on playful practices, meaningful experiences, and the appreciation of the lived territory (Gugssa, 2023).

Despite the normative recognition of Environmental Education as a continuous, integrated and transversal educational practice, it is observed that, in the school routine, its implementation in Early Childhood Education still occurs in a fragmented, punctual or restricted way to conservationist and commemorative approaches (Sabad, 2016; Dutra; Lima; Dresch, 2020). This scenario shows a distance between the assumptions of Critical Environmental Education, which understands the environment as a space of social, cultural and political relations, and the pedagogical practices effectively developed, especially in specific territorial contexts such as the Cerrado of Tocantins (Brazil; Scareli-Santos; Carneiro da Silva, 2025).

From this perspective, the problem that guides this study consisted of understanding how Environmental Education, developed in Early Childhood Education, can act as an instrument of awareness for the preservation of the Cerrado of Tocantins, considering the pedagogical foundations of childhood, official documents and the valorization of the territory and local knowledge. The relevance of the research is justified by the need to strengthen contextualized educational practices, capable of articulating childhood, territory and

sustainability, contributing to the formation of a critical socio-environmental awareness from the first years of schooling.

Thus, this article aimed to analyze the contributions of Environmental Education in Early Childhood Education to environmental awareness and the formation of values aimed at the preservation of the Cerrado in the context of Tocantins, based on a systematized literature review based on the perspective of Critical Environmental Education.

2 METHODOLOGY

The research adopted a qualitative approach, of a theoretical and exploratory nature, operationalized through a systematized literature review (Soares; Tavares, 2025). The choice for the qualitative paradigm is justified by the need to apprehend educational phenomena in their interpretative complexity, prioritizing the senses, meanings and perceptions that structure the relationship between the child, the territory and the Cerrado biome. In view of the research, this approach enables an in-depth analysis of the nuances that distinguish Critical Environmental Education, oriented to social and political transformation, from the merely conservationist or pragmatic perspectives, widely identified in the specialized literature.

The qualitative nature of the research is particularly appropriate to the object of study, since the formation of ethical values, the construction of affective bonds and the processes of environmental awareness in early childhood are not subject to quantitative metrics. It is about investigating subjective and relational dimensions of the development of socio-environmental awareness, anchored in experiences of belonging and territoriality, which could not be properly captured by isolated statistical approaches. Once this design is defined, the technical strategies for data collection and analysis are explained (Mattar; Ramon, 2021).

Reproducibility is a central principle of scientific integrity in systematized reviews. In order to ensure a consistent mapping of the state of the art, a search strategy was employed that articulated descriptors in Portuguese and English, allowing the socio-environmental reality of Tocantins to dialogue with contemporary international debates on childhood, environmental education and the Anthropocene. This methodological option enables the articulation between local anthropogenic pressures, such as agricultural expansion and deforestation in the Cerrado, and global discussions on environmental crisis and socio-environmental justice. In this sense, the search matrix used in the bibliographic survey is presented, as shown in Table 1.

Table 1

Search matrix of the survey

Database	Boolean operators used	Identified records
Scopus	"early childhood education" AND "environmental education" AND "Cerrado"	45
Google Scholar	"early childhood education" AND "environmental education" AND "Cerrado" AND "Tocantins"	1.200
ScienceDirect	"environmental education" AND ("Brazilian biomes" OR "Cerrado") AND "sustainability"	82

Source: the authors (2026)

The inclusion of terms such as Brazilian biomes, territory, and sustainability expanded the analytical scope beyond the biophysical dimension, incorporating the political, cultural, and identity dimension of the biome. By integrating global and local categories, the research avoids epistemological isolation and positions the Cerrado of Tocantins as a strategic locus of learning, resistance and construction of educational practices in the face of contemporary ecological crises.

This strategy allowed the articulation of international scientific production on Environmental Education in early childhood with national and regional studies related to the Cerrado and the educational reality of Tocantins. In total, 1,327 records were identified, 45 in Scopus, 1,200 in Google Scholar and 82 in ScienceDirect.

To mitigate selection biases and provide greater methodological robustness to the documentary corpus, the PRISMA (*Preferred Reporting Items for Systematic Reviews and Meta-Analyses*) protocol was adopted. The study selection process was structured in four distinct and complementary stages. The first stage, called identification, consisted of the initial survey of scientific productions in the Scopus, Google Scholar and ScienceDirect databases, using the previously defined descriptors, in which 1,327 records were identified, 45 in Scopus, 1,200 in Google Scholar and 82 in ScienceDirect. In the second stage, screening, duplicate records were excluded and titles and abstracts that did not adhere to the research objective were analyzed, especially those unrelated to Early Childhood Education, Environmental Education or the context of Brazilian biomes. The third stage, eligibility, involved the full reading of the selected texts, prioritizing those that articulated Critical Environmental Education to the notion of lived territory, understood not only as a physical space, but as a field of social, cultural and historical relations. Finally, the inclusion stage consisted of the definition of 45 studies of the final corpus of studies, which supported the qualitative analysis and content analysis.

The composition of this corpus was based on previously established criteria, which included scientific productions and documents published between 2010 and 2026, due to the

topicality of the debate, as well as studies based on Critical Environmental Education and approaches that valued the territory, local knowledge, and contextualized education. Reports of experience without consistent theoretical foundation, works that approached Environmental Education from a strictly instrumental or pragmatic perspective, and studies unrelated to Early Childhood Education or contexts related to Brazilian biomes were excluded.

Data analysis was conducted based on Content Analysis, as proposed by Bardin, allowing the organization, categorization, and systematic interpretation of information (Bardin, 2016). The emerging analytical categories contemplated aspects such as playful pedagogical practices, environmental awareness in early childhood, socio-environmental identity, appreciation of local knowledge and challenges of implementing Environmental Education in the school context. This approach enabled a critical and contextualized reading of the literature, contributing to the understanding of the role of Environmental Education in the formation of values and bonds with the Cerrado since childhood (Bardin, 2016; Sousa; Salvatierra, 2022), as shown in Table 2.

Table 2

Characteristics of the studies included in this research

Main authors	Year	Document type	Main focus
Ardoín; Bowers	2020	Scientific article (systematic review)	Environmental Education in Early Childhood and Theoretical-Methodological Foundations of the Area
Dolci; Pereira	2020	Scientific article	Environmental Education and Aesthetic Education as Formative Processes for Sustainability
Dutra; Lima; Dresch	2020	Scientific article	Pedagogical practices of Environmental Education in Early Childhood Education
Sabed	2016	Scientific article	Limits and possibilities of Environmental Education in Early Childhood Education
Santos; Muller; Mendes	2024	Scientific article (review)	Teaching biomes in basic education and Environmental Education
Borges et al.	2025	Scientific article	Environmental Education and sustainable development in citizenship education
Da Silva et al.	2025	Scientific article	Environmental Education as a tool for the formation of sustainable citizens
Gugssa	2023	Scientific article	Environmental Education Practices in Basic Education Schools
Brazil; Scareli-Santos; Carneiro da Silva	2025	Scientific article	Environmental Education in formal and non-formal spaces in Tocantins

Main authors	Year	Document type	Main focus
Lopes et al.	2025	Scientific article	Environmental Education, Waste Management and Sustainable Practices
Nogueira et al.	2011	Scientific article	Biodiversity, conservation and characterization of the Cerrado of Tocantins
Segura-Garcia et al.	2025	Scientific article	Environmental dynamics and fire regimes in the Cerrado
Soares; Tavares	2025	Scientific article (review)	Environmental Education and the Cerrado in Brazilian academic production
Dias et al.	2025–2026	Scientific articles	Environmental Education, school afforestation, environmental perception and territory
Official documents (PNEA, DCNEI, DCNEA, BNCC)	1999–2018	Normative documents	Legal and curricular guidelines for Environmental Education and Early Childhood Education

Source: The authors (2026)

The systematization proposed by Bardin made it possible to highlight contradictions and potentialities present in the field analyzed, especially the tension between the formative potential of playfulness and direct contact with nature and the limitations imposed by structural weaknesses of school institutions and the insufficiency of teacher training. It is also noteworthy that the analysis carried out is not intended to neutralize, being explicitly guided by the perspective of Critical Environmental Education, in dialogue with Paulo Freire's Pedagogy of the Oppressed. This reference allowed us to interpret the territory of Tocantins as a space of dispute, resistance and emancipation, recognizing the centrality of the identities of rural peoples, riverside dwellers and traditional communities.

From this perspective, the interpretation of the results is based on the dialogue between scientific and popular knowledge, recognizing the traditional knowledge about the Cerrado as a structuring element of a contextualized Environmental Education, as well as on the normative confrontation, by evidencing the gaps between the consistency of the National Curriculum Guidelines for Early Childhood Education and the National Curriculum Guidelines for Environmental Education and their effective materialization in everyday life school. This methodological architecture ensures that the study goes beyond mere description, configuring itself as an analytical and purposeful instrument, committed to the formation of territorial belonging and ethical commitment to the Cerrado from early childhood.

3 LITERATURE REVIEW

3.1 ENVIRONMENTAL EDUCATION: CONCEPTS, APPROACHES AND PERSPECTIVES

Environmental Education has consolidated itself as an interdisciplinary theoretical-practical field, under constant construction, strongly influenced by the socio-environmental, political, and economic transformations that mark contemporary society (Dias et al., 2026). Its emergence is directly associated with the intensification of the global environmental crisis, especially from the second half of the twentieth century, when the impacts of the industrial development model began to show ecological limits, social inequalities, and risks to human survival itself (Vineis; Gambhir, 2023; Ellis, 2023).

Environmental Education emerges in the international scenario linked to environmental movements and multilateral events that sought to respond to growing environmental degradation. Conferences such as Stockholm (1972), Tbilisi (1977) and, later, Rio-92, were fundamental milestones for the institutionalization of EE, as they recognized it as a strategic instrument for the promotion of new values, attitudes and social practices aimed at sustainability (Dolci; Pereira, 2020).

In Brazil, EE gained strength from the 1980s onwards, being gradually incorporated into public educational policies, culminating in its legal consolidation as an essential component of national education, of a transversal and permanent nature (Ardoin; Bowers, 2020).

Environmental Education practices were strongly associated with punctual actions, of an informative and preservationist nature, aimed at the conservation of natural resources and the change of individual behaviors. With the advancement of theoretical discussions and the deepening of the socio-environmental crisis, this field begins to incorporate social, cultural, economic, and political dimensions, expanding its analytical and formative scope (Gugssa, 2023).

In this aspect, the specialized literature identifies different approaches to Environmental Education, among which the conservationist, pragmatic and critical perspectives stand out. The conservationist approach is characterized by a naturalistic view of the human-nature relationship, prioritizing environmental preservation, the protection of biodiversity, and the adoption of ecologically correct behaviors. Although relevant to initial awareness, this perspective tends to disregard the structural and social dimensions of environmental problems (Dias et al., 2025).

The pragmatic approach, in turn, emerges associated with the discourse of sustainable development and environmental management, emphasizing technical solutions, efficiency in the use of resources, and practices to mitigate environmental impacts. From this perspective,

Environmental Education assumes an instrumental character, oriented to the adaptation of the individual to the demands of the market and the demands of institutional sustainability, which can limit its critical and transformative potential (Santos; Lisbon; Souza, 2021; Da Silva et al., 2025).

Critical Environmental Education, on the contrary, proposes an expanded and problematizing reading of the socio-environmental reality (Dias et al., 2025). Based on references of critical and emancipatory education, this approach understands the environment as a space of political, economic and symbolic disputes, recognizing that environmental problems are intrinsically related to social inequalities, production and consumption models and power relations. Thus, critical EE seeks to train subjects capable of understanding, questioning and intervening in reality, promoting socio-environmental justice and transformative social transformation (Santos; Lisbon; Souza, 2021; Da Silva et al., 2025).

Furthermore, Environmental Education goes beyond the merely pedagogical or informative character, configuring itself as a social and political practice. It is committed to the formation of conscious, participatory citizens who are co-responsible for the construction of fairer and more sustainable societies. By recognizing language, culture, and territory as constitutive dimensions of the educational process, EE begins to value local knowledge, community experiences, and the socio-environmental identity of the subjects (Gugssa, 2023; Dias et al., 2025).

Understood as an emancipatory practice, Environmental Education contributes to the development of autonomy, critical awareness and collective engagement, especially when inserted from Early Childhood Education (Freire, 2011; Ardoin; Bowers, 2020). By enabling meaningful experiences of interaction with the environment and reflection on society-nature relations, EE promotes the construction of ethical, solidary, and sustainable values, which are fundamental for the preservation of Brazilian biomes, such as the Cerrado of Tocantins (Santos; Muller; Mendes, 2024).

In this way, Environmental Education, by articulating historical, conceptual and political dimensions, affirms itself as a structuring axis for the integral formation of subjects, especially in early childhood, a decisive stage for the consolidation of attitudes, perceptions and lasting bonds with the environment.

3.2 ENVIRONMENTAL EDUCATION IN EARLY CHILDHOOD EDUCATION

Early Childhood Education is the first stage of Basic Education and assumes a strategic role in the integral formation of the child, considering its cognitive, affective, social, cultural and ethical dimensions. Based on pedagogical conceptions that recognize the child

as a historical, social, and rights subject, this educational stage is guided by the promotion of full development, through interactions, games, and meaningful experiences (Gugssa, 2023). In this context, Environmental Education finds fertile ground for the construction of attitudes, values and perceptions that favor an ethical and responsible relationship with the environment.

The pedagogical foundations of Early Childhood Education are based on principles that value the child as the protagonist of the educational process, respecting their singularities, times and ways of learning. The National Curriculum Guidelines for Early Childhood Education and the National Common Curriculum Base (BNCC) reinforce the centrality of interactions and play as structuring axes of pedagogical practice, understanding learning as the result of experience, experimentation, and the collective construction of meanings (Brasil, 2018; Santos; Muller; Mendes, 2024).

From this perspective, the Early Childhood Education curriculum should promote experiences that articulate care, educating and playing, enabling the development of autonomy, curiosity, sensitivity and imagination. Such foundations dialogue directly with the assumptions of Environmental Education, by favoring contextualized, interdisciplinary pedagogical practices aimed at the formation of critical subjects from childhood (Freire, 2011; Borges et al., 2025).

The insertion of Environmental Education in early childhood is a fundamental strategy for environmental awareness and the construction of sustainable values. Unlike content-based approaches, EE in Early Childhood Education should prioritize sensory, affective, and symbolic experiences, capable of awakening enchantment, care, and respect for nature. In this sense, environmental awareness occurs in a procedural way, through daily experience, direct contact with the environment and intentional pedagogical mediation (Lopes et al., 2025).

By experiencing Environmental Education practices from an early age, children begin to build positive perceptions about the environment, recognizing themselves as an integral part of nature. This construction contributes to the development of attitudes such as cooperation, collective responsibility and empathy, essential elements for the formation of socio-environmental awareness. Thus, EE in Early Childhood Education assumes a formative character, going beyond the transmission of information and promoting the internalization of ethical and sustainable values (Gugssa, 2023; Bandeira, 2025).

In this sense, play and playfulness are central languages of childhood and play a fundamental role in Environmental Education in Early Childhood Education. Through play, children explore the world, express feelings, elaborate meanings and build knowledge in a

spontaneous and pleasurable way. When articulated with Environmental Education, playful practices enable the child to get closer to nature, strengthening affective bonds and expanding the understanding of the relationships between living beings and the environment (Freire, 2011; Bandeira, 2025).

Concrete experience with nature, such as contact with soil, plants, water and animals, enhances meaningful learning and contributes to the development of environmental sensitivity. Spaces such as gardens, school gardens, green areas and natural environments in the school surroundings are important educational territories, especially in the context of the Cerrado of Tocantins. These experiences allow the child to learn by doing, observing and interacting, strengthening the sense of belonging and the commitment to environmental preservation (Dias et al., 2025).

In this way, by integrating play, playfulness and concrete experiences with nature, Environmental Education in Early Childhood Education promotes significant learning, favoring the formation of sensitive, critical subjects committed to sustainability. This approach reaffirms the transformative potential of Environmental Education from early childhood, contributing to the construction of a more balanced and respectful relationship between society and nature.

3.3 THE CERRADO OF TOCANTINS AS AN EDUCATIONAL CONTEXT

The Cerrado of Tocantins is configured as a territory of high ecological, social and cultural relevance, assuming a strategic role both for environmental conservation and for contextualized educational processes (Brasil; Santos, Carneiro da Silva, 2025). Inserted in the Cerrado biome, the State of Tocantins is home to an expressive diversity of landscapes, species and forms of interaction between society and nature, which makes it a privileged space for the development of Environmental Education practices from Early Childhood Education (Moreira; Bispo, 2020).

In this perspective, it can be said that the Cerrado is recognized as one of the most biodiverse biomes on the planet, with a high richness of fauna and flora, a high degree of endemism and complex ecological interactions (Moreira; Bispo, 2020). In Tocantins, this biome manifests itself in different phytophysionomies, such as *cerradão*, *cerrado sensu stricto*, *veredas* and *clean fields*, composing a fundamental ecological mosaic for the maintenance of natural cycles. In addition to biodiversity, the Cerrado performs essential ecosystem services, such as regulating the water regime, soil conservation, carbon sequestration, and sustaining strategic watersheds for the country (Resende et al., 2017).

Despite its importance, the Cerrado of Tocantins faces increasing pressures resulting from agricultural expansion, deforestation, fires, habitat fragmentation, and inappropriate use of natural resources (Resende et al., 2017). These threats compromise not only the environmental integrity of the biome, but also the ways of life of the populations that depend on it. In this scenario, Environmental Education plays a central role in raising awareness and training subjects capable of understanding the complexity of the relationships between economic development, environmental conservation and socio-environmental justice (Moreira; Bispo, 2020; Dias et al, 2025).

Furthermore, the valorization of the territory and local knowledge is a fundamental element for an effective and meaningful Environmental Education (Brasil; Santos, Carneiro da Silva, 2025). The Cerrado of Tocantins is not limited to a physical space, but represents a lived territory, historically constructed by traditional communities, rural peoples, riverside dwellers and urban populations who establish symbolic, cultural and productive relations with the environment (Rigotto; Santos; Costa, 2022). This knowledge, transmitted through orality, daily practice, and collective experience, is an important source of socio-environmental knowledge (Moreira, 2025).

Incorporating the territory and local knowledge into the educational context makes it possible to break with decontextualized and universalizing approaches to Environmental Education. By recognizing and valuing the experiences and knowledge of communities, the school strengthens the sense of belonging, expands the dialogue between scientific and popular knowledge, and contributes to the construction of an education committed to the local reality (Moreira, 2025). In Early Childhood Education, this appreciation is especially relevant, as it allows the child to understand the environment in which he lives as part of his identity and history (Moreira; Bispo, 2020; Dias et al, 2025).

Contextualized Environmental Education is based on the articulation between the school curriculum, the territory and the experiences of the subjects, promoting meaningful and socially referenced learning (Dias et al., 2026). In the context of the Cerrado of Tocantins, this approach enables children to recognize nature as a space for life, culture, and learning, developing affective and ethical bonds with the environment (Moreira, 2025). Based on concrete and pedagogically mediated experiences, Environmental Education contributes to the construction of socio-environmental identity from early childhood.

Socio-environmental identity refers to the recognition of the subject as an integral part of the environment, responsible for his or her actions and co-responsible for the preservation of natural resources. In Early Childhood Education, this identity is built through practices that involve the observation of nature, the care of plants and animals, the appreciation of the local

territory and the dialogue about environmental problems experienced in everyday life. In this way, Environmental Education ceases to be an isolated content and becomes a formative axis that articulates values, attitudes and knowledge (Brasil; Santos, Carneiro da Silva, 2025)..

Thus, by assuming the Cerrado of Tocantins as an educational context, Environmental Education contributes to the formation of sensitive, critical subjects committed to the preservation of the biome (Brasil; Santos, Carneiro da Silva, 2025; Moreira, 2025). This perspective reinforces the role of the school, especially Early Childhood Education, as a privileged space for the construction of a socio-environmental awareness rooted in the territory, capable of promoting sustainable practices and strengthening the relationship between society and nature.

3.4 ENVIRONMENTAL EDUCATION AND OFFICIAL DOCUMENTS

The institutionalization of Environmental Education (EE) in Brazil results from a normative process that recognizes it as a structuring dimension of citizenship education and as a permanent component of educational processes. In the context of formal education, this guideline is consolidated, above all, by the National Policy on Environmental Education (PNEA) and by curricular documents that guide Early Childhood Education and Basic Education, such as the National Curriculum Guidelines and the BNCC, reaffirming the integrated, continuous and transversal character of the environmental theme (Brasil, 1999; Brazil, 2018).

From a legal point of view, Law No. 9,795/1999 (PNEA) establishes Environmental Education as an "integrated, continuous and permanent educational practice" at all levels and modalities of formal education, and explains that it should not be implemented as a specific discipline in basic education, guiding its insertion in a transversal and articulated way in the curriculum (Brasil, 1999).

In convergence, the National Curriculum Guidelines for Environmental Education (DCNEA), established by Resolution CNE/CP No. 2/2012, reinforce EE as an essential, interdisciplinary and continuous dimension, to be considered in institutional planning (pedagogical project), curriculum organization and school practices, with emphasis on the articulation between education, ethics, sustainability and social participation (Brasil, 2012).

In the specific field of Early Childhood Education, the National Curriculum Guidelines for Early Childhood Education (DCNEI) guide pedagogical proposals centered on interactions and play, supported by ethical and political principles that favor responsibility, care and coexistence. This milestone is relevant because it creates a pedagogical basis for educational

experiences that bring children closer to nature and environmental care practices, without reducing EE to punctual or merely commemorative actions (Brasil, 2012).

The BNCC reinforces this logic by organizing Early Childhood Education into fields of experience, favoring the insertion of contemporary themes and socio-environmental debate through experiences, exploration of the surroundings, observation and care practices, in line with the principle of integrality of child development. Thus, EE, in the BNCC, tends to operate as an articulating axis of formative experiences, connecting environment, culture, territory and citizenship (Brasil, 2018).

In terms of public policies, the PNEA establishes principles, objectives and responsibilities for the promotion of EE at the national level, guiding integrated actions between formal and non-formal education, and stimulating cooperation between the Union, states and municipalities (Brasil, 1999).

In Early Childhood Education, the application of these guidelines tends to gain concreteness when EE is incorporated into the Political-Pedagogical Project (PPP), teacher planning and institutional routines, focusing on: the organization of educational spaces with the presence of nature, such as gardens, vegetable gardens, pedagogical backyards; the experiences of daily care, such as with water, waste, plants and animals; projects that value the territory and the local biome, in this case, the Cerrado of Tocantins, articulating school-family-community (Freire, 2011; Bandeira, 2025).

This normative framework shifts EE from a logic of "content" to a logic of educational practice, sustained by experiences and values, which is especially compatible with Early Childhood Education, in which learning takes place primarily through interaction, experience, language and play (Freire, 2011; Brazil; Santos, Silva, 2025; Moreira, 2025).

Despite the normative robustness, the literature and school practice indicate that the implementation of EE faces recurrent challenges. Among the main ones, they stand out for the risk of superficiality and punctuality, that is, EE is often reduced to events, such as commemorative dates, and isolated activities, without curricular continuity and without a link with the territory, contrary to the requirement of integration and permanence provided for in the PNEA (Freire, 2011; Brazil, 1999; Bandeira, 2025). Furthermore, there are weaknesses in teacher training, in which many teachers did not have sufficient initial and continuing training to work with EE in an interdisciplinary, critical and childhood-appropriate way, which favors conservationist and moralizing practices (focus on "right/wrong"), with little problematization of the socio-environmental context. In addition, the material and organizational conditions, in which the absence of green spaces, pedagogical materials, planning time and institutional support make it difficult to transform EE into a structuring

routine. In addition, the low articulation between documents and practice, in which, although PPPs and curricula cite EE, there are not always developments in pedagogical objectives, didactic sequences, formative assessment and community involvement, reducing the effectiveness of what is proposed by the national guidelines.

In view of this, the effectiveness of Environmental Education in Early Childhood Education requires treating official documents not as a formality, but as pedagogical orientation frameworks, translated into contextualized, continuous and territorially referenced practices, a decisive condition for environmental awareness to be converted into values, attitudes and belonging, particularly in the context of the Cerrado of Tocantins.

4 ANALYSIS AND DISCUSSION

Throughout this study, the main points of the review are discussed, seeking to bring the academic debate closer to the daily reality of children and Early Childhood Education institutions in Tocantins. It is based on the understanding that the Cerrado is not just a school "theme", but a lived territory, which appears in the water, in the climate, in the fires, in the landscape and in the concrete experiences that cross the communities. The analysis articulates literature studies and official documents to understand to what extent Environmental Education, when mediated by play, contact with nature and appreciation of local knowledge, can strengthen affective bonds, a sense of belonging and collective responsibility from early childhood, in addition to evidencing limits and challenges that still make it difficult to transform normative guidelines into continuous and contextualized practices in the pedagogical routine.

In this aspect, it was evidenced that Environmental Education in Early Childhood Education tends to produce more consistent effects of awareness when it is organized as a continuous formative experience, anchored in affective bonds with nature, playfulness and territorial belonging, and not as a set of punctual or moralizing actions. In this sense, the understanding is consolidated by the fact that Environmental Education practices in early childhood are more effective when they prioritize meaningful experiences, relationships and processes, rather than prescriptive content (Ardoin; Bowers, 2020).

Corroborating, the literature states that direct contact with natural environments and pedagogical mediation through play expand children's curiosity, attention, and willingness to care, composing a socio-affective basis indispensable to the construction of environmental values, according to (Dutra; Lima; Dresch. 2020) and (Bandeira, 2021).

This experiential dimension gains density with the discussion about the Cerrado of Tocantins as an educational context. Studies reinforce that the Cerrado is a territory under

continuous environmental pressure, which makes awareness from Early Childhood Education not only desirable, but strategic for local sustainability (Nogueira et al., 2011; Segura-Garcia et al., 2025). At the same time, it is verified that Environmental Education actions linked to conservation units in Tocantins expand learning repertoires and bring the school closer to concrete references in the territory (Moreira and Bispo, 2020). Thus, it can be said that Environmental Education in Early Childhood Education tends to be more powerful when it articulates childhood, nature and territory, making the Cerrado a "living object" of observation, care and narratives, and not just an abstract theme (Ardoin; Bowers, 2020; Bandeira, 2021; Moreira; Bispo, 2020).

However, the literature also indicates important limits to be observed. In this sense, it is verified that, in many contexts, Environmental Education in Early Childhood Education is reduced to occasional activities, often associated with commemorative dates, with low continuity and little integration into the curriculum (Sabed, 2016; Dutra; Lima; Dresch, 2020). This fragility intensifies when there is insufficient teacher training to approach EE in an interdisciplinary and critical way, which favors conservationist and prescriptive practices, centered on "right/wrong", with little problematization of the social and political dimensions of the environmental crisis. At this point, it was found that the displacement of certain practices to a pragmatic/instrumental logic, that is, when EE is limited to behavioral adaptation and waste management as an end in itself, its potential for critical reflection and transformation is reduced (Santos; Lisbon; Souza, 2021; Da Silva et al., 2025). From this, it is inferred that there is a need to reposition EE in Early Childhood Education beyond pragmatism and conservationism, reinforcing a critical, dialogical and territorialized perspective (Dias et al., 2025; Dias et al., 2026).

The centrality of the territory, in turn, appears as the axis of pedagogical and political consistency of Environmental Education in the Cerrado. The discussion about "lived territory" gains strength when interpreting the Cerrado as a space marked by conflicts, inequalities and "sacrifice zones" associated with agribusiness, showing that the environmental crisis is not neutral and affects traditional communities and vulnerable populations in a different way (Rigotto; Santos; Costa, 2022). In this sense, traditional knowledge is constitutive of sociocultural and environmental preservation in the Cerrado, which broadens the understanding of the biome beyond its biophysical aspects (Moreira, 2025). In addition, contextualized Environmental Education must recognize the plurality of narratives about the Cerrado, incorporating memories, practices and local knowledge as components of the lived curriculum, especially in Early Childhood Education, a stage in which belonging and identity

are formed through experiences, language and relationships (Rigotto; Santos; Costa, 2022; Moreira, 2025; Dias et al., 2026).

From the normative point of view, the analysis shows a recurrent mismatch between the robustness of the legal frameworks and the pedagogical materialization in the school routine. The PNEA establishes EE as an integrated, continuous and permanent educational practice (Brasil, 1999), while the National Curriculum Guidelines for Environmental Education reinforce its interdisciplinary and transversal nature (Brasil, 2012). The BNCC, in turn, organizes Early Childhood Education into fields of experience and reaffirms interactions and games as structuring axes (Brasil, 2018), which creates favorable pedagogical conditions for an EE based on experiences with the territory and the environment.

However, it is observed that formal institutionalization does not guarantee effective implementation: there are still planning gaps, insufficient institutional support, absence of green spaces, and difficulties in didactic continuity, which tends to transform EE into a peripheral activity, rather than a structuring axis (Sabed, 2016; Dutra; Lima; Dresch, 2020; Brazil; Scareli-Santos; Carneiro da Silva, 2025).

In this scenario, playfulness appears simultaneously as a potential and as a point of tension. On the one hand, literature converges in recognizing play as a central language of childhood and as a privileged path to environmental awareness (Bandeira, 2021; Dutra; Lima; Dresch, 2020). On the other hand, the effectiveness of these practices depends on objective conditions, such as pedagogical time, adequate spaces, materials, training and didactic intentionality, at the risk of playfulness being treated as "pedagogical activism" disconnected from reflection and continuity.

This tension dialogues with the Freirean perspective, as critical Environmental Education requires problematization of the lived world, even in childhood, through mediations appropriate to the stage, in which the child constructs meanings about care, collectivity, responsibility and justice (Freire, 2011). Thus, it is inferred that environmental awareness in Early Childhood Education must articulate affection and criticality: the bond with nature is a condition of possibility for consciousness, but awareness is strengthened when the territory is also read as a social, cultural and political reality (Freire, 2011; Ardoin; Bowers, 2020; Rigotto; Santos; Costa, 2022).

Therefore, Environmental Education in Early Childhood Education is a relevant instrument of awareness for the preservation of the Cerrado of Tocantins when it assumes a continuous and experiential character, with games, projects and care routines; articulates the lived territory of the Cerrado to educational practices, valuing local knowledge and identities; and it aligns itself with the normative frameworks without reducing them to documentary

formality, translating them into planning, pedagogical mediation and concrete institutional conditions.

5 FINAL CONSIDERATIONS

It is concluded that Environmental Education through Early Childhood Education constitutes an effective instrument of awareness for the preservation of the Cerrado of Tocantins when it is organized as a continuous, integrated and territorially referenced practice. Furthermore, it was evidenced that the insertion of EE in early childhood, mediated by interactions, games and meaningful experiences, favors the construction of affective bonds with nature, the feeling of belonging to the territory and the formation of ethical values oriented to care and collective responsibility, fundamental elements for a critical socio-environmental awareness from the first years of schooling.

The results of the research indicate that playful pedagogical practices, direct contact with natural environments, daily projects of care for water, plants and waste, and the valorization of local knowledge expand the formative power of EE, especially in a biome marked by pressures from human actions and socio-environmental conflicts such as the Cerrado. However, recurrent limitations were also confirmed, such as the persistence of punctual and commemorative approaches, the tendency to instrumental or pragmatic reduction of EE, weaknesses in the initial and continuing training of teachers, insufficient infrastructure, that is, green spaces, materials and pedagogical time, and the mismatch between normative robustness, such as the national plan for Environmental Education and the National Common Curriculum Base, and its effective materialization in the daily life of educational institutions.

As recommendations, the need to strengthen the implementation of Environmental Education in Early Childhood Education is pointed out through articulated fronts, such as institutionalization in the Political-Pedagogical Project and in teacher planning, with continuity and explicit link with the Cerrado of Tocantins; investment in critical, interdisciplinary and childhood-appropriate teacher training, capable of integrating playfulness, problematization and socio-environmental justice; and the improvement of material and pedagogical conditions, with the expansion of educational spaces with nature, such as vegetable gardens, gardens, pedagogical backyards, and greater articulation between school, family and community, incorporating narratives and knowledge of rural peoples, riverside dwellers and traditional communities. It is noteworthy that these measures tend to convert legal guidelines into concrete and sustainable practices, consolidating Environmental Education as the

structuring axis of a contextualized education committed to the preservation of the Cerrado from early childhood.

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EDUCATIONAL LEADERSHIP IN CONTEXTS OF SYSTEMIC DISRUPTION: A CASE STUDY OF INSTITUTIONAL ADAPTATION IN A CRISIS SCENARIO

LIDERANÇA EDUCACIONAL EM CONTEXTOS DE RUPTURA SISTÊMICA: ESTUDO DE CASO DA ADAPTAÇÃO INSTITUCIONAL EM CENÁRIO DE CRISE

LIDERAZGO EDUCATIVO EN CONTEXTOS DE DISRUPCIÓN SISTÉMICA: UN ESTUDIO DE CASO DE ADAPTACIÓN INSTITUCIONAL EN UN ESCENARIO DE CRISIS



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ABSTRACT

This article analyzes educational leadership from a systemic perspective in contexts of organizational disruption, investigating institutional implications of executive decision-making during crisis scenarios. A qualitative interpretive case study is conducted based on institutional documentary evidence, including enrollment evolution, pedagogical strategies, and community engagement actions. The institution operated two school units until July 2022 and expanded to three units thereafter, serving early childhood, elementary, and secondary education. Historical data show growth from 576 enrollments in 2019 to 1,725 in 2026. Findings suggest that technological adaptation, institutional communication, and pedagogical mobilization functioned as drivers of organizational resilience, contributing to institutional stability and community trust.

Keywords: Educational Leadership. Case Study. Organizational Resilience. School Management.

RESUMO

Este artigo analisa a liderança educacional sob perspectiva sistêmica em contextos de ruptura organizacional, investigando implicações institucionais da tomada de decisão executiva durante cenário de crise. Utiliza-se estudo de caso qualitativo interpretativo baseado em evidências documentais institucionais, incluindo evolução de matrículas, estratégias pedagógicas e ações comunitárias. A instituição operou duas unidades até julho de 2022 e expandiu para três unidades a partir de então, atendendo Educação Infantil, Ensino Fundamental e Ensino Médio. A série histórica demonstra crescimento de 576 matrículas em 2019 para 1.725 em 2026. Argumenta-se que adaptação tecnológica, comunicação institucional e mobilização pedagógica atuaram como vetores de resiliência organizacional, contribuindo para estabilidade institucional e confiança das famílias.

Palavras-chave: Liderança Educacional. Estudo de Caso. Resiliência Organizacional. Gestão Escolar.

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RESUMEN

Este artículo analiza el liderazgo educativo desde una perspectiva sistémica en contextos de disrupción organizacional, investigando las implicaciones institucionales de la toma de decisiones ejecutivas durante un escenario de crisis. Se utiliza un estudio de caso cualitativo interpretativo basado en evidencia documental institucional, que incluye tendencias de matrícula, estrategias pedagógicas y acciones comunitarias. La institución operó dos unidades hasta julio de 2022 y posteriormente se expandió a tres unidades, atendiendo Educación Infantil, Primaria y Bachillerato. La serie histórica muestra un crecimiento de 576 matrículas en 2019 a 1725 en 2026. Se argumenta que la adaptación tecnológica, la comunicación institucional y la movilización pedagógica actuaron como vectores de resiliencia organizacional, contribuyendo a la estabilidad institucional y la confianza familiar.

Palabras clave: Liderazgo Educativo. Estudio de Caso. Resiliencia Organizacional. Gestión Escolar.

1 INTRODUCTION

Contemporary educational environments are characterized by organizational complexity and systemic unpredictability, requiring expanded adaptive capacities. In the international debate, studies indicate that school leadership directly influences pedagogical continuity and institutional trust in periods of disruption (Harris; Jones, 2020). In the Brazilian context, school management is often understood as a practice that is inseparable from the pedagogical project and from the concrete conditions of organization of school work (Libâneo, 2004; Paro, 2015), which reinforces the need for situated analysis.

Systemic crises also highlight the role of executive strategic decisions in organizational stability, especially when articulated with institutional culture, team alignment, and the maintenance of ties with families (Fullan, 2014). Thus, this study aims to analyze organizational implications of educational leadership through an institutional case study, relating executive decisions, pedagogical strategies and community bonding actions to observable institutional indicators, with emphasis on the evolution of enrollments over time.

2 THEORETICAL FRAMEWORK

Educational leadership has been associated with institutional performance and organizational adaptability (Leithwood; Harris; Hopkins, 2008). Transformational leadership models emphasize collective mobilization, shared vision, and strengthening professional commitment in contexts of change (Bass; Riggio, 2006).

In Brazil, the literature emphasizes school management as an articulation between pedagogical and administrative dimensions, with attention to the social purpose of the school and the way in which organizational decisions impact teaching work and learning (Libâneo, 2004; Paro, 2015). Saviani (2013), by situating education as a historically constructed social phenomenon, reinforces the importance of understanding leadership as a contextualized practice and not just as a managerial technique detached from concrete conditions.

Organizational culture structures institutional response patterns and influences the consistency of practices and openness to innovation (Schein, 2010; Deal; Peterson, 2009). In addition, organizational resilience is understood as a dynamic capacity for anticipation, coping, and institutional learning in environments of uncertainty (Duchek, 2020).

In the field of educational technology, studies show that technological adoption, by itself, does not guarantee continuity or engagement; institutional support, clarity of guidelines, and the support of pedagogical work are crucial (Bond et al., 2021; Kim; Asbury, 2020). In the Brazilian debate on technological mediation, Kenski (2012) and Moran (2015) emphasize that technologies are means and environments that reconfigure practices, demanding

pedagogical intentionality, training and process management. Thus, systemic leadership can be understood as an integrating axis between strategy, culture and pedagogical practices, favoring adaptive responses and maintaining community trust.

3 METHODOLOGY

The study is characterized as an interpretative qualitative case study with triangulation of institutional documentary evidence. The following were analyzed: (a) administrative enrollment records (2019–2026); (b) operational descriptions of the pedagogical and technological strategies adopted during a period of crisis; and (c) descriptive records of institutional actions of community engagement.

Until July 2022, the organization operated two educational units (Junior Unit – Early Childhood Education; Unit 1 – Elementary and High School). As of July 2022, with the opening of Unit 2, the data will represent the institutional set of the three units. The analysis used a temporal comparative approach to identify relationships between strategic decisions and observable institutional results, considering the evolution of enrollments as an administrative indicator of institutional stability and trust.

As this is a case study, statistical generalization is not intended. The contribution is located in the analytical-conceptual plane, offering interpretative hypotheses and implications for educational management in contexts of rupture. As an analytical procedure, the evidence was organized into axes: (1) pedagogical continuity; (2) technological adaptation; (3) school-family bond; and (4) mobilization of the pedagogical team.

4 RESULTS

Institutional data indicate a trajectory of continuous growth in enrollments between 2019 and 2026. At the same time, strategies for pedagogical continuity and strengthening of community bonds were adopted, including: synchronous classes via Zoom; availability of weekly pedagogical scripts with links to classes and complementary resources; periodic meetings with families by class; and the institutional event "Sempre Juntos" (July/2020), with online actions and delivery of materials via drive-thru to reinforce belonging and institutional presence.

Table 1

Evolution of institutional enrollments (2019–2026)

Year	Enrollment
2019	576
2020	692
2021	704
2022	986
2023	1292
2024	1472
2025	1610
2026	1725

Source: Authors.

There is an increase from 576 enrollments (2019) to 692 (2020) and 704 (2021). In 2022, with the opening of Unit 2 in July, the institutional total increased to 986 enrollments. The trend continues in 2023 (1,292), 2024 (1,472), 2025 (1,610) and 2026 (1,725), suggesting sustained expansion and maintenance of institutional confidence throughout the post-crisis period.

5 ANALYTICAL DISCUSSION

The results allow interpretation beyond empirical description. The trajectory of institutional growth suggests that systemic leadership acted as a mediating mechanism between technological adaptation, pedagogical consistency, and organizational cohesion. Such a reading dialogues with conceptions of strategic leadership and institutional continuity (Fullan, 2014) and with resilience approaches such as dynamic learning capacity and organizational recomposition (Duchek, 2020).

On the pedagogical-operational level, the adoption of synchronous classes via Zoom, associated with the prior availability of weekly scripts with links and complementary resources, increased predictability and clarity for families and students. This aligns with the argument that the quality of the remote transition depends on institutional coordination, support, and pedagogical design — and not just the technological tool (Bond et al., 2021; Kim; Asbury, 2020). In the Brazilian debate, Kenski (2012) and Moran (2015) reinforce that technologies, when integrated with pedagogical intentionality and process management, can expand possibilities of mediation, engagement and communication.

In addition, the close and continuous performance of the executive management played a relevant role in motivating and aligning the pedagogical team. Frequent communication, clarity in guidelines, and operational support contributed to strengthening professional engagement and a sense of belonging, which is consistent with evidence on transformational leadership and faculty commitment (Bass; Riggio, 2006). In the national literature on school management, the centrality of the organization of work and support to the

teams appears as a structuring dimension of institutional quality, by articulating planning, coordination and pedagogical monitoring (Libâneo, 2004; Luck, 2009).

The institutional event "Always Together" (July/2020), with online and drive-thru actions for the delivery of materials, can be interpreted as a strategy to maintain symbolic presence and community bonding. In contexts of uncertainty, institutional trust tends to depend not only on pedagogical deliveries, but on consistent signals of care, predictability, and organizational commitment (Weick; Sutcliffe, 2007). Thus, the findings suggest that trust is not established only by technological means, but by integration between culture, communication and collective mobilization — a dimension consistent with the understanding of the school as a social institution with responsibilities beyond curricular fulfillment (Saviani, 2013; Paro, 2015).

6 LIMITATIONS AND IMPLICATIONS

As this is a case study based on documentary data and institutional descriptions, the results are not generalizable. Future research may explore comparative designs with other institutions and incorporate systematic instruments of perception of families and teachers (e.g., questionnaires and interviews) for expanded triangulation. It is also recommended to deepen the analysis of pedagogical indicators (learning, attendance and participation) to increase inferential robustness.

Even so, the study offers an analytical contribution by showing how leadership, organizational culture, and community bond management can operate as vectors of resilience in disruptive contexts. For school managers, the findings suggest: (a) centrality of clear and frequent communication; (b) structured pedagogical planning with predictability; (c) active support to teams; and (d) initiatives to bond with families that sustain belonging and trust.

7 CONCLUSION

The study shows that educational executive leadership influences processes of institutional resilience and pedagogical continuity in scenarios of systemic disruption. The integration between organizational strategy, pedagogical mobilization and technological adaptation contributed to institutional stability and sustained growth in enrollments in the period analyzed. Although limited to the case study, the findings reinforce the relevance of systemic approaches to educational management to sustain trust and continuity in environments of high uncertainty.

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LEARNING RECOVERY AS A PUBLIC POLICY: IMPLEMENTATION CHALLENGES AND IMPACTS ON EVERYDAY SCHOOL LIFE

A RECOMPOSIÇÃO DAS APRENDIZAGENS COMO POLÍTICA PÚBLICA: DESAFIOS DE IMPLEMENTAÇÃO E IMPACTOS NO COTIDIANO ESCOLAR

LA RECOMPOSICIÓN DE LOS APRENDIZAJES COMO POLÍTICA PÚBLICA: DESAFÍOS DE IMPLEMENTACIÓN E IMPACTOS EN LA VIDA ESCOLAR COTIDIANA



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ABSTRACT

Learning recovery has emerged as a response of educational public policies to the gaps accumulated in teaching and learning processes, intensified by structural inequalities and recent crisis contexts. In this scenario, understanding its implementation challenges and its

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impacts on everyday school life becomes essential to analyze the effects of these policies on pedagogical practices, educational management, and teachers' work. The approach adopted in this research is qualitative in nature, as it is appropriate for analyzing educational public policies and their effects on school daily life. To carry out this study, two complementary research methods were used: bibliographic research and documentary research. The general objective of this research is to analyze learning recovery as an educational public policy, identifying the main challenges of its implementation and the impacts produced in everyday school life, especially in pedagogical practices, educational management, and the organization of teachers' work. The research showed that when treated as a public policy, learning recovery advances, but it also reveals limits that need to be addressed.

Keywords: Learning Recovery. Educational Public Policies. Everyday School Life. Pedagogical Practices. Structural Inequalities.

RESUMO

A recomposição das aprendizagens tem se afirmado como uma resposta das políticas públicas educacionais às lacunas acumuladas nos processos de ensino e aprendizagem, intensificadas por desigualdades estruturais e por contextos recentes de crise. Nesse cenário, compreender seus desafios de implementação e seus impactos no cotidiano escolar torna-se fundamental para analisar os efeitos dessas políticas nas práticas pedagógicas, na gestão educacional e no trabalho docente. A abordagem adotada nesta pesquisa é de natureza qualitativa, por se mostrar adequada à análise de políticas públicas educacionais e de seus efeitos no cotidiano escolar. Para a realização deste estudo, foram utilizados dois métodos de pesquisa que se complementam: a pesquisa bibliográfica e a pesquisa documental. O objetivo geral desta pesquisa é analisar a recomposição das aprendizagens enquanto política pública educacional, identificando os principais desafios de sua implementação e os impactos produzidos no cotidiano escolar, especialmente nas práticas pedagógicas, na gestão educacional e na organização do trabalho docente. A pesquisa evidenciou que quando tratada como política pública, a recomposição das aprendizagens avança, mas também revela limites que necessitam ser enfrentados.

Palavras-chave: Recomposição das Aprendizagens. Políticas Públicas Educacionais. Cotidiano Escolar. Práticas Pedagógicas. Desigualdades Estruturais.

RESUMEN

La recomposición de los aprendizajes se ha consolidado como una respuesta de las políticas públicas educativas a las brechas acumuladas en los procesos de enseñanza y aprendizaje, intensificadas por desigualdades estructurales y por contextos recientes de crisis. En este escenario, comprender sus desafíos de implementación y sus impactos en la vida escolar cotidiana se vuelve fundamental para analizar los efectos de estas políticas en las prácticas pedagógicas, la gestión educativa y el trabajo docente. El enfoque adoptado en esta investigación es de naturaleza cualitativa, por considerarse adecuado para el análisis de las políticas públicas educativas y sus efectos en el cotidiano escolar. Para la realización de este estudio, se utilizaron dos métodos de investigación complementarios: la investigación bibliográfica y la investigación documental. El objetivo general de esta investigación es analizar la recomposición de los aprendizajes como política pública educativa, identificando los principales desafíos de su implementación y los impactos producidos en la vida escolar cotidiana, especialmente en las prácticas pedagógicas, la gestión educativa y la organización del trabajo docente. La investigación evidenció que, cuando se trata como política pública, la recomposición de los aprendizajes avanza, pero también revela límites que deben ser enfrentados.

Palabras clave: Recomposición de los Aprendizajes. Políticas Públicas Educativas. Vida Escolar Cotidiana. Prácticas Pedagógicas. Desigualdades Estructurales.

1 INTRODUCTION

In recent decades, basic education has been intensely modified due to historical inequalities, rapid social changes and, more recently, crises that have directly affected the teaching and learning processes. In this context, concerns have increased in relation to the learning losses accumulated during the students' school life, placing at the center of public discussion the urgency of institutional measures that guarantee the right to learn. Therefore, the reconstitution of learning emerges as a public policy aimed at facing these challenges in an organized way, uniting pedagogical, structural and management actions in the education networks and schools.

However, the adoption of this policy is not restricted to the formulation of specific guidelines or programs, since it involves the complex implementation of processes that become a reality in the school day-to-day. In schools, these normative guidelines gain a new meaning, being adapted and discussed according to the real working conditions, the practices of the teachers and the dynamics of the institution. In this sense, understanding the recomposition of learning as a public policy requires considering not only what is intended to be achieved, but also the obstacles encountered in its implementation and the repercussions it generates on pedagogical practices, school management and the organization of teachers' work, crucial factors for the realization of educational actions.

The approach adopted in this research is qualitative in nature, as it is adequate to the analysis of public educational policies and their effects on school daily life. To carry out this study, two research methods were used that complement each other: bibliographic research and documentary research.

The general objective of this research is to analyze the recomposition of learning as a public educational policy, identifying the main challenges of its implementation and the impacts produced in the school routine, especially in pedagogical practices, educational management and in the organization of teaching work.

The specific objectives planned are as follows: To examine the conceptual and normative foundations of public policies for the recomposition of learning in the context of basic education; Identify the main challenges faced by networks and schools in the implementation of learning recomposition policies; To analyze the impacts of the implementation of these policies on the daily school life, focusing on pedagogical practices, school management and teaching working conditions.

The article is structured in four sections, aiming to ensure both analytical coherence and clarity in the exposition of the investigative path carried out. In the first section, Introduction, the objectives of the research are presented. The second section, Methodology,

explains the methodological procedures followed. Next, the third section, Theoretical Foundation, organizes and analyzes the main normative and conceptual references that concern the recomposition of learning, discussing the challenges of its implementation and its impacts on the school routine. Finally, in the fourth and last section, the Final Considerations, the main results of the research are revisited, with emphasis on the implications for pedagogical practice, educational management and the organization of teachers' work, in addition to the contributions of the article to the academic debate in the field of education investigated.

2 METHODOLOGY

The approach adopted in this research is qualitative in nature, as it is adequate to the analysis of public educational policies and their effects on school daily life. This type of approach allows us to understand meanings, interpretations and relationships that are built in institutional and pedagogical contexts, going beyond the measurement of data and enabling a more contextualized reading of educational processes. In the field of educational research worldwide, the qualitative approach has been widely used to investigate complex phenomena, such as the implementation of policies and their repercussions on school practices, as it favors interpretative analyses sensitive to the specificities of subjects and contexts (Patton, 2015).

To carry out this study, two research methods were used that complement each other: bibliographic research and documentary research. This combination of procedures allows for a solid analysis, by uniting the theoretical discussion with the normative and institutional frameworks that guide the recomposition of learning as a public policy. This methodological approach helps to create an analytical framework that supports the interpretation of the challenges and effects of the implementation of this policy in the educational scenario.

The objective of the bibliographic research was to identify, systematically organize and analyze the production of scientific knowledge that is linked to the recomposition of learning, to public policies aimed at education, as well as to the processes that involve teaching and learning. Thus, we sought to carry out a detailed mapping of the information available in this field to better understand these interconnected themes. According to what the authors Cavalcante and Oliveira point out in their work published in 2020, this type of procedure is fundamental, as it allows the identification of concepts, diverse approaches, and significant results that are already well established in the existing literature. Thus, this procedure offers important theoretical subsidies that are essential for carrying out a critical analysis of the object being studied. This, therefore, enriches the understanding and discussion around the

topic in question. In this work that is being presented, the bibliographic research was carried out with the support of 14 scientific works that are updated, and these works were carefully chosen taking into account both their academic relevance and their pertinence in relation to the topics addressed.

The analysis of official documents, both from Brazil and UNESCO, as well as institutional documents from the Lemann Foundation, the Natura Institute and the organization Vozes da Educação, served as the basis for the documentary research. This procedure enabled the analysis of guidelines, orientations and propositions that underlie the restructuring of learning in the normative and institutional spheres. According to Arantes (2025), investigating through documents is a methodological resource of great value to understand educational policies, since one has direct access to the formal bases that guide their elaboration and execution, which reinforces the analytical coherence between theory, standardization and educational practice.

3 THEORETICAL FOUNDATION

The theoretical foundation was structured in three topics, aiming at a gradual and interconnected exposition of the subject. The first item, Theoretical and normative foundations of learning recovery as a public policy, brings the theoretical references and institutional frameworks that support this policy in the educational sector. In the second topic, Challenges in the implementation of learning recovery policies, the main obstacles that education networks and schools face to put these policies into practice are identified. Finally, the third point, Effects of the recovery of learning in the school routine, investigates the consequences of this policy on pedagogical actions, on the curricular structure and on the life of schools.

3.1 CONCEPTUAL AND NORMATIVE FOUNDATIONS OF THE RECOMPOSITION OF LEARNING AS A PUBLIC POLICY

The recomposition of learning is affirmed as a public educational policy, which aims to ensure the right to learn in situations marked by historical inequalities and recent crises that have increased losses in the educational field. In this sense, the recomposition is not limited to the simple recovery of contents, but is aligned with educational equity and the State's obligation to guarantee real conditions for each student to achieve the learning objectives expected at each stage of basic education. As stated by Bacila (2024), it is a set of intentionally elaborated actions, which includes diagnosis, curricular reorganization, teacher

training and constant pedagogical monitoring, aiming to reduce disparities and reinforce school practices.

When it comes to normative planning, the recovery of learning is supported by national guidelines and international guidelines that affirm education as an essential human right. As the UNESCO and UNICEF report (2021) points out, the global education crisis has required governments to act in a systemic manner, emphasizing the importance of policies that integrate equity, quality, and sustainability. In Brazil, these guidelines are connected to the constitutional principles and guidelines of basic education, emphasizing the right to learning as the core of current educational policies (Brasil, 2024).

In order to summarize the main conceptual and normative pillars of the recomposition of learning as a public policy, Table 1 presents the organization of the thematic axes that were discussed in this topic of the theoretical foundation, which allows for a broader and more detailed view of the issues on the agenda.

Table 1

Conceptual and normative foundations of the recomposition of learning as a public policy

Thematic axis	Description
Recomposition of learning	Set of pedagogical and management strategies aimed at overcoming learning gaps, based on diagnoses and reorganization of school work.
Educational equity	Guiding principle of public policies that seeks to ensure differentiated conditions to meet the diverse needs of students.
Right to learning	Legal and pedagogical foundation that recognizes learning as a subjective right, to be guaranteed by the State and educational institutions.
Legal frameworks and guidelines	National and international standards, guidelines and programs that structure and guide the implementation of the recomposition of learning.

Source: Prepared from Bacila (2024), UNESCO and UNICEF (2021) and Brazil (2024).

In a national context, the Ministry of Education, through the Guide for the Implementation of the Recomposition of Learning, compiles a series of guidelines that are aimed at education networks and school institutions. This guide highlights the need for a strong articulation that integrates educational management, pedagogical practice applied in classrooms, and the way teachers' work is organized (Brasil, 2024). It is essential that these guidelines are followed to ensure significant improvements in the teaching and learning process. The text emphasizes the importance of educational policy achieving effective results, which will only be possible with the implementation of a plan that is in perfect integration. For this to happen, it is necessary to use diagnostic evaluations in a pedagogical way, in addition to making a significant investment in the continuing education of education professionals. These approaches must be adjusted and adapted according to local realities and the specific particularities of each of the education systems involved.

Recent research also points to the challenges that arise in school practice when implementing these policies. Batista, Braga and Nogueira (2026) point to a constant tension between the normative text and its practical application, especially in relation to material conditions, the time dedicated to pedagogy and the commitment of education professionals. This makes us understand that it is essential that schools make a critical appropriation of the conceptual and normative foundations of the recomposition of learning so that they can guide practices that are aligned with the principles of equity and the guarantee of the right to learning.

3.2 CHALLENGES OF IMPLEMENTING POLICIES FOR THE RECOMPOSITION OF LEARNING

Policies for the recomposition of learning are being implemented in a scenario full of challenges that permeate the institutional, pedagogical and structural spheres of the education networks. Ball (2006), based on the sociology of educational policies, argues that policies are not materialized in a linear way, as they are recontextualized in practices, influenced by local conditions, institutional cultures and power dynamics. When it comes to the recovery of learning, this dynamic is reflected in the discrepancy between what is established by standards and what is actually feasible in schools, especially those located in areas of high social vulnerability.

The financing and administrative management of education networks appear, among the institutional challenges, as constant issues. Brito, Souza and Zuchetti (2025) point out that the implementation of these policies requires constant funding, coordinated planning and technical support for schools, conditions that are not always guaranteed on an ongoing basis. The lack of resources compromises the availability of teaching materials, the extension of the school day and the implementation of continuous actions to monitor learning, which limits the impact of the proposed strategies.

Teacher training and curriculum adequacy are central issues in the pedagogical area. According to the research by Oliveira, Palacios and Bellato (2025), initiatives such as the regrouping of students can be beneficial for the recovery of learning, but it is essential that they are implemented with specific training for teachers and well-defined pedagogical criteria. Without this support, there is a danger of fragmentation of the curriculum and an overload of work for teachers, which makes it difficult to establish practices that are aligned with the objectives of recomposition policies.

The management of school time is also a great challenge. According to reports by the Lemann Foundation and the Natura Institute (2022) and the Voices of Education movement

(2021), both the expansion and reorganization of time for learning involve complex decisions that networks and schools need to make. They range from the restructuring of calendars to the new definition of curricular priorities and require a conversation between managers, teachers and school communities so as not to become punctual and disconnected solutions.

To systematize the main challenges to the implementation of the policies for the recomposition of learning that were discussed in this topic, Table 2 is presented below, which organizes the analytical dimensions taken into account.

Table 2

Challenges in implementing policies to recompose learning

Dimension	Key challenges
Institutional	Funding limitations, administrative capacity of networks and technical support to schools.
Pedagogical	Teacher training, curricular adequacy and coherence of recomposition strategies.
Structural	School infrastructure and availability of material and technological resources.
Time management	Reorganization of the school calendar and expansion of pedagogical time.
Teaching work	Overload of functions and the need for collective articulation in schools.

Source: Based on Ball (2006), Brito, Souza and Zuchetti (2025), Oliveira, Palacios and Bellato (2025), Lemann Foundation and Natura Institute (2022), Voices of Education (2021) and Koslinski and Bartholo (2025).

Finally, the literature shows that these challenges do not present themselves in isolation, but rather interact in the daily lives of networks and schools. The synthesis of evidence prepared by Koslinski and Bartholo (2025) reiterates that the effectiveness of learning recovery policies is based on the articulation between structural conditions, management decisions, and pedagogical practices that are contextualized. Therefore, recognizing and understanding these obstacles is an essential step towards a critical analysis of the effects of these policies on teachers' work and school structure.

3.3 IMPACTS OF THE RECOMPOSITION OF LEARNING ON SCHOOL DAILY LIFE

The results of learning recovery policies are visible in the daily life of schools, especially in the pedagogical practices that take place in the classroom. Research by Falcão and Silva (2025) points out that the reorganization of teaching strategies, based on learning diagnoses, has led teachers to reassess didactic sequences, evaluation criteria and forms of student monitoring, which results in direct consequences on school performance. This movement, which is indispensable, also generates constant adaptations in pedagogical routines, demanding a greater articulation between what is planned, what is executed and what is accompanied in terms of learning.

Particularly in the context of Secondary Education, and still applying in a general way to basic education in its entirety, the recovery of learning is closely related to processes that are more comprehensive and that involve a restructuring of the educational curriculum. This restructuring refers to a different and more effective organization of teaching content and methodologies, with the aim of promoting more meaningful and complete learning for students. Therefore, the recovery of knowledge from these students is not an isolated effort, but part of a larger movement that seeks to transform and adapt the way education is offered. As stated by Smole and Oliveira (2025), in the New High School scenario, the educational policies in force are generating a new organization of the schedules and environments that are intended for school activities. In addition, these changes are also promoting a significant reformulation of the priorities that make up the school curriculum. The transformations that are taking place have a significant effect on the administration of educational institutions, which are currently facing a variety of different challenges and needs. Among these demands, we can highlight the need to ensure compliance with the established standards, the supervision and monitoring of pedagogical practices, as well as the effective management of conflicts that arise as a result of the new impositions and institutional requirements that have been introduced.

The changes perceived in the day-to-day life of schools also impact the working conditions of teachers. Garcia et al. (2023) and Silva (2022) indicate that the recomposition of learning has increased the responsibilities of teachers, who now perform extra functions related to diagnosis, personalization of pedagogical interventions, and the systematic recording of teaching and learning processes. This context highlights the importance of institutional support and collective spaces for planning, otherwise there is a risk of overloading teachers and weakening collaborative practices.

In order to summarize the main effects of the recomposition of learning in the school routine, Table 3 is presented below, which organizes the impacts perceived in pedagogical practice, school management and teaching work.

Table 3*Impacts of the recomposition of learning on daily school life*

Dimension	Main impacts
Pedagogical practices	Curricular reorganization, use of learning diagnoses and diversification of teaching strategies.
School management	Readjustment of times and spaces, pedagogical monitoring and mediation of institutional demands.
Teaching work	Expansion of attributions, intensification of routines and need for collective work.
School organization	Adjustments in school flows and in the ways of monitoring students.

Source: Prepared from Falcão and Silva (2025), Smole and Oliveira (2025), Garcia et al. (2023), Silva (2022) and Santos (2025).

In addition to structural and pedagogical changes, the literature also points to adaptation processes in the day-to-day life of public schools. Santos (2025) highlights that the recovery of learning has been translated into effective actions that involve managers, teachers and students, requiring constant negotiations based on the real conditions of operation of schools. These changes expose both the conflicts and the opportunities for reconfiguring the teaching and learning processes, based on the experiences that occur in the school environment.

Finally, experience reports, such as that of Paoli (2024), show that the effects of the recomposition of learning go beyond academic results and extend to school culture and professional relationships. The author, when bringing practices that were carried out in a public school after the pandemic, emphasizes that these policies have the potential to favor the resignification of pedagogical work, as long as there are appropriate institutional conditions and a recognition of the role of teachers in the implementation of recomposition actions.

4 FINAL CONSIDERATIONS

Regaining learning has established itself as a fundamental and necessary path to confront and reduce educational inequalities, which have become even more evident and evidenced due to the interruptions and weakening of educational and learning processes. This approach becomes increasingly essential to recover the learning that was lost. When it comes to public policy, this issue goes beyond the simple pedagogical perspective and also affects educational management, which requires an articulation between regulations, the construction of systemic planning and the realization of actions that are present in the daily life of school institutions. It is essential that all these components are cohesively articulated for the policy in question to work effectively. Therefore, the present study was dedicated to investigating how this policy is reflected in the school routine, taking into account not only its

basic assumptions, but also the obstacles it faces and the real effects it causes in the organization and structuring of the pedagogical work that is carried out in educational institutions. The analysis proposed here sought to unveil in more depth the specificities and consequences of this policy in the day-to-day educational practice.

All the objectives outlined for the research were achieved. The analysis of the conceptual and normative foundations allowed us to show that the recomposition of learning is based on principles of equity, the right to education and the guarantee of learning, guiding the formulation of actions aimed at reducing accumulated educational gaps. It was observed that the alignment between institutional guidelines and pedagogical practices is a central element for the coherence of policies, although this alignment does not always materialize in a homogeneous way in different educational contexts.

Regarding the challenges that can hinder implementation, the research pointed out a series of interconnected obstacles, such as the infrastructure of education networks. Another point that stood out was the difficulties in relation to the continuous and adequate training of teachers, which is crucial for pedagogical practices to achieve satisfactory performance. In addition, the study revealed the lack of essential teaching materials for teaching, as well as the amount of time reserved for the collective planning of classes, which is fundamental for the organization of educational teamwork. In addition, it was noted that diagnostic evaluations are not synchronic in relation to continuous pedagogical interventions, which ends up impairing the effectiveness of the actions that are implemented. The challenges that are emerging point out that the recapture and rerun of learning, when thought of as an effective public policy, requires something that goes beyond simple normative guidelines. It is essential, therefore, that there is a solid institutional and organizational infrastructure that enables the implementation of this policy in a cohesive and continuous manner, ensuring that the established objectives are achieved effectively and sustainably.

With regard to the effects on the school day-to-day, it was found that the recomposition measures have a direct impact on the restructuring of the curriculum, the evaluation practices and the functioning of the classrooms. There began to be signs that students' learning trajectories and the need for diversified pedagogical strategies were receiving more attention. However, it was observed that the increase in administrative and pedagogical requirements can lead to an overload for school teams, which highlights the need for implementation models that take into account the practical reality of schools.

For future investigations, it is recommended to conduct empirical studies in various education systems, comparisons between different implementation models, and research on

the medium and long-term effects of policies on students' school trajectories, with the aim of improving actions and reinforcing the right to learning.

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PATIENT SAFETY IN INITIAL NURSING EDUCATION: ATTITUDES, PROFILES, AND IMPLICATIONS FOR TEACHING

SEGURANÇA DO PACIENTE NA FORMAÇÃO INICIAL EM ENFERMAGEM: ATITUDES, PERFIS E IMPLICAÇÕES PARA O ENSINO

SEGURIDAD DEL PACIENTE EN LA FORMACIÓN INICIAL EN ENFERMERÍA: ACTITUDES, PERFILES E IMPLICACIONES PARA LA ENSEÑANZA



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ABSTRACT

This chapter presents an expanded analysis of the profile, attitudes, and perceptions of incoming nursing students regarding patient safety, grounded in the findings of the master's dissertation. Based on the investigation of four consecutive cohorts (2021–2024), the study reveals that students begin their undergraduate training with heterogeneous beliefs, often shaped by idealized notions of care and individual attributions of error. The results highlight weaknesses related to confidence in error reporting, understanding of the inevitability of human fallibility, and recognition of systemic causes underlying adverse events. Significant differences between cohorts suggest that external factors—such as the pandemic context, social narratives, and generational changes—directly influence initial safety attitudes. Psychometric analysis demonstrated that the 30-item APSQ-3 version offers greater robustness for assessing these perceptions, capturing essential nuances for health-care education. Findings reinforce the importance of early pedagogical strategies, integrated curricula, and learning approaches that promote psychological safety, just culture, and systemic understanding of care. By identifying attitudinal patterns prior to clinical exposure, this chapter contributes to designing educational interventions capable of strengthening the patient safety culture from the beginning of nursing education.

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Keywords: Health Education. Nursing Students. Knowledge. Attitude and Practice in Health. Professionalism. Patient Safety.

RESUMO

Este capítulo apresenta uma análise ampliada do perfil, das atitudes e das percepções de estudantes ingressantes em Enfermagem em relação à segurança do paciente, fundamentada nos achados da dissertação de mestrado. Com base na investigação de quatro coortes consecutivas (2021–2024), o estudo revela que os estudantes iniciam a graduação com crenças heterogêneas, frequentemente moldadas por noções idealizadas de cuidado e por atribuições individuais de erro. Os resultados evidenciam fragilidades relacionadas à confiança na notificação de erros, à compreensão da inevitabilidade da falibilidade humana e ao reconhecimento das causas sistêmicas subjacentes aos eventos adversos. Diferenças significativas entre as coortes sugerem que fatores externos — como o contexto pandêmico, narrativas sociais e mudanças geracionais — influenciam diretamente as atitudes iniciais sobre segurança. A análise psicométrica demonstrou que a versão de 30 itens do APSQ-3 oferece maior robustez para avaliar essas percepções, captando nuances essenciais para a formação em saúde. Os achados reforçam a importância de estratégias pedagógicas precoces, currículos integrados e abordagens de aprendizagem que promovam segurança psicológica, cultura justa e compreensão sistêmica do cuidado. Ao identificar padrões atitudinais antes da exposição clínica, este capítulo contribui para o delineamento de intervenções educacionais capazes de fortalecer a cultura de segurança do paciente desde o início da formação em Enfermagem.

Palavras-chave: Educação em Saúde. Estudantes de Enfermagem. Conhecimento. Atitude e Prática em Saúde. Profissionalismo. Segurança do Paciente.

RESUMEN

Este capítulo presenta un análisis ampliado del perfil, las actitudes y las percepciones de estudiantes ingresantes de Enfermería en relación con la seguridad del paciente, fundamentado en los hallazgos de la tesis de maestría. Con base en la investigación de cuatro cohortes consecutivas (2021–2024), el estudio revela que los estudiantes inician su formación de grado con creencias heterogéneas, frecuentemente moldeadas por nociones idealizadas del cuidado y por atribuciones individuales del error. Los resultados evidencian debilidades relacionadas con la confianza en la notificación de errores, la comprensión de la inevitabilidad de la falibilidad humana y el reconocimiento de las causas sistémicas subyacentes a los eventos adversos. Diferencias significativas entre cohortes sugieren que factores externos — como el contexto pandémico, las narrativas sociales y los cambios generacionales — influyen directamente en las actitudes iniciales sobre seguridad. El análisis psicométrico demostró que la versión de 30 ítems del APSQ-3 ofrece mayor solidez para evaluar estas percepciones, captando matices esenciales para la educación en salud. Los hallazgos refuerzan la importancia de estrategias pedagógicas tempranas, currículos integrados y enfoques de aprendizaje que promuevan la seguridad psicológica, la cultura justa y la comprensión sistémica del cuidado. Al identificar patrones actitudinales antes de la exposición clínica, este capítulo contribuye al diseño de intervenciones educativas capaces de fortalecer la cultura de seguridad del paciente desde el inicio de la formación en Enfermería.

Palabras clave: Educación en Salud. Estudiantes de Enfermería. Conocimiento. Actitud y Práctica en Salud. Profesionalismo. Seguridad del Paciente.

1 INTRODUCTION

Patient safety has become consolidated, over recent decades, as one of the fundamental pillars for enhancing the quality of health systems, representing a field of practices, knowledge, and policies aimed at preventing avoidable harm and promoting more reliable, ethical, and sustainable care (Nora; Junges, 2021). Its development has accompanied profound transformations in management models, organizational culture, and the training of health professionals, who have come to recognize error not as an individual moral failure, but as an expression of complex systems subject to multiple human, structural, and organizational factors (WHO, 2021).

Although the contemporary discussion on patient safety gained global visibility following initiatives such as the *To Err is Human* report, published by the Institute of Medicine in 1999, its historical roots trace back to the work of Florence Nightingale, whose practices in the context of the Crimean War underscored the importance of environmental and organizational conditions for harm prevention. These milestones transformed how error came to be understood in healthcare, shifting from invisibility or punitive treatment to becoming an object of systematic monitoring and institutional learning (Rocha et al., 2024).

The consolidation of national and international policies has helped to anchor this agenda. Notable initiatives include the World Alliance for Patient Safety, established by the World Health Organization, and, in Brazil, the National Patient Safety Program, which standardized practices, protocols, and guidelines aimed at preventing adverse events (Gabriel, 2023). More recently, the Global Patient Safety Action Plan 2021–2030 reaffirmed the global commitment to safer and more resilient health systems, reinforcing the strategic role of education in driving the cultural change required to address patient safety challenges (WHO, 2021).

Within this context, the training of health professionals assumes a central role. The literature shows that, despite regulatory advances, patient safety education remains fragmented, insufficiently integrated into curricula, and often diluted within technical or discipline-specific content. Undergraduate programs—particularly in nursing, the field that accounts for the largest share of the healthcare workforce—tend to address the topic superficially or in a disconnected manner, hindering the development of essential competencies for safe care (Bezerril et al., 2023; Garzin et al., 2021; Matos et al., 2022; Silva, 2021; Uchôa et al., 2023; Zugno et al., 2022).

National studies indicate that patient safety, when present in curricula, appears diffusely, lacking robust pedagogical articulation and exhibiting limited formative intentionality. This gap compromises students' understanding of systemic factors, the

inevitability of human error, and the importance of a just culture—elements essential for incident reporting, prevention, and risk management (Bezerril et al., 2023; Garzin et al., 2021; Matos et al., 2022; Silva, 2021; Uchôa et al., 2023; Zugno et al., 2022).

Considering that incoming students arrive at university with perceptions, beliefs, and expectations already shaped by their educational and social trajectories, it becomes essential to understand which attitudes and knowledge constitute this initial repertoire. This is particularly relevant because such perceptions may directly influence how these future professionals will interpret risk situations, respond to errors, and engage in safe practices.

Against this backdrop, this chapter presents a comprehensive analysis of the knowledge and attitudes regarding patient safety among first-year nursing students at a public institution, drawing on the theoretical-methodological foundations of the master's dissertation available in its original document. The aim is to offer a reflection adapted to the book format, expanding understanding of the role of initial training in building a safety culture and contributing to the academic debate on educational strategies capable of strengthening safe care from the outset of professional formation.

2 OBJECTIVES

The clear definition of a study's objectives is essential for delineating the scope of the investigation, guiding the methodological trajectory, and structuring the interpretation of results. In the context of patient safety—a field characterized by multiple conceptual, behavioral, and systemic dimensions—understanding the attitudes of incoming students makes it possible to identify initial vulnerabilities, guide pedagogical practices, and inform more effective curricular interventions.

This chapter, grounded in the original dissertation, is based on the premise that understanding students' initial formative repertoire is indispensable for strengthening a safety culture from the very beginning of their academic trajectory. To this end, the following objectives are established.

2.1 GENERAL OBJECTIVE

To assess the levels and patterns of knowledge and attitudes regarding patient safety among incoming students of the Nursing program at a public higher education institution, belonging to the cohorts of 2021, 2022, 2023, and 2024, identifying differences and trends in the dimensions evaluated by the Attitudes to Patient Safety Questionnaire – Version 3 (APSQ-3) developed by Carruthers et al. (2009).

2.2 SPECIFIC OBJECTIVES

- a) To characterize the sociodemographic profile of incoming students, encompassing relevant individual and contextual variables such as age, biological sex, gender identity, sexual orientation, marital status, income, religion, educational background, and modality of entry into the institution;
- b) To analyze the factor structure and psychometric reliability of the 30-item version of the APSQ-3, comparing it with the reduced 26-item model and verifying the adequacy of internal consistency indexes and model fit quality;
- c) To describe the distribution of scores across the nine theoretical dimensions of the APSQ-3, assessing statistical aspects such as skewness, kurtosis, normality, and dispersion, in order to support qualitative and inferential interpretations;
- d) To compare attitudes regarding patient safety across different cohorts, identifying significant intergroup variations and interpreting temporal or generational trends that may influence initial training;
- e) To estimate the effect sizes of the identified differences, thereby qualifying the magnitude of variations between groups and strengthening the pedagogical and managerial interpretation of the findings.

3 METHODS

Understanding the attitudes and knowledge regarding patient safety among incoming students requires a methodological design capable of capturing initial perceptions, conceptual patterns, and variations between groups, as well as ensuring the psychometric robustness of the instruments used. This section therefore describes the methodological pathway of the original research, reorganized and adapted to the book chapter format, with emphasis on expository clarity and the applicability of the findings to the educational context.

3.1 STUDY DESIGN

This is a cross-sectional, descriptive study with a quantitative approach, designed to assess attitudes and knowledge regarding patient safety among incoming Nursing students. As an observational investigation, the cross-sectional design enables the capture of perceptions from different cohorts at a single point in time, facilitating group comparisons and generating hypotheses related to historical and educational contexts.

The writing and methodological conduct followed the recommendations of the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE), widely

recognized as a reference for ensuring transparency, completeness, and quality in the reporting of observational studies (Ghaferi; Schwartz; Pawlik, 2021).

3.2 STUDY SETTING

The study was conducted at the Faculdade de Medicina de São José do Rio Preto (FAMERP), a public higher education institution recognized for its excellence in training health professionals and its long-standing tradition in scientific research. The Nursing program at FAMERP integrates theoretical, practical, and extension activities, playing a strategic role in the training of nurses in the northwestern region of the state of São Paulo.

A escolha desse cenário se justifica por três razões principais:

1. The regional and national relevance of the institution, which trains a significant portion of nurses working in the public and private health systems;
2. The heterogeneity of the analyzed cohorts, entering during years marked by distinct contexts—pandemic, post-pandemic, and sociopolitical changes;
3. The strong teaching–service integration environment, which allows the assessment of initial attitudes prior to in-depth contact with clinical training.

3.3 POPULATION AND SAMPLE

The target population of this study comprised first-year incoming Nursing students from the 2021, 2022, 2023, and 2024 cohorts. Included were students who were regularly enrolled, aged 18 years or older, and who provided voluntary consent through the electronic consent form. Conversely, incomplete questionnaires or those deemed infeasible for statistical analysis were excluded.

3.4 DATA COLLECTION INSTRUMENTS

Data collection was carried out using two self-administered electronic instruments, structured into distinct sections. The first consisted of a sociodemographic and academic questionnaire developed by the author, which included variables such as age, biological sex, gender identity, sexual orientation, marital status, personal income, and religion. Additionally, information was collected on students' educational trajectory in elementary and high school, parental education, admission pathway, and employment status, allowing the characterization of the incoming profile and the identification of factors influencing perceptions.

The second instrument was the Attitudes to Patient Safety Questionnaire – Version 3 (APSQ-3), developed by Carruthers et al. (2009), used to measure attitudes and knowledge regarding patient safety. Comprising 30 items on a seven-point Likert scale ranging from “strongly disagree” to “strongly agree,” the questionnaire evaluates nine dimensions: training, confidence in reporting errors, working hours as a cause of failures, inevitability of error, professional incompetence, disclosure responsibility, teamwork functioning, patient involvement, and the importance of the topic in the curriculum. Although a Brazilian version was validated in 2025, it was employed solely for psychometric comparison (Menezes et al., 2025).

3.5 DATA COLLECTION PROCEDURES

Data collection occurred annually between 2021 and 2024, using electronic forms sent to students in the initial weeks of the program. In the initial contact, participants were informed of the study’s objectives, risks, and benefits, formalizing their participation through a digital Informed Consent Form (ICF). Completion took place in a virtual environment, anonymously and voluntarily, ensuring data security and offering flexibility for synchronous or asynchronous participation. The choice of an electronic format ensured process standardization and minimized information loss.

3.6 DATA PROCESSING AND ANALYSIS

Statistical analysis was divided into three stages and conducted using R software (version 4.4.1; R Core Team, 2025), with support from the ggplot2 package (Wickham, 2016). Confirmatory factor analyses and the computation of factor scores were performed using the lavaan package, version 0.6-8 (Rosseel, 2012). Reliability indices were calculated using the semTools package (Jorgensen et al., 2020).

3.6.1 Descriptive Analysis

Absolute and relative frequencies were calculated for categorical variables, and mean, median, minimum, maximum, and standard deviation for numerical variables. Normality was assessed using the Shapiro–Wilk test, complemented by the analysis of skewness and kurtosis.

3.6.2 Psychometric Analysis (CFA and Reliability)

Given the ordinal nature of the items, Confirmatory Factor Analysis (CFA) was performed using a polychoric correlation matrix and the WLSMV estimator (Weighted Least

Squares Mean and Variance Adjusted). Two models were compared: the original 30-item model and the reduced 26-item model (DiStefano et al., 2019; Savalei, 2021).

The fit indices analyzed included the CFI (Comparative Fit Index), TLI (Tucker–Lewis Index), and RMSEA (Root Mean Square Error of Approximation) (Kline, 2016). Factor reliability was assessed using Cronbach’s Alpha (α), McDonald’s Omega (ω), and Composite Reliability (CR).

In addition, an adapted Wright Map (Item–Person Map), based on Item Response Theory (IRT), was applied to identify the relative difficulty of each item within its respective dimension (Skrondal, 2004).

3.6.3 Inferential Analysis

To compare the mean scores of the nine APSQ-3 dimensions across the entry years (2021 to 2024), a one-way Analysis of Variance (ANOVA) was used.

The assumptions of ANOVA were verified beforehand: residual normality was assessed using skewness and kurtosis tests ($|z| < 1.96$) and visual inspection (Q–Q plot), while homogeneity of variances was examined through Levene’s test. When normality was violated, data transformations (e.g., OrderNorm, Yeo–Johnson) were applied using the bestNormalize function (Peterson, 2021).

Effect size was estimated using Partial Eta Squared (η^2_p). For dimensions with statistically significant differences ($p < 0.05$), post-hoc contrast tests with Bonferroni correction were performed to identify which groups differed from one another (Lenth, 2016).

3.7 ETHICAL ASPECTS

The study was conducted in accordance with Resolution No. 466/2012 of the National Health Council and was approved by the Research Ethics Committee (CEP/FAMERP) under opinion No. 4.543.158.

Participation was voluntary, upon acceptance of the electronic ICF, ensuring confidentiality, anonymity, data protection, and respect for the autonomy of participants..

4 RESULTS

The presentation of results was organized into four analytical axes:

- (a) sociodemographic and academic characterization of participants;
- (b) psychometric validation of the APSQ-3;
- (c) descriptive distribution of scores across the nine dimensions;
- (d) comparison of attitudes according to year of entry (2021–2024).

This structure aims to facilitate the understanding of the patterns identified in the study and their connection to the educational context of patient safety.

4.1 SOCIODEMOGRAPHIC AND ACADEMIC CHARACTERIZATION

The total sample comprised 176 incoming Nursing students, with a predominance of female participants (87.5%) and those identifying as women (88.07%). Most students were up to 20 years old (72.16%) and self-identified as single (95.45%). Approximately 52% reported a personal income above R\$ 3,000.00.

Regarding educational trajectory, 69.89% had completed high school in private institutions, and 95.45% had done so in the regular modality. Concerning parental education, a higher proportion of mothers and fathers had completed or partially completed higher education, indicating an elevated family educational profile.

More than 89% were financially dependent on their families, and 91.43% were not engaged in paid work at the time of data collection.

Below is the sample characterization table, reformatted according to editorial requirements.

Table 1

Sociodemographic and Academic Characteristics of Incoming Nursing Students

Variable	Category	n	%
Year of Entry	2021	63	35,80
	2022	45	25,57
	2023	32	18,18
	2024	36	20,45
Biological Sex	Female	154	87,50
	Male	22	12,50
Age Group	0 a 20 years	127	72,16
	21 a 30 years	46	26,14
	31 a 40 years	3	1,70
Monthly Income	≤ R\$ 1.000,00	12	6,82
	R\$ 1.001,00 a R\$ 3.000,00	72	40,91
	≥ R\$ 3.000,00	92	52,27
High School Background	Public	53	30,11
	Private	123	69,89
Institutional Admission Pathway	Open competition	139	78,98
	PIMESP (Public School)	31	17,61
	PIMESP (Black/Brown/Indigenous)	6	3,41
Employment Status	Does not work	160	91,43
	Works (non-health area)	12	6,86
	Works (health-related area)	3	1,71

Source: Research data (Author), 2026.

4.2 PSYCHOMETRIC VALIDATION OF THE APSQ-3

To assess the construct validity of the Attitudes to Patient Safety Questionnaire (APSQ-3), two models were tested using Confirmatory Factor Analysis (CFA): the original 30-item model and a reduced 26-item version. The analysis was conducted using a polychoric correlation matrix and the Weighted Least Squares Mean and Variance Adjusted (WLSMV) estimator, appropriate for ordinal data.

Both models presented acceptable fit indices according to classical criteria ($CFI > 0.95$ and $RMSEA < 0.08$). The 30-item model achieved a classical CFI of 0.967 and a classical RMSEA of 0.059. The 26-item model showed a classical CFI of 0.979 and a classical RMSEA of 0.050. However, when robust criteria were considered, both models were rejected, revealing discrepancies between classical and robust metrics—an effect described in the literature for categorical data with a limited number of response categories.

The decision to retain the 30-item model was based on the analysis of latent variable reliability. As shown in Table 2, the 26-item model presented composite reliability and Cronbach's Alpha values below the 0.60 cutoff for factors F4 (Inevitability of error) and F9 (Importance of patient safety in the curriculum). The 30-item model demonstrated greater consistency, presenting a value below the cutoff only for Cronbach's Alpha in factor F9, while still achieving adequate composite reliability.

Table 2

Reliability indices of the 26-item and 30-item APSQ-3 models by factors

Factors (Dimensions)	26-item Model			30-item Model		
	α	ω	CC	α	ω	CC
F1	.70	.75	.75	.70	.75	.75
F2	.81	.84	.84	.80	.82	.82
F3	.80	.85	.85	.80	.85	.85
F4	.45	.44	.44	.62	.62	.62
F5	.77	.79	.79	.77	.80	.80
F6	.61	.67	.67	.64	.72	.72
F7	.75	.85	.85	.75	.84	.84
F8	.77	.78	.78	.77	.78	.78
F9	.48	.55	.55	.58	.62	.62

Legend. α : Cronbach's Alpha; ω : McDonald's Omega; CR: Composite Reliability; F1: Patient safety training received; F2: Confidence in reporting errors; F3: Working hours as a cause of error; F4: Inevitability of error; F5: Professional incompetence as a cause of error; F6: Disclosure responsibility; F7: Team functioning; F8: Patient involvement in error reduction; F9: Importance of patient safety in the curriculum.

4.3 DISTRIBUTION OF APSQ-3 DIMENSION SCORES

The exploratory analysis of the standardized scores of the nine APSQ-3 dimensions revealed that most variables did not follow a normal distribution, as verified by the Shapiro–Wilk test ($p < 0.05$). Exceptions included the dimensions Confidence in reporting errors ($p = 0.14$), Inevitability of error ($p = 0.06$), and Professional incompetence as a cause of error ($p = 0.51$).

Table 3 presents the measures of central tendency and dispersion for the nine dimensions evaluated.

Table 3

Descriptive analysis of scores for the APSQ-3 dimensions

Factors	N	Mean	SD	W	p-value	Min	P25	P50	P75	Max
F1	176	0.00	0.67	0.98	0.02	-1.62	-0.51	0.04	0.57	1.57
F2	176	0.00	0.88	0.99	0.14	-2.72	-0.53	0.07	0.59	1.75
F3	176	0.00	0.79	0.94	0.00	-2.55	-0.51	0.06	0.70	1.28
F4	176	0.00	0.78	0.98	0.06	-2.34	-0.51	0.09	0.57	1.86
F5	176	0.00	0.64	0.99	0.51	-1.52	-0.46	-0.06	0.46	2.05
F6	176	0.00	0.54	0.97	0.00	-0.93	-0.49	0.02	0.40	1.25
F7	176	0.00	0.79	0.94	0.00	-2.54	-0.52	0.28	0.61	1.14
F8	176	0.00	0.73	0.96	0.00	-1.91	-0.49	0.03	0.57	1.12
F9	176	0.00	0.75	0.98	0.01	-2.63	-0.60	0.03	0.61	1.59

Legend. SD: Standard deviation; W: Shapiro–Wilk test statistic; p-value: p-value of the Shapiro–Wilk test; Min: Minimum; Max: Maximum; P: Percentile; F1: Patient safety training received; F2: Confidence in reporting errors; F3: Working hours as a cause of error; F4: Inevitability of error; F5: Professional incompetence as a cause of error; F6: Disclosure responsibility; F7: Team functioning; F8: Patient involvement in error reduction; F9: Importance of patient safety in the curriculum.

Source: Research data (Author), 2026.

4.3.1 Dynamics of Attitudes: An Analysis Using Item Response Theory (Wright Map)

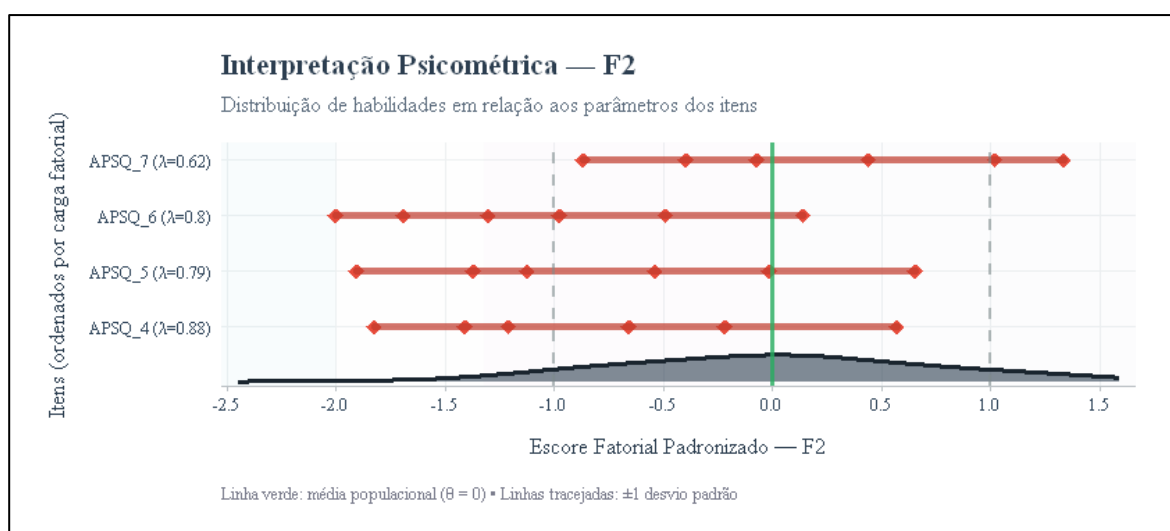
To move beyond descriptive statistical analysis and deepen the understanding of students' attitudes, this study applied Item Response Theory (IRT). Through an adapted Wright Map, it was possible to map the interaction between students' levels of awareness and the "resistance" or difficulty associated with each APSQ-3 statement. Practically, this model visualizes the level of patient safety maturity required for a student to agree with a

given item: the farther to the right an item is positioned, the greater the need for a consolidated and critically grounded perception for it to be endorsed.

When analyzing the dimension Confidence in reporting errors (Factor 2), the data reveal an interesting gradient of psychological maturity, as illustrated in Figure 1. Although incoming students show ease in agreeing with the theoretical importance of reporting failures (Items 4 and 6), the scenario changes markedly in the context of a punitive culture. Item 7—addressing the confidence to report an error without fear of being blamed—emerged as the greatest challenge within this dimension. This suggests that, although students understand the ethical necessity of reporting, the emotional safety required to do so in a potentially punitive environment demands a level of confidence that is still in development.

Figure 1

Adapted Wright Map for the dimension “Confidence in reporting errors” (Factor 2)

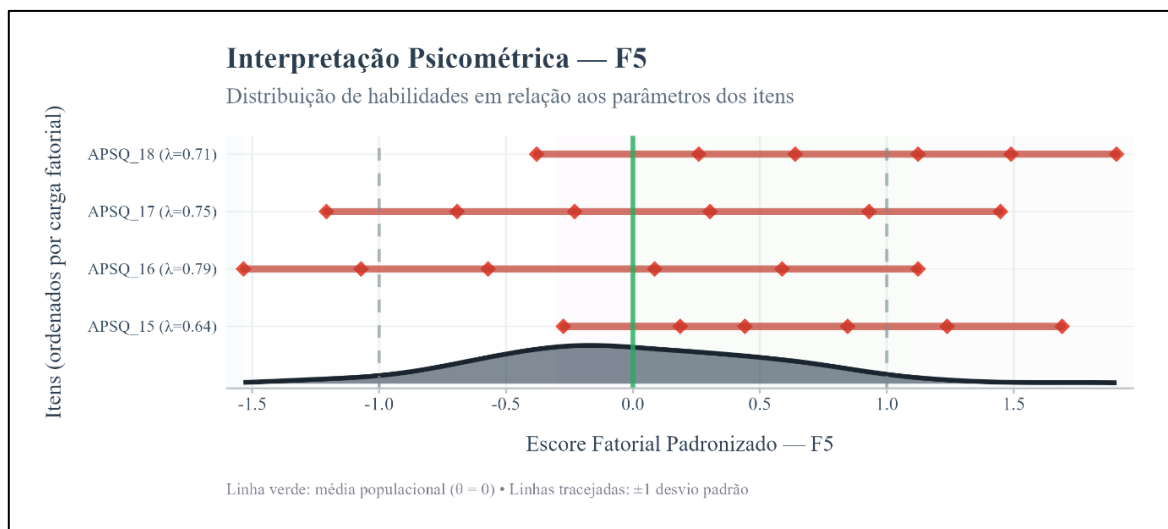


Source: Research data (Author), 2026.

In the dimension that examines Professional incompetence as a cause of error (Factor 5), the Wright Map (Figure 2) highlights a distinction between common-sense reasoning and systemic thinking. While the association of errors with “careless nurses” (Item 15) is easily identified, understanding that errors in healthcare are not merely evidence of technical incompetence (Item 18) requires a substantially higher level of critical recognition. This finding is innovative, as it demonstrates that deconstructing an individualized view of error is one of the most complex stages of academic training.

Figure 2

Adapted Wright Map for the dimension “Professional incompetence as a cause of error” (Factor 5)



Source: Research data (Author), 2026.

The dimension Working hours as a cause of error (Factor 3) also stands out by highlighting the impact of workload burden. Item 10 not only presented the highest factor loading ($\lambda = 0.92$) but also emerged as the most discriminative indicator. This means that the perception of how working hours affect safety is a defining threshold: students who endorse this item demonstrably hold a more mature and systemic understanding of care-related risks.

This visual analysis confirms that the APSQ-3 dimensions are not homogeneous. Each factor encompasses a hierarchy of concepts that range from elementary attitudes to highly complex perceptions, reinforcing the need for pedagogical strategies that not only inform but also cultivate and mature a culture of safety throughout undergraduate education.

4.4 COMPARISON OF ATTITUDES ACCORDING TO YEAR OF ENTRY

The analysis of variance (ANOVA) revealed statistically significant differences in four specific dimensions: confidence in reporting errors ($p = 0.009$), working hours as a cause of error ($p = 0.002$), inevitability of error ($p = 0.007$), and professional incompetence as a cause of error ($p = 0.002$). In the remaining dimensions, no significant variations were observed between cohorts, as detailed in the integrated summary of results presented in Table 4.

Table 4

Dimensions with statistically significant differences between entry years (ANOVA)

Dimension	p (ANOVA)	η^2p	Significant comparisons	Direction of difference
F2 – Confidence	0,009	0,067	2021 vs. 2023	2021 > 2023

F3 – Working hours	0,002	0,083	2021 vs. 2022	2021 < 2022
F4 – Inevitability of error	0,007	0,069	2022 vs. 2024	2022 > 2024
F5 – Professional incompetence	0,002	0,086	2021 vs. 2024	2024 > 2021

Source: Research data (Author), 2026.

5 DISCUSSION: THE GENESIS OF A SAFETY CULTURE IN NURSING EDUCATION

The results of this study reveal a complex and multifaceted scenario in which social, generational, educational, and psychometric elements interact to shape the attitudes of students entering undergraduate Nursing programs. One of the most striking findings is the relatively homogeneous sociodemographic profile of participants—predominantly female, young, and with an educational background linked to private schooling. Although this profile is common in highly competitive programs at public institutions, it carries significant educational implications, especially when considering how these students construct their initial perceptions of patient safety (Castro et al., 2023; Andifes, 2018).

The predominance of students who have not yet had contact with clinical environments or health-related work experiences suggests that their attitudes do not stem from concrete service experiences, but rather from values, school narratives, social expectations, and media portrayals of the profession. This condition, seemingly favorable for initiating critical and emancipatory training, may paradoxically pose an initial barrier: students without prior exposure tend to hold more idealized, individually centered conceptions grounded in notions of perfectionism and personal blame for error—elements the literature identifies as obstacles to the consolidation of a robust safety culture (Nora et al., 2022; Schultz et al., 2023; Wu, 2022).

When examining the psychometric structure of the APSQ-3, particularly the expanded 30-item version, it becomes evident that certain patient safety dimensions are especially fragile and sensitive to prior beliefs. Dimensions such as “inevitability of error,” “confidence in reporting errors,” and “incompetence as a cause of failure” reveal attitudes that often operate in contradictory ways: students partially recognize that error is inherent to human practice, yet simultaneously attribute it to individual failings, reinforcing punitive and moralizing logic. This ambivalence is not accidental; it reflects traditional educational models that value absolute correctness, flawless performance, and individual judgment, without fostering deeper discussions about systems, processes, and human factors.

The psychometric analysis contributes meaningfully to the scientific field. Confirming the superiority of the 30-item APSQ-3 version strengthens national and international literature on the topic, demonstrating that overly simplified approaches or excessive reductions of instruments may compromise the adequate measurement of complex dimensions—

particularly when assessing initial attitudes and structural beliefs. The application of the Wright Map, still uncommon in Brazilian patient safety studies, revealed important nuances regarding the relative difficulty of certain items, showing that some attitudes—such as confidence in reporting errors—require higher levels of maturity and critical understanding.

The way these attitudes vary across cohorts is particularly illuminating. Students entering in 2021, who experienced the direct impact of the COVID-19 pandemic during their final year of schooling, showed greater sensitivity in dealing with error, a higher willingness to report it, and a lower tendency to attribute it exclusively to professional incompetence. This behavior can be understood in light of the extraordinary context of the pandemic, a period in which society witnessed unprecedented visibility of the challenges faced by health professionals, including exhaustion, extended shifts, resource shortages, and emotional overload (Brasil de Fato, 2021; Fiocruz, 2021). This scenario may have fostered a more systemic view of error, contributing to students beginning their degrees with greater empathy and less individualized judgment.

In contrast, the 2023 cohort showed significantly lower levels of confidence in reporting errors. This decline may reflect the progressive return to normality, the reduced public debate on working conditions in health, and the reestablishment of a social culture oriented toward individual performance. From 2022 onward, discussions about excessive workloads and the visibility of nursing professionals gradually softened, possibly leading students from these years to perceive the work environment in a less critical manner and with reduced sensitivity to systemic contributors to error.

The 2024 cohort represents perhaps the most marked generational shift. These students exhibited stricter attitudes, showing lower acceptance of the inevitability of error and a stronger association between error and professional incompetence. This pattern may be related to the recent sociocultural climate, permeated by meritocratic discourse, the hypercompetitiveness amplified by social media, and an educational context increasingly valuing results over processes. This is a generation raised under intense performative pressure and constant social scrutiny, conditions that tend to reinforce moralizing interpretations of error and difficulties in viewing failures as learning opportunities (Turbes; Krebs; Axtell, 2002).

The findings also highlight the urgent need for Nursing programs to adopt pedagogical strategies capable of transforming these initial attitudes. Patient safety education must extend beyond theoretical content, incorporating active methodologies, clinical simulations, case studies, and reflective practices that deconstruct deeply rooted myths about perfection, blame, and infallibility. It is essential to introduce, beginning in the first year, discussions on

Human Error Theory, organizational factors, interprofessional communication, just culture, and psychological safety—concepts often distant from students' prior educational experiences.

In summary, the findings discussed in this chapter demonstrate that the construction of a safety culture does not begin in clinical settings but prior to them—when students first enter educational institutions. The cohorts analyzed carry generational marks that profoundly influence their understanding of error, teamwork, professional responsibility, and the structural factors shaping healthcare practice. This underscores the need for curricula that are sensitive to sociocultural changes and committed to preparing professionals capable of acting within complex systems, addressing risks, and preventing harm with technical competence, critical thinking, and collective responsibility.

More than identifying weaknesses, the findings illuminate pathways for pedagogical interventions that strengthen student protagonism and expand their understanding of patient safety. Recognizing the influence of generational characteristics, entry contexts, and preexisting beliefs is an essential step toward building more effective educational strategies that prepare nurses for safe, collaborative practice grounded in ethical and systemic principles.

6 CONCLUSIONS: THE FUTURE OF SAFETY IN NURSING

This study concludes that incoming students' safety attitudes are positive yet fragile. The innovative use of the Wright Map demonstrated that emotional barriers (fear of blame) outweigh barriers related to technical knowledge. Nursing education thus faces the challenge of educating a generation that enters university with high levels of perfectionism and low tolerance for human fallibility.

The validation of the full APSQ-3 version offers the scientific community a robust tool for diagnosing and intervening in this reality. Ultimately, cultivating a robust safety culture requires recognizing that the academic environment is the first and most important line of defense against punitive culture, transforming future nurses into agents of systemic change.

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SELF-EFFICACY IN SPECIAL EDUCATION: A PSYCHOMETRIC PERSPECTIVE FOR CURRICULUM SPECIALIST TEACHERS

AUTOEFICÁCIA NA EDUCAÇÃO ESPECIAL: UMA PERSPECTIVA PSICOMÉTRICA PARA PROFESSORES ESPECIALISTAS EM CURRÍCULO

AUTOEFICACIA EN LA EDUCACIÓN ESPECIAL: UNA PERSPECTIVA PSICOMÉTRICA PARA DOCENTES ESPECIALISTAS EN CURRÍCULO



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ABSTRACT

This chapter investigates the self-efficacy of Curriculum Specialist Teachers (PECs) in Special Education, a vital construct from Bandura's Social Cognitive Theory. The aim was to adapt the Self-efficacy Scale in Higher Education (AEFS) for the context of job performance, resulting in the Self-Efficacy Scale in Function Performance – Education Context (EAEF-Educ), and to analyze its psychometric properties. Sixty-six PECs from São Paulo's state network participated. Confirmatory and exploratory factor analyses (EGA and bootEGA) were employed. The original factor structure of the AEFS was not confirmed in the EAEF-Educ. EGA indicated a five-factor solution with adequate fit and reliability indices. A new nomenclature for these factors is proposed, reflecting dimensions such as knowledge application, social interaction, goal setting, compliance with external demands, and problem-solving. Results indicate a predominance of moderate self-efficacy and the presence of low levels, highlighting the need for interventions to strengthen these beliefs, optimizing PECs' professional development and enhancing Special Education policies.

Keywords: Self-efficacy. Special Education. Teachers. Psychometrics. Factor Analysis.

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RESUMO

Este capítulo investiga a autoeficácia de Professores Especialistas em Currículo (PECs) na Educação Especial, um construto vital da Teoria Social Cognitiva de Bandura. O objetivo foi adaptar a Escala de Autoeficácia na Formação Superior (AEFS) para o contexto de exercício de função, resultando na Escala de Autoeficácia no Exercício de Função – Contexto Educação (EAEF-Educ), e analisar suas propriedades psicométricas. Participaram 66 PECs da rede estadual de São Paulo. As análises fatoriais confirmatória e exploratória (EGA e bootEGA) foram empregadas. A estrutura fatorial original da AEFS não foi confirmada na EAEF-Educ. O EGA indicou uma solução de cinco fatores, com índices de ajuste e confiabilidade adequados. Propõe-se uma nova nomenclatura para esses fatores, refletindo dimensões como aplicação do conhecimento, interação social, estabelecimento de metas, cumprimento de demandas externas e resolução de problemas. Os resultados revelam a predominância de autoeficácia moderada e a presença de níveis fracos, sublinhando a necessidade de intervenções para fortalecer essas crenças, otimizando o desenvolvimento profissional dos PECs e aprimorando as políticas de Educação Especial.

Palavras-chave: Autoeficácia. Educação Especial. Professores. Psicometria. Análise Fatorial.

RESUMEN

Este capítulo investiga la autoeficacia de los Profesores Especialistas en Currículo (PECs) en la Educación Especial, un constructo fundamental de la Teoría Social Cognitiva de Bandura. El objetivo fue adaptar la Escala de Autoeficacia en la Educación Superior (AEFS) al contexto del desempeño en la función, dando como resultado la Escala de Autoeficacia en el Desempeño de la Función – Contexto Educativo (EAEF-Educ), y analizar sus propiedades psicométricas. Participaron sesenta y seis PECs de la red estatal de São Paulo. Se emplearon análisis factorial confirmatorio y exploratorio (EGA y bootEGA). La estructura factorial original de la AEFS no fue confirmada en la EAEF-Educ. El EGA indicó una solución de cinco factores con índices adecuados de ajuste y confiabilidad. Se propone una nueva nomenclatura para estos factores, reflejando dimensiones como aplicación del conocimiento, interacción social, establecimiento de metas, cumplimiento de demandas externas y resolución de problemas. Los resultados indican predominio de autoeficacia moderada y la presencia de niveles bajos, lo que evidencia la necesidad de intervenciones para fortalecer estas creencias, optimizando el desarrollo profesional de los PECs y mejorando las políticas de Educación Especial.

Palabras clave: Autoeficacia. Educación Especial. Profesores. Psicometría. Análisis Fatorial.

1 INTRODUCTION

The contemporary educational landscape is marked by constant transformations and challenges, especially regarding the inclusion and support of students with special educational needs. In this context, the role of the educational professional becomes even more complex and strategic. The belief in one's own capacity to perform tasks and achieve goals, known as self-efficacy, emerges as a fundamental psychological construct for understanding the performance, motivation, and resilience of these educators. Originating from Albert Bandura's Social Cognitive Theory, the concept of self-efficacy offers a valuable lens to analyze how teachers perceive their abilities and how this perception influences their pedagogical practice, well-being, and, ultimately, the quality of education offered. This chapter proposes to explore self-efficacy in the job performance of Curriculum Specialist Teachers (PECs) who work in Special Education. PECs play a crucial role in articulating educational policies and classroom practice, being responsible for supporting teacher training and the development of pedagogical practices aligned with the school curriculum in the São Paulo state network. Given the specificity and complexity of their attributions, investigating the self-efficacy of these professionals is essential to identify factors that can optimize their performance and contribute to a more effective and inclusive educational environment. The research underpinning this chapter sought to adapt and validate a self-efficacy scale for the PECs' context, based on an existing instrument focused on higher education. This psychometric adaptation process is vital because self-efficacy is a contextual construct, and its measurement must reflect the specificities of the domain and circumstances in which it is evaluated. The non-confirmation of the original factor structure of the adapted instrument, and the subsequent proposal of a new structure through exploratory analyses, highlights the uniqueness of self-efficacy beliefs in the job performance of PECs, in contrast to the higher education environment. Throughout this chapter, we will detail the theoretical foundation of self-efficacy, the relevance of teacher self-efficacy in Special Education, the methodological design of the research that grounds this discussion, the results obtained in the adaptation and validation of the instrument, and the implications of these findings for educational practice and future investigations. Our objective is to offer a deep understanding of the self-efficacy of Curriculum Specialist Teachers, contributing to the development of strategies aimed at strengthening these beliefs and, consequently, improving the performance of these professionals in promoting quality special education.

1.1 SOCIAL COGNITIVE THEORY AND THE CONSTRUCT OF SELF-EFFICACY

Self-efficacy is one of the pillars of Albert Bandura's Social Cognitive Theory, one of the most influential psychologists of the 20th century. Bandura (1997) postulates that self-efficacy refers to people's beliefs about their capabilities to organize and execute courses of action required to produce given attainments. That is, it is not about possessing skills, but about the belief in the ability to use them effectively to achieve specific goals. This distinction is crucial, as individuals with the same skills can exhibit very different performances, depending on their self-efficacy beliefs. According to Bandura (1993), self-efficacy influences cognitive functioning and human development in several ways. It impacts the choice of activities and environments, the amount of effort expended, persistence in the face of obstacles, and resilience in the face of adversity. Individuals with high self-efficacy tend to approach challenging tasks as opportunities to develop new skills, rather than viewing them as threats to be avoided. This proactive perspective is essential for continuous learning and overcoming difficulties, characteristics inherent to teaching practice. Social Cognitive Theory emphasizes the agentic nature of individuals, who are perceived as self-organizing, proactive, self-reflective, and self-regulating beings (BANDURA, 2001). In this view, self-efficacy beliefs are powerful shapers of the courses of action people choose, the level of effort they dedicate, the time they persist in the face of difficulties, and how their thought patterns are self-inhibiting or self-motivating. In the professional context, especially in roles that demand high capacity for adaptation and problem-solving, such as that of PECs in Special Education, self-efficacy becomes a significant predictor of success and well-being.

Self-efficacy beliefs do not arise from nothing; they are developed and strengthened through four main sources, as outlined by Bandura (1997, 2005):

- *Mastery Experiences (or Performance Accomplishments)*: This is the most powerful source of self-efficacy. Previous successes in performing a specific activity strengthen the belief in one's own capacity. Conversely, repeated failures can undermine this belief. For a PEC, successful experiences in implementing a new curriculum or mediating conflicts, for example, reinforce their self-efficacy.
- *Vicarious Experiences (or Social Modeling)*: Observing other people, deemed similar, successfully performing a task through sustained effort can elevate the observer's self-efficacy. If a PEC sees an experienced colleague overcoming a complex challenge in Special Education, they may be led to believe that they too are capable.
- *Social Persuasion (or Verbal Persuasion)*: Verbal encouragement and positive feedback from significant others (colleagues, supervisors, family members) can strengthen an individual's belief in their capabilities. Being told "you can do this" can

boost effort and persistence, provided the persuasion is credible and the task is not perceived as impossible.

- *Physiological and Emotional States:* Physical and emotional reactions (such as anxiety, stress, or excitement) during an activity also influence self-efficacy. The interpretation of these states is fundamental; for example, feeling an increased heart rate can be interpreted as a sign of weakness and incapacity by some, while others may see it as a sign of excitement and readiness for the challenge. Reducing stress and anxiety, and positively interpreting sensations, contribute to a more robust self-efficacy.

When conceiving instruments to measure self-efficacy, Bandura (2005) emphasizes the need to assess perceived self-efficacy in relation to specific domains of functioning, rather than as a global personality trait. This is because self-efficacy varies significantly across different activities and circumstances. A person might have high self-efficacy for teaching mathematics, but low self-efficacy for handling disciplinary issues, for example. This contextual specificity is a central point in the methodology of the research that underpins this chapter, justifying the adaptation of an existing scale for the particular domain of Special Education PECs. Therefore, self-efficacy, within the scope of Social Cognitive Theory, is not merely an indicator of what people can do, but a powerful determinant of what they will actually do. Strengthening these beliefs is a promising path to enhance motivation, resilience, and achievements in any domain, including the complex and vital field of education.

1.2 TEACHER SELF-EFFICACY IN THE EDUCATIONAL CONTEXT

In the field of education, teacher self-efficacy has been the subject of vast research, due to its substantial impact on teacher performance, motivation, well-being, and consequently, students' learning process (BANDURA, 1989; MARTINS; CHACON, 2019; SKAALVIK; SKAALVIK, 2007; TSCHANNEN-MORAN; HOY, 2001). Teachers with high self-efficacy tend to be more engaged, persistent, innovative, and resilient in the face of the multiple challenges that the profession imposes. Teacher self-efficacy influences a series of behaviors and attitudes in the classroom and school environment. Teachers with high self-efficacy are more likely to:

- Experiment with new teaching strategies and adopt innovative methodologies.
- Persist in teaching difficult or unmotivated students.
- Set higher learning goals for their students.
- Face challenges with a proactive stance, seeking solutions instead of avoiding problems.

- Have a greater sense of professional satisfaction and less propensity for burnout.
- Promote a more positive and supportive learning environment, impacting the school climate.

One of the contexts in which teacher self-efficacy proves particularly relevant is inclusive education. Working with students who have special educational needs demands differentiated pedagogical skills, patience, adaptability, and a solid belief in their ability to make a difference from teachers. Weissenfels, Benick, and Perels (2021) investigated whether teacher self-efficacy can act as a protective factor against burnout in inclusive classrooms. Their results indicated that teachers with high self-efficacy reported lower levels of emotional exhaustion and depersonalization, core components of burnout. This finding underscores the importance of fostering self-efficacy for the well-being and career sustainability of educators working in complex environments. Martins and Chacon (2019), in a review of national and international literature on teacher self-efficacy and Special Education, with a focus on teacher training, emphasize the need to promote self-efficacy during initial and continuing training. This aims to prepare teachers to deal with the inherent challenges of school inclusion, which requires not only theoretical knowledge but also confidence in the ability to apply this knowledge in real and often unpredictable situations.

To strengthen teacher self-efficacy, Bandura's four sources of self-efficacy (1997) can be strategically applied:

- *Mastery experiences*: Create opportunities for teachers to experience success in challenging tasks, such as planning and implementing effective inclusive activities, or managing disruptive behaviors in the classroom.
- *Vicarious experiences*: Facilitate the observation of other successful teachers in similar contexts, through mentoring, visits to other schools, or sharing of good practices.
- *Social persuasion*: Offer constructive feedback and encouragement from colleagues, coordinators, principals, and the school community. Recognize and value teachers' efforts and achievements.
- *Physiological and emotional states*: Develop support and self-care programs to help teachers manage the stress and anxiety inherent in the profession, interpreting challenges as opportunities for growth, rather than as threats.

Collaboration, exchange of experiences, and mutual support among teachers are powerful mechanisms for strengthening teacher self-efficacy (MARTINS; CHACON, 2019). Work environments that promote psychological safety and continuous professional development contribute to educators feeling more capable and confident in their duties.

In summary, teacher self-efficacy is a vital construct for understanding the quality of education. Investing in its development means not only improving the individual performance of teachers but also positively impacting the educational environment as a whole, culminating in better outcomes for students and society.

1.3 THE CURRICULUM SPECIALIST TEACHER (PEC) AND SPECIAL EDUCATION

The complexity of the Brazilian educational system, especially in the state of São Paulo, requires the involvement of professionals with strategic and highly specialized functions. Among these, the Curriculum Specialist Teacher (PEC) stands out. According to SEDUC Resolution 62/2022 (SÃO PAULO, 2022), the PEC is a professional appointed to act as a fundamental link in the articulation between the State Secretariat of Education (SEDUC), the Regional Education Directorates (DREs), and schools. Their role transcends direct classroom teaching, focusing on the implementation of educational policies, the continuing education of other teachers, and curriculum development. This professional is often released from direct pedagogical functions to dedicate themselves fully to the role in the pedagogical core of the education directorate. The PEC plays a role as a knowledge multiplier and pedagogical support. Their responsibilities include planning and executing teacher training, guiding the application of new methodologies and didactic materials, and ensuring that pedagogical practices are aligned with state curricular guidelines. In the context of Special Education, this function takes on even more delicate and crucial contours. Special Education PECs are tasked with ensuring that inclusion policies are effectively implemented, and that common classroom teachers and those in Specialized Educational Support (AEE) receive the necessary support to meet the specific needs of students with disabilities, Global Developmental Disorders (TGD), and high abilities/giftedness. The performance of these professionals is vital to bridge the gap between the macro planning of educational policies and the micro reality of the classroom. They are the "adequate scaffolding" that supports the education network in developing effective pedagogical practices. To this end, it is essential that these PECs possess not only technical-pedagogical knowledge but also a solid belief in their own capacity to influence and generate positive impact – that is, robust self-efficacy. The research that gave rise to this chapter was motivated by the observation that, despite the strategic importance of PECs in Special Education, there was a gap in understanding their self-efficacy in performing their duties. The central question that guided the study was: "what is the self-efficacy of Special Education PECs in the context of the work of the pedagogical cores of the Regional Education Directorates in the São Paulo state network?" This question not only seeks to map self-efficacy levels but also to understand how it manifests in a

professional group with such unique responsibilities. The absence of a specific instrument to measure self-efficacy specifically in the workplace, in a context as particular as that of the Special Education pedagogical cores, prompted the need to adapt a scale. The Self-efficacy Scale in Higher Education (AEFS), developed by Polydoro and Guerreiro-Casanova (2010), based on Bandura's Social Cognitive Theory, served as the basis for the creation of the Self-Efficacy Scale in Function Performance – Education Context (EAEF-Educ). The choice to adapt an existing instrument, rather than creating a new one from scratch, was based on psychometric principles that value the adaptation and validation of instruments, provided that proper permissions and evaluations of their psychometric properties are followed. The relevance of this investigation is amplified by the alternations and tensions in the National Special Education Policy (BRASIL, 2008), which are directly reflected in state policies. Understanding the self-efficacy of PECs can offer valuable subsidies for the development of training and support programs aimed at strengthening these professionals, ensuring that educational policies are implemented more effectively and that inclusion becomes a reality in schools. The research is justified by the hope of contributing new trajectories of studies and ways to understand efficacy in the work context of the curriculum specialist teacher's training in the São Paulo state network. By strengthening the self-efficacy of PECs, it is expected to positively impact the quality of teacher training, the implementation of educational policies, and, consequently, the continuous improvement of education for all students, especially those in Special Education.

2 METHODOLOGY

The present research was designed with the necessary rigor for investigating a psychological construct in a specific educational context. This section will detail the methodological procedures adopted, from the study type to the complex statistical analyses.

2.1 RESEARCH DESIGN

The study is characterized as applied research, as it sought to generate knowledge that can be used in practice to solve specific problems, in this case, the understanding and eventual strengthening of self-efficacy in a professional group. Its nature was observational, given that the researchers did not manipulate variables, but rather observed and measured phenomena in their natural context. In terms of approach, the research was quantitative analytical, using statistical methods to analyze the collected data and test hypotheses. It had an exploratory character in the phase of factor structure analysis, especially when the original theoretical model was not confirmed, leading to the investigation of new dimensional

configurations. The field nature indicates that data were collected directly in the environment where the phenomena occur, i.e., with Curriculum Specialist Teachers (PECs) in their work. Finally, it was a cross-sectional study, as data were collected at a single point in time (in the year 2023), offering a snapshot of the participants' self-efficacy at that moment.

2.2 STUDY PARTICIPANTS

The research participants were Curriculum Specialist Teachers (PECs) from the 91 Pedagogical Cores of the Regional Education Directorates of the State Secretariat of Education of São Paulo. Selection occurred through voluntary adherence, with all PECs in this modality who agreed to participate being invited. The final sample consisted of 66 PECs, representing a participation rate of 72% of the total universe of 91 PECs. It is important to note that 6 PECs (6.6%) read the Free and Informed Consent Form (FICF) but chose not to participate, while the remaining 19 PECs (19%) did not respond to the invitation. The sociodemographic and professional characterization of the sample revealed some important aspects:

- *Gender*: The majority of participants (58, or 87.87%) were female, reflecting a historical predominance of women in education.
- *Age*: All professionals were over 30 years old. Among them, 20% were between 31 and 40 years old, and 80% were over 40 years old, suggesting a sample of professionals with consolidated experience.
- *Professional Activity*: The vast majority (63, or 95.45%) worked full-time, with 75.75% of respondents working 40 hours a week.

2.3 DATA COLLECTION INSTRUMENTS

Data collection was conducted using a self-administered Data Collection Instrument (DCI) in the form of an electronic questionnaire (Google Forms). This DCI integrated three main components:

- **Free and Informed Consent Form (FICF)**: Based on the guidelines of CNS Resolution N° 510/2016, MS, it ensured that participants were duly informed about the study and freely consented to their participation.
- **Sociodemographic and Professional Variables Questionnaire (SPVQ)**: Developed by the researchers, this questionnaire collected information on biological sex, gender identity, sexual orientation, age, marital status, number of children, income, religion, prior schooling and parental schooling, and employment status.

- **Self-Efficacy Scale in Function Performance – Education Context (EAEF-Educ):**

This was the main instrument for measuring self-efficacy, resulting from the adaptation of the Self-efficacy Scale in Higher Education (AEFS).

2.3.1 Adaptation of the Self-Efficacy Scale in Higher Education (AEFS) for the Educational Context (EAEF-Educ)

The Self-efficacy Scale in Higher Education (AEFS), developed by Polydoro and Guerreiro-Casanova (2010), is a self-report instrument composed of 34 items, with responses on a Likert scale from 1 (little capable) to 10 (very capable). Originally, the AEFS is divided into five dimensions:

- Academic Self-Efficacy (AFA)
- Self-Efficacy in Training Regulation (AFP)
- Self-Efficacy in Social Interaction (AIS)
- Self-Efficacy in Proactive Actions (AAP)
- Self-Efficacy in Academic Management (AGF)

The adaptation of the AEFS for the specific context of Special Education PECs resulted in the EAEF-Educ. This process was meticulous and followed the principles of psychometric instrument adaptation. Items were modified to reflect the reality of the PECs' work, altering terms such as "course" to "function," "students" to "teachers" or "colleagues," and "higher education" to "educational context." For example, the item "How capable am I of understanding the demands of my course" (AEFS) was adapted to "How capable am I of understanding the demands of the function I perform" (EAEF-Educ). Items referring to evaluations were recontextualized to "evaluations of my function" or "training received." This adaptation sought to maintain the essence of the construct but align it with the new domain.

2.4 DATA COLLECTION PROCEDURES AND ETHICAL ASPECTS

Data collection was carried out in 2023, involving PECs from the Pedagogical Cores of the Regional Education Directorates in the state of São Paulo. The procedure followed these steps:

- *Invitation and Information:* PECs were invited to participate via email, which contained a simple presentation explaining the research objective, the reason for their selection as participants, and the importance of their contribution.
- *Access to the Electronic Form:* The email contained a link to the electronic form (Google Forms), which hosted the FICF and the data collection instruments.

- *Consent:* Upon accessing the form, participants were asked to read the FICF and express their consent by clicking "I HAVE READ AND AGREE." Those who did not agree were directed out of the survey.
- *Instrument Completion:* After consent, participants completed the SPVQ and the EAEF-Educ. The estimated time for completion was approximately 8 minutes.
- *Confidentiality and Anonymity:* The confidentiality and anonymity of participants were guaranteed. Their responses would be treated anonymously and confidentially, used only for the research and disclosed in scientific events or journals without individual identification.
- *Ethical Aspects:* The project was duly submitted to the Research Ethics Committee of the São José do Rio Preto Medical School (CEP-FAMERP), receiving CAAE 68134923.3.0000.5415 and an APPROVED opinion on July 10, 2023. All precautions were taken to safeguard the confidentiality and identification of participants, minimizing risks and ensuring the well-being of those involved.

2.5 DATA ANALYSIS

Data analysis was structured in three distinct stages, reflecting the complexity of psychometric investigation and the need to adapt to empirical findings.

2.5.1 Stage 1: Testing the Original Factor Structure

The first stage aimed to verify whether the original five-factor theoretical structure of the AEFS remained valid in the adapted version, the EAEF-Educ, for the PECs sample. To this end, Confirmatory Factor Analysis (CFA) was used. Considering that the scale has ordinal scores (Likert scale from 1 to 10), the analysis was implemented using a polychoric correlation matrix and the Weighted Least Squares Mean and Variance Adjusted (WLSMV) estimation method. Model fit was evaluated using indices such as the Root Mean Square Error of Approximation (RMSEA), the Comparative Fit Index (CFI), and the Tucker-Lewis Index (TLI). Criteria for a good fit, according to the literature, are RMSEA less than 0.08 (with a 95% confidence interval not reaching 0.10) and CFI/TLI equal to or greater than 0.90. However, the original factor model of the EAEF-Educ did not converge. This means that the CFA was unable to adequately estimate the model parameters, resulting in a non-positive covariance matrix. The lack of convergence prevents the evaluation of fit indices and the confirmation of the theoretical structure. This non-convergence can be attributed to two main factors:

- *Small Sample Size (N=66)*: Complex CFA models, especially with ordinal data and a high number of items (34 items), require larger samples for stable estimates.
- *Inadequacy of the Original Theoretical Factor Structure*: The strongest hypothesis is that the self-efficacy structure conceived for "higher education" (AEFS) does not directly apply to the "job performance" of PECs (EAEF-Educ).

2.5.2 Stage 2: Exploratory Analysis of the Structure

As the CFA failed to confirm the original model, the second stage employed Exploratory Graph Analysis (EGA) to investigate the factor structure of the EAEF-Educ. EGA is a recent and robust method that estimates the number of dimensions in multivariate data using network models. Considering the sample size, Bootstrap Exploratory Graph Analysis (bootEGA) was also used, which evaluates the stability of the dimensional structure estimated by EGA. BootEGA generates a high number of bootstrap samples (in this study, 10,000 resamples) and applies EGA to each one, forming a sampling distribution of the results.

2.5.3 Stage 3: Construction of Factor Scores

After the identification and validation of the new factor structure, the final stage consisted of constructing the respondents' factor scores. For this, the tenBerge technique was used, which preserves the correlational accuracy of the scores, ensuring that the factor scores reproduce the factor correlations. TenBerge factor scores are calculated as z-scores, with a mean of zero and a standard deviation of one. To facilitate interpretation and visualization, these scores were standardized on a scale of 1 to 10, through a linear transformation.

3 RESULTS AND ANALYSIS

The presentation and analysis of the research results are crucial for understanding the self-efficacy of Curriculum Specialist Teachers (PECs) in Special Education and the psychometric properties of the adapted scale, the EAEF-Educ.

3.1 CHARACTERIZATION OF THE PECS SAMPLE

The final sample consisted of 66 Curriculum Specialist Teachers, representing an expressive participation of 72% of the total universe of Special Education PECs in the state of São Paulo. The sample composition offers a relevant demographic and professional portrait:

- *Female Predominance*: 87.87% of participants (58 PECs) were women, a datum that corroborates the strong female presence in the educational field, especially in pedagogical support and training functions.
- *Experienced Professionals*: All participants were over 30 years old, with 80% over 40 years old. This suggests a sample of professionals with considerable experience in education.
- *Full-time Dedication*: 95.45% of PECs (63 participants) performed professional activity full-time, with 75.75% dedicating 40 hours per week to the function.

3.2 TESTING THE ORIGINAL FACTOR MODEL OF AEFS IN EAEF-Educ

The first stage of the factor analysis sought to verify whether the theoretical five-factor structure of the Self-efficacy Scale in Higher Education (AEFS) was maintained in the version adapted for the educational context of PECs, the EAEF-Educ. For this, Confirmatory Factor Analysis (CFA) was used, employing the polychoric correlation matrix and the WLSMV estimation method, suitable for ordinal data. The result of this stage was that the original factor model of the EAEF-Educ did not converge. This means that the CFA could not adequately estimate the model parameters, and the factors presented a non-positive covariance matrix. The lack of convergence prevents the evaluation of fit indices and the confirmation of the theoretical structure. This non-convergence can be attributed to two main factors:

- *Small Sample Size (N=66)*: Complex CFA models, especially with ordinal data and a high number of items (34 items), require larger samples for stable estimates.
- *Inadequacy of the Original Theoretical Factor Structure*: The strongest hypothesis is that the self-efficacy structure conceived for "higher education" (AEFS) does not directly apply to the "job performance" of PECs (EAEF-Educ).

3.3 EXPLORATORY ANALYSIS AND THE NEW FACTOR STRUCTURE OF EAEF-EDUC

Given the non-convergence of the original model, the research proceeded to the Exploratory Analysis of the Structure of EAEF-Educ, using Exploratory Graph Analysis (EGA) and Bootstrap Exploratory Graph Analysis (bootEGA). The EGA retained 5 factors for the factor structure of the scale, the same number of factors as the original theoretical model of the AEFS. However, the distribution of items in these factors was different from expected, indicating that the organization of PECs' self-efficacy beliefs does not perfectly align with the self-efficacy dimensions of higher education.

Table 1

Results of the Bootstrap Exploratory Graph Analysis (bootEGA). São Paulo, Brazil, 2024

Number of factors	Relative frequency
1	0.0056
2	0.0006
3	0.0491
4	0.2272
5	0.3196
6	0.2352
7	0.1132
8	0.0372
9	0.0099
10	0.0021
11	0.0003

Source: Adapted from Lopes (2024, p. 37).

Table 1 demonstrates that the 5-factor solution was the most frequent, occurring in 31.96% of the resamples. This indicates that, even with the variability of bootstrap samples, the 5-factor structure is the most consistently replicated, lending robustness to the solution found by EGA. The analysis of the factor model resulting from EGA and bootEGA, when tested via CFA, presented an acceptable fit: $\chi^2[517] = 629.90$, CFI = .997, TLI = .997, and RMSEA = .058 [95% CI .040 – .073]. These indices are within the limits recommended by the literature (.90 for CFI/TLI and <.08 for RMSEA), allowing the conclusion that the five identified factors are valid for the studied sample.

3.3.1 Proposed Nomenclature for EAEF-Educ Factors

Based on the content analysis of the items that effectively loaded onto each dimension, a new nomenclature is proposed for the EAEF-Educ factors:

- *Factor 1: Self-Efficacy in Knowledge Application and Professional Training* – This factor groups items related to the ability to learn, understand, apply knowledge (from courses, Technical Orientations - OTs), and establish conditions for work development, as well as understanding job demands and defining professional direction.
- *Factor 2: Self-Efficacy in Social Interaction and Professional Development* – This is the most comprehensive factor, uniting items about teamwork, cooperation, relationships with colleagues and trainers, seeking help, updating knowledge, motivation, and contributing to improving performance.

- **Factor 3: Self-Efficacy in Goal Setting and Expression of Opinions** – This factor combines items of self-efficacy in regulating professional training (planning and reflecting on goals) with items of social interaction (expressing opinions and asking for help, advocating for support).
- **Factor 4: Self-Efficacy in Meeting External Demands** – This factor is composed of items reflecting self-efficacy in fulfilling demands from the Education Directorate, completing tasks on time, and planning activities requested by SEDUC/DE.
- **Factor 5: Self-Efficacy in Problem Solving and Resource Seeking** – This factor combines items of self-efficacy in regulating professional training (solving unexpected problems) with items of academic self-efficacy (preparing for evaluations) and proactive actions (seeking information about resources).

3.4 RELIABILITY OF EAEF-EDUC FACTORS

The reliability of factors is an essential indicator of a scale's internal consistency.

Table 2

Summary of factor loadings and reliability indices of the EAEF-Educ instrument. São Paulo, Brazil, 2024. *N = Number of items per factor; SD = Standard deviation; Min = minimum; Max = maximum. Source: Adapted from Lopes (2024, p. 41)*

Factor	N	Mean	SD	Min	Max	Cronbach's Alpha	McDonald's Omega	Composite Reliability
Factor 1	8	0.80	0.11	0.63	0.92	0.90	0.93	0.83
Factor 2	14	0.81	0.08	0.64	0.94	0.94	0.96	0.90
Factor 3	6	0.80	0.15	0.57	0.94	0.87	0.88	0.78
Factor 4	3	0.90	0.05	0.85	0.94	0.88	0.87	0.80
Factor 5	3	0.94	0.02	0.94	0.95	0.92	0.93	0.88

*The results in Table 2 indicate that the EAEF-Educ factors exhibited adequate reliability indices. Cronbach's Alpha ranged from .87 to .94, McDonald's Omega ranged from .88 to .96, and Composite Reliability ranged from .78 to .90. All these values are above the generally acceptable limits in psychometrics (typically >.70 or >.80), confirming that the items within each new factor are consistent with each other and that the scale is a reliable instrument for measuring PECs' self-efficacy in these dimensions.

3.5 FACTOR SCORES AND PECS' SELF-EFFICACY LEVELS

After validating the new factor structure and confirming reliability, factor scores were constructed using the tenBerge technique and standardized to a scale of 1 to 10. The classification of respondents into self-efficacy levels (weak, moderate, and strong) revealed the predominance of moderate levels and the presence of weak levels across all dimensions.

Table 3

Model for interpreting the values of the dimension scores and total self-efficacy.

SCORES	SELF-EFFICACY ASSESSMENT
< 5.9	Weak
≥ 6.0 and ≤ 7.9	Moderate
≥ 8.0 and ≤ 10.0	Strong

Source: Adapted from Polydoro and Guerreiro-Casanova (2010).

This finding is particularly significant. The predominance of moderate levels, combined with the existence of weak levels across all dimensions, suggests that, although PECs demonstrate reasonable self-efficacy for their functions, there is considerable room for strengthening these beliefs.

4 DISCUSSION

The research underpinning this chapter sought to unravel the complex web of self-efficacy beliefs that pervades the work of Curriculum Specialist Teachers (PECs) in Special Education. The adaptation of the Self-Efficacy Scale in Higher Education (AEFS) for the context of job performance (EAEF-Educ) and the subsequent psychometric analysis revealed important nuances that warrant in-depth discussion.

4.1 SELF-EFFICACY AND THE SPECIFICITY OF THE PECS CONTEXT

The primary objective of adapting the AEFS for the PECs context was based on Bandura's premise that self-efficacy is a contextual construct (BANDURA, 2005). The results of the Confirmatory Factor Analysis (CFA) that did not confirm the original structure of the AEFS in the EAEF-Educ strongly validate this premise. The non-convergence of the original model, although partly attributable to sample size, primarily suggests that the self-efficacy beliefs of a university student are intrinsically different from the beliefs of an experienced professional who acts as a trainer and articulator of educational policies in Special Education. The transition from a "higher education" environment to "job performance" implies a radical change in demands, challenges, and expectations. Where in higher education self-efficacy might revolve around "learning content," "preparing for assessments," and "working in groups" for course approval, in the PECs' job performance, these dimensions transform. Self-efficacy shifts to "applying knowledge in practical situations," "understanding job demands," "planning actions to achieve professional goals," "solving unexpected problems," and "interacting with colleagues and trainers" for professional development. The five new factors emerging from the Exploratory Graph Analysis (EGA) – Self-Efficacy in Knowledge

Application and Professional Training; Self-Efficacy in Social Interaction and Professional Development; Self-Efficacy in Goal Setting and Expression of Opinions; Self-Efficacy in Meeting External Demands; and Self-Efficacy in Problem Solving and Resource Seeking – reflect this specificity. They demonstrate that, for PECs, self-efficacy is not just about the individual capacity to perform isolated tasks, but about the ability to work in networks, to influence, to manage complex demands, and to innovate in a dynamic environment. The dimension of "Self-Efficacy in Social Interaction and Professional Development," for example, is particularly relevant. It groups items related to teamwork, cooperating with colleagues, establishing good relationships with trainers, seeking help, and contributing ideas. This underscores that PECs' self-efficacy is interdependent with their relationship skills and their ability to operate within a complex ecosystem of peers, supervisors, and network teachers. For a professional whose central function is articulation and training, confidence in social interaction is as vital as technical-pedagogical mastery.

4.2 CHALLENGES IN ADAPTING PSYCHOMETRIC INSTRUMENTS

The experience of adapting the AEFS to the EAEF-Educ illustrates the inherent challenges of psychometric work in social sciences. The adaptation of an instrument to a new context is not trivial and requires more than a simple change in terminology. It demands a deep understanding of the construct within the new domain and empirical validation of its structure. The impossibility of confirming the original model with CFA, followed by the need to conduct an exploratory analysis (EGA and bootEGA), demonstrates that, no matter how well-founded an original scale may be, its transposition to a significantly different context can fundamentally alter the organization of the factors. This does not diminish the value of the original scale but reinforces the idea that self-efficacy is a dynamic and context-bound construct. The adequate reliability of the emergent factors (Cronbach's Alpha, McDonald's Omega, and Composite Reliability) is a strong indicator of the internal consistency of the EAEF-Educ in its new configuration. This means that, although the factor structure is new, the items composing each of the five factors now cohesively measure the proposed dimension.

4.3 IMPLICATIONS FOR PROFESSIONAL DEVELOPMENT AND EDUCATIONAL POLICIES

The results of this study have significant implications for the formulation of professional development strategies and for the management of educational policies. *Self-Efficacy-Oriented Continuing Education*: Instead of focusing solely on the transmission of technical

knowledge, training programs for PECs should explicitly integrate strategies to strengthen self-efficacy. This can include:

- *Mastery Experiences*: Designing training activities that allow PECs to experience success in applying new strategies or solving complex problems.
- *Modeling (Vicarious Experiences)*: Facilitating the exchange of experiences and the observation of successful PECs in different contexts.
- *Feedback and Encouragement (Social Persuasion)*: Promoting a culture of constructive feedback and recognition.
- *Stress Management (Physiological and Emotional States)*: Including modules for developing resilience skills, time management, and stress management.

Strengthening Specific Dimensions: The new factor structure of the EAEF-Educ provides a map for more targeted interventions. For example:

- For "Self-Efficacy in Social Interaction and Professional Development," invest in workshops on interpersonal communication, conflict mediation, and teamwork.
- For "Self-Efficacy in Goal Setting and Expression of Opinions," promote safe spaces for dialogue, presentation of proposals, and project leadership.
- For "Self-Efficacy in Meeting External Demands," offer clarity on expectations, project management tools, and support for work organization.

Development of Support Policies: Education Secretariats need to go beyond merely allocating tasks and develop support policies that recognize the importance of self-efficacy. This includes creating support networks, making pedagogical and technological resources available, and reducing administrative overloads that divert focus from the PECs' central pedagogical work.

4.4 STUDY LIMITATIONS AND SUGGESTIONS FOR FUTURE RESEARCH

It is crucial to recognize the limitations of the present study to contextualize its findings and guide future investigations:

- *Sample Size*: Although representative of the target population in the state of São Paulo, the small sample size (N=66) is a limitation for more advanced statistical analyses and may have influenced the stability of some items in the bootEGA.
- *Contextual Specificity*: The study was conducted with PECs from the São Paulo state network. Although this ensures domain specificity, it limits the generalization of results to other educational contexts.

- *Cross-Sectional Study*: Being a cross-sectional study, the research offers a "snapshot" of PECs' self-efficacy at a given moment. Longitudinal studies would be valuable to investigate the development of self-efficacy throughout these professionals' careers.
- *Possibility of a General Factor*: The mention of the possibility of a general self-efficacy factor, suggested by the high correlations between factors, warrants investigation. Second-order factor analyses or bifactor models could explore whether a global self-efficacy pervades the specific dimensions.

Despite these limitations, the study makes a significant contribution to the field, offering an adapted and validated instrument to measure the self-efficacy of a crucial professional group, and opening pathways for a more nuanced understanding of self-efficacy beliefs in the complex landscape of Special Education.

5 CONCLUSION

Self-efficacy, a cornerstone of Albert Bandura's Social Cognitive Theory, proves to be an invaluable construct for understanding the performance and well-being of education professionals. This chapter investigated self-efficacy in the job performance of Curriculum Specialist Teachers (PECs) in Special Education, a professional group whose work is strategic for quality and inclusion in the São Paulo public network. The process of adapting the Self-Efficacy Scale in Higher Education (AEFS) for the context of job performance, resulting in the Self-Efficacy Scale in Function Performance – Education Context (EAEF-Educ), demonstrated the importance of contextual specificity in measuring self-efficacy. The non-confirmation of the original factor structure of the AEFS through Confirmatory Factor Analysis (CFA) was a crucial finding, indicating that the dynamics of self-efficacy beliefs differ substantially between the academic training environment and the professional performance setting. The subsequent Exploratory Graph Analysis (EGA) and Bootstrap Exploratory Graph Analysis (bootEGA) were fundamental in unveiling a new five-factor structure for the EAEF-Educ. This new structure, composed of dimensions such as "Self-Efficacy in Knowledge Application and Professional Training," "Self-Efficacy in Social Interaction and Professional Development," "Self-Efficacy in Goal Setting and Expression of Opinions," "Self-Efficacy in Meeting External Demands," and "Self-Efficacy in Problem Solving and Resource Seeking," offers a more precise and contextualized representation of PECs' self-efficacy. The validity of this new structure was confirmed by acceptable fit indices in the CFA, and its reliability was attested by high values of Cronbach's Alpha, McDonald's Omega, and Composite Reliability. The predominance of moderate self-efficacy levels and the presence of weak levels across all dimensions, identified in the PECs sample, underscore the need for focused interventions.

This implies that, although these professionals possess a reasonable level of confidence in their capabilities, there is considerable room for strengthening these beliefs, which could optimize their performance and resilience. The practical implications of this study are vast. Educational institutions and secretariats of education should consider self-efficacy as an explicit target in professional development and training programs for PECs. This means going beyond the mere transmission of content, incorporating strategies that promote mastery experiences, social modeling, verbal persuasion, and the management of physiological and emotional states. Investing in strengthening PECs' self-efficacy is not just an individual benefit but a systemic strategy to elevate the quality of teacher training and, consequently, improve the implementation of educational policies, especially in the complex and vital field of Special Education. Finally, this study opens doors for future investigations. The replication of the factor structure in larger samples and in different contexts, the exploration of the hypothesis of a general self-efficacy factor, and the deepening of longitudinal relationships between self-efficacy, well-being, and PECs' performance are promising avenues. By providing a reliable instrument and empirical evidence on the self-efficacy of such a strategic professional group, this work contributes significantly to the advancement of knowledge in psychometrics and education, paving the way for a more effective, inclusive, and sustainable educational environment.

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INTERPROFESSIONAL EDUCATION AND READINESS FOR LEARNING IN MEDICAL STUDENTS: A LONGITUDINAL ANALYSIS

EDUCAÇÃO INTERPROFISSIONAL E PRONTIDÃO PARA A APRENDIZAGEM EM ESTUDANTES DE MEDICINA: UMA ANÁLISE LONGITUDINAL

EDUCACIÓN INTERPROFESIONAL Y DISPOSICIÓN PARA EL APRENDIZAJE EN ESTUDIANTES DE MEDICINA: UN ANÁLISIS LONGITUDINAL



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ABSTRACT

The growing complexity of healthcare necessitates interprofessional education (IPE) to foster collaborative practice. This longitudinal, quantitative study investigated the evolution of medical students' Readiness for Interprofessional Learning (RIPL) at FAMERP, a Brazilian institution. Using the RIPLS scale, 48 students from the 2021 cohort were assessed at entry (T1), end of the basic cycle (T2), and end of the clinical cycle (T3), focusing on three factors: Teamwork and Collaboration (F1), Professional Identity (F2), and Patient-Centered Healthcare (F3). Results indicated high initial readiness for F1 and F3, but F1 and F2 demonstrated no significant evolution, maintaining stability across the course. Conversely, F3 exhibited a notable non-linear "inverted U" pattern, with a significant increase from T1 to T2, followed by a significant decline from T2 to T3. This trajectory suggests that while students possess a strong initial predisposition towards patient-centered care, clinical training realities may challenge this attitude. These findings emphasize the dynamic, non-linear nature of RIPL and highlight the critical need for systematic, adaptive IPE interventions throughout medical curricula, especially during advanced clinical stages, to effectively cultivate and sustain collaborative competencies and patient-centered approaches.

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Keywords: Interprofessional Education. Readiness for Interprofessional Learning. Medical Students. Longitudinal Analysis. Patient-Centered Care.

RESUMO

A crescente complexidade da atenção à saúde exige a educação interprofissional (EIP) para fomentar a prática colaborativa. Este estudo longitudinal, de abordagem quantitativa, investigou a evolução da Prontidão para a Aprendizagem Interprofissional (RIPL) de estudantes de Medicina da FAMERP, uma instituição brasileira. Utilizando a escala RIPLS, 48 estudantes da turma de 2021 foram avaliados no ingresso (T1), ao final do ciclo básico (T2) e ao final do ciclo clínico (T3), com foco em três fatores: Trabalho em Equipe e Colaboração (F1), Identidade Profissional (F2) e Atenção à Saúde Centrada no Paciente (F3). Os resultados indicaram alta prontidão inicial para F1 e F3, porém F1 e F2 não demonstraram evolução significativa, mantendo estabilidade ao longo do curso. Por outro lado, F3 apresentou um padrão não linear notável em “U invertido”, com aumento significativo de T1 para T2, seguido de declínio significativo de T2 para T3. Essa trajetória sugere que, embora os estudantes possuam forte predisposição inicial para o cuidado centrado no paciente, as realidades do treinamento clínico podem desafiar essa atitude. Esses achados enfatizam a natureza dinâmica e não linear da RIPL e destacam a necessidade crítica de intervenções sistemáticas e adaptativas de EIP ao longo do currículo médico, especialmente nas fases clínicas avançadas, para cultivar e sustentar efetivamente competências colaborativas e abordagens centradas no paciente.

Palavras-chave: Educação Interprofissional. Prontidão para a Aprendizagem Interprofissional. Estudantes de Medicina. Análise Longitudinal. Cuidado Centrado no Paciente.

RESUMEN

La creciente complejidad de la atención sanitaria exige la educación interprofesional (EIP) para fomentar la práctica colaborativa. Este estudio longitudinal, de enfoque cuantitativo, investigó la evolución de la Disposición para el Aprendizaje Interprofesional (RIPL) en estudiantes de Medicina de la FAMERP, una institución brasileña. Utilizando la escala RIPLS, 48 estudiantes de la cohorte 2021 fueron evaluados al ingreso (T1), al final del ciclo básico (T2) y al final del ciclo clínico (T3), centrándose en tres factores: Trabajo en Equipo y Colaboración (F1), Identidad Profesional (F2) y Atención Sanitaria Centrada en el Paciente (F3). Los resultados indicaron una alta disposición inicial para F1 y F3; sin embargo, F1 y F2 no mostraron una evolución significativa, manteniéndose estables a lo largo del curso. Por el contrario, F3 presentó un notable patrón no lineal en “U invertida”, con un aumento significativo de T1 a T2, seguido de un descenso significativo de T2 a T3. Esta trayectoria sugiere que, aunque los estudiantes poseen una fuerte predisposición inicial hacia la atención centrada en el paciente, las realidades de la formación clínica pueden desafiar dicha actitud. Estos hallazgos enfatizan la naturaleza dinámica y no lineal de la RIPL y destacan la necesidad crítica de intervenciones sistemáticas y adaptativas de EIP a lo largo del currículo médico, especialmente en las etapas clínicas avanzadas, para cultivar y sostener eficazmente competencias colaborativas y enfoques centrados en el paciente.

Palabras clave: Educación Interprofesional. Disposición para el Aprendizaje Interprofesional. Estudiantes de Medicina. Análisis Longitudinal. Atención Centrada en el Paciente.

1 INTRODUCTION

The increasing complexity of healthcare systems and the demand for more comprehensive and patient-centered care have driven the search for new approaches in the training of health professionals. In this scenario, Interprofessional Education (IPE) emerges as a fundamental strategy to prepare future professionals capable of acting collaboratively, respecting the specificities of each area, and optimizing health outcomes. IPE, as advocated by the World Health Organization (WHO), is not merely a teaching methodology, but a pillar for transforming assistance models and building more effective and cohesive healthcare teams (World Health Organization (WHO), 2010). The evolution of the concept of health, which today encompasses planetary health, holistic health, health promotion, and sustainability, demands an interdisciplinary and collaborative response. This implies that the actions of healthcare teams can no longer occur in isolation, but rather in an integrated manner, centered on the needs of the patient and the community (Salm et al., 2021; World Health Organization (WHO), 2010; Kaplan et al., 2009; Koplan et al., 2009). Teamwork, therefore, transcends the mere coexistence of different professionals and consolidates as a mode of collective work that values the integration of knowledge, interdisciplinarity, and participatory management (Peduzzi et al., 2015). However, the transition from a predominantly uniprofessional training model to an interprofessional one does not occur without challenges. "Readiness for Interprofessional Learning" (RIPL) thus becomes a key concept. Introduced by Parsell and Bligh in 1999, RIPL measures students' degree of willingness to participate in interprofessional learning, encompassing dimensions such as teamwork and collaboration, professional identity, and patient-centered healthcare (Parsell & Bligh, 1999; Falk et al., 2013). Evaluating and understanding the evolution of this readiness throughout academic training, especially in courses as traditional as medicine, is essential for the continuous improvement of curricula and pedagogical practices. Despite the recognition of IPE's importance, student engagement, particularly among medical students, can be complex. Medical training historically focuses on developing a "monoprofessional" identity, which can hinder adherence to a collaborative model (Ericson et al., 2012; Morison & Jenkins, 2007; Rudland & Mires, 2005; Tunstall-Pedoe et al., 2003). Furthermore, logistical challenges, crowded agendas, and discussions about the most effective time to introduce IPE into the medical curriculum persist (Hudson et al., 2016; Berger-Estilita, Fuchs, et al., 2020). In this context, the present chapter longitudinally analyzes the readiness for interprofessional learning in medical students from a Brazilian institution, the Faculdade de Medicina de São José do Rio Preto (FAMERP), using the RIPLS scale. We seek to understand how the dimensions of Teamwork and Collaboration (F1), Professional Identity

(F2), and Patient-Centered Healthcare (F3) evolve throughout different phases of the medical course – entry, end of the basic cycle, and end of the clinical cycle. Based on this analysis, the aim is to discuss the implications of these findings for curriculum design and pedagogical strategies in interprofessional medical education, contributing to the training of health professionals better aligned with the needs of the 21st century.

2 FOUNDATIONS OF INTERPROFESSIONAL EDUCATION AND READINESS FOR LEARNING

Interprofessional Education (IPE) has been widely recognized as a crucial strategy for improving the quality and safety of healthcare (World Health Organization (WHO), 2010). In a world where health challenges are becoming increasingly multifaceted, collaboration among different health professions is not only desirable but imperative. To understand the essence of IPE, it is fundamental to explore its theoretical pillars and the tools used to assess its effectiveness.

2.1 THE CONCEPT OF INTERPROFESSIONAL EDUCATION (IPE)

IPE is defined as a teaching-learning methodology where students from two or more professions learn together, from each other, and about each other, with the purpose of enhancing collaboration and the quality of healthcare (World Health Organization (WHO), 2010). Unlike multiprofessional education, where professionals from different areas work side-by-side but independently, interprofessionalism implies active and interdependent integration, aiming for the joint resolution of problems based on the specificities of each area.

"Healthcare teamwork 'consists of a modality of collective work that contrasts with the independent and isolated way in which health professionals usually carry out their work in daily services, from the perspective of comprehensiveness, interdisciplinarity, and participatory and communicative management.'" (Peduzzi et al., 2015)

This concept contrasts with traditional uniprofessional training which often perpetuates silos of knowledge and practice, hindering effective communication and collaboration in the real work environment. IPE seeks to break down these barriers by promoting mutual respect, understanding of each professional's roles and responsibilities, and the development of communication and negotiation skills (Costa, 2007).

IPE initiatives are considered promising for providing more qualified, comprehensive, and effective care, as they allow for a better understanding of the determinants of the health-disease process and a search for alternatives to improve the quality and access to healthcare services (Körner et al., 2016). The ultimate goal is to optimize the performance of the

healthcare system, resulting in better health for populations, a better care experience for individuals, reduced costs, and improved professional work experience (Bodenheimer & Sinsky, 2014).

2.2 CHALLENGES IN IMPLEMENTING IPE IN MEDICAL TRAINING

Despite the clear benefits, the implementation of IPE in medical training faces significant resistance. Traditionally, the medical curriculum has been structured to develop a strong "monoprofessional" identity, with an intense focus on autonomy and the central role of the physician. This can create barriers to the acceptance and engagement in collaborative learning activities (Ericson et al., 2012; Morison & Jenkins, 2007; Rudland & Mires, 2005; Tunstall-Pedoe et al., 2003). The complexity of simultaneously teaching different disciplines, coupled with logistical problems, crowded academic agendas, and a lack of consensus on the ideal time to introduce IPE initiatives, represent considerable practical challenges. The choice between continuous "immersion" or periodic "exposure" to collaborative activities is also a point of debate (Hudson et al., 2016). Furthermore, evaluating IPE's effectiveness is crucial, given the investment of time and resources in preparing specialized scenarios, virtual environments, and curricular coordination (Lee et al., 2024).

2.3 THE CONCEPT OF READINESS FOR INTERPROFESSIONAL LEARNING (RIPL)

For IPE to be effective, "Readiness for Interprofessional Learning" (RIPL) is a fundamental prerequisite. This concept, proposed by Parsell and Bligh (1999), refers to students' willingness to participate in interprofessional learning experiences. The Readiness for Interprofessional Learning Scale (RIPLS) is a widely used instrument to measure this readiness.

Originally with four dimensions, the RIPLS version adapted and validated for Brazilian Portuguese by Peduzzi et al. (2015) presents three main factors:

- **Factor 1 (F1): Teamwork and collaboration.** This factor encompasses positive attitudes towards shared learning, teamwork, collaboration, trust, and respect among students from different professional areas. Items related to this factor explore students' perception of how collaboration can improve team effectiveness and patient care.
- **Factor 2 (F2): Professional identity.** This factor, in turn, reflects attitudes towards professional autonomy, the clinical objectives of each profession, and, at times, a competitive component. Notably, the Brazilian version includes items that express negative attitudes towards interprofessional learning, indicating the complexity of developing professional identity in a collaborative context.

- **Factor 3 (F3): Patient-centered healthcare.** This factor assesses students' positive attitude and willingness to understand patient needs from the patient's own perspective, valuing trusting relationships, compassion, and cooperation in the care process.

The ability to take another person's perspective, an essential element of empathy, also proves crucial for readiness in interprofessional learning (Visser et al., 2018). Thus, integrating interprofessional learning into the curriculum, promoting autonomous motivation, is a way for students to gradually develop this readiness, integrating it with the cognitive component of empathy and other curricular elements. Literature has shown that IPE can significantly improve attitudes towards mutual respect and interprofessional knowledge, becoming a viable approach to promote better collaboration (Saragih et al., as cited in Barros, 2025). Recent studies, such as the randomized controlled trial by Costa Marion et al. (2025), indicate that interprofessional simulation practice increases readiness for collaborative practice. However, the challenge lies in optimizing IPE interventions and identifying best practices for instruction and evaluation, ensuring that the impact of IPE goes beyond mere perceptions, translating into effective improvements in educational experience and in the training of professionals better equipped for the current healthcare scenario.

3 METHODOLOGY OF THE LONGITUDINAL STUDY

Understanding the evolution of readiness for interprofessional learning (RIPL) in medical students demands a robust methodological approach capable of capturing the nuances of attitudinal changes over time. The present study adopted a longitudinal, quantitative, and descriptive design to investigate this phenomenon, using a specific cohort of medical students from the Faculdade de Medicina de São José do Rio Preto (FAMERP).

3.1 STUDY DESIGN

The study was designed as a longitudinal, descriptive, and quantitative research. The longitudinal nature allowed for tracking the same group of students at different points in their training, capturing the dynamics of changes in their attitudes and perceptions about interprofessional learning. The quantitative approach, in turn, enabled systematic measurement and statistical analysis of data, lending rigor and objectivity to the results.

3.2 PARTICIPANTS

The study participants were students enrolled in the FAMERP medical course in 2021, who were over 18 years old. A general invitation was extended to this cohort. For the longitudinal analysis, students who responded to the questionnaires at three distinct time points were considered:

- **Time 1 (2021):** Corresponding to the time of entry into the university, representing the baseline of students' perceptions.
- **Time 2 (2022):** Collected at the end of the basic cycle, after a period of acclimatization and the beginning of fundamental disciplines.
- **Time 3 (2024):** Conducted at the end of the clinical cycle, when students had already undergone practical experiences and immersion in healthcare settings.

Of the initial 98 students, 52 responded to the questionnaires at all three time points and were included in the longitudinal analysis. However, 4 of them were excluded due to presenting discrepant values (outliers) in the scores, resulting in a final sample of 48 students for the comparative analyses over time.

3.3 MATERIALS AND DATA COLLECTION INSTRUMENTS

Two main instruments were used for data collection:

3.3.1 Instrument 1: Sociodemographic Variables Questionnaire (SVQ)

This semi-structured questionnaire was developed to collect contextual information and characterize the sample. It included closed questions about:

- **Sociodemographic data:** sex, age, marital status, number of children, family income, and history of physical activity.
- **Academic data:** professional category (if applicable), course period, and current course format (in-person, non-in-person).

3.3.2 Instrument 2: Readiness for Interprofessional Learning Scale (RIPLS)

The RIPLS is an internationally recognized psychometric scale for assessing readiness for interprofessional learning. In the present study, an adapted and validated version for Brazilian Portuguese by Peduzzi et al. (2015) was used, consisting of 27 items (the original version has 29 items). Responses are given on a 5-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree).

The Brazilian version of RIPLS is structured into three main factors:

- **Factor 1 (F1): Teamwork and collaboration:** With 14 items, this factor measures positive attitudes and willingness for shared learning, teamwork, collaboration, trust, and respect towards students from other professional areas.

- **Factor 2 (F2): Professional identity:** With 8 items, this factor explores attitudes towards professional identity. It includes items that refer to negative attitudes towards interprofessional learning and others that refer to professional autonomy and the clinical objectives of each profession, indicating a competitive component.
- **Factor 3 (F3): Patient-centered healthcare:** With 5 items, this factor assesses the positive attitude and willingness to understand patient needs from their own perspective, based on trust, compassion, and cooperation.

3.4 DATA COLLECTION PROCEDURES

The questionnaires and the Informed Consent Form (ICF) were digitized and constructed in an electronic format. The access link was disseminated to the 2021 medical class students via online platforms (WhatsApp or email). Additionally, the option of filling out a printed questionnaire was offered. The estimated average time for completing the instruments was 10 minutes. Data were collected in 2021, 2022, and 2024, according to the academic progression of the students.

3.5 DATA ANALYSIS

Data analysis was carried out in several stages, aiming to ensure the validity and reliability of the results:

3.5.1 Exploratory and Descriptive Analysis

Initially, descriptive statistics (mean, median, standard deviation, minimum and maximum values) were calculated for numerical variables, and frequency and proportion for categorical variables. The normality of continuous variables was assessed using graphs (histogram and boxplot) and the Shapiro-Wilk test, in addition to the Z-test for skewness and kurtosis. When normality was rejected, a transformation was applied to normalize the data.

3.5.1 Instrument Validation and Factor Score Calculation

The validation of the RIPLS structure in the sample was crucial. For this, two procedures were used:

- **Calculation of Dimensional Scores:** The mean of the marker items for each dimension was calculated to obtain the dimensional scores.
- **Calculation of Factor Scores via Confirmatory Factor Analysis (CFA):** The matrix of factor loadings from a previous study (Peduzzi et al., 2015) was used to estimate the correlation matrix of the items. Subsequently, a CFA was performed on this matrix to create a more refined measure of the dimensions. Model fit was verified by the χ^2

(chi-squared), χ^2/df (chi-squared per degree of freedom), RMSEA (Root Mean Square Error of Approximation), and CFI (Comparative Fit Index) indices. RMSEA values < 0.08 (with CI not reaching 0.10) and $CFI \geq 0.90$ were considered acceptable for not rejecting the model.

3.5.2 Instrument Reliability

The reliability of the latent variables (factors) was assessed by Cronbach's α and McDonald's omega (ω). Acceptable reliability was considered for McDonald's omega values above 0.60. Factor scores were calculated for the years 2022 and 2024, following the same procedures as 2021, and standardized based on the 2021 baseline year to correct for possible comparison biases.

3.5.3 Longitudinal Analysis

To test the hypothesis of changes in readiness for interprofessional learning over time, repeated measures ANOVA techniques were applied. Assumptions of normality and sphericity were checked, with Mauchly's test for sphericity and the Z-test for skewness and kurtosis for normality. In cases of non-normal residuals, bootstrapping (1000 samples) was used to estimate the distribution of the F-statistic and the p-value. To assess the magnitude of changes, the partial eta-squared (η^2p) effect size was calculated for the global ANOVA test (0.01: small effect; 0.06: medium effect; 0.14: large effect). For variables significant in the global test, post-hoc tests were performed, and the effect sizes of pairwise comparisons were calculated using Cohen's d (0.00-0.19: very small effect; 0.20-0.49: small effect; 0.50-0.79: medium effect; ≥ 0.80 : large effect).

All analyses were conducted using statistical software.

3.6 ETHICAL ASPECTS

The study was approved by the Research Ethics Committee of the Faculdade de Medicina de São José do Rio Preto (CEP - FAMERP) under CAAE 41220020.8.0000.5415 (opinion number 4.543.158, approved on February 17, 2021). All precautions were taken to ensure the confidentiality and anonymity of participants, safeguarding privacy and data confidentiality. The ICF was presented to all participants, guaranteeing their voluntary participation and the right to withdraw at any time without prejudice.

4 CHARACTERIZATION OF PARTICIPANTS AND EDUCATIONAL DATA

The demographic and educational analysis of FAMERP medical students offers a rich overview of the studied cohort's profile, revealing characteristics that may influence their readiness for interprofessional learning and their academic trajectory. Understanding these aspects is fundamental to contextualize the longitudinal RIPLS results.

4.1 DEMOGRAPHIC PROFILE OF STUDENTS

The sample of 98 initial participants, 48 of whom were included in the longitudinal analysis, presented a predominantly young profile with a slight male majority.

Table 1

Descriptive analysis of participants' demographic data

Variables	N = 98
Age	
Up to 20 years	64 (65.31%)
Between 21 and 30 years	32 (32.65%)
Between 31 and 40 years	2 (2.04%)
Biological Sex	
Female	44 (44.90%)
Male	54 (55.10%)
Gender Identity	
Woman	48 (48.98%)
Man	50 (51.02%)
Sexual Orientation	
Heterosexual	79 (80.61%)
Bisexual	3 (3.06%)
Homosexual	16 (16.33%)
Marital Status	
Single	94 (95.92%)
Married	2 (2.04%)
Stable Relationship	2 (2.04%)
Number of children	
None	96 (97.96%)
1	2 (2.04%)
Religion	
No Religion	44 (44.90%)
Afro-Brazilian	5 (5.10%)
Catholic	41 (41.84%)
Evangelical	6 (6.12%)
Spiritualist	1 (1.02%)
Oriental	1 (1.02%)

Source: Adapted from Barros (2025).

The demographic profile reflects a predominance of young people up to 20 years old (65.31%), indicating early entry into university and a primary dedication to studies. The majority of students are single (95.92%) and childless (97.96%), suggesting that the student body is in a phase of life with few family commitments, allowing greater focus on training. The slight male majority (55.10%) is an interesting datum, as it contrasts with the feminization

observed in many higher education courses, although it aligns with some studies in the medical field. Diversity in terms of sexual orientation and religiosity, with a significant portion declaring no religion (44.90%) and a distribution between Catholics (41.84%) and other beliefs, points to an academic environment potentially open to multiple perspectives. This openness is a facilitator for IPE, as exposure to different values can promote understanding and acceptance of teamwork (Zaher et al., 2022).

4.2 PARENTS' EDUCATIONAL AND SOCIOECONOMIC DATA

The analysis of parents' educational data and students' financial resources reveals a family environment of strong support for education.

Table 2

Descriptive analysis of parents' education and financial resources data

Variables	N = 98
Father's Education Level	
Don't know	2 (2.04%)
Incomplete elementary school	6 (6.12%)
Completed elementary school	3 (3.06%)
Incomplete high school	1 (1.02%)
Completed high school	13 (13.27%)
Incomplete higher education	7 (7.14%)
Completed higher education	65 (66.33%)
Incomplete postgraduate studies	1 (1.02%)
Mother's Education Level	
Incomplete elementary school	5 (5.10%)
Completed elementary school	4 (4.08%)
Incomplete high school	1 (1.02%)
Completed high school	14 (14.29%)
Incomplete higher education	5 (5.10%)
Completed higher education	69 (70.41%)
Main source of funds to pay for studies	
Own resources	90 (91.84%)
Family resources	3 (3.06%)
Will apply for an institutional scholarship	5 (5.10%)
Engages in paid activity?	
No	95 (96.94%)
Yes	3 (3.06%)

Source: Adapted from Barros (2025).

A striking characteristic is the high educational level of the parents, with the majority having completed higher education (66.33% of fathers and 70.41% of mothers). This datum suggests a strong family investment in education, which historically influences children's academic aspirations and educational success. Family cultural capital plays a crucial role, aligning with the findings of da Silva, Batista & Holanda (2025) on the importance of educational background in medical training. Furthermore, almost all students (96.94%) do not engage in paid activity, and the majority finance their studies with their own resources

(91.84%), which indirectly points to substantial family support. This full dedication to studies is a common aspect of traditional medical training, as observed by Rabelo et al. (2024). This scenario of support and academic focus can positively influence students' willingness for IPE experiences, as suggested by Tanriverdi et al. (2025).

4.3 PRIOR EDUCATIONAL BACKGROUND

Students' educational history before entering FAMERP also reveals a specific pattern that may have implications for their interprofessional training.

Table 3

Descriptive analysis of students' Elementary and High School data

Variables	N = 98
Elementary School (ES)	
All or most in public school	26 (26.53%)
All or most in private school	72 (73.47%)
Course Type (ES)	
Regular - 1st to 8th grade	98 (100.00%)
High School (HS)	
All or most in public school	21 (21.43%)
All or most in private school	77 (78.57%)
Course Type (HS)	
Regular - 1st to 3rd grade	94 (95.92%)
Technical	4 (4.08%)
How many years ago did you finish high school?	
Last year	6 (6.12%)
1 to 5 years ago	78 (79.59%)
6 to 10 years ago	8 (8.16%)
More than 10 years ago	6 (6.12%)

Source: Adapted from Barros (2025).

The majority of students completed Elementary School (73.47%) and High School (78.57%) in private schools. This academic trajectory in private educational institutions, combined with the predominance of regular courses and relatively quick entry into university after High School (79.59% finished 1 to 5 years ago), suggests a focused and successful academic preparation for the competitive medical entrance exam. This profile, while providing a solid foundation for academic challenges, may, according to Rabelo et al. (2024), perpetuate a dominant biomedical model in academic centers, which can represent a challenge for the introduction of more humanistic and interprofessional approaches. Xyrichis (2025) points out that medical students often show regression in moral judgment, possibly due to an intense focus on technical skills at the expense of ethical and human aspects. However, the recent training of these students can also be an opportunity for the introduction of IPE concepts, as suggested by Zaher et al. (2022).

4.4 PREVIOUS EXPERIENCE WITH OTHER HIGHER EDUCATION COURSES

Participants' experience with other higher education courses is limited, reinforcing the idea of an early and directed career choice.

Table 4

Descriptive analysis of data related to other Higher Education Courses.

Variables	N = 98
Have you already attended another higher education course?	
No	83 (84.69%)
Yes	15 (15.31%)
Completed the course? (N=15)	
No	8 (53.3%)
Yes	7 (46.7%)
How long did you attend (for those who did not complete, N=8)	
Less than 50% of the course	4 (57.1%)
Less than 1 semester	3 (42.9%)
What was the reason for dropping out? (for those who did not complete, N=8)	
Did not identify with the course	5 (71.4%)
Others: preferred FAMERP	1 (14.3%)
Others: got into medicine, my first choice of course	1 (14.3%)
What type of institution was the course in? (N=14)	
Public	10 (71.43%)
Private	4 (28.57%)

Source: Adapted from Barros (2025).

The vast majority of participants (84.69%) did not attend another higher education course. Among the 15 who did, more than half did not complete it (53.3%), mainly because they did not identify with the course or had been accepted into medicine, their first choice. This suggests a student body with clear professional objectives and determination to pursue a medical career. However, the lack of previous experiences in other courses can represent a challenge for IPE, given that medical students often exhibit less favorable attitudes towards IPE compared to other areas, due to traditionally hierarchical training (Alruwaili et al., 2020). Interestingly, the predominance of public institutions among those who attended other courses (71.43%) may indicate prior exposure to diverse educational environments, which can contribute to a broader view of the healthcare system and the importance of interprofessional collaboration, aligning with the observations of Tanriverdi et al. (2025).

4.5 STUDENT DATA AT FAMERP

The entry profile and expectations of students at FAMERP are indicative of a highly motivated group committed to the medical course.

Table 5

Descriptive analysis of FAMERP students' data.

Variables	N = 98
Your option for entry into FAMERP in the entrance exam was:	
General competition	79 (80.61%)
PIMESP: Student from public school	14 (14.29%)
PIMESP: Self-declared black, brown, or indigenous	5 (5.10%)
You entered FAMERP on the:	
First call	64 (65.31%)
Second call onwards	34 (34.69%)
Do you intend to continue the current course?	
No	1 (1.02%)
Yes	97 (98.98%)

Source: Adapted from Barros (2025).

The majority of students entered through general competition (80.61%) and on the first call (65.31%), highlighting the high competitiveness and strong academic preparation of these individuals. The overwhelming majority (98.98%) intend to continue the current course, demonstrating a high degree of satisfaction and alignment between expectations and the reality of their training. This highly motivated and focused profile can be an advantage for IPE, but, as Alruwaili et al. (2020) warn, medical training may still retain remnants of a hierarchical approach that needs to be overcome. The presence, albeit minority, of students from affirmative action programs (PIMESP) contributes to the diversification of the student body, a crucial aspect for the development of interprofessional competencies and a more humanized medical practice (de Carvalho et al., 2025; Rabelo et al., 2024). In summary, the profile of FAMERP students is that of a young, academically well-prepared group, with strong family support and high motivation for a medical career. While these characteristics can facilitate IPE, there are also challenges arising from a possible bias towards unprofessional training. This characterization provides the necessary background for the analysis of readiness for interprofessional learning, exploring how it manifests and evolves in this specific group.

5 ANALYSIS OF RIPLS VALIDITY AND RELIABILITY

The quality of psychometric longitudinal study results depends directly on the validity and reliability of the instrument used. In the present work, the Readiness for Interprofessional Learning Scale (RIPLS) was the foundation for evaluating medical students' readiness. Therefore, a crucial methodological step involved an in-depth analysis of the validity of the factorial structure and the reliability of the RIPLS dimensions in the specific sample of FAMERP students.

5.1 SCORE CALCULATION PROCEDURES

To measure readiness for interprofessional learning, two score calculation methods were adopted, aiming for a comparative analysis and the selection of the most precise approach:

5.1.1 Calculation of Dimensional Scores

The first method consisted of calculating the mean of the items comprising each dimension (Factor 1: Teamwork and collaboration; Factor 2: Professional identity; Factor 3: Patient-centered healthcare). This is a more direct and conventional approach, frequently used to obtain an overall score for each subscale.

Table 6 details the descriptive statistics for these dimensional scores:

Table 6

Descriptive statistics of dimensional scores (baseline)

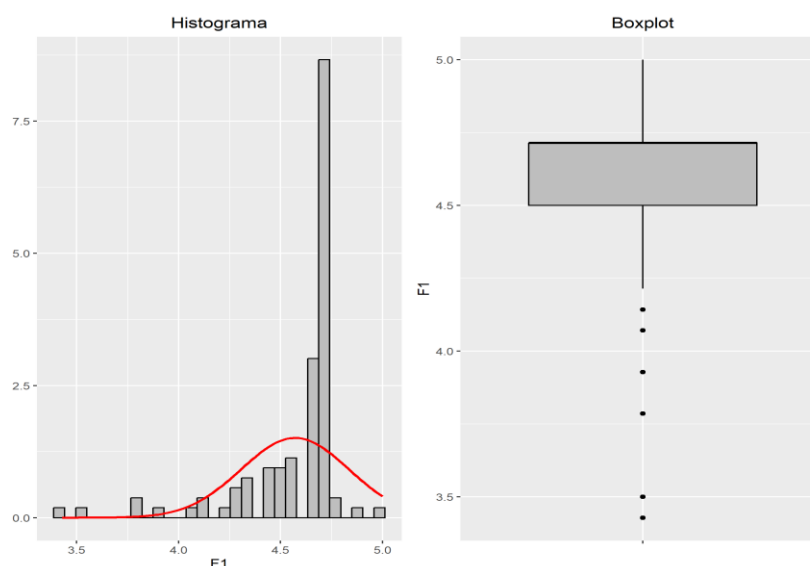
Variables	Mean	SD	W	p-value	Mn	P25	P50	P75	Mx
F1	4.57	0.26	0.70	0.00	3.43	4.50	4.71	4.71	5.00
F2	2.49	0.47	0.96	0.00	1.50	2.12	2.50	2.75	4.25
F3	4.84	0.33	0.55	0.00	3.00	4.80	5.00	5.00	5.00

Source: Adapted from Barros (2025).

In general, students showed high readiness for interprofessional learning in factors F1 (Mean = 4.57) and F3 (Mean = 4.84), indicating a strong initial willingness for collaborative work and patient-centered care. The exception was Factor 2 (Professional identity), with a mean of 2.49. The low score on this factor, which contains items with negative attitudes towards interprofessional learning, can be interpreted positively, suggesting an openness to a more collaborative "health professional" identity. This issue will be revisited later in the discussion. The distributions of the dimensional scores for F1, F2, and F3 were represented in figures in the research, showing different profiles of dispersion and skewness, which motivated further analysis via factor scores.

Figure 1

Graphical representation of the distribution of dimensional scores for Factor 1



Source: Adapted from Barros (2025).

Figure 1 presents a histogram with right-shifted bars and a boxplot indicating that most of the dimensional scores for F1 are concentrated at the higher values of the Likert scale, near 5.00, with a slightly left-skewed distribution, reflecting high readiness for teamwork.

5.1.2 Calculation of Factor Scores via Confirmatory Factor Analysis (CFA)

The second and more refined method for calculating scores involved Confirmatory Factor Analysis (CFA). Using the matrix of factor loadings from a previous study (Peduzzi et al., 2015), it was possible to estimate the factor scores for each dimension. This procedure is crucial because CFA allows verifying whether the theoretical structure of the instrument fits the observed data in the sample, producing more robust measures of the latent variables. The tested model showed an acceptable fit, with the following indices: $\chi^2(df) = 1133.926 (321)$; CFI = 0.924; RMSEA = 0.088 [0.083, 0.094]. These values, particularly CFI > 0.90 and RMSEA close to 0.08, indicate that the three-factor structure of RIPLS is valid for the sample of FAMERP students. This validation is fundamental for the reliability of the scores used in the longitudinal analyses.

After validating the structure, reliability coefficients were calculated for each factor:

- **Factor 1 (Teamwork and collaboration):** Cronbach's $\alpha = 0.91$ and McDonald's $\omega = 0.91$.
- **Factor 2 (Professional identity):** Cronbach's $\alpha = 0.72$ and McDonald's $\omega = 0.45$.
- **Factor 3 (Patient-centered healthcare):** Cronbach's $\alpha = 0.85$ and McDonald's $\omega = 0.85$.

With the exception of Factor 2, all factors showed robust reliability measures (McDonald's $\omega > 0.60$), indicating that their constituent items are internally consistent and reliably measure the construct. The moderate reliability of Factor 2 ($\omega = 0.45$) is a point of attention, which will be further explored in the discussion, but it already suggests the inherent complexity in developing professional identity in the early stages of medical training.

The factor scores were subsequently transformed to preserve the correlation matrix between the factors, an essential methodological step to avoid biases in subsequent analyses. Table 7 shows the descriptive statistics for these transformed factor scores:

Table 7

Descriptive statistics of transformed factorial scores (baseline).

Variables	Mean	SD	W	p-value	Mn	P25	P50	P75	Mx
F1	0.00	0.71	0.65	0.00	-3.60	-0.02	0.35	0.40	0.58
F2	0.00	0.78	0.62	0.00	-0.72	-0.37	-0.23	-0.06	4.96
F3	0.00	0.65	0.63	0.00	-3.78	0.09	0.15	0.23	0.94

Source: Adapted from Barros (2025).

The figures in the research illustrate the distributions of these transformed factor scores. These distributions, unlike the raw dimensional scores, exhibit characteristics more aligned with the expected properties for factor scores, serving as a more appropriate starting point for longitudinal comparative analyses.

5.1.3 Correlations between Scores and the Importance of Factor Scores

The comparison between the correlations of dimensional scores (simple mean) and factor scores revealed the critical importance of methodological choice in analyzing data with latent variables.

Table 8

Correlations between different types of scores and true factor correlations.

	Correlations of Dimensional Scores ^a			Correlations of Factor Scores ^b			Correlations of Factors (True) ^c		
	F1	F2	F3	F1	F2	F3	F1	F2	F3
F1	1.00			1.00			1.00		
F2	-0.20	1.00		-0.37	1.00		-0.37	1.00	
F3	0.54	-0.18	1.00	0.07	0.10	1.00	0.07	0.10	1.00

Source: Adapted from Barros (2025).

As can be seen in Table 8, the use of scores calculated by the simple mean of items (dimensional scores) generated a significantly different pattern of correlations (with higher values) than that observed in the true correlations between latent variables (Factors). This

discrepancy is a warning, as the use of raw dimensional scores would add considerable bias to subsequent analyses. In contrast, the correlations of factor scores proved to be practically identical to the true correlations of the factors, demonstrating that this approach optimized the representation of scores and preserved the correlation structure between the latent variables. This methodological distinction highlights the importance of robust statistical approaches in IPE research, especially for accurately capturing the nuances of students' attitudes (Berger-Estilita et al., 2020a). The inherent complexity in measuring attitudes towards IPE requires precise measures to assess the impact of interventions (Alruwaili et al., 2020; Zaher et al., 2022; Tanriverdi et al., 2025). Thus, for all subsequent and longitudinal comparative analyses, the calculated and transformed factor scores were chosen, ensuring greater reliability of the presented results.

6 LONGITUDINAL ANALYSIS OF READINESS FOR INTERPROFESSIONAL LEARNING

The longitudinal analysis of the RIPLS factors offers a dynamic view of the evolution of readiness for interprofessional learning among FAMERP medical students. By tracking students' perceptions at crucial moments in their training (entry, end of the basic cycle, and end of the clinical cycle), we can identify patterns of change, stability, or regression, which are fundamental for informing pedagogical strategies.

6.1 FACTOR 1: TEAMWORK AND COLLABORATION

Factor 1, "Teamwork and collaboration," is a central dimension of interprofessional readiness, reflecting students' willingness for joint action and recognition of the value of cooperation. The longitudinal analysis of this factor revealed interesting patterns.

6.1.1 Distribution and Descriptive Statistics

The figures in the research illustrate the distributions of F1 scores at each of the evaluated time points. The initial normality test indicated that the original distribution was not normal. To correct this non-normality and ensure the validity of parametric analyses, the data were transformed. After transformation, the normality hypothesis was not refuted.

Table 9 presents the descriptive statistics (mean and standard deviation) of the transformed F1 scores at the three time points:

Table 9

Descriptive statistics of Factor 1 (Teamwork and collaboration) over time.

Time	Mean (SD)
Time 1	-0.01 (1.03)
Time 2	-0.14 (0.95)
Time 3	-0.54 (1.14)

Source: Adapted from Barros (2025).

6.1.2 ANOVA Results and Post-Hoc Tests

Repeated measures ANOVA was applied to verify if there were significant changes in F1 scores over the three time points. Mauchly's test did not refute the sphericity hypothesis. The ANOVA results are presented in Table 10:

Table 10

ANOVA results for Factor 1 (Teamwork and collaboration)

Pair	SQ	num df	Error SQ	den df	F-value	p-value
(Intercept)	0.000	1.000	40.345	47.000	0.000	1.000
time	7.337	2.000	95.037	94.000	3.629	0.030

Source: Adapted from Barros (2025).

The global ANOVA test refuted the null hypothesis of equality of means over time ($p = 0.030$), suggesting a significant change in the factorial scores of F1. The normality of the error distribution was confirmed. Despite the significance of the global test, post-hoc tests (with Bonferroni correction) did not reveal statistically significant differences in pairwise comparisons between time points, as shown in Table 11:

Table 11

Post-hoc tests between time points for the variable Teamwork and collaboration.

Contrast	Estimated	Standard Error	df	t Ratio	p-value
Time.1 effect - Time.2 effect	-0.017	0.218	47	-0.079	1.000
Time.1 effect - Time.3 effect	0.470	0.197	47	2.380	0.064
Time.2 effect - Time.3 effect	0.487	0.200	47	2.440	0.056

Source: Adapted from Barros (2025).

This absence of significant differences between pairs of time points was corroborated by the wide confidence intervals of the effect sizes (Cohen's d) presented in Table 12, which indicated a very small effect for all pairwise comparisons.

Table 12

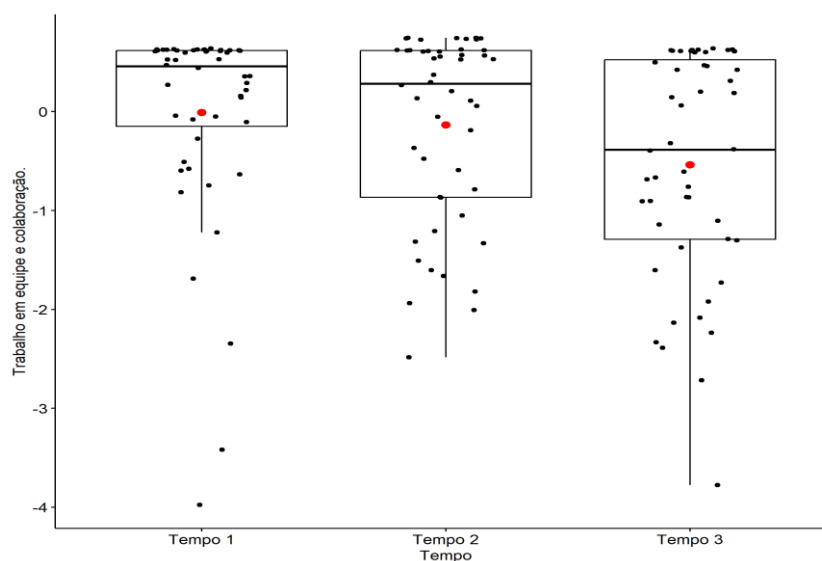
Effect Size of the variable Teamwork and collaboration between time points.

Contrast	Effect size	Standard Error	df	CI Lower	CI Upper
Time.1 effect - Time.2 effect	-0.018	0.222	47	-0.465	0.430
Time.1 effect - Time.3 effect	0.480	0.202	47	0.073	0.887
Time.2 effect - Time.3 effect	0.497	0.204	47	0.086	0.908

Source: Adapted from Barros (2025).

Figure 2

Boxplot representation of F1 scores at T1, T2, and T3



Source: Adapted from Barros (2025).

Figure 2, a boxplot of F1 scores over time, reinforces the perception of stability, with the means (red dots) remaining relatively close. In summary, despite the significance of the global ANOVA test, it is concluded that Factor 1, "Teamwork and collaboration," did not show significant evolution over the three evaluated periods in the medical training of FAMERP students.

6.2 FACTOR 2: PROFESSIONAL IDENTITY

Factor 2, "Professional identity," is a complex dimension of interprofessional readiness, reflecting how students perceive their own profession and interaction with others, sometimes incorporating a competitive bias. The longitudinal analysis of this factor is crucial for understanding how medical training influences the sense of professional identity in the interprofessional context.

6.2.1 Distribution and Descriptive Statistics

The figures in the research show the distributions of F2 scores in each period. As with F1, the initial normality test did not indicate normality of the distribution. Transformation was applied to normalize the data, and the normality hypothesis was not refuted after this intervention.

Table 13 details the descriptive statistics of the transformed F2 scores over time:

Table 13

Descriptive statistics of Factor 2 (Professional identity) over time.

Time	Mean (SD)
Time 1	0.01 (1.04)
Time 2	-0.12 (0.69)
Time 3	0.10 (0.92)

Source: Adapted from Barros (2025).

6.2.2 ANOVA Results

The application of repeated measures ANOVA for Factor 2 did not identify statistically significant differences in means over time. Mauchly's test failed to refute the sphericity hypothesis. Table 14 presents the ANOVA results:

Table 14

ANOVA results for Factor 2 (Professional identity).

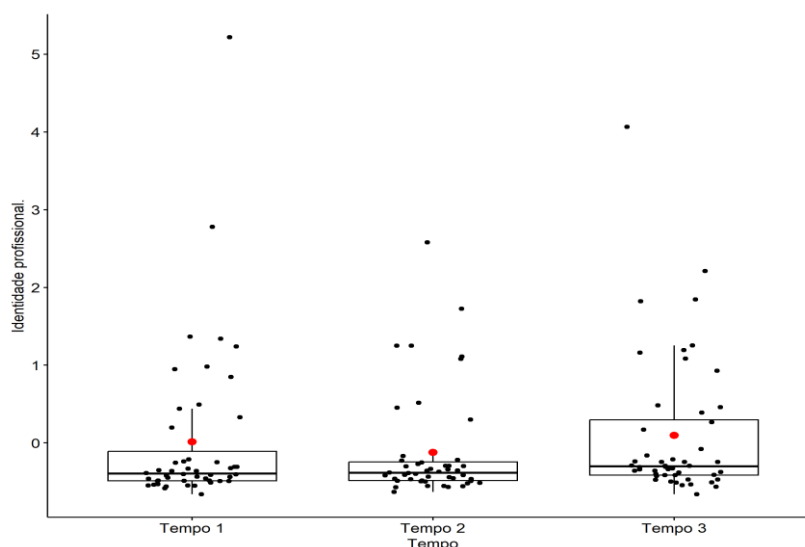
Pair	SQ	num df	Error SQ	den df	F-value	p-value
(Intercept)	0.000	1.000	47.744	47.000	0.000	0.994
time	3.307	2.000	91.150	94.000	1.705	0.187

Source: Adapted from Barros (2025).

With a p-value of 0.187, the global ANOVA test for F2 did not refute the null hypothesis, indicating that there were no statistically significant changes in students' perception of professional identity over the three time points. The normality of the error distribution was confirmed.

Figure 3

Boxplot representation of F2 scores at T1, T2, and T3.



Source: Adapted from Barros (2025).

Figure 3, a boxplot of F2 scores over time, visually corroborates this stability, with means fluctuating slightly, but without a clear trend of significant evolution or decline. The finding that "Professional identity" did not show significant evolution throughout the course is an important result that demands reflection on pedagogical approaches in medical training and how professional identity is constructed or modified in relation to interprofessional practice.

6.3 FACTOR 3: PATIENT-CENTERED HEALTHCARE

Factor 3, "Patient-centered healthcare," is one of the most sensitive and desired dimensions in the training of health professionals, reflecting the ability to prioritize patient needs and perspectives. The longitudinal analysis of this factor is crucial for understanding how this attitude develops or is challenged throughout medical training.

6.3.1 Distribution and Descriptive Statistics

The figures in the research illustrate the distributions of F3 scores in each period. The initial normality test indicated non-normality. After transformation, the normality hypothesis was not refuted.

Table 15 presents the descriptive statistics of the transformed F3 scores over time:

Table 15

Descriptive statistics of Factor 3 (Patient-centered healthcare) over time.

Time	Mean (SD)
Time 1	0.05 (0.94)
Time 2	2.24 (2.25)
Time 3	-0.03 (0.73)

Source: Adapted from Barros (2025).

6.3.1 ANOVA Results and Post-Hoc Tests

Repeated measures ANOVA for Factor 3 revealed highly significant changes over time. Mauchly's test did not refute sphericity. Table 16 presents the ANOVA results.

Table 16

ANOVA results for Factor 3 (Patient-centered healthcare).

Pair	SQ	num df	Error SQ	den df	F-value	p-value
(Intercept)	0.000	1.000	36.352	47.000	0.000	1.000
time	30.660	2.000	75.711	94.000	19.034	< 0.001

Source: Adapted from Barros (2025).

The global ANOVA test refuted the null hypothesis ($p < 0.001$), indicating a highly significant change in the means of Factor 3 over time. The normality of the errors was, however, refuted. To mitigate this, a bootstrapping ANOVA was performed, which confirmed the significant difference.

Post-hoc tests (with Bonferroni correction) detail the nature of these changes (Table 17):

Table 17

Post-hoc tests between time points for the variable Patient-centered healthcare.

Contrast	Estimated	Standard Error	df	t Ratio	p-value
Time.1 effect - Time.2 effect	-0.788	0.186	47	-4.241	< 0.001
Time.1 effect - Time.3 effect	0.308	0.155	47	1.982	0.160
Time.2 effect - Time.3 effect	1.096	0.205	47	5.343	< 0.001

Source: Adapted from Barros (2025).

There was a significant increase in F3 scores between Time 1 and Time 2 ($p < 0.001$), followed by a significant decrease between Time 2 and Time 3 ($p < 0.001$). The comparison between Time 1 and Time 3 was not statistically significant ($p = 0.160$). This "inverted U" trajectory is confirmed by the effect sizes (Cohen's d) presented in Table 18, which show large effects for the differences between T1-T2 and T2-T3.

Table 18

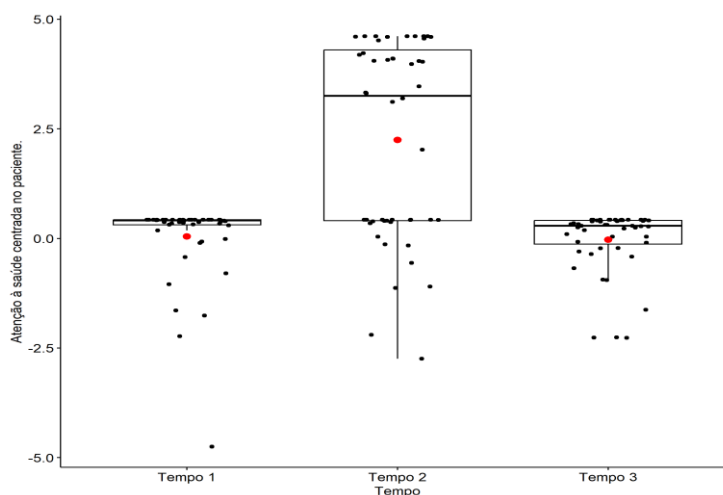
Effect Size of the variable Patient-centered healthcare between time points.

Contrast	Effect size	Standard Error	df	CI Lower	CI Upper
Time.1 effect - Time.2 effect	-0.884	0.215	47	-1.317	-0.451
Time.1 effect - Time.3 effect	0.345	0.178	47	-0.012	0.703
Time.2 effect - Time.3 effect	1.229	0.231	47	0.765	1.693

Source: Adapted from Barros (2025).

Figure 4

Boxplot representation of F3 scores at T1, T2, and T3.



Source: Adapted from Barros (2025).

Figure 4, a boxplot of F3 scores, visually captures this "inverted U" pattern, with a notable increase in the mean at Time 2 (end of the basic cycle) and a subsequent decline at Time 3 (end of the clinical cycle). This is the most dynamic result of the longitudinal study and suggests that readiness for patient-centered care is not a linear accumulation process, but rather a complex path with fluctuations influenced by the different phases of medical training.

7 DISCUSSION OF FINDINGS AND IMPLICATIONS FOR MEDICAL EDUCATION

The results obtained in this longitudinal study offer a unique perspective on the evolution of readiness for interprofessional learning in FAMERP medical students. The analysis of the three RIPLS factors – Teamwork and Collaboration (F1), Professional Identity (F2), and Patient-Centered Healthcare (F3) – at different stages of medical training reveals patterns that challenge linear conceptions of development and provide important insights for curriculum improvement.

7.1 INITIAL READINESS AND STABILITY IN F1 AND F2

FAMERP students demonstrated high initial readiness for interprofessional learning regarding the factors Teamwork and Collaboration (F1) and Patient-Centered Healthcare

(F3), as evidenced by the high mean dimensional scores at baseline (Time 1). This initial openness to collaboration and patient-centeredness is a strength and may reflect a generation of students more aware of the demands for more humanized and integrated healthcare. Berger-Estilita et al. (2020a) also observed favorable attitudes towards IPE in pre-clinical students, corroborating the trend of a positive predisposition upon entering undergraduate studies. However, the longitudinal analysis revealed that Factor 1 (Teamwork and collaboration) did not show significant changes over the three evaluated periods. Although the global ANOVA test indicated statistical significance, pairwise comparisons and effect sizes did not support differences between time points. This suggests that, despite high initial readiness, the experiences offered throughout the course may not be sufficiently impactful to promote a discernible evolution in attitudes towards teamwork and collaboration. Maintaining a high initial level is positive, but the absence of progression may indicate lost opportunities to deepen these competencies. This finding highlights the need for more targeted and continuous interventions that can catalyze more pronounced changes, and not just maintain the initial predisposition. Similarly, Factor 2 (Professional identity) also did not show significant changes over time. With lower initial scores compared to F1 and F3 (and with moderate reliability of the scale for this factor, which should be considered), the stability of F2 raises crucial questions. The items of F2, which include aspects of autonomy and at times a competitive perspective, may reflect the persistence of a traditional medical training model that tends to reinforce a "monoprofessional" identity rather than a more collaborative one (da Silva, Batista & Holanda, 2025; Rabelo et al., 2024). The absence of change in professional identity suggests that, even with the introduction of IPE concepts, curricular experiences may not be effectively modifying students' perceptions of their role in an interprofessional team, or that the complexity of developing a professional identity in training can generate fluctuations and uncertainties. Literature indicates that the formation of professional identity among medical students is complex (Alruwaili et al., 2020; Guinat, 2024), and the observed stability here may indicate the need for more incisive and continuous pedagogical interventions to cultivate a professional identity more aligned with the principles of interprofessionalism.

7.2 THE NON-LINEAR PATTERN OF FACTOR 3: PATIENT-CENTERED HEALTHCARE

The most intriguing and dynamic result of the longitudinal study was observed in Factor 3 (Patient-centered healthcare). This factor exhibited a non-linear pattern, characterized by a significant increase in scores between Time 1 (entry) and Time 2 (end of the basic cycle), followed by a significant decline between Time 2 and Time 3 (end of the clinical cycle).

This "inverted U" pattern suggests that readiness for patient-centered care is not a linear development, but a complex process influenced by different phases of training. The initial increase can be attributed to exposure to basic cycle disciplines that emphasize humanization, ethics, and the importance of the patient at the center of care, cultivating an "initial idealism" (Vanka et al., 2025). During this phase, students may be more receptive to these concepts in a theoretical environment. However, the decrease in scores at the end of the clinical cycle (Time 3) is a worrying finding. This may reflect the challenges and realities of clinical practice, where students are exposed to hospital environments that are often fragmented, with time pressures, established hierarchies, and a greater emphasis on disease than on the patient as a person. The transition from theory to practice can expose students to a reality that does not always correspond to the ideals of patient-centered care, leading to an adjustment of expectations or even a certain disengagement. Vasconcelos et al. (2023) and Prevedello et al. (2022) highlight the importance of considering attitudinal changes and fluctuations in the context of collaborative practice and health training. This decline may also be related to Xyrichis' (2025) observations about the regression in medical students' moral judgment as they deepen their practice, suggesting a conflict between humanistic ideals and the demands of the clinical environment.

7.3 IMPLICATIONS FOR CURRICULUM DESIGN AND PEDAGOGICAL STRATEGIES

The findings of this study have significant implications for curriculum design and pedagogical strategies in interprofessional medical education.

- **Continuous Reinforcement for F1 and F2:** The stability observed in Teamwork and Collaboration (F1) and Professional Identity (F2) since entry suggests that, although students begin the course with a good predisposition for collaboration, curricular initiatives may not be promoting active evolution in these dimensions. It is crucial that the medical curriculum integrates interprofessional experiences more systematically and progressively, going beyond isolated exposures. This includes creating opportunities for joint learning, interprofessional simulations, and practical activities that reinforce collaboration and the construction of a more collective and less hierarchical professional identity. Conte et al. (2022) and Yang et al. (2025) emphasize the continuous integration of interprofessional experiences to promote training more aligned with the demands of collaborative practice.
- **Strategic Interventions for Factor 3:** The non-linear pattern of Factor 3 (Patient-centered healthcare) points to the need for strategic and adaptive pedagogical interventions at different moments of the course. The peak of readiness in the basic

cycle should be capitalized, perhaps with more activities that reinforce these values before clinical immersion. The drop in the clinical cycle demands special attention, suggesting the need for continuous support, reflective discussions about the challenges of practice, and the creation of clinical environments where patient-centered care is explicitly valued and practiced. Almeida et al. (2020) and Marques and Costa (2024) reinforce the importance of integrating interprofessional education approaches consistently throughout the entire curriculum to promote more effective and sustainable patient-centered practice. Mentorship programs, debriefing of clinical experiences, and the presence of professional role models demonstrating patient-centered practice can be effective.

- **Overcoming the Uniprofessional Model:** The predominance of a student profile with strong academic preparation and a history in private schools, while advantageous in some aspects, may be linked to a bias towards the traditional biomedical model (Rabelo et al., 2024). The curriculum therefore needs to actively challenge this perspective, introducing and reinforcing interprofessionalism and humanization from the early years. The diversification of the student body, such as the presence of students from affirmative action programs (PIMESP), can also be a vector for more plural and sensitive training, enriching interprofessional learning.
- **Continuous and Adaptive Assessment:** The results highlight the importance of a longitudinal approach in assessing readiness for interprofessional learning. Pontual assessment may not capture the fluctuations and complexities of developing these competencies. Educational institutions need to implement continuous assessment systems that allow identifying trends, monitoring the impact of interventions, and adapting the curriculum according to students' needs at different stages. Oliveira et al. (2023) corroborate the importance of this longitudinal and adaptive approach in the training of health professionals.

7.4 STUDY LIMITATIONS AND FUTURE DIRECTIONS

This study, although robust in its longitudinal design, presents some limitations. The final sample of 48 students for longitudinal analysis is relatively small, which may have impacted the ability to detect statistically significant differences in pairwise comparisons for F1 and F2. Future studies with larger samples and in different institutions may corroborate or complement these findings.

Additionally, the study focused on students' perceptions through RIPLS. Qualitative methods, such as interviews and focus groups, could deepen the understanding of the

underlying reasons for the observed fluctuations and stabilities, capturing students' lived experiences. The inclusion of data on the implementation of IPE in the FAMERP curriculum and the perception of faculty would also enrich the analysis. Finally, future research should explore specific interventions based on these findings, testing the effectiveness of new pedagogical approaches to promote the development of interprofessional readiness, especially to reverse the decline in patient-centered care during the clinical cycle and to drive a more notable evolution in teamwork and professional identity.

8 CONCLUSION

The training of health professionals capable of facing the challenges of the 21st century requires an unwavering commitment to Interprofessional Education (IPE). This chapter, based on a longitudinal study with FAMERP medical students, aimed to map the evolution of readiness for interprofessional learning, using the RIPLS scale at three crucial moments of their academic trajectory. The results, although complex, offer valuable insights into the dynamics of this readiness and its implications for medical education. From entry, students demonstrated high readiness for Teamwork and Collaboration (F1) and Patient-Centered Healthcare (F3), indicating a positive predisposition for the pillars of interprofessional practice. However, the longitudinal analysis revealed that this readiness does not evolve linearly and progressively in all dimensions. Factor 1 (Teamwork and Collaboration) and Factor 2 (Professional Identity) remained stable throughout the course, suggesting that curricular experiences may not be sufficient to deepen or significantly modify these attitudes and perceptions. The most intriguing pattern emerged in Factor 3 (Patient-Centered Healthcare), which exhibited a non-linear behavior, with a notable increase at the end of the basic cycle, followed by a decline at the end of the clinical cycle. This "inverted U" highlights the potential challenges in the transition from theory to practice, where the realities of the clinical environment can impact students' ability to fully maintain and apply the principles of patient-centered care. This finding points to the urgent need for pedagogical interventions that not only introduce these concepts but also reinforce and protect them throughout training, especially in more advanced clinical stages. In summary, readiness for interprofessional learning is a dynamic and multifaceted construct, requiring an adaptive and continuous educational approach. The results of this study emphasize the importance of a medical curriculum that integrates IPE more intentionally and systematically, with strategies that promote the active development of collaboration skills, the formation of a more plural professional identity, and the sustenance of patient-centered care, from entry to graduation. Understanding these longitudinal patterns is a fundamental step towards training physicians

better equipped to work in the integrated healthcare teams that contemporary society demands, ensuring higher quality and more humane healthcare.

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ADHERENCE OF THE FEDERAL INSTITUTES OF EDUCATION TO THE ENVIRONMENTAL AGENDA IN THE PUBLIC ADMINISTRATION

ADERÊNCIA DOS INSTITUTOS FEDERAIS DE EDUCAÇÃO À AGENDA AMBIENTAL NA ADMINISTRAÇÃO PÚBLICA

ADHERENCIA DE LOS INSTITUTOS FEDERALES DE EDUCACIÓN A LA AGENDA AMBIENTAL EN LA ADMINISTRACIÓN PÚBLICA



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ABSTRACT

The Environmental Agenda in Public Administration (A3P) is a voluntary action by public institutions to reduce their negative socio-environmental impacts, in the context of environmental management and sustainability and in compliance with the principle of efficiency. In this sense, the Public Teaching Institutions (IEP) have a prominent role, because in addition to training professionals and conscious citizens, their campuses must have the same environmental concerns as a small city. The study analyzes how institutions from the same region, with similar structures and objectives, deal differently with the environmental issue. By analyzing these institutions with a single checklist, it becomes possible to externalize these differences. With the objective of evaluating the level of adherence of the Federal Institutes of Education of the Southern Region of Brazil to the axes of the Environmental Agenda in Public Administration. Being a qualitative and descriptive research with secondary data available on the websites of the Institutes, with analysis through a checklist formed by the items of the 6 thematic axes of the A3P. With the systematization of the data, it was verified whether the management procedures that are in accordance with the requirements of the A3P, synthesized in the qualitative analysis of the data. It was identified that the Institutes are not formal partners of A3P, but seek to meet its requirements, with a high adherence to the A3P axes, another point identified is that there is no standardization in management reports. This work demonstrates the need for constant evaluations of the IEP to verify its evolution in environmental management.

Keywords: Environmental Agenda in Public Administration (A3P). Federal Institutes of Education. Management Reports.

RESUMO

A Agenda Ambiental na Administração Pública (A3P) é uma ação voluntária das instituições públicas para reduzir seus impactos socioambientais negativos, no contexto da gestão ambiental e sustentabilidade e atendendo ao princípio da eficiência. Nesse sentido as Instituições de Ensino Públicas (IEP) têm um papel de destaque, pois além de formar

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profissionais e cidadãos conscientes, deve ter em seus campi as mesmas as preocupações ambientais de uma pequena cidade. O estudo analisa como instituições de uma mesma região, com estruturas e objetivos semelhantes tratam de forma diferente a questão ambiental. Ao analisar essas instituições com um checklist único, torna-se possível externalizar estas diferenças. Tendo como objetivo avaliar o nível de aderência do Institutos Federais de Educação da Região Sul do Brasil aos eixos da Agenda Ambiental na Administração Pública. Sendo uma pesquisa qualitativa e descritiva com dados secundários disponíveis nos sítios dos Institutos, com análise por meio de um checklist formado pelos itens dos 6 eixos temáticos da A3P. Com a sistematização dos dados, foi verificado se os procedimentos de gestão que estão de acordo com as exigências da A3P, sintetizadas na análise qualitativa dos dados. Identificou-se que os Institutos não são parceiros formais da A3P, mas buscam atender aos seus requisitos, com uma alta aderência aos eixos da A3P, outro ponto identificado é que não existe uma padronização nos relatórios de gestão. Este trabalho demonstra a necessidade de avaliações constantes das IEP para verificar sua evolução na gestão ambiental.

Palavras-chave: Agenda Ambiental na Administração Pública (A3P). Institutos Federais de Educação. Relatórios de Gestão.

RESUMEN

La Agenda Ambiental en la Administración Pública (A3P) es una acción voluntaria de las instituciones públicas para reducir sus impactos socioambientales negativos, en el marco de la gestión y sostenibilidad ambiental y en cumplimiento del principio de eficiencia. En este sentido, las Instituciones Públicas de Enseñanza (IEP) tienen un papel destacado, pues además de formar profesionales y ciudadanos conscientes, sus recintos deben tener las mismas preocupaciones ambientales que una pequeña ciudad. El estudio analiza cómo instituciones de una misma región, con estructuras y objetivos similares, abordan de manera diferente el tema ambiental. Al analizar estas instituciones con una sola lista de verificación, es posible externalizar estas diferencias. Con el objetivo de evaluar el nivel de adhesión de los Institutos Federales de Educación de la Región Sur de Brasil a los ejes de la A3P. Siendo una investigación cualitativa y descriptiva con datos secundarios disponibles en los sitios web de los Institutos, con análisis a través de una lista de cotejo formada por los ítems de los 6 ejes temáticos del A3P. Con la sistematización de los datos, se verificó si los procedimientos de gestión están de acuerdo con los requisitos de la A3P, sintetizados en el análisis cualitativo de los datos. Se identificó que los Institutos no son socios formales de A3P, sino que buscan cumplir con sus requerimientos, con un alto apego a los ejes de A3P, otro punto identificado es que no existe una estandarización en los informes de gestión. Este trabajo demuestra la necesidad de evaluaciones constantes del IEP para verificar su evolución en la gestión ambiental.

Palabras clave: Agenda Ambiental en la Administración Pública (A3P). Institutos Federales de Educación. Informes de Gestión.

1 INTRODUCTION

The intensity of the consumption of natural resources, exceeding the capacity with which the environment regenerates, has put the survival of future generations at risk. In view of this, governments, the scientific community and society in general seek solutions related to the sustainable development of the planet, defined as "development capable of meeting the needs of the current generation, without compromising the ability to meet the needs of future generations" (CMMAD, 1991, p. 9).

Solidarity with future generations is imperative and is based on the ethical postulate of socio-environmental responsibility (Sachs, 2009), and one of the great challenges faced by contemporary society is to seek development based on sustainable bases, starting from the global to the individual scope and providing greater integration between the economic, social and natural aspects of the development process (Veiga, 2005; Almeida et al., 2017).

In the process of building sustainable societies, it is up to the State to assume the mission of conducting the process, whether through the elaboration and implementation of legislation, or by providing means for research, or by encouraging organizations (Viegas et al., 2015). For A3P (2022), sustainability, in the governmental sphere, has increasingly been a differential of modern public management, where administrators are considered the main agents of change, even in their small and simple actions carried out daily, such as: the efficient use of water and energy, selective collection, responsible consumption of products and services, among others, which contribute to efficiency in sustainability. Based on this awareness, the Brazilian government constituted in 1999 the A3P (Environmental Agenda of Public Administration), coordinated by the Ministry of the Environment (MMA, 2020).

A3P is a voluntary membership program for public agencies, in which Public Educational Institutions are framed, which must include environmental criteria in their activities, whether they are investment, purchasing and/or contracting services, as well as in the proper management of the waste generated, promoting the improvement of the quality of life in the work environment (MMA, 2020).

Given the importance that Public Institutions have in setting an example in relation to the reduction of negative socio-environmental impacts, A3P was structured in six priority thematic axes: rational use of natural resources and public goods; adequate management of solid waste; quality of life in the workplace; awareness and training of civil servants; sustainable public procurement and sustainable construction (A3P, 2022).

The concern of Educational Institutions (IEs) with the environmental issue is not recent. In Europe, it dates back to the late 1970s, with the creation of the University Association for the Environment in Belgium. International conferences followed the theme,

resulting in Declarations - such as the Talloires Declaration, of 1990, in which rectors propose to assume the promotion of sustainability in universities. In Latin America and the Caribbean, this movement has gained more strength in this century, and is always on the agenda of *the Latin American Encuentros de Universidades Sustentables* (ELAUS). Since then, IEs around the world have sought to integrate environmentally sustainable theories, concepts, and practices into their activities (Oliveira et al., 2020; Vallaeys, 2017).

In Brazil, there is a need to incorporate sustainable principles and criteria within university campuses. As much as this fact can already be considered common sense, the dichotomy in a higher education institution (HEI) is remarkable, being one of the main environments for research and professional training, at the same time that its administrators are not yet in full resonance with the theme of sustainability (Zeitoune et al., 2019). In view of these considerations, this work aims **to evaluate the adherence of the Federal Institutes of Education of the Southern Region of Brazil to the axes of the Environmental Agenda in Public Administration (A3P).**

2 ENVIRONMENTAL AGENDA

After the end of World War II, people began to think about the possibility of destroying the planet, initiating, albeit discreetly, environmental awareness, leading the theme of nature to take over public opinion, due to the media repercussions regarding environmental disasters (Gurski et al., 2012; Sornberger et al., 2014). In the 1960s, the publication of the book *Silent Spring* and the Conference on the Biosphere emphasized the need to reflect on the damage caused to the environment, with the aim of expanding discussions on this theme to other areas, such as economics and politics (Gurski et al., 2012; Sornberger et al., 2014; Viegas et al., 2015; Oliveira et al., 2020).

In the 1970s, the report "The Limits to Growth" stated that Planet Earth was unable to maintain its balance due to the consequences of the population effect and pollution, which generated great international repercussion, as it emphasized the theme in a catastrophic way. (Gurski et al., 2012; Sornberger et al., 2014; Viegas et al., 2015; Oliveira et al., 2020). All this repercussion led the United Nations to hold the Stockholm Conference, the first official meeting, in which government entities from all over the world met to think about the environment. This meeting made the problem of great international relevance, as it allowed the definitive entry of the environmental issue into the political agenda of countries (Gurski et al., 2012; Luiz et al., 2013; Sornberger et al., 2014).

According to Viegas et al. (2015), in 1984 a World Commission on Environment and Development (CMMAD) was created, formed by experts in the field, which prepared the

report entitled "Our Common Future". In this work, the commitments of the Nations to build a development model focused on economic growth linked to concern for the environment, peace and security were defined. This report resulted in the concept of sustainable development, which refers to a development model capable of harmonizing economic development with environmental protection and social justice, in a long-term temporal perspective, which reaches future generations (Viegas et al., 2015). In continuity with the political discussions held in the 1980s, the Earth Summit was held in 1992 in Rio de Janeiro; a conference that represented a milestone in the trajectory of sustainable development due to the significant participation of governments, which resulted in numerous documents, including Agenda 21, where the intentions of the participating countries in the adoption of sustainable initiatives were established (Almeida et al., 2017).

According to Sornberger et al. (2014), Agenda 21 encompasses aspects of Public Administration, not only addressing the preservation and conservation of nature, as it considers strategic issues related to the generation of employment and income; the mitigation of regional and interpersonal income inequalities; changes in consumption and production patterns; the possibility of sustainable construction of cities; and also the incorporation of new management instruments and models. In 2012, in Rio de Janeiro, another World Conference on the Environment was held: Rio+20. The objective of this Conference was to promote an evaluation of the progress and gaps observed in the processes of implementation of the decisions taken within the framework of the summits on the environment, as well as to discuss the ways of operationalizing the concepts of "development and sustainability", which contributed to defining the sustainable development agenda for the coming decades. with the agreement of all the governments represented there regarding the establishment of goals favorable to sustainable development (Sornberger et al., 2014; Viegas et al., 2015).

In 2015, the 2030 Agenda was created, a plan with 17 Sustainable Development Goals (SDGs). These goals are integrated and indivisible, and mix, in a balanced way, the three dimensions of sustainable development: economic, social and environmental (Agenda 2030, 2015). According to the 2030 Agenda (2015), in order for sustainable development to occur in all its dimensions (social, economic and environmental), it is necessary that, in addition to awareness, tools are also offered for this development that have a direct or indirect relationship with technological innovations, going beyond mere bureaucratic activities, with actions that contribute to improving people's quality of life.

2.1 ENVIRONMENTAL AGENDA IN THE BRAZILIAN PUBLIC ADMINISTRATION

According to Batista et al. (2019), the activities of the public administration are seen as potentially polluting, so the inspection with private companies is the same as that which should be applicable to the public service, which must adapt to the demands. In other words, it is the role of the State as a manager of the environment and on equal terms in the ethical responsibilities of sustainability. Thus, one must add the attitudinal aspects in the search for quality and good political and ecologically correct image that make up the new ways of managing the public service (Sornberger et al., 2014).

The Environmental Agenda in Public Administration (A3P) emerged with the objective of inserting public entities in the context of environmental management and sustainability, in order to take another step towards meeting the principle of efficiency. A3P is a program of the Brazilian Federal Government, created based on principle 8 of Agenda 21, the Rio 92 Declaration and the Johannesburg Declaration, which called on participating countries to establish, set and monitor new sustainability standards. The Program is developed through the Secretariat for Institutional Articulation and Environmental Citizenship, of the Ministry of the Environment (MMA), for the Federal Government (Viegas et al., 2015). According to available information (MMA, 2020), A3P is a way to include public organizations in sustainability discussions, meeting the principle of efficiency, established by the 1988 Magna Carta and recognized by UNESCO, also having a direct relationship with the "Sustainable Development Goals (SDGs)", the global agenda adopted during the United Nations Summit on Sustainable Development that took place in September 2015.

According to A3P (2022),

the A3P program is aimed at public agencies at the three levels: federal, state and municipal; and to the three branches of the Republic: executive, legislative and judiciary. It is a voluntary agenda – there is no rule imposing or sanctioning for those who do not follow its guidelines, but adherence to the Program is increasing for two reasons: 1. To adopt an environmental agenda in the agency to use natural resources rationally and 2. Society demands from the public administration the implementation of practices.

that have the sustainability of the planet as a principle, which are the guidelines of the A3P.

According to Barbosa (2018), most public agencies already adopt procedures considered sustainable. In several institutions, selective collection, for example, is a common practice; in some a system was adopted to avoid wasting water; Others have established that all bidding will be within sustainability criteria. Playing a strategic and fundamental role in the promotion and indication of new production and consumption patterns, it must be an example

in reducing negative socio-environmental impacts generated by its activity (A3P). This management model also aims to establish new forms of environmental education through awareness and motivation of employees, preparation of didactic-pedagogical and informative materials, and the promotion of events for a relaxed exchange of information. A consolidated planning process on a participatory basis should be the driver of strategies, that the entire system should be a collective achievement and that it should be used to increase the transparency of public actions (Kruger et al., 2011).

What the A3P Program did was to systematize in six thematic axes what is fundamental for a sustainability project, currently dispersed in several agencies: Use of natural resources; Quality of life in the workplace; Awareness of civil servants for sustainability; Sustainable procurement; Sustainable buildings ; and Solid waste management (A3P, 2020). Having similarities in some points with NBR ISO 14001 (Oliveira et al., 2020), it prioritizes as one of its principles the policy of the 5 R's: Rethinking the need for consumption; Reduce the amount consumed; Refuse to consume products that generate significant socio-environmental impacts; Reuse and Recycle all possible waste (Kruger et al., 2011). This principle guides the six thematic axes of A3P (Table 1).

Table 1

Directions of the Thematic Axes of the A3P

A3P Thematic Axes	Direction of actions
Rational use of natural resources and public goods	It aims at the rational use of natural resources and public goods. The focus is to avoid all forms of waste, using water, energy, wood with economy, in addition to reducing the consumption of paper, plastic cups, recycling fluorescent lamps.
Proper management of waste generated	It aims to promote the environmental management of waste, including partnerships with cooperatives of waste pickers to generate work and income. The objective is to motivate the reduction of waste, through the 5R's: rethink; refuse; reduce; Reuse and recycle
Quality of life in the workplace	Facilitate and satisfy the needs of workers when developing their activities, through actions for personal and professional development aimed at the use of skills; autonomy in the activity developed; social and internal integration; occupational health and other conditions.
Awareness and training of civil servants	Create and consolidate citizen awareness of socio-environmental responsibility among civil servants, with campaigns focused on socio-environmental issues. Training process for the development of institutional and individual skills, strengthening attitudes for a better performance of activities.
Sustainable Bidding (Procurement, Contracting of Services)	Ensure the acquisition of material goods and contracting services efficiently, through the requirement of sustainability criteria, stimulate competition between industries for the environmental performance of their products, obtaining lower prices and greater supply.
Sustainable Buildings	It was included in the Program in 2014, and was previously part of the previous axis. Sustainable buildings are buildings and environments that consider, from their conception, construction, operation and renovation, the use of recognized sustainability concepts and procedures.

Source: Adapted from MMA (2020) and Barbosa (2018)

A3P is an invitation to individual and collective commitment to the adoption of a public management model that corrects and reduces negative impacts generated during the workday (MMA, 2020). To achieve this goal, it is necessary to make efficient use of natural, material, financial and human resources. This model aims to put public agencies in line with the concept of producing more and better, including socio-environmental criteria in investments, purchases and contracting of services by government agencies (Almeida et al., 2017). Even though it is voluntary, adherence to A3P is encouraged for all levels of the Brazilian public administration, including educational institutions, which must become sustainable educational institutions.

2.1 ENVIRONMENTAL AGENDA IN PUBLIC EDUCATIONAL INSTITUTIONS

Higher Education Institutions (HEIs), in Brazil and in the world, serve as a model for other organizations, and are called upon to be part of the construction of a new management concept, based on sustainability (Lanzarin et al., 2018). The expectation of social groups, users of the services offered by HEIs, is that such organizations, because they have a differentiated intellectual capital and are centers that promote teaching, research and extension, can position themselves at the forefront of the processes of acquiring new values, principles and ways of functioning (Viegas et al., 2015).

According to MMA (2017), it is necessary for the university to have in all undergraduate courses in the areas of health sciences, exact sciences, agrarian sciences, human sciences, social sciences, biological sciences and technological sciences, disciplines that deal with environmental and sustainability themes, because A3P understands that society needs professionals and managers from different areas with academic training and knowledge in the environment, sustainability and socio-environmental responsibility. The professional's commitment to these topics is what will make a difference in the job market and, more importantly, in the care he will have in the face of dilemmas and challenges to preserve the planet (A3P, 2022).

What is done at the university, due to the symbolism it represents, causes effects that transcend economic and environmental aspects (MMA, 2017). The community's view will be different when it realizes that the university is implementing socio-environmental measures with A3P. It will be, mainly, a look of recognition that university management is concerned with the education of students and with life in the community and on the planet (A3P, 2022). Normally, according to Viegas et al. (2015), Sornberger et al. (2014) and Zeitoune et al. (2019), the administrative management of the public university already deals with a set of factors that concern the A3P Program. For example: people management; bidding and

purchases of durable goods and consumables; maintenance of buildings and physical spaces; waste and effluent management (MMA, 2017).

Encouraged by national and international agendas to make sustainable commitments, HEIs are conquering their prominent place, positioning themselves more strategically, developing more proactive actions at the forefront in favor of socio-environmental sustainability (Lozano et al., 2013). There are also barriers to developing sustainable work in institutions, which need to be known, understood and circumvented. It is important to emphasize that stakeholders, especially internal stakeholders, will be the major disseminators in the process, so they need to be aligned with the strategic context of changes (Barbieri & Silva, 2011; Leal Filho et al., 2015; Vallaes, 2017).

3 METHODOLOGICAL PROCEDURES

This article is the result of a descriptive documentary research, carried out from public secondary data. This is a multiple case study with a sample consisting of the 5 Federal Institutes of the Southern Region of Brazil. The data were selected based on the last Management Report, in addition to the PDI (Institutional Development Plan) and PLS (Sustainable Logistics Plan) and other environmental information were consolidated and made available on the website of each institution.

The research assumes a descriptive character, since it observes and analyzes the adherence of the Federal Institutes to the A3P agenda, in order to evaluate its effectiveness and its status quo as a tool to support strategic management. Thus, descriptive research aims to make statements that describe aspects of a population or to analyze specific characteristics and attributes. In descriptive research "the researcher does not focus his attention on why a certain distribution is observed, but on what that distribution is". (Richardson, 2017, p.91)

As an analysis and comparison tool, a checklist adapted from Kruger et al. (2011), Luiz et al. (2013) and Almeida et al. (2017) was used. It is formed by the 52 items of the 6 thematic axes of the A3P: Use of natural resources; Quality of life in the workplace; Awareness of civil servants for sustainability; Sustainable procurement; Sustainable constructions; and Solid waste management. In addition to information about vision, mission and values. In the data analysis, we seek to identify possible congruences between the actions of this HEI with the principles defined in the A3P. From the systematized answers according to the *adopted checklist*, we sought to identify the management procedures that are in accordance with the requirements of the A3P, summarized in the qualitative analysis of the data.

All of the extracted indicators were then compiled, resulting in a comprehensive list of indicators. This list was transformed into tables, divided by axes, allowing the identification of the level of indicators found in relation to the total of the procedures specified in the A3P, evidencing those indicators that are more and less frequent. Result in the level of adhesion to the A3P Axes: NO: 0%; LOW: $\leq 30\%$; MEDIUM: $> 30\%$ and $\leq 70\%$; INCREASE $> 70\%$; TOTAL: 100%.

The Federal Institutes are present in all Brazilian states, and have the following purposes and characteristics: to offer professional and technological education with an emphasis on regional development; promote the integration and verticalization of basic education in accordance with professional and higher education; to train professionals with a view to strengthening local productive, social and cultural arrangements; qualify teachers to offer quality education; develop extension programs and scientific and technological dissemination; conduct applied research; and to promote the development of social technologies aimed at preserving the environment (Law 11.892, 2008, art. 6).

The 6 institutes in the southern region were chosen due to the similarity of structure, facilitating the comparison of data. In total, they have 104 campuses, with 1724 courses, 11,978 servers (teachers and technicians) and 141,032 students (PNP, 2020). The 104 campuses of these Federal Institutes have a structure of a small city such as the large circulation of people, works, use of water and electricity.

4 ANALYSIS AND DISCUSSION OF THE RESULTS

After analyzing the documents, it was possible to generate Table 2, referring to the A3P checklist.

Table 2

Results of the Analysis of the Adherence of FIs to the A3P Axes

INDICATOR	IF1	IF2	IF3	IF4	IF5	IF6
Do you have environmental care mission/vision/values?	NO	M/VL**	M/VL**	M/VL**	VL*	VL*
Is the Institute a formal partner of the A3P Network?	NO	PARTIAL	PARTIAL	PARTIAL	NO	NO
AXIS 1 – Rational use of natural resources and public goods	HIGH	TOTAL	TOTAL	TOTAL	HIGH	TOTAL
AXIS 2 – Proper management of waste generated	AVERAGE	HIGH	HIGH	HIGH	AVERAGE	HIGH
AXIS 3 – Quality of life in the workplace	LOW	AVERAGE	LOW	AVERAGE	LOW	LOW

AXIS 4 – Awareness and training of civil servants	HIGH	HIGH	HIGH	HIGH	AVERAGE	AVERAGE
AXIS 5 – Acquisition of Goods	LOW	AVERAGE	HIGH	LOW	LOW	LOW
AXIS 5 – Contracting of Services	HIGH	HIGH	HIGH	HIGH	AVERAGE	HIGH
AXIS 6 – Sustainable Buildings	HIGH	TOTAL	TOTAL	TOTAL	TOTAL	TOTAL

* Disclosure of sustainability or environmental responsibility: N – Does not mention; M – In Mission; VS – In Vision and In VL – In Values

Adherence to A3P Axles: NO: 0%; LOW: <=30%; MEDIUM; >30% and <=70; INCREASE > 70%; TOTAL: 100%

As shown in Table 2, it was identified that only 1 institution has no mention of environmental concern or sustainability in its Mission, Vision and Values statements, while 3 FIs present both mission and values. This analysis is important because these statements are fundamental for the preparation of a Strategic Plan and, more than that: these definitions are important because they serve as guidelines for all decisions to be made by managers on a daily basis and will serve as a basis for defining behaviors, and should make it very clear which path to follow, and where the company intends to go (Bianchi et al., 2013; Jacomossi & Demajorovic, 2017).

This result demonstrates a greater commitment of the Federal Institutes to their organizational objectives, when compared to the Federal Universities which, according to the study by Freitas et al. (2019) who surveyed 41 Federal Universities and only 25 had the issue of sustainability or environmental in their statements. This environmental vocation of the institutes has been since their creation in 2008, since already in the law of creation they already had as one of their purposes "to promote the production, development and transfer of social technologies, notably those aimed at the preservation of the environment" (BRASIL, 2008).

The incorporation of environmental concern in the intentions and management policies of the IEs does not always translate into effective sustainability practices in the organizational routine, demonstrating a rupture between organizational discourse and practice. A common situation in Brazilian organizations, the challenge for organizations, especially public organizations, is to go beyond the merely theoretical discourse of socio-environmental responsibility and make solid long-term commitments to environmentally responsible management (Ribeiro et al., 2015; Prado et al., 2019). Araujo et al. (2015) corroborate the idea that a paradigm review is necessary for environmental management to be truly inserted into the daily practice of public agencies.

It was verified in the second item that the Institutes are not formal partners of the A3P network in its entirety, only a few isolated campuses took this initiative. In the management

reports and PDI, the Institutes have this objective of formally following this agenda, but they have not yet put this action into practice. This, according to Wals and Jickling (2002) and Araujo et al. (2015), is justified because environmental concern is incorporated into management intentions and policies, but which do not always translate into effective sustainability practices in the organizational routine, demonstrating a rupture between organizational discourse and practice, a common situation in Brazilian organizations, because Institutions find it very difficult to overcome barriers, because there is no prioritization when allocating resources in order to transpose them, so efforts are dispersed and lose strength, making the process of formal adhesion even more difficult.

Sustainable consumption involves everything from opting for products that aim to use fewer natural resources in their production, and that can be reused or recycled, to the issue of guaranteeing decent employment for those who produced them (Souto-Maior & Bocasanta, 2019). Be aware of buying what is really necessary and consume in a sustainable, conscious, and responsible way. It is important to understand that certain consumption will have environmental and social consequences, whether positive or negative (A3P, 2022). In this sense, all institutes, even though they are not formal partners of the A3P network, showed total/high adherence to the first axis of the Rational Use of Natural Resources and Public Goods, because they use a large amount of the available resources. This is mainly due to the large flow of people, information and activities developed. Thus, they must research and develop sustainable practices in their institutional spaces, where the elimination of waste and the reduction of the consumption of natural resources must prevail, necessarily implying a change in behavior (Tauchen & Brandli, 2006). For Alshuwaikhat and Abubakar (2018), and Gazzoni et al. (2018), the institution must be environmentally sound, with the possibility of saving financial resources through rationalization in energy consumption and resource conservation, waste reduction and efficient environmental management; and it must promote equity and social justice and export these values to the community.

Federal Educational Institutions, as well as other public bodies and entities that have the challenge of managing the different types of waste generated in the performance of their activities, must observe the provisions of Decree No. 5,940/2006 and Law 12,305/2010 in the incorporation of sustainable practices in the management of solid waste, among which are recyclables, (Marques et al., 2017 and Freitas et al., 2020). In the implementation of this selective collection modality, as well as in other selective collection systems, the awareness and adherence of those responsible for waste generation (teachers, students, technical-administrative staff and outsourced workers) is a great challenge and constitutes a

determining factor for its consolidation. Social participation is a fundamental requirement for selective collection to achieve its objectives, since if the generating source does not carry out the correct separation and disposal of recyclable waste, the entire system will be compromised (Beluque et al., 2015; Bringhenti et al., 2019).

In the second axis referring to the Proper Management of Waste Generated, the adherence of most institutes to A3P is high, this is because the institutes carry out selective collection, but there are few campuses that have 5R programs, and also do not fully carry out the Solidary Selective Collection, regulated by Decree 5.940 of 2006, which instituted the separation of recyclable waste discarded by the bodies and entities of the federal public administration and its destination to the associations and cooperatives of recyclable material collectors (Brasil, 2006). Even with the decree, the institutes do not have a formal procedure to carry out this type of partnership with the waste pickers' association. Because there is no formal procedure, it is not possible to measure the efficiency and scope of solidary selective collection in the institutes.

Regarding quality of life in the workplace (QWL), most federal institutes in the southern region have low adherence to A3P. Even appearing in all management reports, the actions do not meet all the premises of the A3P, which contains at least 19 variables for full quality of life at work. The issue of physical health is the most worked on by the institutions, leaving out issues related to nutritional guidance, psychological problems and addictions, and issues of integration and prejudice. According to Pinto et al. (2014) and Klein et al. (2018), physical and psychological exhaustion, low self-esteem, pressure for results and dissatisfaction are aspects that lead to a loss of efficiency in the public service.

QWL is a very broad field. According to Klein et al. (2018), it comprises the living conditions in the work environment and encompasses aspects of well-being, health, physical, mental, and social safety, and training to perform tasks with precision and good use of personal energy. However, despite the extensive discussion and long study of the QWL issue, there is no common understanding of the factors that influence the formation and development of QWL. In addition, Liliy et al. (2015) and Pinto et al. (2014) describe that there is a lack of awareness of QWL in the academic community, and argue that a QWL balance must be maintained effectively to ensure the work potential for all civil servants and other groups. For the effectiveness of QWL, it is also necessary that the institutes have a formal program, to be constantly evaluated in order to correct errors and make continuous improvements, with programming and actions that serve all employees (Klein et al., 2018).

Moving on to the fourth axis of Awareness and Training of Civil Servants, that is, the management of people in the sense of involving them in the search for means to preserve

the environment and actions that promote institutional development in a sustainable way (Madu et al., 2017), it was found that federal institutes have a high adherence to A3P. This is due to the fact that most campuses have environmental management bodies, which deal with this awareness and training of servers, working with servers, students and outsourced workers. The high adherence to this axis also influences the high adherence to axis 2 of the Proper Management of Waste Generated, because with the community aware and trained, the waste disposal process becomes more efficient.

The adherence was not total only because once again there is no integrated program of environmental awareness and training in the institutions, and the actions are taken by internal environmental agencies, independently. According to Silva (2018), an effective and efficient training program needs the support of a management sensitive to the true sectoral needs, and its planning must be integrated, participatory, in a dynamic way, through mechanisms that allow a continuous evaluation and open to all stakeholders. Thus, sustainability must be achieved by all organizations and institutions, whether social or not. In this sense, educational institutions also have a preponderant role in the process of raising awareness in society and encouraging other agents to seek sustainable development. For Tauchen and Brandli (2006), educational institutions have assumed a prominent role in relation to the concern with the environment with the development of students and in the preparation of the provision of information to improve knowledge. For this, it is necessary that institutions incorporate sustainable practices into their actions to achieve awareness in their internal environment, such as servers, students and outsourced workers.

This awareness of the management in relation to the environmental issue also influences the actions of the fifth axis, Acquisition of Goods. Despite the efforts of the institutes to carry out sustainable bids, their adherence to this axis is still low. According to the management reports, there are environmental requirements in its purchases, but not meeting all the requirements regarding the actions defined by the fifth axis of A3P. Sustainable bidding is a process in which organizations satisfy their needs for goods, services, works and facilities, in an economical way considering the totality of life cycles with regard to the generation of benefits not only for the organization, but also for society and the economy, while minimizing the damage caused to the environment (Yaker et al, 2014; Castro & Lobato, 2020).

The Public Administration is a major consumer of goods and services with purchasing power through bidding, and, therefore, should be an example of good practices in the activities that fall to them, fulfilling their responsibility imposed by public policies (MMA, 2020). For Gallon et al. (2019), the Brazilian Public Administration seeks, through sustainable

bidding, to introduce environmental, social, and economic aspects in its routine procurement and contracting actions, fostering good management and consumption practices.

Among the main reasons for the low adhesion to this axle, the issue of price stands out. According to Castro and Lobato (2020)

Due to the constitutional principle of economy, federal institutions seek to acquire products and services at a lower cost within the requested quality. It is a fact that many sustainable products have a slightly higher cost than traditional ones, and among the reasons that lead to this high price, we can mention the technological innovation that is used in their manufacture, and the demand that has not yet reached high levels, due to the low adherence to this type of product, The market for sustainable products and services is a promising market, but it is still restricted and far from reaching a high level.

The bids for contracting services by the institutions are already more adapted to environmental issues. In this axis of Contracting Services, the institutes have a high adherence, as the bids follow rules by the Federal Government, generating a standardization of notices through outsourced service notebooks with the inclusion of socio-environmental criteria and registration of materials with the specification of products with these criteria. The insertion of ecological criteria should not be carried out at any cost, and it is up to the Public Administration to weigh the cost-benefit of the good or service to be contracted, and then decide which is the best option within its financial possibilities (Gallon et al., 2019). Even so, according to Martins (2014) and Souza and Sander (2019), there is a certain difficulty in finding suitable partners in the public service, and this is due to the fact that the contracting is carried out by bidding where the criterion for choosing the contracted company is the lowest value, and this can become a disadvantage when the chosen company does not have the competence to carry out the activities that are required and financial sustainability to honor its obligations.

Completing the axes related to contracting, it was found that in the Sustainable Constructions axis, the adherence of federal institutes to A3P is practically total. This is due to the standardization of works, by the Federal Government, through booklets of Sustainable Private Constructions and Reforms of the Ministry of the Environment. This axis treats as a priority the hiring of labor, materials, technologies and raw materials of local origin; in addition to requiring the bidder to be certified as to sustainable disposal practices or recycling of goods that are unusable for the reuse process (MMA, 2020). In this logic, the manual of Socio-environmental Management in Public Universities also presents some practical solutions: wood must be certified; the roof must not be made of asbestos; the taps must have automatic flow cut-off; The building structure must choose the use of natural light.

Contributing to this understanding, Roaf et al. (2009) point out that the options for building sustainably are broad and can be initiated with the use of a lower amount of electricity and other natural resources, planning from the construction project and the acquisition of economically viable, ecologically correct and socially fair inputs, through the research and development of construction methods and materials that emit a lower amount of CO₂ into the atmosphere (which are more responsible for global warming), to the minimization of the environmental impacts caused by them, through: the reduction of waste and waste generation; the reuse of materials discarded in the environment, including plastics, wood, hardware, construction waste, etc.; the reduction of expenses with the consumption of electricity and water; the optimization of the quality of life of residents; healthy attitudes that contribute to the preservation of nature.

5 FINAL CONSIDERATIONS

This study aimed to identify the adherence of the Federal Institutes of the Southern Region to the axes of the A3P, using as a tool the search for secondary data in the websites of these institutes. With the available data, it was possible to identify that its adherence is high to the A3P axes, but there is still much to be implemented and improved, even between campuses of the same institute there is no standardization of environmental management and control processes.

Through the management reports and other documents available on the website of the Federal Institutes of the Southern Region, it was possible to identify that they have a high adherence to the axes of A3P, despite not being formal partners of this Network. This high adherence occurs due to environmental legislation for public service that has been improved since the beginning of the twenty-first century, in addition to legislation. According to Tauchen and Brandli (2006), there are significant reasons to implement environmental actions in the IFECTs, as these can be compared to small urban centers, since the campus needs basic infrastructure, water and energy supply networks, sanitation networks and rainwater collection and access roads. In addition, they involve various teaching, research, extension activities and activities related to its operation through bars, restaurants, accommodations, convenience centers, among others. As a consequence of its activities and operations, there is generation of solid waste and liquid effluents, consumption of natural resources, that is, the industrial view of inputs and outputs.

For the institutions analyzed, adherence to the A3P axes involves the training of employees and the internal public. Even without requiring significant economic investments, this ended up being a weak point for the maintenance of the programs and projects analyzed.

Results based on environmental education tend to be easily lost when not continuously reinforced, and small investments do not mean large losses if the results are interrupted. Added to this element of fragility is the perception that sustainability practices are associated with activities of secondary importance in most of the organizations analyzed. A3P installation programs and projects are rarely linked to the organization's strategic activities

The institutes with the least adherence to the axes are those that do not have environmental care in their mission/vision/values and do not have any type of partnership with AP3, leading to the conclusion that managers do not have a strategic vision about the impact of sustainability in their institution. This, as analyzed in this study, causes an incomplete education of the students, as they do not have a complete education as citizens, lack of well-being of their employees, and damage to the environment of the region where they are inserted.

A3P's challenge in consolidating itself as part of the public agency's strategic plan is in relation to the organization's core business and more long-term investments. These requirements are necessary for A3P to direct organizations to proactive environmental and social responsibility practices, which go beyond social and legal requirements. Once these challenges are overcome, A3P will demonstrate its potential to contribute to sustainable development, which can stimulate a real and lasting commitment of the management to its social and environmental responsibility.

As limitations of the study, the lack of standardization of management reports in relation to sustainability and other institutional documents can be highlighted, hindering the analysis of actions and comparison with other institutes. This lack of information and sustainability indices was also detected in other studies such as Freitas et al. (2011) and Gazzoni et al. (2018).

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LIBERATING PEDAGOGY AS A METHODOLOGY FOR HUMAN RIGHTS EDUCATION

A PEDAGOGIA LIBERTADORA COMO METODOLOGIA PARA A EDUCAÇÃO EM DIREITOS HUMANOS

LA PEDAGOGÍA LIBERADORA COMO METODOLOGÍA PARA LA EDUCACIÓN EN DERECHOS HUMANOS



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ABSTRACT

The study aims to investigate the implementation of liberating pedagogy as a methodology for human rights education. The National Plan for Human Rights Education, structured on the basis of the World Programme for Human Rights Education into five strategic axes, has supported the State in its commitment to the realization of human rights through public educational policies. On the other hand, the debate on education in and for human rights remains one of the major contemporary challenges. Even today, a reality far from the ideal persists, characterized by inequalities and exclusions in the economic, social, cultural, ethnic-racial, and gender spheres, thus demanding new approaches through a liberating pedagogy that empowers individuals, encourages critical thinking, and forms conscious citizens who respect human values, especially the dignity of the human person, without any distinction of race, creed, gender, social class, or sexual orientation. The construction of a liberating educational system that shapes future citizens committed to respecting and promoting human rights depends on the expansion of spaces for listening, debate, and dialogue, fostering transversality and enabling a critical reading of the world and the confrontation of the dilemmas experienced in the 21st century.

Keywords: Human Rights Education. Methodology. Liberating Pedagogy.

RESUMO

O trabalho tem como objetivo investigar a implantação da pedagogia libertadora como metodologia para uma educação em direitos humanos. O Plano Nacional de Educação para direitos humanos, estruturado a partir do Plano Mundial de Educação para direitos humanos em cinco eixos estratégicos auxiliou o Estado no compromisso com a concretização dos direitos humanos através de políticas públicas educacionais. De outro lado, o debate sobre a educação em e para os direitos humanos é um dos grandes desafios contemporâneos. Ainda hoje presencia-se uma realidade bastante diversa da ideal, caracterizado pela presença de desigualdades e exclusões nos segmentos econômico, social, cultural, étnico-racial e de gênero, exigindo assim novos contornos, através de uma pedagogia libertadora, que empodera o indivíduo, que o faz pensar criticamente, que forma um cidadão consciente,

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que respeita valores humanos, em especial, à dignidade da pessoa humana, sem qualquer distinção de raça, credo, gênero, classe social ou orientação sexual. A construção de um sistema educacional libertador que forme um futuro cidadão respeitador e efetivador dos direitos humanos se dá com a ampliação dos espaços de escuta, de debates, de diálogos, que favorecem a transversalidade possibilitando uma leitura crítica do mundo e o enfrentamento dos dilemas vivenciados no século XXI.

Palavras-chave: Educação em Direitos Humanos. Metodologia. Pedagogia Libertadora.

RESUMEN

El trabajo tiene como objetivo investigar la implementación de la pedagogía liberadora como metodología para la educación en derechos humanos. El Plan Nacional de Educación en Derechos Humanos, estructurado a partir del Programa Mundial para la Educación en Derechos Humanos en cinco ejes estratégicos, ha apoyado al Estado en su compromiso con la concreción de los derechos humanos a través de políticas públicas educativas. Por otro lado, el debate sobre la educación en y para los derechos humanos constituye uno de los grandes desafíos contemporáneos. Aún hoy se observa una realidad bastante distante de la ideal, caracterizada por la presencia de desigualdades y exclusiones en los ámbitos económico, social, cultural, étnico-racial y de género, lo que exige nuevos enfoques mediante una pedagogía liberadora que empodere al individuo, que lo haga pensar críticamente y que forme un ciudadano consciente, respetuoso de los valores humanos, en especial de la dignidad de la persona humana, sin ninguna distinción de raza, credo, género, clase social u orientación sexual. La construcción de un sistema educativo liberador que forme a un futuro ciudadano respetuoso y promotor de los derechos humanos se logra mediante la ampliación de espacios de escucha, debate y diálogo, favoreciendo la transversalidad y posibilitando una lectura crítica del mundo y el enfrentamiento de los dilemas vividos en el siglo XXI.

Palabras clave: Educación en Derechos Humanos. Metodología. Pedagogía Liberadora.

1 INTRODUCTION

The objective of this work was to investigate the implementation of Paulo Freire's liberating pedagogy as a methodology for education for or in human rights. Regarding the methodology, the method will be the hypothetical deductive one, diagnosing a problem, through theoretical research and its possible answers.

The relevance of the subject addressed lies in the fact that education as a human right is a concrete alternative for the dissemination of ethical values, thus being able to teach the student or individual to be a citizen who respects rights and propagates a culture of mutual respect, peace and tolerance of differences, at the same time, which can boost you to contextualize your reality and thus be able to eliminate conflicts.

Thus, the structure of the work will be developed in three research topics, starting with the conceptualization and contextualization of Paulo Freire's liberating pedagogy, later going through the approach of education for human rights and ending with the study of liberating pedagogy as a methodology for an education focused on human rights.

The choice of the theme is essential, as it presents challenges and a new posture or way of thinking and acting, arousing interest in the study of education as a viable way to overcome everyday problems for the realization of human rights.

2 THEORETICAL FRAMEWORK

Human rights simultaneously represent an achievement of humanity, introducing the idea of protection of the human being and human dignity. From this point on, the human person is respected and seen as a subject with rights.

The historical construction of these rights has led to the valorization of man and his recognition as an autonomous being on an equal footing with others, enshrining a modern concept of humanity that values the principles of human dignity, solidarity, fraternity and equality.

It is within this perspective arising from processes of struggles, respect, and even violations, that human rights must be taught from a liberating pedagogy, which reflects an autonomous, empowered, critical individual with values, in line with the values so protected throughout the history of humanity's evolution.

2.1 LIBERATING PEDAGOGY IN PAULO FREIRE

Talking about the pedagogy of liberation presupposes making some historical considerations about its emergence in Brazil, from the first decade of the twentieth century:

(...) the pedagogical principles of libertarian education were the only parameters for contesting the traditional pedagogy that, at that time, reigned supreme in schools and offices, as well as in the minds of authorities, parents and teachers (KASSICK; KASSICK apud SANTANA, 2018, p. 483).

Occurring in a context of European immigration to Brazil, of workers with ideals linked to revolutionary unionism, who settled in the most diverse branches or services, the liberating pedagogy ended up providing, through the narrowing between the working class and the students, the favoring of critical spaces, where pertinent issues were debated, on the one hand, scientific knowledge to the workers, and on the other hand, the organization of protests among the workers, without authoritarianism and dogmatism on the part of either side.

These "living" texts represented an integrated action of the anarchists in the factories, together with the workers, and, at the same time, a rejection of the books that circulated in Europe of a religious nature with a bourgeois bias and an ideology that did not promote the critical debate of the reality lived at that time (KASSICK; KASSICK apud SANTANA, 2018, p. 484).

From this perspective, in Brazil there were several schools that emerged influenced by anarchist ideals from the European continent, especially Italy, Spain and Portugal:

In Rio de Janeiro, the 1st of May School was founded in Vila Isabel. The Modern School Association was also created, at Rua do Senado, 63. In São Paulo, the Modern School was founded in 1909, at Avenida Celso Garcia, 262. In Rio Grande do Sul, the Library Society for Rationalist Teaching was created, by Leopoldo Bettiol. Many of the proletarian organizations created workers' schools influenced by Ferrer's libertarian pedagogy. It was important to teach Brazilian workers to read and write, exercise reading, and indoctrinate them. These libertarian schools, for the most part, were called Modern Schools by the anarchists themselves, because of Ferrer's book of the same name, published after his death (SANTOS apud SANTANA, 2018, p. 483).

Thus, it is clear that the relations established between the illiterate mass and the workers linked to the anarcho-syndicalist movement, who received instructions from anarchist educators, made this mass of the population better able to acquire more culture than the other workers exploited by the bourgeoisie of the country, that is, to the exact extent that the information disseminated by the anarchist syndicalist movement was being discussed, these people with access to them were better able to evaluate the precarious conditions of the education that were offered.

In summary, the anarchist educational model, in relation to traditional educational processes, sought to transcend school limits, demonstrating that knowledge could be acquired not only in the school space, but in other spaces as well.

Libertarian education can cross schools and universities, its own associations, the circumvented and unavoidable spaces of computo-informational production. It shows the relevance of anarchism, no longer through its criticism of the State, socialist totalitarianism or the cunning bourgeois democracy, but through its inventiveness in dealing with the overcoming of power relations and in asserting powers of freedom and enabling the unexpected and the emergency of the extraordinary (PASSETI, AUGUSTO apud SANTANA, 2018, p. 488).

Within this context of libertarian para-school education, portrayed in non-governmental organizations, in non-partisan movements, "emancipation is sought, on the basis of mutual support and solidarity, trying not to take away the protagonism of local students and with projects that seek a less hierarchical policy and with direct interventions by all who are participating there" (SANTANA, 2018, p. 487).

Following this progressive trend of education, based on popular education, and as a rule, outside the school walls, Paulo Freire, a great contributor to the ideals of liberating pedagogy, criticized the traditional model of education, which he called education by the banking method, which contemplates a passive education, in an authoritarian model of teaching, from top to bottom, where the student is absent of knowledge, unable to think critically.

This education that criticizes the banking method is based, for Freire, on the freedom of the oppressed, that is, "the pedagogy of the oppressed, which, in the end, is the pedagogy of men engaged in the struggle for their liberation, has its roots there. And it has to have in the oppressed themselves, who know themselves or critically begin to know themselves as oppressed, one of their subjects. (FREIRE, p. 22, 1987)

Regarding the banking method, Freire teaches that this "oppressive pedagogy does not provide dialogue, on the contrary, it tames and dehumanizes the oppressed more and more, it only deposits knowledge, and that its conception is the empty man, and therefore easy to be dominated" (FREIRE apud MIRANDA, 2022, p. 14).

So, Freire strives first for the liberation of this oppressive education, in a humanist character that begins with the transformation of praxis, and that, after this, transforms itself from an oppressive pedagogy and becomes a liberating pedagogy.

About this perception of humanist education mentioned above, Freire teaches that man stops objectifying himself to humanize himself:

(...) What was urgently needed was to provide quick and safe solutions to their distressing problems. Solutions, it should be repeated, with the people and never about or simply for them. It was to go to meet these people who emerged in the urban

centers and emerged in the rural ones and help them to insert themselves in the process, critically. And this passage, absolutely indispensable to the humanization of the Brazilian man, could not be made by deception, fear, or force. But for an education that, because it is education, would have to be courageous, proposing to the people a reflection on themselves, on their time, on their responsibilities, on their role in the new cultural climate of the transition era. An education that would provide him with reflection on his own power to reflect and that would have his instrumentality, for this very reason, in the development of this power, in the explanation of his potentialities, from which his capacity for choice would derive. Education that took into account the various degrees of power of capture of the Brazilian man of the highest importance in the sense of his humanization. Hence the concern we have always had to analyze these various degrees of understanding of reality in its historical-cultural conditioning (...) . (FREIRE, p.57-58, 1967).

The transformation of the culture of silence, where the student is passive, only listens and reproduces what is transmitted horizontally by the teacher is essential for an education that prepares an individual in a conscious way, critical of what the society in which he lives and the relationships where he is situated does.

Paulo Freire's great issue is that the culture of Silence brought by this banking method is a culture that exercises authoritarianism over the individual, making this individual incorporate the idea of inferiority, apathetic to the reality that surrounds him.

On the need to transform reality, praxis, the experience of the world, of reality is fundamental for a critical education:

As the oppressed get rid of oppression, through a liberating pedagogy, whose character has to be humanistic, and they begin to get involved in praxis, through their own transformation, and after this oppressive situation is transformed, the pedagogy no longer belongs to the oppressed, but to men in a process of continuous liberation (MIRANDA, 2022, p. 26).

So, of course, from these precepts idealized by Paulo Freire, a form of model of liberating education was constituted, favored in the experience of the individual, aware of social inequalities, but potentially based on a process of conscious emancipation, leaving aside the merely technical, unconscious education, which does not provide the individual with the understanding and understanding of this educational process.

Thus, in contrast to this education based on the banking method, reproductive, unconscious and alien to social reality, liberating pedagogy privileges dialogue, problematization, permeated by reflections, by the critical analysis of reality, both by students and by educators.

In fact, it would not be possible for problem-solving education, which breaks with the vertical schemes characteristic of banking education, to realize itself as a practice of freedom, without overcoming the contradiction between the educator and the students. Nor would it be possible for him to do so outside of dialogue (FREIRE apud MIRANDA, 2022, p. 14).

Liberating pedagogy proposes a critical, reflective education that empowers and makes the individual aware of the problems faced in the reality that surrounds him, and prepares him for the need to educate himself to transform this reality, whether in the social, economic or political field, aiming to overcome the inequalities permeated in society.

2.2 HUMAN RIGHTS EDUCATION

Educating in human rights contributes to the strengthening of democracy and to the formation of an autonomous and emancipated citizen, aware of his rights and duties. For this, it is necessary to understand human rights education as a systematized process that combines various moments, strategies and dimensions.

Educating oneself in human rights reflects the need to assimilate historically constructed knowledge about human rights, in the affirmation of values, attitudes and social practices, in the formation of a citizen conscience, in the development of participatory methodological processes, in the strengthening of individual and social practices, in order to articulate attitudes, competencies and skills that translate into positioning and action (CARBONARI, 2011).

Complementing this perspective, Silva and Tavares lecture on educating in human rights:

Educating in this perspective requires ensuring the right to education as a human right of all people and fundamental for the achievement of other rights. But, mainly, that educational practices are permeated by the values and principles of the rights and duties of all and encourage attitudes consistent with respect for human dignity (2012, p. 15).

Defining human rights education, the World Plan for Human Rights Education conceptualizes it as the a set of training and information dissemination activities aimed at creating a universal culture in the sphere of human rights, through the transmission of knowledge, the teaching of techniques, and the formation of attitudes, with the aim of: (a) strengthening respect for human rights and fundamental freedoms; (b) to fully develop the human personality and the sense of human dignity; (c) To promote understanding, tolerance, gender equality and friendship among all nations, indigenous peoples and racial, national,

ethnic, religious and linguistic groups; (d) to facilitate the effective participation of all people in a free and democratic society in which the rule of law prevails;

(e) to promote and maintain peace; (f) promote a sustainable development model centered on people and social justice (BRASIL, 2022, p. 3-4).

On the other hand, Muhl and Mainardi (2012) explain that educating oneself in human rights goes much further than obtaining understanding and knowledge on the subject, but rather starts from a "dimension of formation that implies the construction of a new way of being, thinking and acting of the human being in relation to himself and in relation to others" (2012, p. 39).

To educate oneself within this perspective is to assume an understanding of the world, of oneself and of the relations between the subject and the world, with the school having the fundamental role of promoting the construction of this systematized and humanized knowledge.

The role of education as a privileged space for the construction of subjects of rights, and also for the formation of a culture of human rights, brings to light the need to think about the citizen in his or her relations with the right to education and the effective participation in the political, economic, social and cultural structures of society (CAPUCHO, 2012, p. 21).

Morin (2009) says that the great challenge today lies in educating "in" and "for" the planetary era. To this end, the main objective of education in the planetary era is to educate for the awakening of a world-society, comprised of a planetary civilization and a cosmopolitan citizenship.

The mission of education for the planetary era is to strengthen the conditions for the possibility of the emergence of a world-society composed of protagonist citizens, consciously and critically committed to the construction of a planetary civilization (MORIN, 2009, p.98).

This planetary perspective is allied to Benevides' idea of education for human rights, while he attributes that three pillars are necessary to be built: first, it must be permanent, continuing and global education; second, it must provide a cultural change and third, it must not only instruct the individual, but also penetrate their feelings and senses, however, without forgetting to cover educators equally (2022, 01).

For this, it is necessary to intertwine the different educational spaces according to the different levels of learning, aiming at a citizen action, articulating their experiences and knowledge, and for a permanent contextualization of their fundamental problems in the pursuit of hominization. Planetary education must provide a worldology of everyday life (MORIN, 2009, p. 99).

Morin's central idea lies in the migration of teaching focused only on the formation of a profession to the transmission of strategies for life and citizenship.

The educational process of human rights education reinforces the idea of training subjects of rights, through the recognition that these subjects are not ready, but in full construction and formation (CARBONARI, 2011).

Within this premise, the conception of education for human rights ends up incorporating an understanding of democratic, active, and popular citizenship, based on the principles of freedom, equality, diversity, universality, indivisibility and interdependence of rights (MARINHO, 2012).

Educating for and in human rights also represents assuming a commitment to the affirmation of historical subjects who have in human rights "the content of their meaning and the instrument of their own social, political and cultural construction" (CARBONARI, 2011, p. 121).

The educational process, therefore, implicitly brings the tool to combat all types of human rights violations. This process destroys the paradigm of prejudice and atrocities committed against human beings and a new citizen and humanized perspective is rebuilt.

Human Rights Education seeks to awaken society as a whole to the essentiality of this respect, so that every citizen is an agent of his or her own history, builder and defender of his or her citizenship, constituting one of the ways to combat violence and human rights violations (MARINHO, 2012, p. 42).

The conception of education for human rights is linked to an education focused on values, to a critical and reflective moral posture, as well as to information and access to fundamental rights. It must also be linked to the idea of spreading a culture of peace, love, respect for others, respect for differences, social solidarity, forgiveness, civility and civility, participation and inclusion.

It is the formation of a culture of respect for human dignity through the promotion and living of the values of freedom, justice, equality, solidarity, cooperation, tolerance and peace. This means creating, influencing, sharing, and consolidating mentalities, customs, attitudes, habits, and behaviors that all derive from those essential values mentioned – which must be transformed into practices (BENEVIDES, 2022, p. 01)

Educate for the discernment of all these values and transmit the idea that everyone has an ethical and transformative nature on the goals of life, especially for those who experience a reality of violence, prejudice, discrimination or segregation on a daily basis: "The culture of respect for human dignity is oriented towards change in the sense of

eliminating everything that is rooted in mentalities due to prejudice, discrimination, non-acceptance of everyone's rights, non-acceptance of difference" (BENEVIDES, 2022, p. 01).

It is therefore essential to confront this heritage of historically perpetuated prejudices and discrimination, including in relation to human rights, in order to demystify the erroneous identity that human rights are the rights of marginality or banditry. It is also necessary to demonstrate that human rights encompass not only individual and political rights, but also social, economic and cultural rights. And this transformation only occurs through the individual's educational process. Thus, within this conception, human rights are "those considered essential to all people, without any distinctions of sex, nationality, ethnicity, skin color, age group, socio-economic environment, profession, physical and mental health condition, political opinion, religion, level of education and moral judgment" (BENEVIDES, 2012, 03).

It is necessary to understand that human rights are essential to the life of the human being. Thus, the training of subjects in human rights must combine a new pedagogical posture, through a systematic and multidimensional process that guides the formation of subjects:

The realization of education for human rights as the construction of processes that make the subjects from the inside and place them inside the educational processes as a mediation for the transformation of relationships, in such a way as to collaborate for the concrete realization of the set of human rights in the life of each subject (in their singularity) and also for the set of them, in social and political processes (in its particularity and universality) requires the production of a new pedagogical posture (CARBONARI, 2011, p. 123).

Through the educational act that contemplates the understanding of democracy and human rights as historical products, it is possible to transform and build a society in and for human rights (VIOLA, BARREIRA, PIRES, 2011).

In this way, education is understood as a right in itself and an indispensable means for access to other rights, gaining importance when directed to human development and its potential, when it values respect for socially excluded groups. Thus, it is clear that he seeks to achieve full citizenship for the construction of knowledge, for the development of values, attitudes, and behaviors, in addition to socio-environmental defense and social justice (BRASIL, 2022, b).

This discourse of an emancipated, conscious and participatory citizen, based on an education based on human rights, is a difficult task, even more so in view of the current complexity of society, characterized by cultural diversity and historically different peoples. In the face of this new world conjuncture, of a planetary citizenship, human rights assume a new

status, contributing to an emancipatory perspective, of a global nature, which has formal education as its main instrument for implementing these premises.

Active citizen participation strengthens democracy and forms citizens who are able to make their own decisions and assume their responsibilities. By this statement, the higher the level of education, the greater the conditions they will have to form their value judgments and make their choices, effectively participating in the construction of concrete solutions for a more just and egalitarian society (COSTA, 2013).

Education has this function of teaching, but at the same time forming an individual capable of facing their dilemmas and not passively accepting them without trying to eliminate them.

Thus, the skillful instrument for the person to achieve this status is quality formal education added to education for responsible citizenship. [...] The citizen starts to act independently, connected to global issues such as cultural plurality, peace, social inequalities, environment, health and safety. It will be through effective and quality education that the Democratic Rule of Law will be achieved, understanding that education favors personal progress and the strengthening of citizenship, in addition to contributing to sustainable development in all its dimensions [...] (COSTA, 2013, p. 16).

The idea of education for human rights, even in the face of a contradictory and paradoxical panorama, as a form of full exercise of citizenship highlights the legal importance that this right reflects in the 1988 Constitution and how much it interferes in the construction of a citizen education. However, in order to develop this premise, it is necessary to join a set of factors, in particular, to work on ways to enable investments in the training of professionals who will disseminate the theme involved in human rights, as well as to work on proposals for the insertion of this theme in all training spaces.

3 LIBERATING PEDAGOGY AS A METHODOLOGY FOR HUMAN RIGHTS EDUCATION

Combining human rights with liberating pedagogy makes it possible to deal with issues that transcend the current debates on the subject, especially with regard to the definition of human rights, or even in relation to the process of affirmation and struggle for these rights, or even in relation to their importance in the current context, their ambiguities and especially thinking about human rights, in such controversial and unequal times.

It is necessary to think about a liberating pedagogy of human rights, so that the bad and badly seen image of human rights sown and perpetuated in society can be demystified, especially with regard to the mistaken assertion that human rights aim at the sole and exclusive protection of criminals and dissociate what is wrongly thought with what they

actually represent and what they have in fact historically sought, that is, the recognition of rights to human beings, regardless of color, creed, social condition, nationality.

For this, it is necessary to have a method that allows problematizing the tensions that permeate the field of human rights, dialoguing and debating their ambiguities, incongruities and contradictions through the collective construction of a pedagogy of human rights, which provides freedom from the shackles of certain prejudices or absolute truths; so that each citizen can constitute his own idea on the subject, consciously based on historical ideals.

The perspective is to create new possibilities of living and relating to the rubble of traditional institutions, breaking with static ways of thinking about social problems and establishing a game of separating, joining, reorganizing and inventing forms of insertion in the world that, in some way, burst the cloister in which they were abandoned. It is the task, which is each and everyone, at the same time, of initiating and continuing a dialogue, essentially democratic [...] that has as its starting point, the very reality of the protagonists who experience, in practice, the great challenge of implementing fundamental values of human rights in their respective places of action (FREIRE apud SANTOS, 2022, p. 11).

In order to materialize these ideas, it is necessary that all school spaces, from basic education, through elementary, secondary and higher education, dialogue about human rights, in order to understand what they really represent within the current context.

Paulo Freire, in his works, makes clear the need to transform society through education. He emphasizes the need to transform reality depends on the subjects also involved in the educational process, in the reconstruction and rethinking of knowledge and practices, "assuming the task of calling on the other social actors to compose a great front in favor of life, human rights and education for freedom" (FREIRE apud SANTOS, 2022, p 11).

Within this context, where both students and educators can make a difference in this process of rethinking human rights, including using the school and academic environment, there is no way to dissociate from the idea of a citizen school, which acts in the citizenship formation of its students.

In view of this, the pedagogical relationship between education and human rights must occur in a way that contemplates all subjects, from basic education, so that they are able to learn about the value of human rights and with this, they can disseminate a culture of respect for diversity, and thus contribute to a society that cultivates tolerance and peace.

The composition of thematic forums, aimed at strengthening education for human rights, when observing the importance of transdisciplinary knowledge and actions, allows proposals to be generated, horizontally and vertically, that redirect the paths of early childhood, elementary, secondary and higher education (MONTEIRO, 2009, p. 03).

Today, the concept of citizenship is limited only to the exercise of political rights, and it is up to the Democratic State to improve this concept, also understanding it as a synonym for individual autonomy, as a citizen who is less and less dependent on the State and who effectively seeks to guarantee individual freedoms (CAPUCHO, 2012).

Thus, the starting point of liberating education is characterized exactly from the dimension of man with his reality, valuing that educational process that starts from the reality of the students, from the mediating world of the subjects in the educational process: "It is the action of the students on the world that triggers the transforming action of men, resulting, thus, in humanization, in the possibility of being more, of being free" (MAGRI, 2012, p. 52).

This liberating education allows the subject to be an author and build his own freedom, bearer of rights, thus exercising an active citizenship.

In the same sense, a critical education can develop awareness, helping to enable both the teacher and the student to become people who are increasingly aware of their context and their condition as a human being. A space that allows subjects to teach and learn at the same time. A liberating education that through conscious action transforms praxis, "in which students and teachers become subjects who know how to see reality and take transformative action to change this reality based on critical reflection" [...] (FREIRE apud AU, 2011, p. 251).

In relation to the current neoliberal context, which ends up influencing the educational system, and which ends up destroying responsibility and social criticism, which encourages the flourishing of an inconsequential and consumer-oriented individualism and which kills consciousness, it is necessary to work to prevent this neoliberal appropriation in relation to education:

[...] safeguarding the autonomy of the learning process, teaching, intellectual production, and encouraging the reproduction of critical academics and the conditions for expanding access to those who are at a great disadvantage according to current formulas and who are being passed from one bad educational option to an even worse one. Discourses and practices educational projects need to be reconnected to a progressive emancipatory project based on solidarity and social justice (MCCARTHY; PITTON [et al], 2011, p. 62).

All this discourse in relation to education as an instrument to work on human rights as a guideline for citizenship is still recent. In the Latin American context, it has developed in a heterogeneous way, through a diversity of trajectories, articulated with the social political processes of each context (MARINHO, 2012).

For this perspective that works through the school, the participatory formation of the student, in order to prepare him for a critical, emancipated and liberating citizenship, it is necessary that the individual becomes aware of his often imperfect reality and, with this, from

knowledge, can try to improve his ability to transform this reality. It will be up to education to "contribute to the formation of people with the ability to perceive, question, use and produce technologies", as well as teachers will serve to have the ability to question, use, and consciously produce technologies, going through a process of elaboration and (re)elaboration of new knowledge, thus enabling the confrontation of diverse opinions, knowledge and learning (SILVA, 2003).

It is up to education to train this professional and for this, it is not only based on the instruction that the teacher gives to the student, but on the construction of knowledge by the student and the development of new technologies, such as: the ability to innovate, to create the new from the known, adaptability to the new, creativity, autonomy, communication (MERCADO, 2002, p. 13).

In order for the effective integration of education with new technologies, the knowledge society requires a new profile of the educator, committed, competent, critical, open to change, demanding and interactive. But, primarily, it is necessary to create conditions that favor the development of a critical view of the use of new technologies in education, in order to provide a reflective action on the objects of knowledge, thus favoring effective learning.

Teixeira makes it clear that the use of new technologies allied to education means breaking with old paradigms of knowledge reproduction to assume an emancipatory role and producer of new knowledge, making it possible to open a vast set of probability, these of 'inter' and 'transdisciplinarity' that end up being enhanced by the advent of these new technologies (TEIXEIRA, 2002, p. 41-42).

It is necessary to rethink education and its role in society, and with that, propose new directions, which meet not only the demands of the contemporary labor market, but also promote the development of critical, autonomous, creative citizens, and with sufficient capacities to solve unexpected and unforeseen problems, and also, question and transform society (TIJIBOY, 2001).

In this sense, the role of education in educational spaces is important, as it contributes to the formation of a citizen capable of a critical and conscious reading of the role in this information society, which is in constant transformation.

Morin, in this sense, teaches that these possibilities play and play an important role in the sciences, as they break the isolation between the disciplines (MORIN, 2000). Combining education with new technologies enhances inter and transdisciplinary aspects in the construction of knowledge, as they allow interaction between individuals or groups from different cultures.

Freire already said that education is a path to social and political responsibility, and also that democratic knowledge is never constituted in an authoritarian way, but rather a collective conquest of educator and student. The author says: "Education that, undressed in alienated and alienating clothing, is a force for change and liberation" (FREIRE, 1983, p. 36).

Delors also says that education is the passport to human development, that is, to understand oneself and the other, and thus participate in life in society (DELORS, 2001).

In this way, the role of liberating education assumes a posture of self-reflection on the current context of society and on your role as a citizen in this society. Awareness will result in the participation of this individual not as a spectator, but as the author of his story.

Monteiro rightly states that education for human rights intertwines diverse perspectives and knowledge that must extend throughout the person's education, from their young age to their adulthood. It says that education for human rights must be confirmed as a principle of public policy and must be implemented in all areas of school education and also informal education, insofar as it plays an essential role in promoting respect, participation, equality, peace, and above all, in the confronting any and all types of discrimination or exclusion against people or groups (MONTEIRO, 2009).

Liberating education for human rights, being effectively used in the school environment and outside it, also makes it possible to manage a whole universe of ambiguities, providing a new dialogical bias with other sources and areas of knowledge, establishing parameters that lead to a new perception of what human rights are and what their importance is.

Within this context, education is treated as one of the foundations for the development of the citizen. This conjuncture must be understood in the eyes of article 3º of the 1988 Constitution, as Ferreira considers:

The formula education for development is indeed useful, but education becomes difficult without development, since education, being a privilege of privileged and rich minorities, only flourishes in areas of prosperity, and not in areas of poverty (1995, p. 261).

This perspective of emphasizing individual and social rights and the obligation of the State to promote them is contemporaneously assumed as a democratic, constitutional and social project of Law, where education, as well as other rights of the same nature, gain prominence while projecting an idea of human dignity from a conception "that allows us to view human beings as part of an immense balance that is constantly undone and which constantly needs to be remade, in a permanent consultation with a vital ethic" (SCHOLZE, 2009, p. 271).

Currently, liberating education in human rights can "contribute to the formation of people with the ability to perceive, question, use and produce technologies", as well as serve as training to question, use, and consciously produce technologies, going through a process of elaboration and (re)elaboration of new knowledge, thus enabling the confrontation of diverse opinions, knowledge and learning (SILVA, 2003, p. 23).

Educating for human rights contemplates the approach of the most varied thematic axes that involve human rights. In the face of such a wide range of conflicts and differences that are increasingly highlighted in the contemporary world, educating in and for rights

Art. 3 The fundamental objectives of the Federative Republic of Brazil are:

I build a free, fair and solidary society;
 II to ensure national development;
 III eradicate poverty and marginalization and reduce social and regional inequalities;
 IV promote the good of all, without prejudice of origin, race, sex, color, age and any other forms of discrimination within a perspective of liberating pedagogy means disseminating inalienable rights inherent to the human being so that they serve as instruments to mediate the conflicts and ills that still exist today.

All these aspects are in line with the precepts established by the National Plan for Education for Human Rights, which establish programmatic actions for a practice in human rights in five basic axes: Basic Education, Higher Education, Non-formal Education, Education of Justice and Security Professionals, and Education and Media, aiming to disseminate and propagate the culture of human rights, through education as a mechanism for this dissemination, in order to strengthen democratic society, identifying desires and transforming them into effective achievements (GORCZEWSKI, 2009).

The elaboration of a "Pedagogy of Human Rights" in schools, universities and in the various spaces interested in debating the theme and its problems, would be an important strategy for us to make clear the fact that we will not accept, under any circumstances, the establishment and institutionalization of "impunity for those who kill children in the streets, for those who murder peasants who fight for their rights, of those who discriminate against blacks, of those who inferiorize women", (FREIRE apud SANTOS, 2022, p. 11-12).

This bias of liberating education inside and outside the school environment, combined with the emancipatory role of students and educated, of awareness about reality and about the problems experienced in society, from a methodology focused on human rights, provides a reflection on the need to sculpt a society, a citizen, an empowered, conscious and full individual about their rights and about the need to change and transform reality and existing problems, moving from the ideal discourse to the practical discourse of the protection of human rights.

4 FINAL CONSIDERATIONS

Even though we are still witnessing a discriminatory universe, prejudiced against human beings and violating human rights, it is still possible to build an alternative path from this bias, through education for human rights, based on a liberating logic idealized by Paulo Freire.

Education focused on human rights can be an instrument to be used in the school environment and outside it, in order to break with an exclusionary, discriminatory and intolerant paradigm that is still present today. Likewise, if worked according to a methodology based on liberating pedagogy, it prepares the student/individual to face these problems in a creative, conscious, empowered, and constructive way.

For this reason, education is considered the great challenge of the twenty-first century, which in the face of a changing society, in constant transformation, implies a reconstruction of the educational system, through curricular models that contemplate transversal axes that will guide the construction of an ethical and moral model that enables the formation of a better world.

Unfortunately, it is known that the context of violence, discrimination and intolerance hinder the practical applicability of this new pedagogy in human rights, even more so since historically education suffers the influences of a culture of colonialism, which today prevents an open view of values such as democracy, participation in decision-making, active citizenship and ethical posture. Society, even if it normatively contemplates human rights through the Federal Constitution of 1988 and international documents recognized as universal, still remains unequal and discriminatory, reproducing and trivializing these problems even more.

For a pedagogy in human rights, it is necessary to train teachers focused on human rights, capable of making them able to work on goals of awareness about the importance of these values. Working on curricular proposals through curricular disciplines or in a transversal way also contributes to the deconstruction of prejudiced, alienated and discriminatory mentalities, postures and behaviors and instigates a reconstruction that liberates, emancipates, and enriches all subjects of the educational process.

In conclusion, education for human rights contributes to the creation of a universal culture of human rights, to respect for the fundamental rights and freedoms of the human being, to the full development of the human personality, to the protection of dignity; for the practice of tolerance, respect for diversity of all kinds.

As we are facing a multifaceted society, it is necessary to have a contextualized interpretation of the events. Paulo Freire's liberating education thus contributes through citizen awareness committed to the values guided and protected by human rights.

It is necessary to break the myth that human rights reflect the protection of the marginalized or criminals and rebuild a new perception that encompasses the rights inherent to the human person, regardless of creed, color, race, sexual option, gender or even regardless of geographic location or socio-economic or cultural condition.

Education for human rights in the educational space provides the transformation of reality, contributing to a democratic, fair and solidary society, contributing to the formation of a future citizen aware of their obligations and rights.

It is necessary to remove the blindfold and eliminate totalizing dogmas. It is necessary to relearn and look at education with an emancipatory perspective. Human rights education can awaken the purest feelings of man, hidden in these times of misunderstanding, intolerance and discrimination.

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THE IMPORTANCE OF GAMES IN THE LEARNING OF CHILDREN WITH AUTISM SPECTRUM DISORDER IN EARLY CHILDHOOD EDUCATION

A IMPORTÂNCIA DOS JOGOS NA APRENDIZAGEM DE CRIANÇAS COM ESPECTRO AUTISTA NA EDUCAÇÃO INFANTIL

LA IMPORTANCIA DE LOS JUEGOS EN EL APRENDIZAJE DE NIÑOS CON TRASTORNO DEL ESPECTRO AUTISTA EN LA EDUCACIÓN INFANTIL



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ABSTRACT

This research seeks to reflect on the importance of playfulness in the learning process of children with Autism Spectrum Disorder in early childhood education, since games and playful activities are exceptional instruments of mediation between pleasure and learning, given that playfulness is eminently cultural. The theme of this study is the importance of games in the learning of children with Autism Spectrum Disorder in early childhood education. However, the general objective of this work is to understand the importance of playful activities in the learning process of children with Autism Spectrum Disorder in Early Childhood Education. The methodology adopted is qualitative and quantitative, making inferences through bibliographic research. It was concluded that games in early childhood education are important as facilitators of students' learning and should certainly be part of the daily practice of all schools, as they develop skills not only related to cognition, but also to social, affective, and emotional aspects.

Keywords: Autism Spectrum Disorder. Early Childhood Education. Playfulness.

RESUMO

Esta pesquisa busca refletir sobre a importância do lúdico na aprendizagem de crianças com espectro autista na educação infantil, uma vez que os jogos e brincadeiras são excepcionais instrumentos de mediação entre o prazer e a aprendizagem, já que o lúdico é eminentemente cultural. Tem como tema a importância dos Jogos na aprendizagem de crianças com espectro autista na educação infantil. Entretanto, este trabalho tem por objetivo geral compreender a importância das atividades lúdicas no processo de aprendizagem de criança com espectro autista na Educação Infantil. Em relação a metodologia qualitativa e quantitativa, fazendo inferências por meio de pesquisas bibliográficas. Concluiu-se que os jogos na Educação Infantil são importantes como facilitadores da aprendizagem dos alunos da escola e que certamente deve fazer parte do cotidiano da prática educativa de todas as escolas, pois desenvolve habilidades que não estão voltadas somente para o cognitivo, mas também para o social, o afetivo, o emocional.

Palavras-chave: Espectro Autista. Educação Infantil. Ludicidade.

RESUMEN

Esta investigación busca reflexionar sobre la importancia de lo lúdico en el aprendizaje de niños con Trastorno del Espectro Autista en la educación infantil, ya que los juegos y las actividades lúdicas son instrumentos excepcionales de mediación entre el placer y el aprendizaje, dado que lo lúdico es eminentemente cultural. El tema de este estudio es la importancia de los juegos en el aprendizaje de niños con Trastorno del Espectro Autista en la educación infantil. Sin embargo, el objetivo general de este trabajo es comprender la importancia de las actividades lúdicas en el proceso de aprendizaje de niños con Trastorno del Espectro Autista en la Educación Infantil. La metodología adoptada es cualitativa y cuantitativa, realizando inferencias a través de investigaciones bibliográficas. Se concluyó que los juegos en la educación infantil son importantes como facilitadores del aprendizaje de los alumnos y que, sin duda, deben formar parte de la práctica educativa cotidiana de todas las escuelas, ya que desarrollan habilidades que no solo están orientadas al aspecto cognitivo, sino también al social, afectivo y emocional.

Palabras clave: Trastorno del Espectro Autista. Educación Infantil. Ludicidad.

1 INTRODUCTION

The process of school inclusion has been the subject of discussion in the school context of Brazil. The recent publication of the Brazilian Law for the Inclusion of Persons with Disabilities (Law No. 13,146, 2015) reinforces this discussion, emphasizing the principles of establishing an inclusive society. However, Special Education at school becomes a space of conducive reception, molded to the student. Inclusive Education differs from Special Education, as it is not characterized as a modality, but rather a methodological procedure within basic education.

Special Education is of great importance, especially in its inclusive perspective, because it is through it that the rights of individuals are ensured by law, and this inclusive process occurs in the regular school system. (Kassar, 2011).

Every day the methodologies that facilitate the child's learning are being discussed. It has long been believed that children learned only by receiving information from the teacher. The child listened, copied, memorized and should learn in this way. But as time went by, other ideas about how to teach the child developed. These ideas were the products of the work of several educators and also of psychologists who sought to study means that facilitated the child's understanding and consequently better learning.

It is considered that the function of Early Childhood Education is to promote the global development of the child; To do so, it is necessary to consider the knowledge he already has, allowing the child to experience his world, exploring, respecting and reconstructing. Each individual learns in their own personal and unique way. Even so, there are several types of methodology that can be applied to facilitate the child's learning. It is important to find out the type of learning style of the child, so that you can teach him more efficiently and obtain better results.

This article seeks to reflect on the importance of games for the integral development of children with Autism Spectrum in Early Childhood Education, since games and play are excellent instruments of mediation between pleasure and learning, especially mathematics.

According to Principle VII of UNICEF's Universal Declaration of the Rights of the Child, play is a right of all children in the world. It is an enriching task for the child, as it makes him agile, satisfied, creative, and gives him the opportunity to communicate with the environment.

In this sense, the guiding problem of this research is based on the need to seek answers to the question: **What is the importance of playful activities in the learning process of children with autism spectrum in Early Childhood Education?** Thus, the following hypotheses were raised: Playfulness is important for the learning of students with

autism spectrum in Early Childhood Education. The types of playfulness that are worked on facilitate children's learning.

The justification for the research is that when using games, children with autism spectrum disorder seek to reflect on how play can complement learning, providing an excellent development of their potentialities and skills. In view of its degree of importance for the development and formation of the child, through this work that has as its theme: "the importance of play in the learning of children with autism spectrum in early childhood education."

The objective of this study was to understand the importance of playful activities in the learning process of children with autism spectrum in Early Childhood Education. And, in this way, characterize children with Autism Spectrum in Early Childhood Education; Know the playful activities as a pedagogical strategy; Explain the relevance of playfulness in the process of school inclusion of a child with Autism Spectrum, through reflection on its use in classrooms. To know the role of the Teacher in the Early Childhood Education of children with Autism Spectrum in Early Childhood Education.

For the methodology of the work, a qualitative descriptive approach was used , focusing on bibliographic research. The theoretical basis for this work was given through the following authors: Cunha (2011), Kishimoto (2014 and 2016), among others, who contemplate the theme proposed in this project, as well as the laws of the Federal National Constitution (1988), Statute of the Child and Adolescent - ECA (2013), LDB Law of Guidelines and Bases of Education - LDB (2016) and the National Curriculum Parameters (2018).

2 THEORETICAL FRAMEWORK

2.1 BRIEF HISTORY OF EARLY CHILDHOOD EDUCATION

Currently, schools that work with early childhood education have adopted a new scenario, with the main focus on children, the center of education. We can, therefore, observe numerous changes that have occurred over the years, whether in the way of understanding the child, their evolution or the educational process in which they are inserted.

In Brazil, early childhood education has been discussed about the importance of play in classroom practice. In addition, play is one of the crucial tools for the child's teaching and learning development process. With great studies by theorists and scholars in recent decades, it has been developing and gaining a new expression (Rego, 2014; Kishimoto, 2016; Piaget, 2016).

With the creation of the Federal Constitution in 1988, with the legal definitions of the Law of Guidelines and Bases of National Education, Law No. 9,394/96, there was an advance

in relation to early childhood education, acquiring a new instrumentalization in the country's education. The Law of Guidelines and Bases of National Education, Law No. 9,394/96 in its Article 29, expresses that early childhood education has as its purpose the integral development of children up to 5 years old, in their physical, psychological, intellectual and social aspects.

In this sense, according to article 205 of the Federal Constitution of 1988, Education must be promoted and encouraged with the collaboration of society, aiming at the full development of the person, his preparation for the exercise of citizenship and his qualification for work.

In 1990, the ECA (Statute of the Child and Adolescent) was created, whose main objective is to guarantee the merit of the rights and duties of children and adolescents. According to Ferreira (2015, p. 184), this Law is more than a simple legal instrument, because it inserted children and adolescents into the world of human rights; it established a system for the elaboration and inspection of public policies aimed at children, trying to prevent abuse, embezzlement of funds and violations of children's rights; It also served as a basis for the construction of a new way of looking at the child: a child with the right to be a child, with the right to affection, the right to play, the right to want, the right not to want, the right to know, the right to dream. This means that they are actors of their own development.

For Veronese and Custódio (2011, p. 37):

The rights of children and adolescents emerge from a system guided by the principle of the best interests of the child, provided for in article 3, 1, of the International Convention on the Rights of the Child, which determines that 'All actions relating to children, carried out by public or private social welfare institutions, courts, administrative authorities or legislative bodies, must consider, primarily, the best interests of the child'. It is a principle arising from the recognition of the child's peculiar condition as a person in the process of development.

Despite the changes that have occurred in education in the twenty-first century, many institutions still operate with the same educational system focused on traditionalism, failing to exercise an educational action focused on playfulness. Teaching requires a lot of skill and knowledge, respecting the students' knowledge and not transmitting the implicit content without discussing the theme, knowing that these activities work on the free and spontaneous movements of the student (Freire, 2016).

The National Curriculum Parameter for Early Childhood Education (Brasil, 2018, p. 13), specifies the various aspects to be contemplated, including playing.

The quality of the experiences offered that can contribute to the exercise of citizenship, respecting the affective, emotional, social and cognitive specificities of children from zero to six years old, must be based on the following principles:

Respect for the dignity and rights of children, considered in their individual, social, economic, cultural, ethnic, religious differences, etc.;

The right of children to play, as a particular form of expression, thought, interaction and communication of children;

Children's access to available socio-cultural goods, expanding the development of skills related to expression, communication, interaction, thought, ethics and science.

The socialization of children through their participation and insertion in the most diversified social practices, without discrimination of any kind;

Attendance to essential care associated with survival and the development of their identity.

Also, according to Brasil (2018, p. 23),

Educating means, therefore, providing situations of care, play and learning oriented in an integrated way and that can contribute to the development of children's capacities for interpersonal relationships, to be and to be with others in a basic attitude of acceptance, respect and trust, and access by children to broader knowledge of social and cultural reality. In this process, education can help the development of the capacities of appropriation and knowledge of the bodily, affective, emotional, aesthetic and ethical potentialities, in the perspective of contributing to the formation of happy and healthy children.

2.1.1 Children with Autism Spectrum in Early Childhood Education

In recent years, autism has been discussed, especially in Early Childhood Education. Because the child with autism spectrum has a certain limitation, presenting difficulties in socialization, communication and language. For this, it is necessary to create strategies for the development of skills for better school performance.

In this sense, Cunha (2011, p. 20) explains that:

Autism comprises the observation of a set of behaviors grouped into a main triad: impairments in communication, difficulties in social interaction and restricted-repetitive activities (...) Kanner observed children with an inability in interpersonal relationships that differentiated it from other pathologies, as well as delays in speech acquisition and motor difficulties.

In this sense, the school has a very important role when it comes to educating a child with autism spectrum, as it is necessary to provide their socialization effectively, for this

reason, the school has the responsibility to enhance their growth to achieve their purpose.

As Brito (2003, p. 85) explains:

It is from the daycare center that the intellectual and affective development of the autistic child must be conducted, through an interaction between the environments he is part of, making him aware of the reality existing in society and providing knowledge of humanity and the relationships that surround it. It is clear that placing the autistic person in an institution can bring many internal conflicts and even emotional problems for parents. Many of them usually have the feeling that they are leaving their children aside, as if there were a feeling of guilt, because there is already a feeling in our world linked to the rejection of the disabled child.

It is understood that through play, play, games, and the rules of the games, the child with Autism Spectrum in Early Childhood Education begins to acquire knowledge of his rights and the rights of his classmates, so necessary for socialization.

Thus, Feijó (2012, p. 185) says that:

Through play and its history, the ways and customs of civilizations are recovered. The possibilities that play offers the child are enormous: it is capable of revealing the contradictions between the adult and the child's perspective when interpreting the toy; make contact with challenges, seek to satiate curiosity everything, know; to represent social practices, to release richness from children's imagination; facing and overcoming barriers and conditioning, offering creation, imagination and fantasy, affective and cognitive development.

The author talks about the need to use games and play in early childhood education, showing in her research the importance of using this mechanism in the classroom.

2.2.2 The role of the teacher in Early Childhood Education

With playfulness, the school space can be transformed into a pleasant and dynamic environment, so that the teacher can reach the main objective of his professional performance, which is to achieve the success of students in the classroom. No educational process is efficient without the participation of a good teacher. It is largely up to him to enable the school to become an educational space, for sharing, reflection and construction of knowledge. For any change to occur in the educational area, it must first go through the training and appreciation of teachers, so an early childhood education teacher must be aware of his great responsibility towards these little ones, and above all he must enjoy what he does.

According to Rego (2014, p. 8) the role of the educator is "to be a facilitator of games, and it is necessary to mix moments where he guides and directs the process, with other moments where children are responsible for their own games". Also according to this author,

whenever possible, the educator should participate in the games and take the opportunity to question the children about them, in addition, organize and structure the space in order to stimulate the child's need to play, aiming to facilitate the games.

In this sense, it is important to remember that the teacher also learns, and this learning is constant, so he must identify different ways of thinking about his profession, he must face it as part of a constant movement of search. As Freire (2016, p. 24) says, "the awareness of the world and the awareness of oneself as an unfinished being necessarily inscribe the being aware of its incompleteness in a permanent movement of search".

It is important that the educator has a good relationship with his students so that he can provide safety and protection to the child in the school environment. For this to occur, it is necessary that the teacher has adequate training, so that they can actually guide the children, being a mediator of knowledge, assisting in their activities and encouraging them to do them alone, so that there is interaction and can facilitate the child's development.

According to Piaget (2016), the child's development happens through play. She needs to play to grow, she needs the game as a way of balancing with the world. Thus, in order to be successful in the school environment, it is necessary to have a good organization in the workplace, seeking multiple teaching, aiming at a combination of reciprocal exchange of experiences, that is, between teacher and student, with commitment and responsibility to share experiences in the classroom.

According to Fortuna (2010), in a classroom where playfulness is present, knowledge is assimilated through a mutual exchange of information between teacher and student, collecting the importance that the student's participation has in the learning process, thus generating a harmonious environment that motivates new knowledge.

However, playing is a resource that can efficiently assist in teaching practices, making classes more creative and contributing to more productive learning. In this sense, the teacher must plan his classes so that they are more meaningful to the student. It must create several conditions that provide a more collective and individual work. For Coll (2017), the analysis of any learning process needs to take into account all factors and the possible interactions that can be established between them.

[...] In the cultural and biological context, the activities are free, joyful and involve a meaning. It is of great social value, offering educational possibilities, as it favors bodily development, stimulates psychic life and intelligence, contributes to adaptation to the group preparing to live in society, participating and questioning the assumptions of social relationships (Kishimoto, 2014, p. 13).

According to Arroyo (2010), only through playful teaching can education undergo positive transformations, encouraging and innovating the methodological relationship between teacher and student, thus enhancing the assimilation of knowledge in a meaningful and interactive way.

For Coll (2017), the analysis of any learning process needs to take into account all factors and the possible interactions that can be established between them. Therefore, the teacher must organize his activities so that they are meaningful to the student. It must create conditions for group or individual work, facilitating its development. Because, in playfulness, the child will have the opportunity to experience rules, norms, transform, recreate, learn according to their needs, develop their reasoning.

Therefore, games are essential for the Autistic Spectrum child to develop their skills, and for them to learn to socialize and participate with other children in a joint action, with the participation of the teacher who will mediate between playing and learning.

2.2.3 The Practice of Play in the Learning of Children with Autism Spectrum

We live in a globalized world, where a certain barrier has fallen for some, while others are raised for others. In this contemporary society, with its fast capitalist consumption behavior, the "different" has not always been tolerated, the difference, discards cultures, customs and values, all this for an unequal competition, where only the strongest has been considered in the "race" for success. This way of life of the citizen, young, old, black, and especially fragments the lives of people with special educational needs, making them beings with serious difficulties in relating.

In the school environment, these situations are affirmed, as there has been a significant increase in the number of children with some type of disability in the country's regular school system in recent years, and this growth is not accidental, but the result of the mobilization of Brazilian society, which after the Brazilian Constitution of 1988 guarantees access to regular elementary education to all children and adolescents. without exception, and makes it clear that children with special educational needs should receive complementary specialized care, preferably within the school.

But the problem is that the PNEE child is sometimes excluded within the school and one of, if not the best instrument for the true inclusion of these children is to treat them as equals, and one way for this to happen, according to several theorists, is through the use of toys and games, games and recreation. In this case, the playful:

(...) it is play that is universal and that is health itself: play facilitates growth and, therefore, health; play leads to group relationships; finally, psychoanalysis was

developed as a highly specialized form of play, at the service of communication with oneself and with only others (Winnicott, 2015. p. 63).

Playing not only reinforces inclusion, but is also a powerful tool in the hands of the teacher as an additional subsidy for children with some type of special need. Let's take as an example a child with visual impairment, DV (blindness), studying in a regular class, the teacher when dealing with a content, for example, geometric figures needed an extra resource, because in an expository class he had left the DV student "out" of the subject, at that time the toy will be valuable, because he will be able to use toys with geometric shapes, and so through touch the blind child will have the same opportunity to learn.

The toy, in addition to being the main child activity, is also the privileged way in which their mind, their superior psychological capacities, such as attention, memory, imagination and (...) creativity, develop" (Zanluchi, 2015, p. 2).

It is also possible to mention the Multifunctional Resource rooms, which are spaces, organized in schools of the education network, which offer Special Education services and resources to students with disabilities, global developmental disorders and high abilities/giftedness. The resources of these rooms are mostly toys of various types and used according to the needs of each student.

The various playful activities carried out in the classroom by teachers serve as excellent didactic resources for the teaching and learning process of children with Autism Spectrum. They can also transform the school environment by making it more attractive.

In the conception of the theorist mentioned in the quote above, first, the teacher must always plan looking for tools that facilitate knowledge, worrying about the training of their students, especially children with the Autistic Spectrum, always aiming to improve and enrich their work as a teacher.

The use of the game in the classroom requires attention in the sense of exploring what will be done, and it is important to direct to whom, where and to which reality it should be directed. The act of playing provides the construction of knowledge in a natural and pleasant way, helping in socialization and the development of autonomy.

Intentional intervention based on the observation of children's play, offering them adequate material, as well as a structured space to play, allows the enrichment of children's imaginative, creative and organizational skills. It is up to the teacher to organize situations so that the games occur in a diversified way to provide the children with the possibility of choosing the themes, roles, objects and companions with whom to play or the games of rules and construction, and thus elaborate in a personal and

independent way their emotions, feelings, knowledge and social rules. (Brazil, 2018, p. 29).

Both the use of materials and the school space are useful for the learning of children with autism spectrum, and the teacher as an advisor is fundamental for their development, proposing various resources that stimulate and are of great effectiveness for their learning.

The teacher is a competent being and must create a diversified place of games and play for the integration of children with Autism Spectrum in the classroom. By looking for forms of learning according to the specificities of the student, making him an active being in this development process.

The game is a facilitating tool used in the learning process, which motivates the student through playfulness to analyze and create strategies to solve challenges, also providing the educator with the role of mediator and stimulator in the assimilation of new knowledge (Antunes, 2012).

The presence of play in the classroom is fundamental for the integrality of the autistic child, making him more active and participative, adding joy and transforming the school space, making it increasingly pleasurable and dynamic. According to Antunes (2012) apud Macedo (2014), for the assimilation of knowledge to occur, it is necessary that teaching is dynamized by the educator, and this must be continuously renewed through methodologies that relate the student's daily life to the knowledge passed on in the classroom.

Likewise, Ribeiro (2017, p. 9) highlights the importance of play for the development of skills in children:

Playful Education, in a spontaneous and pleasant way, puts the child in a position to be guided in his instinctive impulses. To encourage, guide and develop the child's instinctive manifestations is to help the timely development of his intelligence, to refine his emotions, to strengthen his will, his individuality and his sociability.

For an effective and successful development, it is necessary that the student has built concrete knowledge and, above all, understands the contents clearly and objectively. Playfulness acts as a tool to facilitate knowledge, so it is noticeable that playing helps in the development of autistic children, especially during early childhood education.

It is up to the teacher to use strategies to use playfulness and we can then, through playfulness, encourage the imagination of the child with autism in a practical and admissible way, without harming the instigation of these students.

It is the responsibility of the school and the teachers to provide innovations that can facilitate their learning and development. However, as these are students with ASD, it is

essential that these professionals are qualified so that they can be successful in following the games and games, as each student has their specificities.

Playfulness is an essential resource to help in learning, as it favors the acquisition of knowledge, it is known that all games have rules, which provide the opportunity to explore the contents. For autistic students, the playful activity works as a link between several aspects, as the child enhances his learning, through cultural and social advancement, contributing to a healthy physical and mental life, representing a creative and communicative means through naturalness. However, the obstacles that cross the use of games with autistic students are of great relevance not only in learning, but also in the emotional state of these children who in certain situations sometimes do not have support from the efficient parts.

3 METHODOLOGICAL PROCEDURES

To carry out this research work, about the importance of games in the learning of children with autism spectrum in early childhood education, as a fundamental educational principle for the development of children with Autism Spectrum, it was decided to use a bibliographic research, using a descriptive qualitative approach, as this aims at research, analysis and understanding of the theme.

The research was carried out through data collection, selection of scientific articles and qualitative analysis that addressed the topic studied, in the Portuguese language, published in Brazil, between the years 2024 and 2025, through websites such as: the Scielo-Scientific Electronic Library On-Line, Google Scholar and others. Which will serve as a database. The following keywords were used: learning, autistic spectrum, early childhood education and playfulness.

After reading all the material, all the most relevant information was selected, with great criteria. Consequently, it was used in a descriptive way, with an investigation of all monographs, especially articles, always seeking to understand and polish more the knowledge about the theme studied.

4 FINAL CONSIDERATIONS

It was concluded that Games contribute as a facilitating agent for learning. Playing can be used as an instrument of practical complement, complementing theory, however, pedagogically very enriching, because it unsettles the subject, provoking him to move and interact with his peers and space and his environment, to the extent that a certain game, or learning proposal that the teachers are presenting at that moment, other knowledge comes into action; such as respect for rules, clarity of communication, strengthening of the affective

bond between the group, disinhibition, trust with each other, among other issues of values such as understanding, friendship, cooperation, solidarity and other knowledge that are articulated among themselves, linked by a large network incorporating themselves into each other.

The games and Play is an important strategy for development and learning, because in addition to contributing to the learning of school content, it helps in the cognitive, affective, social and psychomotor development of the autistic or non-autistic student. When playfulness is worked on in education, a door is opened for the autistic child to release his feelings, offering him the opportunity to develop his affection, thus learning to socialize better with the people around him. To assist the autistic child, adapted methods and techniques are necessary for inclusion to happen.

It is hoped that this work can contribute to a greater reflection on the theme in question, it is up to the teacher to work towards a diversified and playful methodology in the search to improve every day and have a good performance in the learning of their students. It is believed that play is an enriching source for children with the Autism Spectrum. For this learning to occur, it is necessary for the autistic child to build his own knowledge by assimilating the contents more effectively. In addition, another resource that also facilitates their learning is games.

Finally, the teacher needs to develop dynamic classes with the student as the guiding focus of his actions. Make a didactic plan aimed at constant motivation and can only happen if playful activities are present in the teacher's day-to-day life. Thus, it is possible to have a new look at the learning of autistic children, with the proper use of games, developing pleasurable playful activities that motivate and activate learning. Efforts are needed to break down barriers, eliminate prejudices and guarantee the right to quality education and recognition of differences.

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THE IMPORTANCE OF MATHEMATICS FOR AUTISTIC STUDENTS

A IMPORTÂNCIA DA MATEMÁTICA PARA ALUNOS AUTISTA

LA IMPORTANCIA DE LA MATEMÁTICA PARA ESTUDIANTES AUTISTAS



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ABSTRACT

This paper addresses the essence of teaching mathematics to students with Autism Spectrum Disorder, highlighting its role in promoting social inclusion within the school environment. The main objective is to analyze the pedagogical practices and methodologies used in the teaching–learning process of mathematics. The specific objectives are to promote and encourage the teaching of mathematics in a dynamic way and to reflect on the importance of including students with autism. This research is a qualitative study grounded in a bibliographic review based on theoretical reflections from various authors who emphasize this theme. The results indicate that the use of visual resources, games, and practical activities significantly contributes to student engagement and learning. It is concluded that mathematics, when presented in an accessible manner, becomes an effective tool for inclusion, promoting active participation and the comprehensive development of students.

Keywords: School Inclusion. Learning. Special Education.

RESUMO

Este trabalho aborda a essência do ensino da matemática para discentes com transtorno do espectro autista, destacando seu papel na promoção da inclusão social no ambiente escolar. O objetivo principal é analisar as práticas pedagógicas e metodologias utilizadas no processo de ensino-aprendizagem da matemática. E os específicos são: Promover a prática e incentivo ao ensino de matemática de forma dinâmica e refletir sobre a importância da inclusão de discentes com autismo. De modo que essa pesquisa trata-se de um estudo qualitativo fundamentado em um estudo bibliográfico realizado a partir de reflexões teóricas de vários autores que ressaltam acerca dessa temática. Os resultados indicam que o uso de recursos visuais, jogos e atividades práticas contribui significativamente para o engajamento e a aprendizagem dos alunos. Conclui-se que a matemática, quando elencada de maneira acessível tornando-se uma ferramenta eficaz de inclusão, promovendo a participação ativa e o desenvolvimento integral dos discentes.

Palavras-chave: Inclusão Escolar. Aprendizagem. Educação Especial.

RESUMEN

Este trabajo aborda la esencia de la enseñanza de la matemática a estudiantes con Trastorno del Espectro Autista, destacando su papel en la promoción de la inclusión social

en el entorno escolar. El objetivo principal es analizar las prácticas pedagógicas y las metodologías utilizadas en el proceso de enseñanza-aprendizaje de la matemática. Los objetivos específicos son promover y fomentar la enseñanza de la matemática de manera dinámica y reflexionar sobre la importancia de la inclusión de estudiantes con autismo. Esta investigación se caracteriza como un estudio cualitativo fundamentado en una revisión bibliográfica basada en reflexiones teóricas de diversos autores que destacan esta temática. Los resultados indican que el uso de recursos visuales, juegos y actividades prácticas contribuye significativamente al compromiso y al aprendizaje de los estudiantes. Se concluye que la matemática, cuando se presenta de manera accesible, se convierte en una herramienta eficaz de inclusión, promoviendo la participación activa y el desarrollo integral de los estudiantes.

Palabras clave: Inclusión Escolar. Aprendizaje. Educación Especial.

1 INTRODUCTION

The study scenario for the elaboration of this work was a broad research of different articles, TCCs and various materials, where the relevance of mathematics teaching tools for the inclusion of special students was outlined. The inclusion of students with autism spectrum disorder in the school context represents a challenge and, at the same time, an opportunity to propose a more egalitarian and accessible education. Among several curricular areas, that is, mathematics stands out for its complexity and for requiring approaches that consider the particularities of each student. Autistic students, in particular, demand pedagogical strategies that value their potential, respecting their times and ways of learning.

It is worth mentioning that the use of games can be very valuable in the process of appropriating mathematical knowledge. In this sense, the "interest in studies of the relationship between games and mathematical learning is based on the possibility that all students can, through games, become more involved in carrying out mathematical activities" (Muniz, 2010, p. 26).

It is relevant to understand the importance of mathematics as mechanisms to stimulate cognitive development and social interaction, which becomes fundamental for the construction of more inclusive educational practices. In which this work seeks to reflect on how the teaching of mathematics can contribute significantly to the integral formation of these students, proposing an effective participation in school and social life.

Thus, the choice of this theme was due to the curiosity to research the importance of mathematics for the inclusion of students with Autism Spectrum Disorder (ASD), especially when mediated by the use of goals. Considering the cognitive, behavioral and social particularities of these students, the research seeks the importance of the pedagogical practices used in the teaching-learning process of mathematics.

We emphasize that the relationship between mathematics teaching and technological tools are of fundamental importance for the improvement and inclusion of the teaching-learning process. The technological resources used in mathematics teaching lead to the diversification of pedagogical strategies, contributing to a substantial support in learning.

2 THEORETICAL FRAMEWORK

Mathematics offers broad benefits specific to ASD students as one of the most well-known autistic activists, many people on the spectrum have specific skills, such as logical and visual thinking, which can be enhanced through adapted teaching goals focused on problem-solving. In accordance with Gentili (2009, p. 1063) says that: "Educational inclusion

is a process that is built in opposition to the forces and tendencies that have produced and historically produce the denial of the right to education of the poorest and most excluded."

According to Rodrigues, the implementation of inclusive education:

If the regular school wants to be able to respond competently and rigorously to the diversity of all its students, it needs to recruit more specialized personnel (therapists, psychologists, social workers, etc.) and needs to have more differentiated equipment and material resources (Rodrigues, 2006, p. 9).

It is noticeable to reflect that the inclusion of students with ASD in the school context has intensified in recent decades, driven by legislation such as the Brazilian Inclusion Law (Law No. 13,146/2015) and the National Policy on Special Education in the Perspective of Inclusive Education. It is worth mentioning that the teaching of mathematics represents a relevant challenge, as well as an opportunity to promote the cognitive development and social participation of these students.

Law No. 13,146/2015, also known as the Brazilian Inclusion Law (LBI) or the Statute of Persons with Disabilities, is a milestone in Brazilian legislation to guarantee and promote equal rights and fundamental freedoms of people with disabilities, aiming at their social inclusion and citizenship. In which this law establishes the rights and duties related to people with disabilities, including accessibility, health, education, work, transportation, social assistance, among others (Brasil, 2015).

According to Santos, the inclusion:

It is a process that reiterates democratic principles of full social participation. In this sense, inclusion is not limited to one or a few areas of human life, such as, for example, health, leisure or education. It is a struggle, a movement that has the essence of being present in all areas of human life, including education. Inclusion refers, therefore, to all efforts to guarantee the maximum participation of any citizen in any area of society in which he lives, to which he has a right, and over which he has duties (Santos, 2006, p. 4).

It is important that the teacher knows very well the autistic student in which he will be included in his class. According to Cunha (2014, p. 13) "Autism requires study, preparation and dedication from the teacher." Thus, the teacher will need to know much more than the limitation in restriction of the disorder, he needs to know the student beyond the disability.

The autistic student will not express his feelings. The understanding of this will come under the careful observation of the teacher and those who are directly included with the learning of this student. In accordance with this conception, Cunha states:

The autism situation imposes that all psychopedagogical evaluation be an action and research on the individual, with pertinence in his biological, family and social history; their love, their desires, their needs, using theoretical and practical instruments, where observation is the compass in conducting the entire process (Cunha, 2014, p. 52).

In this sense, Cunha (2014, p. 30) reports that "care is needed for an accurate assessment of the situations that cause harmful attitudes, because they foster the disorder, limiting learning." In consonance, the statement highlights the essence of an attentive and continuous observation of the behavior of students with ASD in the school context, especially during mathematics classes.

In this scenario, the teacher's performance must be based on inclusive pedagogical practices, which believe in the sensory, cognitive and emotional particularities of these students. Thus, the use of structured routines, visual language and playful activities, for example, can reduce challenging behaviors and favor concentration and engagement with mathematical content. In line with Cunha (2014, p. 33) "the teacher needs to learn to relate to the reality of the autistic world".

According to Blanco:

Knowing students well implies intense interaction and communication with them, a constant observation of their learning processes and a review of the educational response offered to them. This knowledge is a continuous process, which is not exhausted at the initial moment of preparing the annual program (Blanco, 2004, p. 296).

This instrument is elaborated in a joint action with all those directly involved in the student's educational process. That is, the regent teacher, the resource room teacher, the mediator teacher and the student's family (Mascaro; Redig, 2016).

Teaching children with ASD represents a huge challenge. Thus, students with these disorders show impairments in communication and social interaction, which makes it difficult to socialize with other children

According to Cunha:

The outside world is a stimulator for learning. In childhood, through their external relationships, the child learns the names of objects, being able to use them in a functional way or symbolize games. Information becomes knowledge. However, in autism, their social interaction is impaired, and this knowledge is not revealed, and objects start to have only sensory functions, with little cognitive contribution. (Cunha, 2014, p. 27)

Thus, it is understood that the deficit in social interaction, characteristic of Autism Spectrum Disorder, can significantly compromise the process of information construction, as reported by Cunha (2014).

According to Amaral and Silva (2019), strategies such as the use of games, manipulative materials, technological resources, and visual support (such as pictograms and diagrams) are effective in bringing the student closer to the mathematical content, allowing him to establish more meaningful relationships with concepts and operations. In addition, these resources make it possible to make teaching more flexible, respecting the pace and particular ways of learning of each student.

3 METHODOLOGY

This work is a qualitative research, elaborated from bibliographic surveys. In which its main focus was to verify the relevance of the inclusion of students with ASD. Since it is a technique for obtaining answers that were presented throughout the explorative approach.

We emphasize that the data collection took place through scientific publications obtained in electronic media in the databases: Scielo (Scientific Electronic Library Online) and Google Scholar, where they were used for research and development of all the work.

Exploratory research has as its main focus to develop, improve, elucidate and transform meanings and ideas, always based on the formulation of the most relevant problems or accessible hypotheses. In this case, the researcher has greater flexibility with the data of social reality, in addition to providing a flexible and not so formal posture.

In addition, it enables the researcher to obtain more information on a given subject, facilitating the delimitation of the work theme and the definition of objectives, and also provokes the formulation of research hypotheses, which the investigation can result in the discovery of a new type of focus for the work that is in mind.

4 RESULTS AND DISCUSSIONS

In order to carry out the respective research, a data survey was carried out through Scielo and Google Scholar. It is worth mentioning that the teaching of Mathematics contributes significantly to child development, especially when it is worked through games and play.

This approach makes learning more attractive and accessible, promoting the participation of all students, stimulating creativity, the construction of new knowledge, and social interaction. In the case of children with ASD, it is essential to offer support, specialized

follow-up, and pedagogical strategies adapted to their reality. In this process, the partnership between school and family becomes indispensable to ensure effective and inclusive learning.

In today's society, school inclusion has gained more and more prominence, especially with regard to the educational service of students with ASD. Thus, Mathematics, in turn, plays a relevant role in this process, that is, in addition to stimulating logical reasoning, it contributes to the development of autonomy and social interaction.

Manrique (2014, p. 10) states that "inclusive education becomes a difficult standard to achieve if there is no adequate initial and/or continuing training for teachers who teach mathematics". This finding highlights the importance of teacher preparation to deal with the diversity present in the classroom, especially with regard to the inclusion of students with ASD.

The absence of specific training compromises the effectiveness of pedagogical practices, making it difficult to adapt strategies, resources, and approaches that meet the needs of these students. Thus, investing in training aimed at inclusive education, with a focus on the teaching of mathematics, is essential to guarantee the right to learning for all students, respecting their particularities and promoting educational equity.

According to Pletsch (2009), teacher training is a central element for the success of inclusion, as it is through it that skills are developed to deal with diversity and promote appropriate strategies for teaching all students.

The following table presents the articles selected in the research, identified by the letters A, B, and C, with the objective of facilitating the visualization and analysis of the data. In it, the main results obtained are highlighted, especially with regard to the valorization of the inclusion of students with autism for the teaching of mathematics. The most relevant points were duly highlighted and underlined for greater evidence and understanding.

Table 1

Presentation of selected studies

Author/year	Type of Study	Objective	Methodology	Conclusion
(A) Cunha (2014)	Qualitative cross-sectional study	Verify the importance of inclusion for students with ASD the authors, containing teaching mathematics.	An online questionnaire was applied to 37 teachers developed by the authors, containing 11 Closed questions	Strategies based on digital resources, such as educational games, demonstrate effectiveness in teaching, contributing to more dynamic and

(B) Rodrigues (2006)	Observational, descriptive epidemiological study and retrospective	Evaluating education inclusion	Its method was an electronic questionnaire divided into 5 items, applied to 34 participants, who report to increasing the motivation of students, importance of technological tools. highlight that inclusive practices in education contribute significantly to increasing the motivation of students, including those with special needs, in the discipline of mathematics, stimulating their curiosity and willingness to learn.
(C) Amaral e Silva (2019)	Observational study with a quantitative descriptive approach	Check the Effects the use of technological tools in the school environment.	It used a survey for 40 individuals on leveraging games and various technological tools. <u>100% of the Research</u> shows that dynamic activities stimulate the student's interest in mathematics.

Source: The authors.

As reported in the table above, the main goals found were to use technological digital methodologies in favor of teaching, as well as the use of digital games in the educational sector.

Santos and Oliveira (2024, p. 15) state that "The use of games is of paramount importance because they contain control in relation to error, which enables the child to self-instruct and take their own initiatives.

It is worth mentioning that in the incidence of evolution in the teaching of mathematics to students with ASD, the survey revealed that 50% of students showed significant advances in the process of learning mathematics. The results of the studies analyzed reinforce this trend: Study B, 83%, and Study C, 100%.

The learning of mathematics by students with ASD can be boosted when strategies adapted to their specific needs are adopted, providing greater interest and absorption of content.

The evolution of students with ASD in the process of learning mathematics points to a positive trend when inclusive pedagogical tools are clearly applied.

Through all the research, it was possible to realize how much mathematics contributes to the process of inclusion of students with autism. Based on the entire study carried out, it was noticeable to understand that 75% of the authors have the same opinions and 25% understand it as not very essential, that is, according to the entire study carried out. According to Mantoan (2006) and Oliveira (2017), the teaching of Mathematics can be an important tool for inclusion when pedagogical practices are adopted that consider the specificities of students with Autism Spectrum Disorder.

5 FINAL CONSIDERATIONS

In view of the above, it is concluded that the teaching of mathematics to students with Autism Spectrum Disorder represents an important instrument of social inclusion in the school context. The analysis of pedagogical practices shows that methodologies adapted to the specific needs of these students are relevant to promote cognitive development, autonomy and active participation in school activities.

It is essential that educators are able to welcome diversity in the classroom, using methodologies that consider the divergent forms of learning. Visual resources, concrete activities and the use of assistive technologies proved to be effective in the teaching-learning process, thus helping for a more viable and meaningful education.

In this sense, the essence of the continuing education of teachers, the collaboration between education professionals and the construction of an inclusive school context, where the human rights and dignity of all students are respected, is affirmed. By ensuring the access and permanence of students with ASD in the teaching of mathematics, we are providing not only educational equity, but also the appreciation of divergences as an enriching factor in educational evolution.

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ANALYSIS OF THE EFFECTIVENESS OF THE MONITORING PROGRAM IN THE CHEMISTRY COURSE: AN EVOLUTIONARY PERSPECTIVE

ANÁLISE DA EFETIVIDADE DO PROGRAMA DE MONITORIA NO CURSO DE QUÍMICA: UMA PERSPECTIVA EVOLUTIVA

ANÁLISIS DE LA EFECTIVIDAD DEL PROGRAMA DE MONITORÍA EN EL CURSO DE QUÍMICA: UNA PERSPECTIVA EVOLUTIVA



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ABSTRACT

This study presents an analysis of the tutoring (monitoring) program in the Chemistry Teacher Education (Licentiate) course at a large university in the city of Curitiba, PR. The research was guided by the following question: how does the tutoring program in the Chemistry Teacher Education course, in the distance education (EAD) modality, contribute to improving students' academic performance and optimizing the support provided for their questions and pedagogical needs? The objective is to analyze the effectiveness of the tutoring program in distance Chemistry Teacher Education courses at the university. The tutoring program in this institution, recently implemented in this modality, aims to promote greater student engagement and enhance the training process. The theoretical framework is based on authors such as Cunha Júnior (2015), Demelash, Andargie and Belachew (2024), Lima and Sousa (2023), Pereira (2023), Sousa et al. (2019), and Zingra et al. (2018). This is a qualitative study, using a methodological procedure of the experience report type. The analysis was based on final reports from the years 2024 and 2025, each year involving a different tutor. The criteria for analysis focused on the organization and evolution of tutoring practices, student performance, and the reduction of inquiries via the "Contact Us" channel. The results indicate that tutoring in the distance Chemistry Teacher Education course has not only been consolidated as a positive and indispensable practice in the teaching and learning process, but has also shown significant progress in its effectiveness.

Keywords: Academic Tutoring. Chemistry Teacher Education. Distance Education. Teaching and Learning.

RESUMO

Este trabalho apresenta uma análise do programa de monitoria no curso de Licenciatura em Química de uma universidade de grande porte da cidade de Curitiba-Pr. O estudo partiu do seguinte problema de pesquisa: como o programa de monitoria no curso de Licenciatura em Química, na modalidade de educação a distância (EAD) contribui para a melhoria do desempenho acadêmico dos estudantes e para a otimização do atendimento às suas dúvidas e necessidades pedagógicas? O objetivo é analisar a efetividade do programa de

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monitoria nos cursos EAD de Licenciatura em Química na universidade. A monitoria nesta instituição, implementada recentemente nesta modalidade, busca promover maior engajamento dos estudantes e qualificar o processo formativo. A fundamentação teórica apoia-se em autores como Cunha Júnior (2015), Demelash, Andargie e Belachew (2024), Lima e Sousa (2023), Pereira (2023), Sousa et al. (2019) e Zingra et al. (2018). Trata-se de uma pesquisa qualitativa, com procedimento metodológico do tipo relato de experiência. A análise apresentada tomou por base os relatórios finais dos anos de 2024 e 2025, sendo cada ano com a atuação de uma monitora diferente. Os critérios de análise foram focados na organização e evolução das práticas da monitoria, no desempenho dos estudantes, na redução das consultas via canal "Fale com a Gente". Os resultados apresentados indicam que a monitoria no curso de Licenciatura em Química na educação a distância não só se consolidou como uma prática positiva e indispensável ao processo de ensino e aprendizagem, como também evidenciou um progresso significativo em sua eficácia.

Palavras-chave: Monitoria Acadêmica. Licenciatura em Química. Educação a Distância. Ensino e Aprendizagem.

RESUMEN

Este trabajo presenta un análisis del programa de monitoría en el curso de Licenciatura en Química de una universidad de gran tamaño en la ciudad de Curitiba, PR. El estudio partió del siguiente problema de investigación: ¿cómo el programa de monitoría en el curso de Licenciatura en Química, en la modalidad de educación a distancia (EAD), contribuye a la mejora del desempeño académico de los estudiantes y a la optimización de la atención a sus dudas y necesidades pedagógicas? El objetivo es analizar la efectividad del programa de monitoría en los cursos EAD de Licenciatura en Química en la universidad. La monitoría en esta institución, implementada recientemente en esta modalidad, busca promover un mayor compromiso de los estudiantes y cualificar el proceso formativo. El marco teórico se apoya en autores como Cunha Júnior (2015), Demelash, Andargie y Belachew (2024), Lima y Sousa (2023), Pereira (2023), Sousa et al. (2019) y Zingra et al. (2018). Se trata de una investigación cualitativa, con un procedimiento metodológico del tipo relato de experiencia. El análisis presentado se basó en los informes finales de los años 2024 y 2025, siendo cada año con la actuación de una monitora diferente. Los criterios de análisis se centraron en la organización y evolución de las prácticas de monitoría, en el desempeño de los estudiantes y en la reducción de consultas a través del canal "Hable con nosotros". Los resultados indican que la monitoría en el curso de Licenciatura en Química en la educación a distancia no solo se ha consolidado como una práctica positiva e indispensable para el proceso de enseñanza y aprendizaje, sino que también ha evidenciado un progreso significativo en su eficacia.

Palabras clave: Monitoría Académica. Licenciatura en Química. Educación a Distancia. Enseñanza y Aprendizaje.

1 INTRODUCTION

Distance education (EAD) has been consolidated as a strategic modality in the Brazilian higher education scenario, especially because it expands access to academic training and enables flexible learning. However, this modality also presents specific challenges, such as the difficulty of continuous interaction between students and teachers, the dispersion in the monitoring of activities and the need for greater autonomy on the part of students. In this context, it is essential to implement support strategies that promote student engagement and the effectiveness of the educational process. Academic monitoring is one of these strategies, working as a link between students, professors, coordination, and the institution.

Monitoring plays a crucial role in the teaching and learning process both in the face-to-face modality and in distance education, functioning as an essential link between the didactic content and the effective understanding of students. In a virtual environment, where face-to-face interaction is limited, the monitor becomes a learning facilitator, helping to solve complex doubts, explain abstract concepts, and provide guidance for carrying out practical and theoretical activities.

In the Chemistry Degree course at the institution in question, the monitoring program was introduced as a recent initiative in distance courses, with the objective of improving academic performance, helping to overcome pedagogical difficulties and stimulating more collaborative and participatory learning practices. Monitoring is thus presented as a concrete response to the needs of pedagogical support in distance learning, especially in courses with a high degree of theoretical and practical complexity, as is the case of Chemistry.

The introduction of monitoring in the institution's Teaching Degree in Chemistry was driven by systematic observations carried out by the teacher-tutor throughout her experience in the disciplines offered. Such observations subsidized the elaboration of a project that outlined the main challenges foreseen for the execution of monitoring, including the need to improve student engagement, the sense of belonging, interactivity and the habit of studying.

Monitoring plays a crucial role in the teaching-learning process, both in the face-to-face modality and in distance education (EAD). In virtual contexts, where face-to-face interaction is inherently limited, the monitor emerges as an essential facilitator of learning. Its performance ranges from helping to resolve complex doubts and explaining abstract concepts to guiding the execution of practical and theoretical activities, establishing a vital link between the didactic content and the effective understanding of students.

In the Distance Learning Chemistry Degree of the institution in question, the monitoring program was recently implemented, aiming to optimize academic performance, overcome

pedagogical difficulties and encourage collaborative and participatory learning practices. In this way, monitoring is configured as a strategic response to the demands for pedagogical support in distance learning environments, particularly in courses characterized by a high degree of theoretical and practical complexity, as is the case of Chemistry.

The introduction of monitoring in the institution's Teaching Degree in Chemistry was driven by systematic observations carried out by the teacher-tutor throughout her experience in the disciplines offered. Such observations subsidized the elaboration of a project that outlined the main challenges foreseen for the execution of monitoring, including the need to improve student engagement, the sense of belonging, interactivity and the habit of studying.

The pedagogical difficulties to be faced by the students were identified and presented in the project with an emphasis on chemical and mathematical calculations, in addition to chemical reactions, themes that permeate the disciplines covered by the monitoring. The central proposal was that the monitoring offer a differentiated support, through synchronous and interactive moments with the purpose of supporting students not only in the specific difficulties of the disciplines, but also in the organization of studies and in the punctual delivery of evaluation activities.

In addition, the observations made by the teacher-tutor evidenced the need to expand communication between peers, in order to favor the timely clarification of doubts and, thus, enable the adequate performance of the evaluations. It was also verified the relevance of intensifying the engagement and interactivity between students, the teacher-tutor and the educational institution, as well as improving student participation in synchronous meetings, considered strategic for strengthening the training process.

These aspects were duly contemplated in the monitoring project, which began to guide the structuring of synchronous moments with an emphasis on promoting interactivity, stimulating critical-reflective thinking and encouraging students' intellectual autonomy. The proposal seeks, therefore, not only immediate support for academic activities, but also the consolidation of practices that contribute to the integral formation of students, both personally and professionally.

Thus, monitoring began to play a strategic role in the educational process, configuring itself as a pedagogical action that responds to the emerging demands of the distance learning modality, especially in courses that require a high degree of abstraction and logical reasoning, such as the Degree in Chemistry.

The justification of this study lies in the importance of evaluating in depth the effects of this action within the context of distance education, understanding to what extent monitoring contributes to student learning, to the optimization of institutional support and to the

development of teacher training for monitors. Considering the current scenario of expansion of distance learning courses and the growing demand for effective pedagogical mediation strategies, it is essential to analyze practices such as monitoring in a systematic and reasoned way.

The present investigation is characterized as a qualitative research, of the experience report type, an approach that focuses on the description, reflection and critical analysis of practices experienced in specific educational contexts. This type of research does not seek the generalization of results, but rather the in-depth understanding of a concrete reality, valuing practical experience as a legitimate source of knowledge. By reporting and examining the actions developed by the monitors in the years 2024 and 2025, the study takes a reflective perspective, highlighting both the challenges faced and the advances observed, contributing to the improvement of support programs in distance higher education.

Thus, this work aims to analyze the effectiveness of the monitoring program in the distance learning course of Chemistry of a large institution in Curitiba, based on the performance developed in two distinct cycles.

The analysis considers the impact of monitoring on the academic performance of students, the reduction in the demand for assistance via institutional channels, the evolution of the pedagogical strategies adopted and the development of the teaching skills of the monitors. By exploring this practice from an evolutionary and experiential perspective, it is intended to contribute to the strengthening of innovative and effective pedagogical actions in the context of distance education.

2 DEVELOPMENT

Monitoring is a pedagogical practice that goes beyond simple academic support, it represents a bridge between the faculty and students, promoting the strengthening of the teaching-learning process. By acting as mediators, monitors contribute to the construction of a more collaborative, accessible, and dynamic environment, where knowledge is shared in a meaningful way. Cunha Júnior (2018) highlights that monitoring, when well guided, contributes to the formation of bonds between students and strengthens learning through the exchange of knowledge between peers. Academic monitoring is recognized as an essential pedagogical support service that promotes theoretical deepening and the development of technical skills in students, contributing to their overall improvement (Zingra et al, 2018; Pereira, 2023).

In the general context of teaching, monitoring favors the development of students' autonomy, stimulates academic responsibility and provides monitors with a rich formative

experience, often being the first contact with teaching practice. Both monitors and students benefit from monitoring: the former develop teaching skills and a sense of responsibility, while the latter find a more accessible environment to answer questions and organize their studies (Zingra et al, 2018; Pereira, 2023).

In chemical education, monitoring takes on an even more strategic role. As it is a discipline that involves abstract concepts, symbolic language and laboratory practices, the support of monitors can be decisive for the understanding of the contents. They assist in solving exercises, preparing for evaluations and, especially, in monitoring practical activities, where they reinforce safety standards, guide procedures and help consolidate the relationship between theory and practice. Thus, the performance of the student-monitor favors the construction of a more dynamic and participatory learning environment, allowing the exchange of experiences between students and teachers, and stimulating student protagonism through active methodologies (Lima and Sousa, 2023; Sousa et al, 2019).

Monitoring in Chemistry can contribute to the development of active methodologies, such as study groups, experimental workshops, and peer tutorials, making learning more attractive and contextualized. This action also favors the formation of a scientific culture among students, encouraging critical thinking and investigative curiosity.

Thus, academic monitoring is understood as an activity that goes beyond technical support, being an opportunity for teacher training and deepening the knowledge acquired throughout the undergraduate course, while contributing to the teaching-learning process of colleagues (Lima and Sousa, 2023; Sousa et al, 2019). Therefore, monitoring not only complements the teaching work, but also enriches the training of those involved, promoting a more inclusive, participatory and effective education — especially in challenging areas such as Chemistry.

2.1 ORGANIZATION OF MONITORING WORK: STRATEGIES AND EVOLUTION

In the two years evaluated, the monitoring organization demonstrated careful planning and continuous adaptation to the needs of students in the distance learning modality. Initially, in mid-2024, the first weeks were dedicated to the organization of materials and methodological planning. A key strategy was to send a form to students to identify their availability and preference for active participation in online meetings. Based on this, fixed schedules were defined for monitoring, for example, in the months of August to October, in 2024 the monitoring worked on Monday nights and Wednesday afternoons; Similarly, in the period from March to May 2025, the meetings took place weekly on Mondays, in the evening.

Dissemination and engagement were priorities in both cycles. In 2024, informative

folders were used, such as the example presented in Image 1, and were widely disseminated in the course's WhatsApp groups, in the Chemistry community, and in the Virtual Learning Environment (VLE). This dissemination was complemented by inviting videos recorded by the monitor. In the subsequent cycle, this practice was maintained because it proved to be efficient in the monitoring work.

A central and highly relevant element in both periods was the creation of specific *WhatsApp* groups for monitoring. These groups functioned as private channels for students to share doubts and difficulties, in addition to being used to send links to access the meetings and to provide support and recorded materials. The practicality and agility of communication via *WhatsApp* were highlighted as very positive points, allowing effective interaction between students, monitor, teacher-tutor and course coordination.

Faced with the challenge of students' unavailability to participate in synchronous moments, which is common in the distance learning modality, the monitoring demonstrated the ability to adapt. Thus, one of the initiatives was to create a *YouTube* channel to store the recordings of the meetings, making the links available via *WhatsApp*. This strategy allowed students to access the material at a flexible time, without the need for active participation in synchronous time. Another initiative was to record the synchronous meetings and make the videos available in the VLE, within the specific disciplines.

The production of diversified and innovative teaching materials was a constant, among them we mention: videos explaining practices within the institution's virtual laboratory, videos with experiments using low-cost materials, quizzes, games using the *Wordwall website*, PowerPoint presentations, podcasts and cards, as shown in the example presented in Figure 1.

Figure 1

Invitation to monitoring



Source: The authors (2025).

The presence of monitors in learning environments that use innovative methodologies favors collaborative learning and the development of students' autonomy in the study of Chemistry (Demelash, Andargie and Belachew, 2024).

The monitor also created forms for content suggestions and podcasts about the National Student Performance Exam - ENADE. There was a significant focus on explanatory videos and recorded resolution of exercises, especially for more complex content, such as Chemical Kinetics. This adaptation was even a direct response to requests from students to help understand complex calculations.

Collaboration with the teacher-tutors and coordination was another pillar of the organization, with emphasis on the holding of regular meetings between the monitor and the teacher-tutor to clarify doubts, administrative assistance, discuss methodologies and engagement strategies. The course coordination also offered continuous support in the dissemination of materials, in addition to exchanging ideas to favor student engagement. These partnerships were crucial for the adaptation and improvement of the monitoring work.

2.2 EFFECTIVENESS OF MONITORING PRACTICES: STUDENT PERFORMANCE

The monitoring demonstrated a positive and quantifiable impact on the students' academic performance, overcoming challenges such as chemical and mathematical calculations, and chemical reactions. The performance of academic monitors, according to Pereira (2023), is associated with a positive impact on student performance, especially when monitoring is integrated with collaborative practices and self-regulation strategies for learning. Comparing the years 2023 and 2024, there was an improvement in the final averages in the subjects attended: in the Professional Practice discipline: Organic Chemistry Laboratory, the percentage of students with a final average above 7.0 increased from 44.44% in 2023 to 50% in 2024; in the discipline of Organic Chemistry, the improvement was even more significant, with the percentage of students with a final average above 7.0 jumping from 57.14% in 2023 to 80% in 2024.

The data collected for 2024 and 2025 showed an even more significant growth in the approval rate in the disciplines listed for monitoring: in the discipline of Chemical Kinetics, the number of approved students (final average > 7.0) increased from 50% in 2024 to 75% in 2025, while the number of failed students decreased from 33.3% to 12.5%; in the discipline of Professional Practice: Physical Chemistry Laboratory, the improvement was remarkable, with the percentage of students with a final average above 7.0 rising from 42.9% in 2024 to 100% in 2025, and the number of failures completely zero.

These data prove that monitoring is, in fact, fundamental in the teaching and learning

process of students, contributing to gains and significant improvement in performance. Zingra et al. (2018) highlight that the presence of monitors in the educational environment contributes to overcoming academic difficulties, being perceived by teachers and students as a factor that favors school performance.

2.3 EFFECTIVENESS OF MONITORING PRACTICES: REDUCTION OF MESSAGES IN "TALK TO US"

Another robust indication of the effectiveness of monitoring is the significant decrease in messages sent to the institution's official "Talk to Us" channel to clarify doubts related to content. This channel, sometimes overloaded, received many specific doubts. Comparing the years 2023 and 2024, it was noted that: the Inorganic Chemistry discipline saw a reduction from 11 messages in 2023 to 9 in 2024, although most were still about summative activities; the disciplines of Organic Chemistry and Professional Practice: Preparation of Didactic Materials for the Teaching of Chemistry zeroed out the messages in 2024 (there were 2 and 11, respectively, in 2023).

In 2025, the improvement was even more significant: there was a 100% improvement in messages about content via "Talk to Us" in 2025 compared to 2024. In 2025, there were no messages from students with doubts about the content of the subjects, only doubts related to the structuring of the evaluation activities. This significant reduction in the flow of messages evidences the commitment and effectiveness of the monitor in her work, minimizing the difficulties of the students and facilitating the work of the teacher-tutor. The monitoring redirected support, becoming the main point of contact for content questions.

2.4 EVOLUTION AND COMPREHENSIVE IMPACT OF THE MONITORING WORK

The comparison between the periods mentioned reveals a consistent evolution and continuous improvement in the monitoring program. Initially, the monitoring focused on establishing its presence in a recent distance learning context, with strategies for dissemination and organization of schedules. Adapting to the unavailability of students led to the creation of asynchronous resources, such as the *YouTube* channel, for example. This flexibility was consolidated with the availability of materials recorded directly in the VLE, and the monitor's proactivity in creating specific videos requested by students for complex calculations, showing a more refined response capacity.

Student engagement, initially a timid challenge, demonstrated progress, with positive comments in the *WhatsApp group* and direct praise in the satisfaction survey, such as a student's testimony to the monitor.

In addition to the academic gains for students, monitoring also proved to be a fundamental space for the personal and professional growth of the monitors. The remarkable development of the monitor who worked in this action in 2024 stands out, showing significant improvement in academic writing, in the production of relevant teaching materials, compatible with active and dynamic methodologies, including the production of articles for presentation at events, and a scientific article entitled: University/school interconnection and digital technologies in the context of chemistry teaching, published in the journal *Contribuciones a Las Ciencias Sociales*, in the same year of operation. Regarding the monitor of the year 2025, we emphasize skills such as organization, active listening, patience, group management and clear communication, essential for future teaching, especially in virtual environments.

For future cycles, the analyses point to the continuity of the concern with the synchronous engagement of students, with proposals for the creation of Instagram and study groups, and study agendas, in addition to greater diversification of materials, focus on videos and commented exercises, more interactive online meetings and the use of practical resources, such as online simulations. The use of simulations in the teaching of Chemistry, when accompanied by trained monitors, contributes to the understanding of abstract concepts and increases student engagement in the proposed activities (Demelash, Andargie and Belachew, 2024). In addition, plans to expand the offer of schedules and introduce differentiated activities demonstrate the commitment to continuous improvement.

3 FINAL CONSIDERATIONS

The data presented show that monitoring in the Chemistry Degree course in the distance learning modality was not only established as a positive and essential action for the teaching and learning process, but also demonstrated a remarkable evolution in its effectiveness. Through a flexible organization and adaptive strategies, such as the intensive use of digital platforms (*WhatsApp*, *YouTube*, *VLE*, *Microsoft Teams*) and the production of varied teaching materials, the monitoring was able to significantly improve the academic performance of students and reduce the demand for support in official channels, optimizing the work of the teacher-tutors.

The constant search for feedback and the ability to integrate new approaches, combined with the professional development of the monitors, solidify monitoring as a fundamental pillar for the success and quality of distance education in the institution. The mediation carried out by the monitors adds value and brings together students, monitoring, teachers-tutors, coordination and the university.

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EDUCATION FOR ETHNIC-RACIAL RELATIONS IN HIGH SCHOOL: A CHALLENGE FOR ANTI-RACIST EDUCATION

A EDUCAÇÃO PARA AS RELAÇÕES ÉTNICO-RACIAIS, NO ENSINO MÉDIO, UM DESAFIO PARA A EDUCAÇÃO ANTIRRACISTA

EDUCACIÓN PARA LAS RELACIONES ÉTNICO-RACIALES EN LA ESCUELA SECUNDARIA: UN DESAFÍO PARA LA EDUCACIÓN ANTIRRACISTA



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ABSTRACT

This study analyzes the implementation of education for ethnic-racial relations in high schools in Campo Grande-MS: challenges for anti-racist education. Our general objective is to analyze the implementation of the National Curriculum Guidelines for Ethnic-Racial Relations (DCNERE) in the high school curriculum, and our specific objectives are: to identify anti-racist pedagogical practices and to map school projects that strengthen education for ethnic-racial relations. The work is field-based, diagnostic, and qualitative. The methodology consists of mapping scientific productions from 2017 to 2024; conducting interviews through questionnaires; and analyzing educational documents from the State Department of Education of Mato Grosso do Sul. The study is based on education for ethnic-racial relations, through the valorization of the knowledge of African and Indigenous ancestries, according to the theoretical studies of (ALMEIDA, 2019), (BENTO, 2016), (GOMES, 2005-2008), among other intellectuals on the ethnic-racial theme.

Keywords: Education. ERER. High School.

RESUMO

O presente estudo analisa a implementação da educação para as relações étnico-raciais, no ensino médio das escolas estaduais de Campo Grande-MS: desafios para a educação antirracista. Temos como objetivo geral analisar a implementação das DCNERER, no currículo do Ensino Médio e objetivos específicos: identificar as práticas pedagógicas antirracistas e mapear projetos escolares que fortaleçam a ERER. O trabalho é de campo, diagnóstico e qualitativo. A metodologia consiste em realizar um mapeamento de produções científicas de 2017 a 2024; Promover entrevistas por meio de questionários; Analisar documentos educacionais, da Secretaria de Estado de Educação, de Mato Grosso do Sul. O estudo fundamenta-se na ERER, através da valorização dos saberes das ancestralidades

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africanas e indígenas, conforme os estudos teóricos de (ALMEIDA, 2019), (BENTO, 2016), (GOMES, 2005-2008), entre outros intelectuais da temática étnico-racial.

Palavras-chave: Educação. ERER. Ensino Médio.

RESUMEN

Este estudio analiza la implementación de la educación para las relaciones étnico-raciales en las escuelas secundarias de Campo Grande-MS: desafíos para la educación antirracista. Nuestro objetivo general es analizar la implementación de las Directrices Curriculares Nacionales para las Relaciones Étnico-raciales (DCNERE) en el currículo de la escuela secundaria, y nuestros objetivos específicos son: identificar prácticas pedagógicas antirracistas y mapear proyectos escolares que fortalezcan la educación para las relaciones étnico-raciales. El trabajo es de campo, diagnóstico y cualitativo. La metodología consiste en el mapeo de la producción científica de 2017 a 2024; la realización de entrevistas mediante cuestionarios; y el análisis de documentos educativos de la Secretaría de Educación del Estado de Mato Grosso do Sul. El estudio se basa en la educación para las relaciones étnico-raciales, a través de la valorización del conocimiento de las ascendencias africanas e indígenas, según los estudios teóricos de (ALMEIDA, 2019), (BENTO, 2016), (GOMES, 2005-2008), entre otros intelectuales sobre la temática étnico-racial.

Palabras clave: Educación. ERER. Escuela Secundaria.

1 INTRODUCTION

It is important to note that the National Curriculum Guidelines for the Education of Ethnic-Racial Relations and for the Teaching of Afro-Brazilian and African History and Culture/2004, presents to the Brazilian society, a reflection on this theme, that is, the importance of the responsibility of each Brazilian citizen in combating racist practices, not being an exclusive agenda of the black population. In this sense, the school has a unique responsibility in combating racism and racial discrimination, "[...] Legislation No. 10,636/2003 and No. 11,645/2008 contribute to the visibility of the culture of colonized peoples and provide another epistemology for the possible decolonization of the school curriculum , as well as for the otherness of these peoples in relation to Western society [...]" (MARQUES; CALDERONI, 2016, p. 312).

From this point of view, it is possible to perceive the need to rediscuss the issue of our colonization in the daily school life, not only from the point of view of Europeans, but also of indigenous and African peoples, in all stages of education, that is, from early childhood education to higher education, since throughout our educational training, We had a knowledge of the African peoples, only in the slave view, never about their history and culture, which was so important for the construction of our country. That is why it is essential to rediscuss educational background, cultural, political and economic trajectory, since we have not had the opportunity to study, dialogue or reflect on the role of enslaved blacks in the formation of national identity, nor of their history and culture. Denying high school students access to ERER is to contribute to the maintenance of structural and institutional racism, which for decades has prevented black students from having educational equity and better job opportunities, in addition to access and permanence in higher education, so paying attention to this stage of education is essential, to prevent data related to violence and school dropout, are increasingly alarming, if compared to black youth.

Gomes (2005) presents us with the following aspects:

When discussing the racial identity of black Brazilians, we cannot dissociate it from the historical process. The rescue of culture, the defense of social, economic and educational equality, with respect to differences, can only be carried out if accompanied by the proper contextualization of memory. (GOMES, 1995, p. 44)

We cannot forget that the ethnocentric and westernized vision tried to erase African and Afro-Brazilian history, by valuing only the European and Western process of knowledge, as fundamental for our formation, not taking into account the true construction of the identity of the Brazilian population, which is the set of other ethnic-racial representations.

"Overcoming the Eurocentric perspective of knowledge and the world becomes a challenge for the school, educators, the curriculum and teacher training." (GOMES, 2008, p. 527).

It is important to highlight that laws 10.639/03 and 11.645/08 establish the mandatory inclusion of African and Afro-Brazilian history and culture, as well as the history and culture of indigenous peoples, within the scope of the entire school curriculum, especially in the areas of Artistic Education and Brazilian Literature and History, in basic education, in public and private educational establishments, constitute an educational policy, in the implementation of public policies, for the education of ethnic-racial relations. "[...] These legislations provoke an epistemic shift in the hegemonic logic of a common Western-based culture, which challenges the adoption of pedagogical practices that have not been silent in the face of Eurocentric legacies that have hierarchized, subordinated, and dehumanized colonized subjects." (MARQUES; CALDERONI, 2016, p. 302).

In this context, it is evident that it is of fundamental importance that the school is aware of its applicability in the entire school context, in the problematization and resignification of monocultural curricula, through curricular components, such as history, African culture, Afro-Brazilian and indigenous culture, however, Brazilian education is constituted in a Eurocentric teaching, that is, with the production of contents that make the African presence unfeasible, that has prevented over the centuries the recognition and appreciation of African and Afro-Brazilian history and culture in public and private school curricula, that to this day, even with specific laws and guidelines, which guarantee the implementation and applicability of this theme in schools, it is still timidly seen its execution in school practices by education professionals, That is why it is still common, unfortunately, numerous news related to practices of racism in the school environment, which leaves deep marks on children, adolescents, young people and adults, victims of this plague, which crosses generations and culminates in numerous delays, which imply the quality of studies, learning, school advancement of the black population, self-esteem, in the issue of belonging, among other aspects related to the appreciation of black identity. Munanga (2008) points out that:

The black identity that black social movements and researchers of ethnic-racial issues have been trying to build and disseminate among the population, concerns several peculiarities. Among them his historical past, his situation and exclusion from command positions and his belonging to an ethnic-racial group that had its humanity denied. (MUNANGA, 2008, p. 14).

When the school denies an anti-racist education, a silence is evident that corroborates a terrible abyss in education, since it limits or excludes the right of black children, adolescents, young people and adults to have equal opportunities, during the teaching of basic education,

as whites of the same age group. "We come from an education that attributes to whites, to Europeans, the culture that they call classic, because it remains in time, ignoring the cultures of non-European peoples that have also remained in time [...]" (SILVA, 2007, p. 500). It is important to highlight that through African and Afro-Brazilian culture, it will be possible to discuss the issue of belonging, giving equal opportunities that everyone will have access to the most varied professions, whether technical or academic.

1.1 OBJECTIVES

The present study aims to analyze the implementation of the National Curriculum Guidelines for the Education of ethnic-racial relations in the high school curriculum of state schools in Campo Grande, from the perspective of an anti-racist education. As specific objectives, we intended to identify anti-racist pedagogical practices in everyday school life, mapping school projects, in order to develop projects for the education of ethnic-racial relations. It was also intended to verify the textbooks and paradidactic books, selected by the SED - State Department of Education, specific to High School contemplating EREER, with the objective of demonstrating who are the protagonists of EREER, in schools.

2 THEORETICAL FRAMEWORK

According to data from the IBGE – Brazilian Institute of Geography and Statistics, from 2012 to 2022, in a survey carried out by Todos Pela Educação, compared to white students, black and brown students are still a decade behind in completing high school. We know that this result is not only a problem of the school, but must be thought and rethought by the school, hence the importance of discussing this silence, this refusal to promote an anti-racist education, understanding the need to rebuild a curriculum so that black history and culture are present, not only in the month of November, Not only for black students, but for all students in general, because we live in a multiracial and multicultural country, where black culture and history belongs to all Brazilians. We have to think about citizen education, from a democratic point of view, that is, we have to think about the diversity of citizens who are present in school units, who bring in their baggage diversified elements of representation, such as in culture, history and formation of their identities, so dialogue, reflect and discuss, with the school community, on the valorization of a political and historical consciousness is fundamental for the school to find ways that will imply the fight against racism, as the studies of Marques and Calderoni point out:

To decolonize the curriculum is to oppose the logics of the colonality of power, of being and of knowledge, in the conception that there are other political experiences, other

cultural and economic experiences and knowledge production, which are essential for democratic, intercultural and decolonial education. In this sense, we defend the importance of an epistemic review in teacher training and the resignification of institutionalized political and pedagogical practices in schools, in order to problematize them in the sense of building different practices based on intercultural dialogue. (MARQUES and CALDERONI, 2016, p. 302)

By dialoguing from anti-racist education, through EREER it will be possible to know African and Afro-Brazilian civilizational values, because it is necessary that in the school daily life it is presented and reinforced that African peoples are bearers of knowledge, that they have values that have been incorporated into our culture since the process of enslavement, remaining in the social structure of Brazil, such as cooking, plantation, dance, music, religion, language, among others. "The role of the school is in a democratic way and committed to the promotion of the human being in its entirety, to stimulate the formation of values, habits and behaviors that respect the differences and characteristics of groups and minorities [...]" (DCN, 2004, p.7). Therefore, it is important that the school appropriates this knowledge and multiplies it with teachers and students, so that they can appropriate the knowledge and discuss its entire dimension, in actions that will aim to promote the recognition of the identity of blacks in Brazil. However, such a feat will only be successful if in fact the EREER legislation is presented and discussed to teachers, in training and pedagogical journeys, since many of these educators did not have in their training learning related to anti-racist education. It is not enough to present, it is necessary to provide means for the teacher to promote and incorporate in his pedagogical work actions that promote EREER.

According to the National Curriculum Guidelines:

It is important to highlight that it is not a matter of changing an ethnocentric focus markedly of European roots for an African one, but of broadening the focus of school curricula to Brazilian cultural, racial, social and economic diversity. In this perspective, it is up to schools to include in the context of studies and activities, which it provides on a daily basis, also the historical-cultural contributions of indigenous peoples and Asian descendants, in addition to those of African and European roots. It is necessary to be clear that Article 26-A added to Law No. 9,394/96 causes much more than the inclusion of new contents, it requires the rethinking of ethnic-racial, social, pedagogical relations, teaching procedures, conditions offered for learning, tacit and explicit objectives of the education offered by schools (BRASIL, 2004).

We cannot fail to mention that the teaching of education for ethnic-racial relations in school units has currently become more accessible to teachers, through media tools and with the acquisition of new literature, magazines, internet and articles related to ethnic-racial education, which are most often acquired by the PDDE (Direct Money at School Program). It is important to highlight that the Education Systems are preparing teaching professionals

through training days, as the legal framework determines, however, this preparation is still quite timid, compared to the growing cases of racism, which are registered daily in our country. "[...] we defend the importance of an epistemic revision in teacher training and the resignification of institutionalized political and pedagogical practices in schools, in order to problematize them in order to build different practices based on intercultural dialogue." (MARQUES; CALDERONI, 2016, p. 313). That is why it is important that white and black teachers are attentive, so that in the absence of public policies, for this purpose, they are agents of inspection and enforcement of the rights that the laws guarantee to Brazilian citizens in the school context.

At the same time, the following question remains: How many of us, professors, know the works of black researchers? It is challenging to broaden our worldview and seek to understand the African continent as a producer of knowledge, culture and politics. We know that in pedagogical training the racial issue generally does not find room for discussion, because whenever it arises, it does not gain the same visibility as other debated agendas, because it does not find due importance, a reflection of structural racism. "Racism, as a historical and political process, creates the social conditions so that, directly or indirectly, racialized groups are systematically discriminated against." (ALMEIDA 2019, p. 51)

We know that the school is the institution responsible for the construction and expansion of knowledge, however, it is necessary to ask the following questions: What knowledge does the school build? What knowledge does this school expand? What knowledge does this school offer? How did this knowledge come about over the centuries? In this sense, we need to make it explicit that the school denied the issue of the racial agenda for many years, since only Eurocentric values standardized our society, since they were considered universal. Law 10.639/2003 gave us freedom to explore the racial agenda, so it is important to address and discuss it within schools, employing all the historical and cultural diversity of Africa and Afro-Brazilian.

In this way,

[...] The proposal presented to the curricular component of History has as its primary objective to reinforce stereotyping and folklorized practices, since just talking about racism, contextualizing it in a Eurocentric, linear and evolutionary conception of History, or promoting situations of recognition of its presence, are not sufficient actions to effectively transform the reality of its conditioning factors (SANTOS, SANTOS; SANTOS, 2021, p. 146).

It is necessary that more and more Brazilian society understands that Brazil is a country with a black majority, that it knows the true history of the African peoples, who were

brought to Brazil in the holds of slave ships, in inhumane conditions being enslaved for more than three centuries. Here the African peoples built a large part of the wealth of this nation. Their descendants throughout a historical process were made invisible and placed on the margins of society. "[...] Building a positive black identity in a society that has historically taught blacks, from a very early age, that to be accepted it is necessary to deny oneself is a challenge faced by black Brazilians [...]", he says (GOMES, 2005, p.43). Therefore, when we think about education, the access and permanence of the black population in an education that values ethnic-racial differences is evident

We have in Brazil the constant denial of racism, this ends up being challenging for the school, since it deals all the time with subjects, who are most of the time victims of racism, despite the last demographic census showing a population of 55.5% black or brown, according to the IBGE – Brazilian Institute of Geography and Statistics of 2022. Even with the growth of people who declare themselves black or brown, racism is still rooted, which is constantly denied. "In fact, the legacy of slavery for whites is a subject that the country does not want to discuss, because whites came out of slavery with an extremely positive symbolic and concrete heritage [...]" (BENTO 2016, p. 30). Racism is camouflaged in Brazilian institutions, such as in public and private schools, that is, it is hidden by a false idea of racial and social equality, however the lack of opportunities for the black population is clear, which even though it is the majority in terms of population, ends up being a victim of the abandonment of the state, with regard to public policies, it is enough to analyze the rates of violence, crime, low education, lack of job opportunities in leadership or leadership positions, equal salaries for white people, low level of education, among others, so thinking and discussing the issue of ethnic-racial relations, from the BNCC – National Common Curricular Base is an important path for the school, who deals daily with students and families who are victims of structural racism.

According to Gomes (2005),

There is no denying that education is a broad and complex process of construction of cultural and social knowledge that is part of human happening. However, isn't it contradictory that so many educators agree with this statement and, at the same time, deny the role of the school in dealing with ethnic-racial diversity? How can we think of the Brazilian school, especially the public one, detached from the racial relations that are part of the historical, cultural and social construction of this country? And how can we think about race relations outside the set of social relations? (GOMES, 2005, p. 146 147).

From this point of view, the role of the school in Brazilian society is increasingly evident, from a perspective related to education for ethnic-racial relations, since sociocultural diversity

is intertwined in the school environment, "to understand that society is formed by people who belong to distinct ethnic-racial groups, who have their own culture and history, equally valuable, and that together build, in the Brazilian nation, its history" (BRASIL, 2018, p. 467), so actions aimed at an anti-racist education need to be discussed, planned and applied, in the daily life of school units, but it is necessary to prepare teachers, through pedagogical training and enrich school libraries with black literature.

An important aspect is that the teacher, as he has not received academic training or continuing education, to use actions focused on the racial theme in his pedagogical practice, this educator will not be able to have an anti-racist stance, in the promotion of practices that can show the potentiality of black people and the contribution of blacks in the construction of Brazil.

The National Curriculum Guidelines present:

Inclusion of discussion of the racial issue as an integral part of the curricular matrix, both in the licentiate courses for Early Childhood Education, the initial and final years of Elementary Education, Secondary Education, Youth and Adult Education, as well as in the processes of continuing education of teachers, including teachers in Higher Education (BRASIL, 2004).

On the other hand, it is essential to make it clear that the racial issue is not an exclusive agenda of black people, such an issue is an agenda of the entire Brazilian society, so the school needs to discuss the racial theme in the moments of pedagogical training and prepare teachers for the daily work with education for ethnic-racial relations. "(...) the school is capable of offering both young people and adults the possibility of questioning and deconstructing the myths of superiority and inferiority between human groups that have been introjected into them by the racist culture in which they have been socialized" as he states (MUNANGA, 2005, p. 17). It is necessary for the high school curriculum to present to students aspects related to ethnic-racial diversity, since there is still a curriculum, which in practice, still offers a Eurocentric education.

According to SANTOS, SANTOS; SANTOS:

Unlike previous educational documents, the BNCC does not present racism as a fundamental element of the Basic Education curriculum, restricting it only to the History curricular component in the 8th and 9th grades of Elementary School. We emphasize that the document addresses diversity and prejudice in a generalized way in the years preceding the eighth. (SANTOS, SANTOS; SANTOS, 2021, p. 141-142)

Soon the need for a curriculum that meets the demands of black students aged 15 to 17, enrolled in the last stage of basic education, who need to feel their belonging intertwined

in the daily contents, which are addressed by teachers, is perceived. However, it is necessary that this belonging be perceived, that is, it be explored by all areas of knowledge, especially the formative itineraries that make up high school, so that students feel valued in their cultural identity, while promoting an anti-racist education.

In Brazil, one of the great challenges in basic education is to contain school dropout, especially in high school, but this challenge becomes even greater when we refer to black students, who are mostly poor, miserable and peripheral. “[...] Regarding color or race, 61.8% of white persons had completed at least the basic educational cycle. Among black or brown persons, this percentage was 48.3%, a difference of 13.5 p.p. between the two groups analyzed. [...] (PNAD CONTINUA, 2023, p. 3), We know that school dropout in high school is directly linked to historical, cultural, and social factors, which are a legacy of structural racism present in power structures, in addition to the fragility in the implementation and execution of public policies, which can actually reduce school dropout, of this specific public in the short term, medium and long term.

According to a survey carried out by the Continuous National Household Sample Survey - PNAD

Taking into account the group of young people aged 14 to 29 in the country, 9.0 million did not complete high school, either because they dropped out of school before the end of this stage or because they had never attended it. Of these, 58.1% were men and 41.9% were women. Considering color or race, 27.4% were white and 71.6% were black or brown. (PNAD CONTINUA, 2023, p. 9)

We know that combating school dropout in high school is not an easy task and becomes even more challenging when we refer to black students, as we are constantly faced with structural racism and institutional racism, which hinder the actions of ethnic-racial relations in school, which are necessary to keep high school students until the completion of the basic stage of education. An important instrument that has been corroborating the reduction in the process of racial inequality in schools is Law No. 12,711, of 2011, known as the quota law, which was created to reserve at least 50% of vacancies in universities and federal institutes for students who attended all of high school in public schools.

According to BOANAFINA; MACIEL; LIMA

The Quota Law aims to establish an affirmative action of reserving vacancies, in all public HEIs, for self-declared black, brown and indigenous students, who come from families with an income equal to or less than one and a half minimum wages per capita, and/or who have attended high school in public schools (Brasil, 2012) [...] (BOANAFINA; MACIEL; LIMA, 2024, p. 11)

It is important to highlight that affirmative policies are essential for the access and permanence of public school students in high school, however they would not have positive effects if it were not for education for ethnic-racial relations, so it is important that public policies contemplate EREER. In addition to the quota law, the Lula government recently created the Pé de Meia Program, specific to high school, it is an important public policy, which aims to keep students in the three grades of high school, allowing them to enter and remain in this stage of education until its completion.

In Brazil, black students are in the majority in public schools, a portrait of a country where 56% of the population is black, according to IBGE data from 2022 "[...] The breakdowns by color, race and region show different realities. While 60.7% of white people aged at least 25 had finished high school, among black and brown people this rate was 47%. [...]" (BOANAFINA; MACIEL; LIMA, 2024, p. 14), so the creation and execution of this program legitimately corroborates the fight against social and racial inequalities, contributing to anti-racist education. This program, of course, is an important mechanism that aims to reduce school dropout in basic education, allowing young black students to enter a public university, through the quota policy, or a private institution, through PROUNI.

3 METHODOLOGY

The present study is characterized as a fieldwork, of a diagnostic and qualitative nature, and is configured as a study that makes use of some methodological procedures.

[...] the need arises to select ways to investigate this object. In Social Sciences, with qualitative research as a reference, fieldwork is presented as a possibility to achieve not only an approximation with what we want to know and study, but also to create knowledge, starting from the reality present in the field. (MINAYO, 1992, p.51).

It should be considered that the methodological contribution of the research contemplates, fundamentally, three investigative axes.

Firstly, it is an ongoing research that makes use of a survey of studies related to ethnic-racial relations, in public high schools, of the state education network of Campo Grande-MS, from the National Curriculum Guidelines for the Education of Ethnic-Racial Relations and for the Teaching of Afro-Brazilian and African History and Culture/2004. This whole process is important, as it strengthens the knowledge of the theme, implying a greater understanding and critical analysis of the researched object.

Of an empirical nature, the present research involves the analysis of documents and bibliographic references, varying the possibilities of sources consulted. "The documents also constitute a powerful source from which evidence can be drawn that substantiates the

researcher's assertions and statements. They also represent a "natural" source of information [...]". (LUDKE; ANDRÉ, 1986, p. 39). It is notorious that when using, in research, scientific and historical documents, the wealth of information should be a strong point to be explored, in the political and social fields, relating them to the racial issue in Brazil, so that we can discuss EREER, from a perspective of building an anti-racist education.

[...] The written document constitutes an extremely precious source for every researcher in the social sciences. It is, of course, irreplaceable in any reconstitution referring to a relatively distant past, since it is not uncommon for it to represent almost all the vestiges of human activity in certain epochs. In addition, very often, it remains as the only testimony of particular activities that occurred in the recent past (CELLARD, 2008, p. 295)

For Cellard, the concept of document is broad and all traces of the past must be considered, which serves as proof. Therefore, it is necessary to be judicious when consulting research sources, as it is a task that requires time, reading, analysis, understanding and interpretation of the data obtained. We cannot be in a hurry to disclose the data we find, so following the research schedule is essential for the implementation of the planned actions, with efficiency and responsibility.

Kripka, Scheller; Bonotto point out that:

The challenge to this research technique is the researcher's ability to select, treat and interpret information, in order to understand the interaction with its source. When this happens, there is an increase in details to the research and the data collected become more significant (KRIPKA; SCHELLER; BONOTTO, 2015, p. 57).

The investigations are being carried out in databases of the State Department of Education, of the high schools of Campo Grande-MS, of the state network of Mato Grosso do Sul and submitted to thematic content analysis from a qualitative perspective. "Qualitative studies are characterized as those that seek to understand a phenomenon in its natural environment, where they occur and of which they are part" (KRIPKA, SCHELLER; BONOTTO, 2015, p. 57).

The research consists of documentary analysis and also an interview in the google forms form, directed to EREER in the school context, specific for teaching professionals, according to the authorization of the SED – State Department of Education of Mato Grosso do Sul, who will answer a questionnaire through the institutional email, including the pedagogical coordination and the school manager. The present study, through this media tool, facilitates the understanding of data, since there are resources, such as comparative graphs, that allow greater clarity during the analysis of information, because "the advantage

of the interview over other techniques is that it allows us to immediately and stream the desired information, with practically any type of informant and on the most varied topics" (LÜDKE; ANDRÉ, 1986, p. 34).

The thematic content analysis is accompanied by procedures for exploring the material and identifying the central ideas and points that connect the discussion in relation to ethnic-racial processes in the school environment, based on the DCNs - National Curriculum Guidelines and the BNCC - National Common Curriculum Base.

A good understanding of the context is therefore crucial at all stages of documentary research, both at the time of elaborating a problem, choosing the clues to follow in order to discover the main archival databases, and at the time of the analysis itself. This knowledge must also be global, as one can never know in advance which elements of social life will be useful to know when the time comes to formulate interpretations and explanations (CELLARD, 2008, p. 300).

In this sense, we understand that the school is the space of ethnic-racial differences, which has the duty to promote an anti-racist education, especially in the fight against structural and institutional racism, corroborating the construction of a society that respects and values ethnic-racial groups, for the execution of ERE, in the high school of state public schools in Campo Grande-MS.

4 RESULTS AND DISCUSSIONS

The present research is in progress, so it is believed that it will contribute to the educational system and to society in general, since it will be an important source of consultation, in the databases of research related to education for ethnic-racial relations, in high school, in the teaching of the National Curriculum Guidelines, for ERE, in the high school curriculum of the state schools of Campo Grande, from the perspective of an anti-racist education, since it will be possible to verify the effectiveness of the high school curriculum, that is, how the school has been exploring African and Afro-Brazilian culture during the school year, undoing the idea of specific dates, such as May 13 and November 20.

It is challenging to debate and face ethnic-racial relations in the school environment, however it is necessary to take it to the classroom, as it is a challenge for teachers, researchers and all segments of society, as the road to be covered is long in a country that camouflages racism, leaving its marks in jokes, in figurative language, among other situations. Changes in speech, posture, gestures, expressions, jokes, among many other situations of inferiority against black people are necessary. In this sense, the school must be

prepared in the short, medium and long term, as determined by Law No. 10,639/03, as well as the DCNs/04.

The high school curriculum will be composed of the National Common Curricular Base and training itineraries, which should be organized through the offer of different curricular arrangements, according to the relevance to the local context and the possibility of the education systems, namely: I – languages and their technologies; II – mathematics and its technologies; III – natural sciences and their technologies; IV – applied human and social sciences; V – technical and professional training (LDB, Art. 36; emphasis added) (BRASIL, 2018, p. 468).

It is important to consider that the school curriculum, in its decolonization process, must make visible the black and indigenous population, which were previously erased in the country's educational institutions, so the elaboration of a curriculum that, in fact, is contemplating African and Afro-Brazilian history and culture, in the formative itineraries of the new high school, in the different areas of knowledge, inserting ERER, in the PPP – Pedagogical Political Project of the high school curriculum, enabling new discoveries according to the students' abilities, in a critical view, so that students can identify the camouflaged racism in society. “[...] the education of ethnic-racial relations, as a nucleus of the political-pedagogical projects of educational institutions of different levels and as one of the focuses of the procedures and instruments used for their evaluation and supervision [...]”. (SILVA, 2007, p. 490).

It is true that educational policies must occur according to school practices committed to the differences of the subjects, which must be recognized, valued and respected, in the social, political, historical and cultural aspects in the school environment.

The education of ethnic-racial relations aims at the formation of citizens, women and men committed to promoting conditions of equality in the exercise of social, political, economic rights, the rights to be, live, think, proper to the different ethnic-racial and social belongings. In other words, it pursues the main objective of triggering learning and teaching in which participation is effective in the public space. That is, in which men and women committed to and discussing issues of general interest are formed, being able to recognize and value worldviews, historical experiences, contributions of the different peoples that have formed the nation, as well as to negotiate priorities, coordinating different interests, purposes, desires, in addition to proposing policies that effectively contemplate everyone. (SILVA, 2007, p. 490)

In this context, it is necessary for black students to feel inserted in the educational process, to recognize their identity and their ancestry, because belonging is fundamental in the teaching and learning process, in education for ethnic-racial relations, from a perspective

of an anti-racist education, in the curriculum of high school, state schools, Campo Grande, in the state of Mato Grosso do Sul.

5 FINAL CONSIDERATIONS

In view of the above, the importance of laws No. 10,639/2003 and 11,645/2008 is evidenced, to institute the mandatory teaching of African history and Afro-Brazilian cultures and indigenous culture in the curricula of basic education in the education systems of the entire country, however, for us to reach this moment there was a long road marked by deprivation of freedom, resistance, struggles, suffering, union and determination of the black people, to leave the condition of inferiority, marked by a period of slavery and a post-abolitionism in which blacks were seen as merchandise, that is, exploitative bargaining chips and with the deprivation of basic fundamental rights for human dignity, such as: health, education, housing, employment, among others.

It is important to point out that education for ethnic-racial relations is the result of a long process of discussions and debates driven by black social movements, in a historical process of struggle and resistance of the Brazilian black population, against racism and racial discrimination. In this sense, EREER began with the advent of Law No. 10,639/2003, authored by the then federal deputy for the state of Mato Grosso do Sul, Ben-Hur Ferreira, with Professor Petronilha Beatriz Gonçalves Silva as rapporteur of the commission, responsible for the preparation of CNE/CP Opinion No. 3/2004, which established the national curriculum guidelines for the teaching of Afro-Brazilian and African history and culture in public and private schools throughout the country.

This law was sanctioned on January 9, 2003, by the President of the Republic Luiz Inácio Lula da Silva, providing legal and didactic support, so that the school and the teacher could enter into African, Afro-Brazilian and indigenous themes, without them being persecuted by racists or any other type of ideology, especially in contemporary times. with the advent of digital media.

Currently, there is a legal framework that provides legal support for education systems to ensure, in the school curriculum, throughout the school year, themes focused on African ancestry, rescuing values, knowledge, cuisine, dance, music, literature, beliefs, etc. However, even in the face of laws, legal opinions and resolutions, specific to the ethnic-racial issue in education, there are still education systems, school units and teachers that address EREER in a superficial way, for example only on thematic dates, such as Black Consciousness Day, or simply ignore it, not contemplating it in its daily contents, as determined by DCNERER.

In this panorama, we realize that the challenge faced by the black social movement, in search of an education that promotes equity, even before the abolition of slavery, extends to contemporaneity, showing how difficult it is to build an education that can actually contemplate the knowledge of African ancestry, since we have a racist society, which tends to hinder any attempt to break the structural racism rooted in the different sectors of the economy, education, security, leisure, among others.

From this point of view, the importance of EREER in confronting a Eurocentric curriculum is noted, that is, one that insists on remaining in the approach of European culture, in a policy of erasure of African and Afro-Brazilian history and identity, as occurred in previous decades. The DCNERER allow basic education teachers to have the freedom to include in their daily content the knowledge of Africanity, without, however, ceasing to work on the specific content of their discipline, so we highlight the importance of teachers as transforming agents of cultures of different knowledge, which can, from legal support, correct exaggerations and distortions related to blacks, in Brazil. However, the approach to themes directed by EREER is not mandatory only for black or brown teachers. It is a policy that must be adopted by the entire school community, regardless of whether they are white or yellow. Discussing the ethnic-racial issue and its applicability is the mission of all agents involved with school education, without taking into account color, race or credulity.

From this perspective, we perceive the role of EREER in high school, acting as a guiding instrument for teachers, in the construction of an education that can actually promote racial equity, in an increasingly democratic educational system, where black children, adolescents and young people can feel that they belong to the environment in which they are inserted, that is, that they have their Afro-Brazilian identity valued, through teachers, since there is direct contact with educators and students, who create bonds of affection. Therefore, the school must promote interaction between everyone, from the doorman, the lunch lady to the school principal, promoting, in addition to the content directed to EREER, lectures, training and discussions for the entire school community, in order to reduce and eliminate racial prejudice, promoting anti-racist attitudes within it.

The Brazilian educational system, together with political authorities and entities linked to education, need to think about an education that in the short, medium and long term is increasingly plural, that has in its PPP – Pedagogical Political Project education for ethnic-racial relations, from kindergarten to high school, that goes throughout the entire school trajectory of students building bonds of equity, respect and appreciation, so that in fact our country can establish a reparatory justice for the black population, which was enslaved, wronged, abandoned by the Brazilian political authorities, from the period of colonization, to

the present day, in an abandonment that culminates in social inequalities, which are externalized in violence, low education, unemployment, inferiority of race, among many other atrocities directed at the black population.

Under this bias, we see the importance of education as a transformer of opportunities, we have as an example affirmative policies, which are allowing more young black people to complete high school and enter universities in the country, so the implementation of public educational policies, with a focus on ERER, of high school, from an anti-racist perspective must be permanent, so that we have a more egalitarian and less cruel country, against the black population, especially black youth, constant victims of violence and school dropout.

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THE IMPACT OF GAMIFICATION AND PHYSICAL EDUCATION ON ENGAGEMENT IN ENGLISH LANGUAGE TEACHING

O IMPACTO DA GAMIFICAÇÃO E DA EDUCAÇÃO FÍSICA NO ENGAJAMENTO NO ENSINO DE INGLÊS

EL IMPACTO DE LA GAMIFICACIÓN Y DE LA EDUCACIÓN FÍSICA EN EL COMPROMISO EN LA ENSEÑANZA DEL INGLÉS



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ABSTRACT

This article analyzes the impact of integrating gamification and Physical Education in English language teaching, considering their contributions to student engagement and meaningful learning among high school students. The research, qualitative in nature and reflective in character, is grounded in authors such as Deterding et al. (2011), Gee (2003), Kapp (2012), and Freire (1996), as well as the guidelines of the Brazilian National Common Curricular Base (BNCC). The study aimed to understand how the use of game elements, challenges, and physical practices in a foreign language can make learning more dynamic, participatory, and contextualized. The reflections were based on pedagogical observations of gamified activities developed in joint Physical Education and English classes, in which students participated in physical games with commands and interactions in English, such as Simon Says and Treasure Hunt. The results showed that gamification promotes motivation, collaboration, and the reduction of language anxiety, in addition to encouraging student protagonism and strengthening linguistic, cognitive, and socioemotional competencies. A positive shift in the teacher's role was also observed, as teachers increasingly acted as mediators and facilitators of learning experiences. It is concluded that the integration of gamification and Physical Education represents an innovative and interdisciplinary pedagogical practice capable of transforming language teaching into a meaningful, enjoyable experience that fosters critical, creative, and autonomous learners.

Keywords: Gamification. Language Teaching. Engagement. Physical Education.

RESUMO

Este artigo analisa o impacto da integração entre gamificação e Educação Física no ensino de Língua Inglesa, considerando suas contribuições para o engajamento e a aprendizagem significativa de estudantes do Ensino Médio. A pesquisa, de natureza qualitativa e caráter

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reflexivo, fundamenta-se em autores como Deterding et al. (2011), Gee (2003), Kapp (2012) e Freire (1996), além das orientações da Base Nacional Comum Curricular (BNCC). A investigação teve como propósito compreender como o uso de elementos de jogos, desafios e práticas corporais em língua estrangeira pode tornar o aprendizado mais dinâmico, participativo e contextualizado. As reflexões foram baseadas em observações pedagógicas de atividades gamificadas desenvolvidas em aulas conjuntas de Educação Física e Língua Inglesa, nas quais os estudantes participaram de jogos físicos com comandos e interações em inglês, como Simon Says e Treasure Hunt. Os resultados evidenciaram que a gamificação favorece a motivação, a colaboração e a redução da ansiedade linguística, além de promover o protagonismo estudantil e o fortalecimento das competências linguísticas, cognitivas e socioemocionais. Verificou-se também uma mudança positiva no papel docente, que passou a atuar como mediador e facilitador de experiências. Conclui-se que a integração entre gamificação e Educação Física representa uma prática pedagógica inovadora e interdisciplinar, capaz de transformar o ensino de línguas em uma experiência significativa, prazerosa e formadora de sujeitos críticos, criativos e autônomos.

Palavras-chave: Gamificação. Ensino de Línguas. Engajamento. Educação Física.

RESUMEN

Este artículo analiza el impacto de la integración entre la gamificación y la Educación Física en la enseñanza de la lengua inglesa, considerando sus contribuciones al compromiso y al aprendizaje significativo de estudiantes de educación secundaria. La investigación, de naturaleza cualitativa y carácter reflexivo, se fundamenta en autores como Deterding et al. (2011), Gee (2003), Kapp (2012) y Freire (1996), además de las orientaciones de la Base Nacional Común Curricular (BNCC) de Brasil. El estudio tuvo como propósito comprender cómo el uso de elementos de juego, desafíos y prácticas corporales en una lengua extranjera puede hacer que el aprendizaje sea más dinámico, participativo y contextualizado. Las reflexiones se basaron en observaciones pedagógicas de actividades gamificadas desarrolladas en clases conjuntas de Educación Física y lengua inglesa, en las cuales los estudiantes participaron en juegos físicos con comandos e interacciones en inglés, como Simon Says y Treasure Hunt. Los resultados evidenciaron que la gamificación favorece la motivación, la colaboración y la reducción de la ansiedad lingüística, además de promover el protagonismo estudiantil y fortalecer las competencias lingüísticas, cognitivas y socioemocionales. También se observó un cambio positivo en el papel del docente, quien pasó a actuar como mediador y facilitador de experiencias de aprendizaje. Se concluye que la integración entre la gamificación y la Educación Física constituye una práctica pedagógica innovadora e interdisciplinaria, capaz de transformar la enseñanza de lenguas en una experiencia significativa, placentera y formadora de sujetos críticos, creativos y autónomos.

Palabras clave: Gamificación. Enseñanza de Lenguas. Compromiso. Educación Física.

1 INTRODUCTION

The socio-technological transformations of the last decades have profoundly redefined the dynamics of teaching and learning. The massive presence of digital technologies, multimodal languages and new forms of social interaction has challenged the traditional school to review its methods, its practices and its own conception of knowledge. In this scenario, active methodologies emerge as responses to the need to make the student the protagonist of his education, moving him from the passive position of receiver to that of subject builder of knowledge.

Among these methodologies, gamification occupies a prominent place. Deterding et al. (2011, p. 12) define gamification as the "use of game design elements in non-game contexts", with the aim of promoting engagement and motivation. This definition broadens the understanding of the practice beyond the superficial use of games in the classroom, emphasizing the intentional structuring of formative experiences based on challenges, symbolic rewards, progression, and continuous feedback.

In English language teaching, the challenge of engagement is particularly sensitive. Communicative insecurity, fear of making mistakes, and the absence of authentic contexts for language use often result in affective blocks that compromise the development of communicative competence. Krashen (1982, p. 22) argues that the acquisition of a second language is favored when the "affective filter" is low, that is, when the learner is in an emotionally safe and motivating environment. Thus, thinking about strategies that reduce linguistic anxiety becomes essential.

The articulation between gamification and Physical Education emerges, in this context, as an innovative and interdisciplinary proposal. By integrating body movement, social interaction, and functional use of the foreign language, an experiential learning environment is created that dialogues with the general competencies of the National Common Curricular Base (BRASIL, 2018, p. 61), especially those related to protagonism, digital culture, critical thinking, and collaboration.

In addition, interdisciplinarity strengthens the understanding of language as a situated social practice. By associating commands in English with bodily actions, cooperative games and physical challenges, learning ceases to be abstract and becomes concrete and meaningful. According to Ausubel (2003, p. 27), meaningful learning occurs when new knowledge is anchored in previous cognitive structures and in real experiences lived by the subject.

Thus, this study proposes to analyze, from a theoretical and reflective perspective, the impacts of the integration between gamification and Physical Education on the engagement

and learning of the English Language in High School, seeking to understand its contributions to the integral formation of the student and to the strengthening of multidisciplinary pedagogical practices.

2 METHODOLOGY

The present study is characterized as a qualitative research of a reflective-interpretative character, based on theoretical analysis articulated with the interdisciplinary pedagogical experience developed in High School. The qualitative approach is justified by privileging the understanding of educational phenomena in their contextual complexity, considering cognitive, affective, social and pedagogical dimensions involved in the teaching-learning process.

The investigation does not assume an experimental character with a control group, but is structured as an analytical-reflective study supported by systematized observations of teaching practice. This methodological option allows us to understand the gamified experience not only as a punctual intervention, but as a situated pedagogical practice, permeated by human, cultural and institutional relations.

The analysis was guided by consolidated theoretical frameworks on gamification (DETERDING et al., 2011; KAPP, 2012; HAMARI et al., 2014), situated learning (GEE, 2003), second language acquisition (KRASHEN, 1982; REINDERS; WATTANA, 2015), meaningful learning (AUSUBEL, 2003) and interdisciplinarity (BRASIL, 2018; MATOS; ALMEIDA, 2019; FREIRE, 1996; MORAN, 2018).

The analyzed experiences were developed in high school classes, in the context of integrated classes of English Language and Physical Education, based on an interdisciplinary proposal planned collaboratively between the teachers of the two areas. The planning articulated linguistic and motor objectives, seeking to simultaneously promote the development of communicative competence in English and body skills, within a pedagogical perspective that understands the body as a mediator of learning.

The gamified activities implemented included dynamics such as *Simon Says*, with body commands in English; *Treasure Hunt*, structured as a treasure hunt with elaborate clues in the target language; *Word Relay*, organized in a relay race format for word and sentence formation; cooperative challenges with team scoring; and progressive missions accompanied by immediate feedback. All proposals were structured based on classic elements of gamification, such as the construction of an engaging narrative, definition of clear goals, use of a symbolic scoring system, organization in levels of increasing difficulty and offer of non-

material rewards, such as collective recognition, symbolic certificates and pedagogical medals.

The structuring of the activities as "missions" was based on the understanding that student engagement is directly related to the perception of purpose and progression throughout the learning process. As Karl Kapp (2012, p. 67) argues, engagement emerges when the student identifies meaning in the task and visualizes its evolution. In this sense, the dynamics were designed to favor emotional involvement, stimulating active participation and the construction of a meaningful learning experience.

The analysis procedures adopted an interpretative approach, centered on the systematic observation of qualitative indicators of the learning process. Aspects such as spontaneous oral participation, frequency of interaction in English, reduction of hesitations and communicative blocks, level of cooperation among students, posture in the face of error and the degree of engagement demonstrated during activities were considered. These indicators were confronted with the theoretical assumptions about motivation and meaningful learning, allowing an analytical reading of the results in the light of contemporary discussions on gamification and interdisciplinary practices in High School.

3 THEORETICAL FRAMEWORK

The discussion about innovative teaching methodologies has gained significant space in recent decades, driven by social, cultural, and technological transformations that directly affect the way individuals learn and interact with knowledge. In the educational field, the search for strategies that stimulate autonomy, engagement, and meaningful learning has led educators and researchers to explore student-centered approaches, among which gamification stands out. According to Deterding et al. (2011, p. 12), the term "gamification" refers to the use of game elements and dynamics in non-playful contexts, with the purpose of increasing the motivation and involvement of participants. This methodology, by inserting scoring mechanics, rewards, levels, narratives, and challenges, seeks to transform the learning process into an active, pleasurable, and meaningful experience.

Karl Kapp (2012, p. 67) points out that gamification should not be reduced to the mere application of games in classes, but understood as an instructional design strategy that uses game principles to create immersive learning experiences. The author highlights that the strength of this methodology lies in its ability to promote a state of cognitive and emotional engagement, in which the student becomes the protagonist of his or her own educational trajectory. This perspective is close to the concept of meaningful learning, proposed by David Ausubel (2003, p. 27), according to which learning is more effective when the new knowledge

is related to previous concepts and to real situations experienced by the student. In this way, gamification acts as a mediator that connects curricular content to concrete experiences, contributing to knowledge being internalized in a lasting way.

James Paul Gee (2003, p. 45) adds that games are powerful environments of situated learning, as they allow the subject to learn by "doing", experimenting and reflecting on his actions. For the author, digital games and gamified experiences create learning ecosystems in which error is not seen as a failure, but as part of the process, which stimulates trying, exploration, and discovery. This aspect dialogues directly with the teaching of foreign languages, especially the English language, in which insecurity in communicating and the fear of making mistakes are recurrent barriers. Thus, the use of game dynamics can create a safe and stimulating space for communicative practice, favoring the development of orality and listening comprehension.

In the Brazilian context, the National Common Curricular Base (BRASIL, 2018, p. 61) emphasizes the importance of interdisciplinarity and student protagonism as foundations for the integral formation of students. The document highlights that teaching should promote the articulation between different areas of knowledge, enabling the student to understand and intervene in reality in a critical and creative way. In this sense, the integration between English Language and Physical Education emerges as an innovative proposal that is coherent with contemporary teaching principles. By uniting body movement, linguistic expression, and social interaction, this approach breaks with the traditional fragmentation of disciplines and creates contextualized learning experiences, in which the body and language complement each other.

Matos and Almeida (2019, p. 102) argue that the body is an important mediator of language, and that physical practices integrated with language teaching can expand students' understanding and linguistic production. According to the authors, bodily experiences promote a more lively and meaningful learning, as they unite emotion, cognition and action in the same educational process. When Physical Education activities incorporate commands, challenges and interactions in English, the student experiences the functional use of the language in authentic contexts, reinforcing learning through movement and cooperation. This articulation between body, mind and language also finds support in Paulo Freire (1996, p. 39), who highlights the role of dialogue and action in the construction of knowledge. For the educator, teaching requires understanding that education is a political act, and that learning is a way of acting on the world. In this way, the union between body practices and language teaching not only expands the linguistic repertoire of students, but also strengthens their critical awareness, autonomy and social participation.

In the field of motivation and engagement, studies such as that of Hamari et al. (2014, p. 3050) demonstrate that gamification has proven positive effects on student engagement. In a meta-analysis on gamified educational experiences, the authors concluded that the use of game elements increases learners' intrinsic motivation, persistence, and sense of belonging. These results are reinforced by Dickey (2011, p. 23), who points out that games create emotionally safe and challenging environments, in which the student feels free to experiment and learn from mistakes, which contributes to the development of self-confidence and communication. In the case of English teaching, this factor is especially relevant, as the fear of making mistakes and the lack of opportunities for real communicative use usually limit learning.

Reinders and Wattana (2015, p. 122) argue that gamified activities offer authentic communicative contexts in which students use the target language spontaneously, which favors both natural acquisition and meaningful practice. This perspective dialogues with Stephen Krashen (1982, p. 22), who states that the learning of a second language occurs more effectively when the learner is emotionally involved and exposed to understandable inputs in low-anxiety environments. Thus, gamification, by combining playfulness, challenge and cooperation, creates an emotionally welcoming and cognitively stimulating space for learning the English language.

The motivational dimension is also deeply linked to the idea of student protagonism, defended by the National Common Curricular Base (BRASIL, 2018, p. 63), which recognizes the student as an active subject and responsible for his or her formative process. In this context, Moran (2018, p. 58) highlights that the teacher assumes the role of mediator and designer of learning experiences, capable of creating challenging and meaningful situations that arouse the student's interest and curiosity. Gamification, therefore, is not only a playful tool, but a means of reconfiguring pedagogical relationships, transforming teaching into a participatory, collaborative, and dynamic process.

Based on these assumptions, it is understood that the articulation between gamification, Physical Education and English language teaching represents a pedagogical proposal consistent with the demands of contemporary education. This approach favors active learning, cooperation, the development of socio-emotional skills, and the consolidation of language skills, contributing to the student's comprehensive education. By integrating the body, the game and the language, the teaching process becomes more engaging, contextualized and humanized, reaffirming the importance of interdisciplinary methodologies that consider the student not only as a receiver of information, but as an agent of transformation in the educational space.

In addition to these foundations, it is pertinent to deepen the theoretical framework that supports this proposal, situating it in a broader epistemological field. Gamification, when analyzed from the perspective of constructivist and socioconstructivist theories, is aligned with the conceptions of learning as an active process of knowledge construction. Social interaction, a central element in gamified dynamics, is close to the contributions of Lev Vygotsky, especially with regard to the notion of the zone of proximal development, in which learning occurs through mediation and collaboration between peers. Activities structured in teams, with progressive challenges and mutual support, favor shared learning and the collective construction of meanings, strengthening linguistic and socio-emotional skills simultaneously.

In addition, the incorporation of body movement in language teaching can be understood in the light of contemporary discussions on embodied cognition, which defend the inseparability between mind and body in cognitive processes. Body-mediated learning expands the neural connections associated with memory and meaning, enhancing the retention and practical application of content. In this sense, the interdisciplinarity between Physical Education and English Language is not only configured as a methodological strategy, but as a theoretical position that recognizes the integrality of the learning subject.

Another relevant aspect concerns the theory of self-determination, proposed by Edward Deci and Richard Ryan, according to which intrinsic motivation is strengthened when the basic psychological needs of autonomy, competence and belonging are met. Gamified experiences, by offering choices, gradual challenges, and collaborative interaction, contribute to meeting these needs, increasing student engagement and persistence.

In this way, the theoretical framework that underlies the integration between gamification, body movement and English language teaching evidences a convergence between different contemporary pedagogical currents, all centered on the valorization of experience, interaction and meaning. The proposal is not limited to introducing playful elements into the school space, but seeks to reconfigure the teaching paradigm itself, moving it from a transmissive logic to an experiential, dialogical and participatory logic. Such a perspective reinforces the understanding that innovating in education does not only mean adopting new tools, but rethinking conceptions of learning, subject and pedagogical practice in the light of the formative demands of the twenty-first century.

4 RESULTS AND DISCUSSION

The results obtained from the implementation of gamified and interdisciplinary practices show significant impacts on the engagement, motivation and linguistic performance

of high school students. A significant increase in student participation was consistently observed, including among those who, in traditional contexts, demonstrated a more passive posture. Active involvement in the proposed dynamics confirms the analyses of Hamari et al. (2014, p. 3050), according to which gamified elements increase intrinsic motivation and persistence. The narrative structure of the activities, organized into progressive challenges and collective goals, favored the feeling of belonging and the perception of continuous advancement. This configuration is close to what James Paul Gee (2003, p. 45) defends, when he states that environments based on the logic of games allow the learner to "learn by doing", strengthening the internalization of knowledge through active experience. It is important to highlight that the students' interest was not primarily focused on external rewards, but on the experience of the challenge itself and on collective overcoming, which differentiates structured gamification from merely recreational or competitive practices devoid of pedagogical intentionality.

With regard to orality in English, there was a significant improvement in communicative fluency and spontaneity. The students showed less fear of making mistakes and greater willingness to participate in the proposed challenges, especially in activities that required constant interaction between peers. This reduction in linguistic anxiety can be understood in the light of the affective filter hypothesis formulated by Stephen Krashen (1982, p. 22), according to which acquisition occurs more efficiently when the learner is in an emotionally secure environment with low levels of tension. The playful, cooperative and bodily nature of the activities contributed to the reduction of the pressure typical of traditional foreign language classes. In a convergent way, Reinders and Wattana (2015, p. 122) argue that game-based contexts increase the willingness to communicate in the target language, a phenomenon clearly perceptible in the dynamics of treasure hunting, in which communication in English became a necessary condition for achieving collective goals.

Another relevant aspect concerns meaningful learning and vocabulary retention. The association between body movement and language produced noticeable effects on the comprehension and memorization of simple commands and structures, such as jump, run, turn around, stop, find, and look under, which began to be assimilated not only at a semantic level, but also at an experiential level. This concrete experience dialogues with David Ausubel's theory of meaningful learning (2003, p. 27), which maintains that new knowledge is incorporated in a more lasting way when anchored in previous experiences and concrete situations. By physically executing the commands, the students established multiple cognitive connections, integrating perception, action, and language. This integration confirms the perspective defended by Matos and Almeida (2019, p. 102), when they state that the body is

a legitimate mediator of language and the construction of meanings, expanding the possibilities of meaning in the educational process.

The practices developed also favored the strengthening of socio-emotional skills, especially with regard to cooperation, empathy and respect for collectively established rules. The activities required teamwork, active listening and co-responsibility for the results, promoting learning that goes beyond the cognitive dimension. This dynamic is close to the dialogical conception of education proposed by Paulo Freire (1996, p. 39), for whom knowledge is built in interaction and shared action. The interdisciplinarity analyzed made it possible for students with lower linguistic performance to find protagonism in the motor dimensions, reinforcing the principle of educational equity and expanding the forms of recognition in the school space.

The experience also implied a significant transformation in the teaching role. The gamified practice required the teacher to mediate and organize experiences, shifting the centrality of the transmission of content to the creation of challenging and meaningful situations. This change converges with the perspective presented by Moran (2018, p. 58), according to which the contemporary educator acts as a designer of learning experiences. The teacher started to structure challenges, offer continuous feedback and adjust the dynamics according to the needs of the group, which positively impacted the classroom climate and strengthened pedagogical bonds.

The integration between Physical Education and English Language proved to be consistent with the guidelines of the National Common Curricular Base (BRASIL, 2018, p. 61), which emphasizes the articulation between areas of knowledge as the foundation of integral education. Interdisciplinarity broadened the meaning of learning by demonstrating that knowledge is not fragmented into isolated compartments, but is constructed in a relational and contextualized way. Language was experienced as a situated social practice, linked to the body, to action and to interaction.

The pedagogical and academic implications arising from this study indicate that the integration between gamification and Physical Education in English language teaching goes beyond the merely methodological dimension, configuring itself as an epistemologically coherent strategy with the contemporary demands of integral education. It is evident that gamification, when structured with didactic intentionality, promotes sustained cognitive engagement, reduces communicative anxiety, expands spontaneous orality, favors meaningful learning anchored in body experience, strengthens socio-emotional skills and stimulates student autonomy. As Karl Kapp (2012, p. 67) points out, the effectiveness of gamification lies in intentional instructional design, which requires careful planning and

alignment with curricular objectives. In the interdisciplinary context, the articulation between body and language breaks with the traditional fragmentation of the curriculum, in line with the guidelines of the National Common Curricular Base, by promoting an expanded understanding of reality through the integration between areas.

Despite the positive results observed, it is necessary to recognize limitations inherent to the methodological design adopted. This is a qualitative study, of a reflective and non-experimental nature, which makes statistical generalizations impossible. The analysis is based on pedagogical observations and theoretical interpretation, without the application of quantitative instruments to measure language proficiency. In addition, the practices were developed in a specific context of High School, and may present variations when applied in other stages of basic education. Such limitations, however, do not invalidate the study's contributions, but indicate the need for future investigations that incorporate quasi-experimental designs, application of proficiency tests before and after interventions, longitudinal analyses, and comparative studies between traditional and gamified methodologies. Hamari et al. (2014, p. 3050) emphasize the importance of expanding empirical evidence on the long-term impacts of gamification, especially in the formal educational context.

Finally, it is highlighted that the interdisciplinary nature of this research enables a broad dialogue with different fields of knowledge, such as Education, Applied Linguistics, Human Movement Sciences, Educational Psychology, Studies on Motivation and Pedagogical Innovation. The analyzed proposal shows that the integration between areas not only enhances educational results, but also strengthens a systemic and relational conception of knowledge, in which language, body and social interaction are inseparably articulated.

The experience investigated points to the need to expand pedagogical practices that break with curricular fragmentation and promote significant connections between knowledge. In this sense, space is opened for the deepening of investigations that integrate gamified digital technologies into body practices, as well as for the development of hybrid teaching models that articulate face-to-face, playfulness and digital resources. Research aimed at the application of this approach in other foreign languages, in bilingual contexts and in different stages of basic education is also promising, analyzing possible variations in the cognitive, linguistic and socio-emotional impacts.

In addition, future research can explore the long-term effects of interdisciplinary gamification, especially with regard to the consolidation of autonomy, the self-regulation of learning, and the expansion of students' communicative disposition. As Reinders and Wattana (2015, p. 122) point out, game-based environments tend to increase the desire to

communicate in the target language, indicating that the articulation between playful resources, body movement and social interaction constitutes a fertile field for more in-depth research. Thus, the proposal discussed here does not end as an isolated experience, but presents itself as a concrete possibility of reconfiguring pedagogical practices, aligned with contemporary formative demands and the valorization of active, collaborative and integral learning.

5 FINAL CONSIDERATIONS

The present investigation allowed us to understand that the integration between gamification and Physical Education in English language teaching constitutes an innovative pedagogical practice, of an interdisciplinary nature and aligned with the contemporary assumptions of integral education. The articulation between body movement, structured challenges and functional use of the English language demonstrated the potential to transform the dynamics of the classroom, shifting the focus from the transmission of content to the active and experiential construction of knowledge.

The results showed a significant increase in student engagement, a reduction in linguistic anxiety and greater spontaneity in orality. It was also observed that vocabulary retention was strengthened through the association between bodily experience and language, transformation of the teaching role towards active mediation and reorganization of the teaching process based on an interdisciplinary logic that enhanced the meaning of learning. Such findings are supported by different theoretical frameworks that, although coming from different fields, converge by emphasizing the centrality of experience, interaction and motivation in the training process.

Deterding et al. (2011, p. 12) highlight that gamification promotes engagement when applied in a structured way, overcoming superficial approaches based only on external rewards. This understanding is deepened by Karl Kapp (2012, p. 67), when he states that the effectiveness of gamification depends on intentional pedagogical design, capable of articulating clear objectives, progression of challenges, and meaningful feedback. In the field of situated learning, James Paul Gee (2003, p. 45) demonstrates that environments inspired by the logic of games favor "learning by doing", promoting cognitive and emotional involvement. In the context of second language acquisition, Stephen Krashen (1982, p. 22) shows that learning occurs more efficiently when the affective filter is low, a condition favored by cooperative and less threatening environments. David Ausubel (2003, p. 27) bases the importance of meaningful learning, in which new content is anchored in concrete

experiences, an aspect enhanced by the bodily experience of commands and interactions in English.

The dialogical and emancipatory dimension of the educational process is supported by Paulo Freire (1996, p. 39), who reaffirms dialogue as the structuring axis of human formation, while Moran (2018, p. 58) redefines the role of teachers as mediators and designers of learning experiences. The interdisciplinary perspective is legitimized by the National Common Curricular Base (BRASIL, 2018, p. 61), which defends the articulation between areas of knowledge as the foundation of integral education. With regard to the relationship between body and language, Matos and Almeida (2019, p. 102) consolidate the understanding of the body as a legitimate mediator of the construction of meanings. In turn, Hamari et al. (2014, p. 3050) empirically confirm the motivational effects of gamification, especially with regard to intrinsic motivation and persistence.

The convergence of these references theoretically supports the observed results and shows that the analyzed proposal is not configured as an isolated or circumstantial intervention, but as a practice anchored in consistent epistemological foundations. The articulation between body, game and language proved to be capable of dynamizing the teaching of English at the same time that it promoted significant displacements in the pedagogical culture of the classroom, favoring more horizontal, collaborative and dialogical relationships.

In broader terms, the final considerations of this investigation allow us to affirm that the integration between gamification and body practices in foreign language teaching represents more than methodological innovation; It is a paradigmatic reconfiguration of the educational process. By breaking with curricular fragmentation and integrating cognitive, affective, bodily and social dimensions, this approach reaffirms the centrality of the subject in the construction of knowledge and strengthens the conception of learning as a living, situated and relational experience. The analyzed experience indicates that English language teaching can transcend the content-based and structural logic, assuming a performative and interactive character, in which language is experienced as a concrete social practice.

In addition, by promoting sustained engagement, reducing emotional barriers, and expanding opportunities for authentic use of the language, the proposal contributes to the formation of more autonomous, confident, and collaborative students. Such a perspective dialogues with contemporary demands that require subjects capable of acting critically in multilingual and culturally diverse contexts. Interdisciplinarity, in this scenario, is not only presented as an organizational strategy of the curriculum, but as an epistemological principle

that recognizes the complexity of the educational phenomenon and the interdependence between different dimensions of knowledge.

It is concluded, therefore, that the articulation between body, game and language reconfigures the school experience by promoting critical, collaborative and meaningful education. By integrating the fundamentals of gamification, meaningful learning, second language acquisition and dialogic education, the analyzed practice points to promising paths in the consolidation of more humane, participatory pedagogical models that are coherent with the educational challenges of the twenty-first century.

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CYBERSECURITY MATURITY IN A BASIC EDUCATION SCHOOL NETWORK

MATURIDADE EM CIBERSEGURANÇA EM UMA REDE DE ESCOLAS DE EDUCAÇÃO BÁSICA

MADUREZ EN CIBERSEGURIDAD EN UNA RED DE ESCUELAS DE EDUCACIÓN BÁSICA



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ABSTRACT

Educational institutions, due to their handling of sensitive data from employees, students, and their guardians, are susceptible to cyberattacks. In this context, the need for structured cybersecurity practices aligned with governance principles becomes evident. This research aims to analyze the cybersecurity maturity level of a Basic Education School Network. To this end, a quantitative exploratory-descriptive case study was conducted using the National Institute of Standards and Technology's Cybersecurity Framework 2.0, composed of 22 categories and six dimensions operationalized through 106 statements arranged on a five-point Likert scale. For the statistical legitimacy of the dimensions, the Kaiser-Meyer-Olkin criterion for dimensionality, Cronbach's Alpha for reliability, and Pearson's (r) coefficient along with the p-value for validity were employed. Maturity was determined through the Mean, Standard Deviation, and 95% Confidence Interval. As a result, all six dimensions of the framework were positioned at maturity level two out of five, termed Risk-Informed, in which risk management practices are approved by management but may not be established as organizational policy. It is concluded that, although technical measures are in place, cybersecurity governance requires strengthening, particularly in supply chain risk management, to enhance organizational maturity.

Keywords: Cybersecurity. Governance. Basic Education. Maturity.

RESUMO

As instituições de ensino, ao lidarem com dados sensíveis de alunos, responsáveis e funcionários, tornaram-se alvos frequentes de ataques cibernéticos, o que evidencia a necessidade de práticas estruturadas de segurança digital alinhadas à governança. Objetivava-se analisar o nível de maturidade em cibersegurança de uma Rede de Escolas de Educação

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Básica. Para tanto, procede-se a um estudo de caso, de natureza exploratória-descritiva e abordagem quantitativa, utilizando o Cybersecurity Framework 2.0 do National Institute of Standards and Technology, composto por 22 categorias e seis dimensões, operacionalizado por 106 afirmativas em escala Likert. Para validação estatística empregaram-se os testes Kaiser-Meyer-Olkin, Alfa de Cronbach e coeficiente de Pearson. Observa-se que todas as dimensões posicionam-se no nível dois de maturidade, denominado Informado por Risco, no qual as práticas são reconhecidas pela administração, mas não plenamente institucionalizadas. Conclui-se que, embora haja estrutura técnica estabelecida, a governança da cibersegurança necessita de fortalecimento, especialmente na gestão da cadeia de suprimentos, para evolução do nível de maturidade organizacional.

Palavras-chave: Cibersegurança. Governança. Educação Básica. Maturidade.

RESUMEN

Las instituciones educativas, al manejar datos sensibles de empleados, estudiantes y sus responsables, son susceptibles a ataques cibernéticos, lo que evidencia la necesidad de prácticas estructuradas de ciberseguridad alineadas con principios de gobernanza. En este sentido, esta investigación tiene como objetivo analizar el nivel de madurez en ciberseguridad de una Red de Escuelas de Educación Básica. Para ello, se desarrolló un estudio de caso de naturaleza exploratoria-descriptiva con enfoque cuantitativo, utilizando el Cybersecurity Framework 2.0 del National Institute of Standards and Technology, compuesto por 22 categorías y seis dimensiones, operacionalizadas mediante 106 afirmaciones en escala Likert. Para la legitimidad estadística se emplearon los criterios Kaiser-Meyer-Olkin, Alfa de Cronbach y coeficiente de Pearson. Como resultado, las seis dimensiones del framework se posicionan en el nivel de madurez dos de cinco, denominado Informado por Riesgo, en el que las prácticas son reconocidas por la administración, pero no plenamente institucionalizadas. Se concluye que, aunque existen controles técnicos establecidos, es necesario fortalecer la gobernanza de la ciberseguridad, especialmente en la gestión de riesgos de la cadena de suministro, para elevar el nivel de madurez organizacional.

Palabras clave: Ciberseguridad. Gobernanza. Educación Básica. Madurez.

1 INTRODUCTION

The growing digitalization in the educational environment has brought numerous benefits, but it has also imposed significant challenges, especially in the face of the increase in cyberattacks and the mishandling of sensitive data in educational institutions (Santos et al., 2023). In this context, sensitive data is understood to include the personal information of employees, students and their guardians, as well as their financial histories (Santos; Farias; Nunes, 2024).

The Microsoft report (2024) points out that educational institutions often operate with a combination of old and new systems, while making intensive use of decentralized networks and personal devices, elements that amplify vulnerabilities and make structured cyber risk management difficult.

Thus, the hybrid technological conjuncture composed of legacy systems and recent technologies, combined with the constant exposure of these environments to the internet (Microsoft, 2024), makes sensitive data handled by educational institutions susceptible to cyberattacks (Santos et al., 2023; Microsoft, 2024). This scenario announces the need for digital security-oriented approaches for educational institutions, which is called cybersecurity.

Within the scope of this research, it is understood that "[...] cybersecurity is the set of standards, practices, and processes that make it possible to protect critical systems, particularly important information, and, above all, people from potential cyber risks and threats" (Belli et al., 2023, p. 9).

However, cybersecurity must be contemplated from a broader perspective, the authors Andrade et al. (2024) state that schools have adopted specific security measures, but demand a structured governance model capable of integrating strategy, responsibilities, and institutional supervision mechanisms. Governance establishes principles oriented to the internal and external environment of the institution (Frogeri; Portugal; Guedes, 2022); because it covers the organization in its entirety, as well as the society in which it is inserted. Thus, while cybersecurity refers to the protection of sensitive data, governance establishes the need to contemplate the internal and external environment. Therefore, the alignment between both considers the digital security of the institution and its surroundings, being materialized through structured approaches, called frameworks.

Cybersecurity frameworks have the primary objective of preventing or mitigating attacks, reducing the risk of threats (Purser, 2014), combined with governance principles. In addition, a framework assumes maturity levels, which determine the degree of compliance through pre-established standards, and the measurement of these levels is an action that

guides improvements in the processes and standards adopted (Araujo; Albuquerque Jr.; Passos, 2025).

In view of the above, maturity, expressed by a cybersecurity framework, supports the institution to identify its position in relation to certain levels, aiming at improving digital security, and this measurement includes governance. However, there is a lack of systematic diagnoses about the level of cybersecurity maturity in Basic Education School Networks, especially from the integrated perspective of governance.

In this context, the following research question is formulated: what is the level of cybersecurity maturity of a Network of Basic Education Schools in the light of the Cybersecurity Framework 2.0?

This investigation is justified by the social and institutional relevance of the protection of sensitive data in the educational environment, as well as by the need for diagnoses that support strategic decisions and organizational policies aimed at strengthening cybersecurity governance. Thus, the objective of this study is to analyze the level of cybersecurity maturity of a Network of Basic Education Schools, based on the Cybersecurity Framework 2.0 of the National Institute of Standards and Technology (NIST), through the statistical validation of the indicators and the measurement of the dimensions of the framework, in a specific, measurable and achievable way.

With this intent, this investigation is divided into sections. In addition to this introduction, the following section addresses the context of digital security in the school environment, presents the place of application of this research, as well as the cybersecurity framework adopted for the maturity examination, which includes governance. In sequence, the methodological paths permeated by this investigation are presented, which are followed by the explanation of the results. Finally, the final considerations are announced.

2 THEORETICAL FRAMEWORK

2.1 CYBERSECURITY IN THE EDUCATIONAL CONTEXT

According to Santos, Farias, and Nunes (2024), many institutions deal with sensitive data on a daily basis, such as customers' personal information, financial histories, and employee records. In the educational context, this reality takes on greater complexity, as it involves data from children and adolescents, an especially vulnerable audience in the digital environment. Thus, personal information of students and their guardians becomes even more relevant from the perspective of data protection. When there are no adequate security mechanisms, these records become potential targets for cyberattacks, leaks, and misuse, compromising not only institutional integrity, but also individual rights.

In this sense, Hurel and Lobato (2018) observed that the insertion of technologies in schools occurred, in many cases, without infrastructure planning or adequate training, increasing exposure to digital risks. This finding dialogues with the diagnosis presented by the National Laboratory for Scientific Computing (LNCC, 2024), according to which the Brazilian educational sector is among the most vulnerable to cyberattacks. Such vulnerability, as evidenced, stems from the absence of consistent institutional policies aimed at digital security, indicating that the problem is not restricted to the technical dimension, but involves management and strategic planning failures.

Additionally, the UNESCO report (2023) points out that many Brazilian schools still operate with precarious infrastructure, unstable connections, and the absence of structured data protection policies. This precariousness manifests itself even more intensely in rural and peripheral regions, where technological resources are scarce and the maintenance of digital systems faces structural limitations.

Souza and Brito (2021) corroborate this scenario by warning of institutional risks arising from the absence of clear guidelines and technical fragility, factors that compromise the ability to respond to incidents, such as breaches and data leaks. Therefore, there is convergence between studies regarding the structural fragility of the educational environment in the face of digital threats.

From an economic perspective, Sapiński (2023) demonstrates that the impacts of cyber incidents go beyond the operational sphere. Based on surveys carried out in 2020, the author indicates that the average costs of a data breach reached approximately US\$ 3.86 million. In addition, the estimated global cost of losses associated with cyberattacks exceeded \$1.5 trillion annually, evidencing the economic and social magnitude of these incidents. These data reinforce that cybersecurity cannot be treated only as a technical issue, but as an essential strategic component for institutional sustainability.

There is convergence between Hurel and Lobato (2018), Souza and Brito (2021), UNESCO (2023) and LNCC (2024) regarding the structural vulnerability of the educational sector, whether due to insufficient technological planning, institutional fragility, precarious infrastructure or absence of consolidated policies. Such a consensus shows that the challenge goes beyond connectivity and requires a systemic approach.

In this sense, the Organization for Economic Cooperation and Development (OECD, 2019) maintains that it is necessary to ensure safe access and adequate digital education, respecting regional and sociocultural specificities.

Therefore, the responsibility for protecting information falls on the institution and its managers, who must adopt structured measures to ensure the integrity and security of data,

preventing unauthorized access and leaks. Considering the risks imputed to students and employees, arising from the handling of sensitive data (Farias; Nunes, 2024), the institutional vulnerability pointed out by the LNCC (2024), the structural precariousness evidenced by UNESCO (2023), the absence of planning highlighted by Hurel and Lobato (2018) and the financial impact indicated by Sapiński (2023), it becomes necessary to treat cybersecurity from a broader and more integrated perspective. In this context, governance emerges as a structuring dimension capable of articulating strategy, institutional responsibility, and risk management.

2.2 ORGANIZATIONAL GOVERNANCE AND CYBERSECURITY

According to Kjaer (2004), the term governance refers to the act of piloting, conducting or drafting rules, indicating a notion of direction and strategic orientation.

Historically, its consolidation in the organizational field is related to the need for regulation resulting from financial scandals that occurred in companies in the United States in the 1980s, when investors began to react against shareholders and managers who conducted organizations in a manner dissonant with institutional and corporate interests (Oliveira; Santos; Pinto, 2023). Thus, governance emerges as a response to the demand for greater control, transparency, and strategic alignment in organizations.

In the contemporary organizational sphere, Frogeri, Portugal, and Guedes (2022) associate governance with structuring principles such as transparency, equity, corporate responsibility, and accountability, operationalized through formal control and supervision mechanisms. Such principles contemplate both the internal and external environment of the institution, showing that governance is not limited to administrative processes, but involves the relationship of the organization with its stakeholders and with society. From this perspective, governance assumes a systemic character, going beyond operational management and incorporating strategic and normative dimensions.

According to Silva et al. (2023), governance has a multidimensional connotation, as it encompasses the organization in its entirety and the social context in which it is inserted, it is observed, however, that although there is consensus in the literature regarding the structuring principles of governance, its incorporation into cybersecurity still occurs gradually in educational institutions. In many cases, practices remain restricted to operational controls, such as access definition and isolated technical measures, without full integration into institutional strategy and high-level decision-making processes. It is in this context that cybersecurity frameworks assume relevance. Purser (2014) states that such frameworks have as their primary objective to prevent or mitigate attacks, reducing the risk of threats.

In addition, Maleh et al. (2021) point out that these instruments aim to increase the protection of organizational assets against cyber threats. However, when articulated with governance, frameworks are no longer merely technical instruments and become strategic tools, capable of integrating policies, responsibilities, risk management and institutional supervision. Thus, the approximation between governance and cybersecurity proves to be fundamental for the consolidation of structured and sustainable practices in the educational environment.

2.3 NIST FRAMEWORK AND MATURITY LEVELS

In this research, the Cybersecurity Framework 2.0 (CSF) stands out, called in Portuguese Cybersecurity Framework, prepared by the National Institute of Standards and Technology (NIST, 2024). The instrument is designed to be used by organizations of different sizes and sectors, including industry, government, academia and non-profit entities. Its proposal consists of offering structured guidelines for identifying, managing and mitigating cyber risks, integrating technical and strategic dimensions.

CSF 2.0 is structured in six functions, also called dimensions: identify, protect, detect, respond, recover, and governance. The first five functions make up the operational cycle of risk management, while governance assumes a transversal character, guiding the other dimensions. According to NIST (2024), the governance dimension involves understanding the organizational context, establishing the cybersecurity strategy, managing supply chain risks, defining roles, responsibilities, and authorities, as well as supervising institutional policies. The identify dimension establishes that the organization's cybersecurity risks must be understood in a systemic way, including the analysis of assets, vulnerabilities, and threats. In addition, it provides for the identification of improvement opportunities for policies, plans, and processes that underpin risk management (NIST, 2024).

The protect dimension prioritizes the implementation of security measures aimed at mitigating previously identified risks, including access control and restricting users to appropriate levels of authorization, as discussed by Abouelmehdi et al. (2017) and Santana (2021). The detect dimension, on the other hand, presupposes that possible attacks and compromises must be found and analyzed in a timely manner (NIST, 2024). In the logical sequence of the framework, the respond dimension establishes the taking of measures in the face of previously detected incidents, including containment, analysis, mitigation, reporting, and institutional communication actions (NIST, 2024).

Finally, the recover dimension determines that affected assets and operations are restored in a structured manner, allowing the reestablishment of activities and the reduction

of impacts resulting from the incident. Thus, it is observed that CSF 2.0 is not limited to technical controls, but organizes a continuous cycle of risk management guided by governance. With regard to maturity levels, CSF 2.0 (NIST, 2024) establishes four evolutionary stages: Level 1 – Partial (Partial); Level 2 – Risk-Informed; Level 3 – Repeatable; and Level 4 – Adaptive. Maturity, in this context, is associated with the degree of institutionalization of risk management practices and their integration into organizational processes.

According to Araujo, Albuquerque Jr. and Passos (2025, p. 4), "maturity is the degree of compliance of a process in relation to standards of excellence, which makes it important to measure it to guide the improvement of organizational practices." This definition shows that the measurement of maturity is not a merely classificatory exercise, but a guiding instrument for institutional improvement, although the CSF 2.0 is widely recognized as an international reference, it is observed that its empirical application in Networks of Basic Education Schools is still little explored in the national literature, especially from the perspective of the structured measurement of maturity associated with governance.

2.4 THEORETICAL GAP AND RESEARCH DIRECTION

In light of the above, considering the importance of governance and maturity in cybersecurity, combined with the need to confront attacks directed at sensitive data (Farias; Nunes, 2024), this research situates the analysis of maturity within the scope of Educational Institutions. As previously discussed, these institutions have structural and organizational weaknesses (LNCC, 2024; UNESCO, 2023), as well as potentially significant financial impacts from cyber incidents (Sapiński, 2023).

This scenario shows that cybersecurity, when dissociated from a strategic and governance perspective, tends to remain restricted to isolated operational measures. Although the national and international literature broadly addresses topics such as data protection, cybersecurity frameworks, and organizational governance principles, it is observed that the intersection between these elements is still little explored from the perspective of systematic measurement of maturity in educational contexts. In particular, there is a lack of empirical studies applied to Brazilian Basic Education Networks that use the Cybersecurity Framework 2.0 as a structuring instrument of evaluation, integrating governance and risk management in a consolidated analysis.

Thus, a gap in the literature is identified regarding the structured measurement of the level of cybersecurity maturity in educational organizations with multiple administrative units, whose operational complexity requires strategic coordination and institutional alignment. The

absence of systematic diagnoses makes it difficult to plan corrective actions and strengthen institutional digital security policies, especially in networks with wide territorial dispersion.

Therefore, the locus of this research is a Network of Basic Education Schools composed of 98 units distributed in the national territory. The choice of this context is justified by the need to understand how governance and risk management practices manifest themselves in broad and decentralized educational structures. By directing the analysis to this specific environment, it seeks to contribute to filling the identified gap, offering theoretical and empirical subsidies that guide the institutional improvement of cybersecurity maturity.

3 METHODOLOGY

3.1 RESEARCH DESIGN

Regarding the typification of this investigation, it is a Case Study (Yin, 2014), with an exploratory-descriptive nature and a quantitative approach. In the search to increase the experience about cybersecurity maturity (exploratory), which must be carried out rigorously in the presentation of findings (descriptive), it is clear that "[...] exploratory research makes precise descriptions of the situation and wants to discover the relationships between its elements and components" (Bervian; Deer; Silva, 2002, p. 63).

Nevertheless, it is quantitative due to the use of mathematical methods to allow the observation of the phenomenon in a neutral way (Minayo, 1998), enabling the objective measurement of the indicators and the systematic analysis of the identified maturity levels.

This approach favors the analytical consistency of the results, by allowing the statistical treatment of the variables and the reasoned interpretation of the data collected, in line with the purpose of evaluating, in a structured way, the maturity in cybersecurity in the context investigated.

3.2 LOCUS, POPULATION AND SAMPLE

The locus of the research is a Network of Basic Education Schools. The population consisted of 139 employees working in the area of Information Technology, considering that these professionals play a central role in the management, maintenance and protection of institutional systems. The estimated sample consisted of 103 respondents, according to the sample size calculation based on the parameters $N = 139$, $Z\alpha = 1.96$ (95% confidence), and $= 0.05$, $p = 0.5$ and $q = 0.5$ (Miot, 2011).

The adoption of these parameters aimed to ensure an adequate level of statistical precision and representativeness of the data collected. Along with the questionnaire, created through Google Forms, the Informed Consent Form (ICF) was made available, and its reading

is mandatory for the continuity of the answers. This procedure ensured that the participants were duly informed about the objectives of the research, the voluntary nature of the participation and the confidentiality of the information provided.

3.3 DATA COLLECTION INSTRUMENT

The methodological procedures of this investigation were operationalized in three stages: i) data collection; ii) legitimization of indicators; and iii) maturity analysis. The first stage consisted of applying the questionnaire based on the Cybersecurity Framework 2.0 (CSF 2.0) of the National Institute of Standards and Technology (NIST, 2024), a structured instrument for evaluating practices related to cybersecurity risk management.

The questionnaire is composed of 106 statements, organized into 22 categories, which are distributed in six functions (dimensions): governance, identify, protect, detect, respond and recover. This organization allows for a systematic examination of the different components of the framework, covering both strategic and operational aspects of cybersecurity. The statements were presented on a five-point Likert scale, with the anchors strongly disagree, neutral and totally agree. This structure makes it possible to measure the degree of adherence of institutional practices to the parameters established by the CSF 2.0, allowing subsequent statistical treatment of the responses.

3.4 STATISTICAL VALIDATION OF INDICATORS

After data collection, the indicators (ii) were legitimized, a stage aimed at the statistical validation of the concepts adopted in the instrument (Hair et al., 2009). In this process, the 106 statements in the questionnaire were treated as observable variables, while the 22 categories and six functions of the CSF 2.0 were considered analytical constructs. This distinction allowed the analysis to be structured in a way that was coherent with the theoretical organization of the framework. To this end, subsets of variables were grouped into representative blocks of each category or dimension of the instrument, ensuring correspondence between the items of the questionnaire and the constructs evaluated (Hair et al., 2009).

Initially, the presence of outliers was verified, in order to avoid distortions in the subsequent analyses. Next, the analysis of dimensionality, reliability and validity of the indicators was performed. Dimensionality was examined using the Kaiser-Meyer-Olkin (KMO) criterion, adopting a minimum value of 0.50 for each category and dimension (Damásio, 2012). Reliability was measured using Cronbach's alpha (CA), and a value higher than 0.60 was considered adequate (Hair et al., 2009).

Validity was assessed using Pearson's coefficient (r), with a positive correlation between the variables and a p -value lower than 0.05 (Formiga et al., 2018). The simultaneous fulfillment of these parameters ensures internal consistency, statistical adequacy and robustness to the indicators used in the analysis.

3.5 MATURITY ANALYSIS

In the third stage (iii), the maturity of the categories and dimensions evaluated was analyzed. To this end, measures of central tendency (Mean), measure of dispersion (Standard Deviation) and the 95% Confidence Interval were used, allowing to examine not only the mean positioning of the responses, but also the stability and variability of the results obtained. NIST (2024) establishes four maturity levels: Level 1 – Partial (Partial); Level 2 – Risk-Informed; Level 3 – Repeatable; and Level 4 – Adaptive. These levels express progressive stages of institutionalization of cybersecurity risk management practices.

Based on this structure, Bernardo (2024) and Bernardo, Malta and Magalhães (2025) associated the following mean intervals to the levels: ≤ 2.99 ; ≤ 3.99 ; ≤ 4.99 ; and $= 5.00$, respectively, adding the value ≤ 1.99 as level zero, called "very poor". Thus, this research adopts such parameters, incorporating Level 0: Non-existent, in order to contemplate situations of absence or extreme fragility of the practices evaluated.

In view of the results obtained by category and dimension, the general level of maturity of the Network's Educational Institutions was determined by the lowest level identified among the functions of the CSF 2.0, considering the systemic character of the framework and the need for integration between its dimensions. This criterion is based on the understanding that organizational maturity cannot be higher than its most fragile dimension, since functions must act in an articulated manner.

For the dimensions that presented a lower level of maturity, actions were outlined to increase them, in line with the guidelines established by NIST (2025). The statistical treatment of the data was carried out using the RStudio software, version 2021.09.2 Build 382, enabling the execution of the analyses in a structured and reproducible way.

4 RESULTS AND DISCUSSIONS

Data collection was carried out between 01/20 and 01/23/2026, totaling 118 valid responses. No outliers were identified, according to the criteria established by Hair et al. (2009), which reinforces the consistency of the database analyzed. Thus, the final sample of 118 respondents exceeds the initial estimate of 103 participants, calculated according to the parameters presented by Miot (2011), ensuring adequate statistical margin and greater

robustness to the results obtained. The sample profile of the respondents is presented in Table 1.

Table 1

Profile of the sample of 118 respondents

Aspect	Feature	N.	Σ	%	Σ%
Age	Between 19 and 29 years old	12	12	10,17	10,17
	Between 30 and 39 years old	52	64	44,07	54,23
	Between 40 and 49 years old	41	105	34,75	88,99
	Between 50 and 65 years old	13	118	11,02	100,00
Gender	Women	15	15	12,71	12,71
	Male	103	118	87,29	100,00
Education	Elementary School	0	0	0,00	0,00
	High School	2	2	1,69	1,69
	Higher Education (Undergraduate)	44	46	37,29	38,98
	Post-Graduation (Specialization)	64	110	54,24	93,22
	Postgraduate (Master's Degree)	8	118	6,78	100,00
	Postgraduate (Doctorate)	0	118	0,00	100,00
He has an academic background in the area of Technology	No	29	29	24,58	24,58
	Yes	89	118	75,42	100,00
Experienced some kind of digital security incident	No	84	84	71,19	71,19
	Yes	34	118	28,81	100,00
Time (years) of experience in the area of Information Technology	Less than 1 year	13	13	11,02	11,01
	Between 1 and 9 years	30	43	25,42	36,44
	Between 10 and 19 years old	49	92	41,53	77,97
	Between 20 and 29 years old	21	113	17,80	95,77
	Between 30 and 35 years old	5	118	4,24	100,00

Legend: N.: Number (quantitative); Σ: Summation; %: Percentage; Σ%: Sum of the Percentage.

Source: Survey data (2026)

It is observed that most respondents are over 30 years old (89.83%), which indicates consolidated professional maturity. In terms of academic background, 98.31% have completed higher education or post-graduation, demonstrating high intellectual capital in the group analyzed. It is also noteworthy that 75.42% have training in the area of Information Technology, which reinforces the technical adherence of the responses to the dimensions evaluated in the CSF 2.0 instrument.

As for the time of experience in the area of Information Technology, it is verified that 65.57% have more than ten years of experience, indicating consolidated professional trajectory and familiarity with technological management practices. The male predominance (87.29%) reflects a characteristic that is still recurrent in the technology sector, without prejudice to the validity of the analysis, since the selection criterion was linked to the function performed and not to demographic characteristics.

When asked about the occurrence of digital security incidents in the personal sphere, 71.19% stated that they had not experienced such events, while 28.81% reported

occurrence. This distribution may be associated with the level of technical training and professional experience of the respondents, factors that tend to favor greater capacity for prevention, identification and mitigation of cyber risks.

The data presented show that the sample is composed of professionals with consolidated experience, high training and direct work in the technological area, which gives legitimacy to the perceptions expressed about the cybersecurity maturity of the analyzed Network. In addition, considering that the participants are distributed in the different Units of the Network – in their private and social purposes – the answers tend to broadly reflect the organizational context investigated.

Based on the characterization of the sample, the statistical legitimation of the indicators was carried out, considering the criteria of dimensionality, reliability and validity (Hair et al., 2009), operationalized through Chart 1 (Appendix A). The Kaiser-Meyer-Olkin index showed values not lower than 0.50 (Damásio, 2012), Cronbach's alpha exceeded the minimum limit recommended in the literature (Hair et al., 2009) and the Pearson coefficient (r) showed positive correlations with p-value lower than 0.05 (Formiga et al., 2018). These results confirm the statistical adequacy of the instrument applied and support the reliability of subsequent analyses.

After the validation stage, maturity was analyzed using the Mean, Standard Deviation, and 95% Confidence Interval measures of the dimensions and categories of the CSF 2.0 (NIST, 2024), as shown in Table 2.

Table 2

Mean, Standard Deviation and 95% Confidence Interval of the dimensions and categories of the Cybersecurity Framework (CSF 2.0)

Dimension Category	Average	D.P.	I.C. 95%
GOVERNANCE (GV)	3,86	0,93	[3,70; 4,03]
Organizational Context (GV.OC)	3,99	0,86	[3,84; 4,15]
Risk Management Strategy (GV.RM)	3,85	0,92	[3,69; 4,02]
Roles, Responsibilities and Authorities (GV. RR)	3,84	1,01	[3,66; 4,02]
Politics (GV. PO)	3,89	0,93	[3,72; 4,06]
Supervision (GV. OV)	3,99	0,85	[3,84; 4,15]
Cybersecurity Risk Management in the Supply Chain (GV. SC)	3,77	0,95	[3,60; 3,95]
IDENTIFY (ID)	4,08	0,88	[3,92; 4,23]
Asset Management (ID.AM)	3,99	0,90	[3,83; 4,15]
Risk Assessment (ID.RA)	4,13	0,86	[3,98; 4,29]
Improvement (ID.IM)	4,09	0,88	[3,93; 4,25]
PROTECT (PR)	4,12	0,86	[3,97; 4,28]
Identity Management, Authentication and Access Control (PR. AA)	4,27	0,80	[4,13; 4,42]
Awareness and Training (PR. AT)	3,95	0,91	[3,79; 4,12]
Data Security (PR.DS)	4,22	0,80	[4,07; 4,36]
Platform Security (PR.PS)	4,04	0,87	[3,88; 4,19]
Resilience of Technological Infrastructure (PR. IR)	4,02	0,90	[3,86; 4,18]
DETECT (DE)	4,05	0,91	[3,88; 4,21]

Continuous Monitoring (DE. CM)	4,12	0,89	[3,96; 4,28]
Analysis of Adverse Events (DE. AE)	3,98	0,93	[3,81; 4,15]
REPLY (RS)	4,06	0,88	[3,90; 4,22]
Incident Management (RS. MA)	4,08	0,89	[3,92; 4,24]
Incident Analysis (RS. AN)	4,08	0,90	[3,92; 4,24]
Incident Response (RS.CO) Reporting and Communication	3,99	0,81	[3,84; 4,13]
Incident Mitigation (RS.MI)	4,06	0,88	[3,90; 4,22]
RETRIEVE (RC)	4,05	0,84	[3,90; 4,20]
Execution of the Incident Recovery Plan (RC. RP)	4,08	0,83	[3,93; 4,23]
Incident Recovery Communication (RC.CO)	3,94	0,86	[3,78; 4,10]
Legend: D.P.: Standard Deviation; I.C.: Confidence Interval			

Source: Survey data (2026)

The Cybersecurity Risk Management in the Supply Chain (GV. SC), belonging to the Governance (GV) dimension, has the lowest average (3.77) among all the categories of the CSF 2.0. According to NIST (2024), contemporary technological environments depend on interconnected supply chains, which involve suppliers, developers, system integrators, and external service providers responsible for sustaining technology products and services. Because these interactions are shaped and influenced by technological resources, it is essential to systematically manage the risks associated with this chain.

In the opposite direction, the category Identity Management, Authentication and Access Control (PR. AA), linked to the Protect (PR) dimension, has the highest average (4.27) among the categories analyzed. Authentication aims to verify the identity of users, while access control restricts permissions according to functional attributions (Abouelmehdi et al., 2017).

Santana (2021) points out that the expansion of access control to integrated identity management is a central element in protecting against improper access and unauthorized use of sensitive information. Therefore, a relevant asymmetry is observed between the dimensions analyzed. While respondents perceive a high level of internal protection, associated with authentication and identity control mechanisms, they identify lower maturity in the management of risks related to the supply chain. This difference indicates that internal controls are more consolidated than mechanisms aimed at supervising and prioritizing risks from suppliers and external agents.

Such a scenario suggests that the instituted control is partially comprehensive. When external risk management does not keep pace with the level of internal protection, the organization remains vulnerable to incidents originating outside its direct operational boundaries.

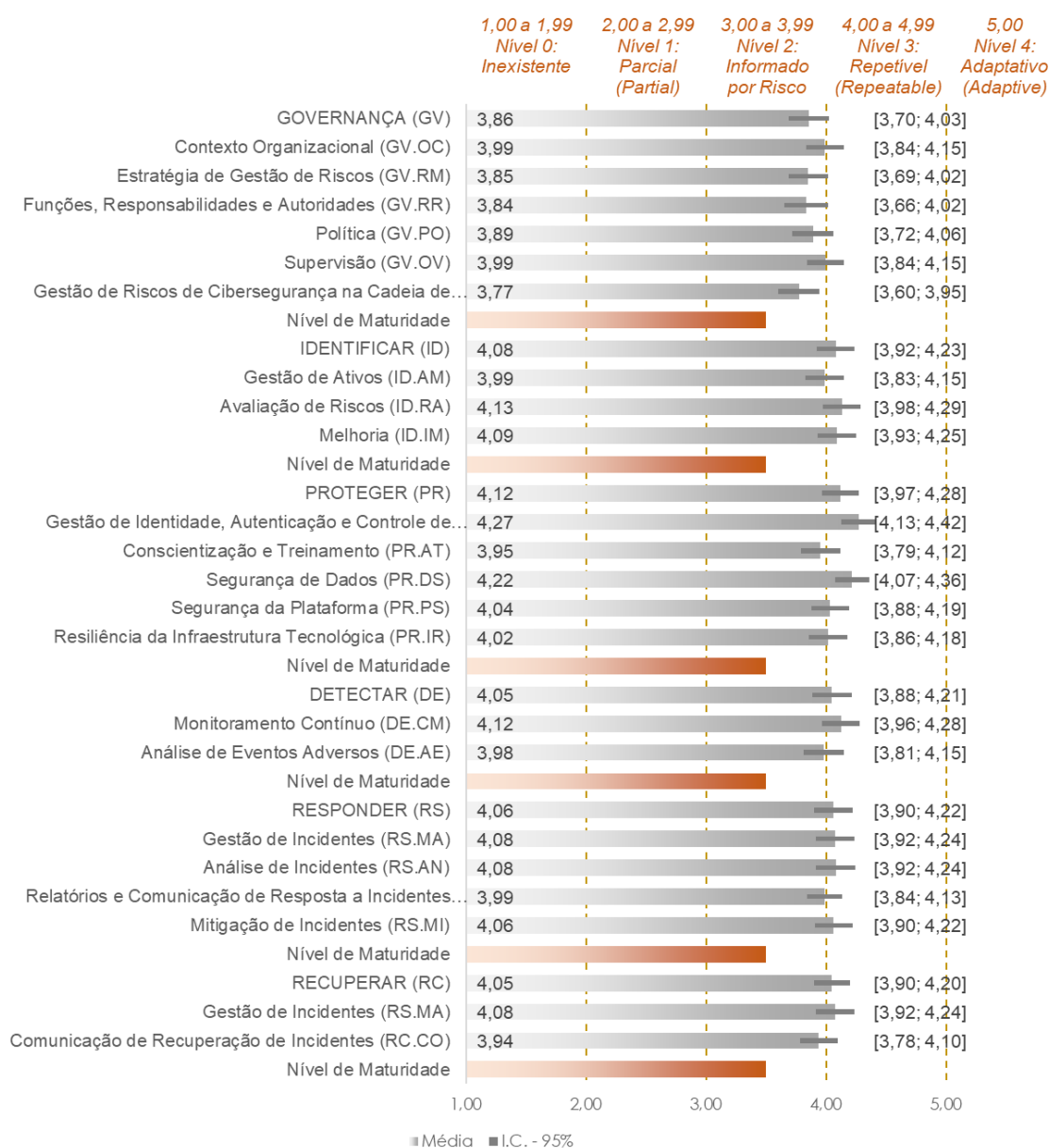
Considering that the supply chain is composed of multiple interdependent actors (NIST, 2024), weaknesses in this domain can compromise the coherence and effectiveness of the global cybersecurity strategy.

Statistical analysis reinforces this interpretation. The confidence interval of the GV category. SC is between 3.60 and 3.95, while the PR category. AA is between 4.13 and 4.42. As there is no overlap between the intervals, the difference observed reveals statistical consistency between the categories analyzed. This evidence strengthens the understanding that maturity in internal protection outweighs maturity in supply chain governance.

These distinctions, presented in Table 2, are complemented by the analysis of the maturity levels of the categories and dimensions of the CSF 2.0, as represented in Figure 1.

Figure 1

Maturity levels of the Cybersecurity Framework



Source: Survey data (2026)

Thus, the Protect (RP) dimension proves to be a relevant aspect for the Institution; however, it is not fully articulated in the context of Governance (GV), since both represent extremes in the cybersecurity spectrum, with averages of 4.12 and 3.86, respectively. Considering that Governance comprises the analysis of the organizational context, the definition of the cybersecurity strategy and the management of Supply Chain risks, as well as the delimitation of roles, responsibilities and authorities (NIST, 2024), it is urgent to examine cybersecurity from a systemic perspective of Governance, as opposed to a restricted and predominantly operational approach centered on the Protect dimension. all dimensions of CSF 2.0 (NIST, 2024) are at Level 2 of maturity, characterized as risk-informed management.

At this stage, risk management practices are recognized and approved by management, but may not yet be formally institutionalized as consolidated organizational policies. Such a scenario indicates the need to strengthen Governance, as it is this dimension that guides the prioritization and integration of other functions in the context of the institutional mission and the expectations of stakeholders (NIST, 2024).

Considering that cybersecurity risks, such as the violation of sensitive data, involve student and staff information (Farias; Nunes, 2024), as well as external agents linked to the Supply Chain, Governance assumes a central role by covering the institution's internal and external environments. This perspective dialogues with the principles of transparency, equity, corporate responsibility and accountability, supported by control mechanisms (Frogeri; Portugal; Guedes, 2022). In this sense, the consolidation of maturity requires integration of all dimensions under the aegis of Governance (NIST, 2024).

For the evolution of the maturity level, it is noteworthy that the Governance (GV) dimension has the lowest average among the dimensions analyzed, totaling 3.86 points (Figure 1). Within this dimension, the Cybersecurity Risk Management in the Supply Chain (GV. SC) registers a mean of 3.77 points and a confidence interval of 95% between 3.60 and 3.95. As it is entirely at Level 2, this category is the most critical in the scope of Governance.

Among the statements in the questionnaire associated with the GV. SC, GV stands out. SC-04: "Suppliers are known and prioritized by criticality" (NIST, 2024, p. 17), whose average was 3.61, the lowest among the statements in this category. This result contributes to the reduction of the global average of GV. SC and suggests a tendency towards a reactive posture, since the value is close to the neutral point of the Likert scale adopted.

In view of this scenario, actions are proposed aimed at advancing the level of maturity of the Governance (GV) dimension, especially with regard to the GV category. SC. In this sense, it is recommended:

- i) establish formal criteria for the classification of suppliers by criticality, considering the sensitivity of the data processed, the level of access to institutional systems and the strategic relevance of the services provided;
- ii) maintain an updated register of suppliers, prioritizing them according to previously defined criteria (NIST, 2025).

According to NIST (2024), the Supply Chain is a critical area in cybersecurity risk management, as the systems and networks that support the organizational mission involve multiple interdependent actors. The vulnerability in this chain becomes significant precisely because of the technological interconnection between internal and external agents.

In the context of the Network of Basic Education Schools analyzed, composed of 98 units distributed in the national territory, the structured management of this chain is even more necessary. However, as evidenced in the previous analyses from the perspective of the respondents, the prioritization of suppliers by criticality is not yet consolidated (GV. SC-04). The implementation of the proposed actions may contribute to mitigating risks, promoting a proactive posture, and reducing vulnerabilities associated with the chain, not only from the financial perspective of cyber incidents (Sapiński, 2023), but also from a strategic and institutional perspective.

5 CONCLUSION

This research aimed to analyze the level of cybersecurity maturity of a Network of Basic Education Schools. Based on a sample of 118 respondents, an overall maturity level of two was identified, on a five-level scale adopted in this investigation, classified as Risk-Informed. At this stage, risk management practices are recognized by management, although they are not yet fully institutionalized as a formal organizational policy. Such framing was observed in the dimensions identify, protect, detect, respond and recover, as well as in governance, which guides and integrates the other functions of the framework.

The results indicate that, despite the high level of academic training of the respondents (98.31%) and the predominance of work in the area of Information Technology (75.42%), technical qualification does not automatically translate into consolidated maturity in cybersecurity governance. The latter presupposes strategic articulation, clear definition of responsibilities and organizational integration, going beyond the strictly operational domain.

It was found that the Protect dimension presented the highest performance, especially in the Identity Management, Authentication and Access Control category. However, the lower maturity identified in Cybersecurity Risk Management in the Supply Chain, linked to the

Governance dimension, shows relevant structural fragility. Such asymmetry demonstrates that internal technical controls, when not accompanied by strategic management of external actors, can compromise the consistency of the adopted security model.

In educational organizations, the eventual occurrence of incidents involving sensitive data of students, guardians, and employees can generate significant financial, legal, and reputational impacts. In this context, preventive action, supported by governance practices, proves to be more effective than merely reactive interventions.

In light of the findings, it is recommended to strengthen cybersecurity governance, with an emphasis on the classification of suppliers by criticality, considering the sensitivity of the data processed, the level of access granted, and the strategic relevance of the services provided, as well as the maintenance of updated records that allow structured prioritization of these partners.

It is expected that this research will contribute, at the empirical level, to the improvement of the cybersecurity practices of the analyzed Network. In the academic sphere, it is suggested that the study be replicated in other Basic Education Networks, in order to broaden the comparative base and deepen the debate on cybersecurity maturity in the Brazilian educational context.

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ANNEXES

Table 1

Statistics of legitimation of indicators

Categoria da Dimensão	KMO	AC	Seq Afirm	r de Pearson										p-Valor										
				[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	
Dimensão (função) GOVERNANÇA (GV)																								
Contexto Organizacional (GV_OC)	0,79	0,88	[1] 1	1,00	0,66	0,55	0,61	0,46						0,00	0,00	0,00	0,00	0,00						
			[2] 2	0,66	1,00	0,75	0,59	0,57						0,00	0,00	0,00	0,00	0,00						
			[3] 3	0,55	0,75	1,00	0,57	0,48						0,00	0,00	0,00	0,00	0,00						
			[4] 4	0,61	0,59	0,57	1,00	0,69						0,00	0,00	0,00	0,00	0,00						
			[5] 5	0,46	0,57	0,48	0,69	1,00						0,00	0,00	0,00	0,00	0,00						
Estratégia de Gestão de Riscos (GV_RM)	0,89	0,92	[1] 6	1,00	0,67	0,64	0,58	0,43	0,51	0,45				0,00	0,00	0,00	0,00	0,00	0,00	0,00				
			[2] 7	0,67	1,00	0,61	0,68	0,58	0,65	0,65				0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00			
			[3] 8	0,64	0,61	1,00	0,60	0,54	0,53	0,57				0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00		
			[4] 9	0,58	0,68	0,60	1,00	0,71	0,73	0,70				0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00		
			[5] 10	0,43	0,58	0,54	0,71	1,00	0,74	0,60				0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00		
			[6] 11	0,51	0,65	0,53	0,73	0,74	1,00	0,70				0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00		
			[7] 12	0,45	0,65	0,57	0,70	0,60	0,70	1,00				0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00			
Funções, Responsabilidades e Autoridades (GV_RR)	0,74	0,84	[1] 13	1,00	0,69	0,63	0,51							0,00	0,00	0,00	0,00							
			[2] 14	0,69	1,00	0,70	0,39							0,00	0,00	0,00	0,00							
			[3] 15	0,63	0,70	1,00	0,58							0,00	0,00	0,00	0,00							
			[4] 16	0,51	0,39	0,58	1,00							0,00	0,00	0,00	0,00							
Política (GV_PO)	0,51	0,82	[1] 17	1,00	0,69								0,00	0,00										
			[2] 18	0,69	1,00									0,00	0,00									
Supervisão (GV_OV)	0,76	0,92	[1] 19	1,00	0,81	0,81								0,00	0,00	0,00								
			[2] 20	0,81	1,00	0,77								0,00	0,00	0,00								
			[3] 21	0,81	0,77	1,00								0,00	0,00	0,00								
Gestão de Riscos de Cibersegurança na Cadeia de Suprimentos (GV_SC)	0,93	0,96	[1] 22	1,00	0,75	0,77	0,68	0,68	0,59	0,72	0,65	0,75	0,69	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	
			[2] 23	0,75	1,00	0,72	0,69	0,69	0,63	0,63	0,63	0,71	0,61	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	
			[3] 24	0,77	0,72	1,00	0,73	0,78	0,67	0,74	0,67	0,74	0,74	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	
			[4] 25	0,68	0,69	0,73	1,00	0,78	0,61	0,67	0,70	0,74	0,60	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	
			[5] 26	0,68	0,69	0,78	0,78	1,00	0,64	0,62	0,67	0,72	0,69	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	
			[6] 27	0,59	0,63	0,67	0,61	0,64	1,00	0,73	0,72	0,64	0,63	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	
			[7] 28	0,72	0,63	0,74	0,67	0,62	0,73	1,00	0,82	0,77	0,74	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	
			[8] 29	0,65	0,63	0,67	0,70	0,67	0,72	0,82	1,00	0,74	0,71	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	
			[9] 30	0,75	0,71	0,74	0,74	0,72	0,64	0,77	0,74	1,00	0,79	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	
			[10] 31	0,69	0,61	0,74	0,60	0,69	0,63	0,74	0,71	0,79	1,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	
Dimensão (função) IDENTIFICAR (ID)																								
Gestão de Ativos (ID_AM)	0,92	0,94	[1] 32	1,00	0,74	0,67	0,57	0,58	0,60	0,69				0,00	0,00	0,00	0,00	0,00	0,00	0,00				
			[2] 33	0,74	1,00	0,78	0,65	0,65	0,72	0,65				0,00	0,00	0,00	0,00	0,00	0,00	0,00				
			[3] 34	0,67	0,78	1,00	0,73	0,68	0,73	0,72				0,00	0,00	0,00	0,00	0,00	0,00	0,00				
			[4] 35	0,57	0,65	0,73	1,00	0,66	0,72	0,68				0,00	0,00	0,00	0,00	0,00	0,00	0,00				
			[5] 36	0,58	0,65	0,68	0,66	1,00	0,73	0,69				0,00	0,00	0,00	0,00	0,00	0,00	0,00				
			[6] 37	0,60	0,72	0,73	0,72	0,73	1,00	0,67				0,00	0,00	0,00	0,00	0,00	0,00	0,00				
Avaliação de Riscos (ID_RA)	0,92	0,96	[7] 38	0,69	0,65	0,72	0,68	0,69	0,67	1,00				0,00	0,00	0,00	0,00	0,00	0,00	0,00				
			[1] 39	1,00	0,72	0,73	0,79	0,62	0,72	0,69	0,67	0,73	0,64	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	
			[2] 40	0,72	1,00	0,78	0,77	0,72	0,72	0,69	0,70	0,62	0,59	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	
			[3] 41	0,73	0,78	1,00	0,82	0,80	0,76	0,69	0,72	0,66	0,56	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	
			[4] 42	0,79	0,77	0,82	1,00	0,76	0,71	0,64	0,70	0,67	0,61	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	
			[5] 43	0,62	0,72	0,80	0,76	1,00	0,71	0,70	0,72	0,56	0,62	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	
			[6] 44	0,72	0,72	0,76	0,71	0,71	1,00	0,81	0,75	0,66	0,57	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	
			[7] 45	0,69	0,69	0,69	0,64	0,70	0,81	1,00	0,78	0,68	0,65	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	
			[8] 46	0,67	0,70	0,72	0,70	0,72	0,75	0,78	1,00	0,62	0,66	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	
			[9] 47	0,73	0,62	0,66	0,67	0,56	0,66	0,68	0,62	1,00	0,77	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	
[10] 48	0,64	0,59	0,56	0,61	0,62	0,57	0,65	0,66	0,77	1,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00				
Melhoria (ID_IM)	0,84	0,91	[1] 49	1,00	0,72	0,70	0,70							0,00	0,00	0,00	0,00							
			[2] 50	0,72	1,00	0,77	0,70							0,00	0,00	0,00	0,00							
			[3] 51	0,70	0,77	1,00	0,75							0,00	0,00	0,00	0,00							
			[4] 52	0,70	0,70	0,75	1,00							0,00	0,00	0,00	0,00							
Dimensão (função) PROTEGER (PR)																								
Gestão de Identidade, Autenticação e Controle de Acesso (PR_AA)	0,89	0,93	[1] 53	1,00	0,82	0,75	0,75	0,57	0,63					0,00	0,00	0,00	0,00	0,00	0,00					
			[2] 54	0,82	1,00	0,76	0,81	0,60	0,62					0,00	0,00	0,00	0,00	0,00	0,00					
			[3] 55	0,75	0,76	1,00	0,73	0,63	0,69					0,00	0,00	0,00	0,00	0,00	0,00					
			[4] 56	0,75	0,81	0,73	1,00	0,66	0,59					0,00	0,00	0,00	0,00	0,00	0,00					
			[5] 57	0,57	0,60	0,63	0,66	1,00	0,68					0,00	0,00	0,00	0,00	0,00	0,00					
			[6] 58	0,63	0,62	0,69	0,59	0,68	1,00					0,00	0,00	0,00	0,00	0,00	0,00					
Conscientização e Treinamento (PR_AT)	0,51	0,88	[1] 59	1,00	0,79								0,00	0,00										
			[2] 60	0,79	1,00									0,00	0,00									
Segurança de Dados (PR_DS)	0,81	0,92	[1] 61	1,00	0,76	0,78	0,76							0,00	0,00	0,00	0,00							
			[2] 62	0,76	1,00	0,86	0,70							0,00	0,00	0,00	0,00							
			[3] 63	0,78	0,86	1,00	0,67							0,00	0,00	0,00	0,00							
			[4] 64	0,76	0,70	0,67	1,00							0,00	0,00	0,00	0,00							
Segurança da Plataforma (PR_PS)	0,84	0,89	[1] 65	1,00	0,68	0,54	0,66	0,49	0,50					0,00	0,00	0,00	0,00	0,00	0,00					
			[2] 66	0,68	1,00	0,84	0,58	0,56	0,70					0,00	0,00	0,00	0,00	0,00	0,00					
			[3] 67	0,54	0,84	1,00	0,51	0,52	0,65					0,00	0,00	0,00	0,00	0,00	0,00					
			[4] 68	0,66	0,58	0,51	1,00	0,40	0,41					0,00	0,00	0,00	0,00	0,00	0,00					
			[5] 69	0,49	0,56	0,52	0,40	1,00	0,56					0,00	0,00	0,00	0,00	0,00	0,00					
Resiliência da Infraestrutura Tecnológica (PR_IR)	0,78	0,87	[6] 70	0,50	0,70	0,65	0,41	0,56	1,00					0,00	0,00	0,00	0,00	0,00	0,00					
			[1] 71	1,00	0,46	0,70	0,58							0,00	0,00	0,00	0,00							
			[2] 72	0,46	1,00	0,65	0,72							0,00	0,00	0,00	0,00							
			[3] 73	0,70	0,65	1,00	0,74																	

Análise de Eventos Adversos (DE.AE)	0,88	0,94	[1] 80	1,00	0,78	0,77	0,64	0,69	0,69					0,00	0,00	0,00	0,00	0,00	0,00						
			[2] 81	0,78	1,00	0,80	0,56	0,61	0,61					0,00	0,00	0,00	0,00	0,00	0,00						
			[3] 82	0,77	0,80	1,00	0,76	0,73	0,79					0,00	0,00	0,00	0,00	0,00	0,00						
			[4] 83	0,64	0,56	0,76	1,00	0,79	0,77					0,00	0,00	0,00	0,00	0,00	0,00						
			[5] 84	0,69	0,61	0,73	0,79	1,00	0,79					0,00	0,00	0,00	0,00	0,00	0,00						
			[6] 85	0,69	0,61	0,79	0,77	0,79	1,00					0,00	0,00	0,00	0,00	0,00	0,00						
Dimensão (função) RESPONDER (RS)																									
Gestão de Incidentes (RS.MA)	0,89	0,96	[1] 86	1,00	0,76	0,77	0,80	0,87					0,00	0,00	0,00	0,00	0,00								
			[2] 87	0,76	1,00	0,82	0,83	0,81					0,00	0,00	0,00	0,00	0,00								
			[3] 88	0,77	0,82	1,00	0,85	0,81					0,00	0,00	0,00	0,00	0,00								
			[4] 89	0,80	0,83	0,85	1,00	0,89					0,00	0,00	0,00	0,00	0,00								
			[5] 90	0,87	0,81	0,81	0,89	1,00					0,00	0,00	0,00	0,00	0,00								
Análise de Incidentes (RS.AN)	0,85	0,93	[1] 91	1,00	0,83	0,80	0,71					0,00	0,00	0,00	0,00										
			[2] 92	0,83	1,00	0,87	0,72					0,00	0,00	0,00	0,00										
			[3] 93	0,80	0,87	1,00	0,74					0,00	0,00	0,00	0,00										
			[4] 94	0,71	0,72	0,74	1,00					0,00	0,00	0,00	0,00										
Relatórios e Comunicação de Resposta a Incidentes (RS.CO)	0,51	0,91	[1] 95	1,00	0,83							0,00	0,00												
			[2] 96	0,83	1,00							0,00	0,00												
Mitigação de Incidentes (RS.MI)	0,51	0,83	[1] 97	1,00	0,71								0,00	0,00											
			[2] 98	0,71	1,00									0,00	0,00										
Dimensão (função) RECUPERAR (RC)																									
Execução do Plano de Recuperação de Incidentes (RC.RP)	0,89	0,94	[1] 99	1,00	0,75	0,72	0,60	0,66	0,63					0,00	0,00	0,00	0,00	0,00	0,00						
			[2] 100	0,75	1,00	0,80	0,68	0,76	0,72					0,00	0,00	0,00	0,00	0,00	0,00						
			[3] 101	0,72	0,80	1,00	0,67	0,70	0,76					0,00	0,00	0,00	0,00	0,00	0,00						
			[4] 102	0,60	0,68	0,67	1,00	0,65	0,77					0,00	0,00	0,00	0,00	0,00	0,00						
			[5] 103	0,66	0,76	0,70	0,65	1,00	0,79					0,00	0,00	0,00	0,00	0,00	0,00						
			[6] 104	0,63	0,72	0,76	0,77	0,79	1,00					0,00	0,00	0,00	0,00	0,00	0,00						
Comunicação de Recuperação de Incidentes (RC.CO)	0,51	0,86	[1] 105	1,00	0,76							0,00	0,00												
			[2] 106	0,76	1,00							0,00	0,00												

Legend: KMO: Kaiser-Meyer-Olkin; AC: Cronbach's alpha; Seq Aaffirm: Sequential of the instrument's statements

Source: Survey data (2026)

SUCCESSFUL PEDAGOGICAL PRACTICES IN MATHEMATICS: CONTRIBUTIONS OF PEDAGOGICAL PLANNING

PRÁTICAS PEDAGÓGICAS EXITOSAS EM MATEMÁTICA: CONTRIBUIÇÕES DO PLANEJAMENTO PEDAGÓGICO

PRÁCTICAS PEDAGÓGICAS EXITOSAS EN MATEMÁTICAS: APORTES DE LA PLANIFICACIÓN PEDAGÓGICA



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ABSTRACT

This article stems from a doctoral thesis that is methodologically characterized as qualitative research of the case study type. Its theoretical foundation is based on: successful pedagogical practices, pedagogical planning, and learning assessment within the discipline of Mathematics in secondary education at CETI Augustinho Brandão, in Cocal dos Alves-Piauí. This section addresses the following research question: how does pedagogical planning contribute to the development of successful pedagogical practices in Mathematics in secondary education? It aims to analyze how pedagogical planning contributes to the construction of successful pedagogical practices in Mathematics in secondary education. It uses narrative interviews with teachers and administrators for data collection. For the analytical procedure, it employs the technique of comprehensive-interpretative data analysis (Sousa, 2014). It concludes that the success of pedagogical practices requires, preliminarily, the presence of careful pedagogical planning that guides and supports the implementation of teaching actions, based on information provided by learning assessment, promoting successful mathematics learning for high school students at the aforementioned institution.

Keywords: Educational Planning. Successful Teaching Practices. Mathematics Teaching.

RESUMO

Este artigo decorre de uma tese doutoral que se caracteriza, metodologicamente, como pesquisa qualitativa do tipo estudo de caso. Dispõe como fundamentação teórica: práticas pedagógicas exitosas, planejamento pedagógico e avaliação da aprendizagem no âmbito da disciplina Matemática, no Ensino Médio no CETI Augustinho Brandão, em Cocal dos Alves-Piauí. Neste recorte, registra a seguinte questão-problema: como o planejamento pedagógico contribui para o desenvolvimento de práticas pedagógicas exitosas em Matemática, no ensino médio? Objetiva analisar como o planejamento pedagógico contribui na construção de práticas pedagógicas exitosas em Matemática no ensino médio. Adota a entrevista narrativa, com professores e gestores, para a produção de dados. Para o procedimento analítico, utiliza a técnica de análise compreensiva-interpretativa de dados (Sousa, 2014). Conclui que o êxito das práticas pedagógicas requer, preliminarmente, a

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presença de cuidadoso planejamento pedagógico que direcione e apoie a efetivação das ações docentes, fundamentadas nas informações fornecidas pela avaliação da aprendizagem, promovendo bem-sucedidas aprendizagens de matemática dos estudantes no ensino médio da referida instituição.

Palavras-chave: Planejamento Pedagógico. Práticas Pedagógicas Exitosas. Ensino de Matemática.

RESUMEN

Este artículo se deriva de una tesis doctoral que se caracteriza metodológicamente como una investigación cualitativa de tipo estudio de caso. Su fundamento teórico se basa en: prácticas pedagógicas exitosas, planificación pedagógica y evaluación del aprendizaje en la disciplina de Matemáticas en la educación secundaria en el CETI Augustinho Brandão, en Cocal dos Alves-Piauí. Esta sección aborda la siguiente pregunta de investigación: ¿cómo contribuye la planificación pedagógica al desarrollo de prácticas pedagógicas exitosas en Matemáticas en la educación secundaria? El objetivo es analizar cómo la planificación pedagógica contribuye a la construcción de prácticas pedagógicas exitosas en Matemáticas en la educación secundaria. Utiliza entrevistas narrativas con docentes y administradores para la recopilación de datos. Para el procedimiento analítico, emplea la técnica de análisis de datos comprensivo-interpretativo (Sousa, 2014). Concluye que el éxito de las prácticas pedagógicas requiere, preliminarmente, la presencia de una planificación pedagógica cuidadosa que guíe y apoye la implementación de acciones de enseñanza, basadas en la información proporcionada por la evaluación del aprendizaje, promoviendo el aprendizaje exitoso de las matemáticas para estudiantes de secundaria en la institución mencionada.

Palabras clave: Planificación Educativa. Prácticas Docentes Exitosas. Enseñanza de Matemática.

1 INTRODUCTION

The discipline of Mathematics in High School, in a way, has presented itself as a challenging field for teachers, since it is often observed that students have difficulties in understanding basic mathematical concepts, not adequately deepened in Elementary School, a reality that brings as more visible results, with students, demotivation and low school performance. In this scenario, pedagogical planning assumes centrality, as a guide and strengthener of the teaching work, in the organization and processes of teaching and learning with a view to the construction of effective and meaningful pedagogical practices.

By assuming this centrality, planning reveals the perspective that planning is not just about the elaboration of lesson plans, but implies critically reflecting on the students' reality in order to define learning goals and select methodologies that favor the achievement of these purposes. Thus, we start from the assumption that successful pedagogical practices in Mathematics result from intentional planning, articulated with the needs of students, supported by an inclusive view of the educational process.

Initially, it registers the following question: how does pedagogical planning contribute to the development of successful pedagogical practices in the discipline of Mathematics in High School? We selected as the research space the CETI Augustinho Brandão, in Cocal dos Alves-PI, due to the expressive performance of teachers and students of the aforementioned institution in the mathematical field, as shown by the qualitative parameters recorded in the Basic Education Development Index (IDEB), in the period from 2015 to 2024, according to data made available by the National Institute of Educational Studies and Research Anísio Teixeira (INEP), agency linked to the Ministry of Education and Culture (MEC).

The monitoring of the school flow of High School carried out by the State Department of Education of Piauí (SEDUC-PI), in conjunction with the evolution of the IDEB, in the aforementioned 2015-2024 time frame, highlights relevant aspects in this regard, among which we highlight: a) progressive increase in the performance and promotion rates of students, resulting in a school success rate above 90%, considered the most expressive recorded; b) according to data from the QEdU Portal – Educational Data Portal of Brazil (Lemann Foundation, 2021), the Augustinho Brandão State Full-Time Center (CETI) presented a remarkable performance in the area of Mathematics, reaching, in 2015, an index of 336.26 points (Level 9, the highest); in 2017, an index of 346.37 points (Level 9); and, in 2019, an index of 333.48 points (Level 9).

In a context of this nature, in which we are faced with expressive results regarding student performance, we note that its general objective is to analyze how pedagogical

planning contributes to the construction of successful pedagogical practices in Mathematics in High School. The relevance of this case study expresses the need to reinforce and diversify pedagogical practices of this school subject as an appreciation of planning as an instrument of reflection and action, to qualify the teaching work and, consequently, favor the learning of students in High School.

With regard to the methodological aspects, it adopts a qualitative approach of the case study type (Yin, 2005), and for the production of the data it uses the narrative interview with mathematics teachers and school managers (Director and Pedagogical Coordinator) (Jovchelovich; Bauer, 2002). Based on the methodology adopted, the results were systematized in order to constitute an empirical database, revealing pedagogical practices of two Mathematics teachers and information provided by the aforementioned managers. The data were produced and organized according to the objective of the study, in order to support the processes of analysis and interpretation of the research findings. based on the technique of Comprehensive-Interpretative Analysis, according to Souza (2014).

Through the presentation of these introductory elements, which underlie the proposed analysis, we deal with the relationship between pedagogical planning and the construction of successful pedagogical practices in the teaching of Mathematics, at the State Center of Full-Time (CETI) Augustinho Brandão, as the closing of this article, we present our conclusive considerations.

2 PEDAGOGICAL PLANNING: BASIS OF PEDAGOGICAL PRACTICE

We begin this theoretical reflection by expanding and reinforcing the notion of pedagogical practice, as Jesus (2021, p. 174) conceives it: "[...] it needs to promote the transformation and emancipation of the subjects involved. This transformation causes changes in the way educators and students teach and learn mediated by pedagogical practice".

When dealing with the relationship between pedagogical planning and the construction of successful pedagogical practices in the teaching of Mathematics, initially, we present the conception of successful pedagogical practice, discussing the theoretical foundations that define and characterize it as such, understood as a process of transformation and emancipation of the subjects resulting from intentional, reflective and ethical actions of the teacher.

The author in question points out that successful pedagogical practices are constituted in the teaching-learning process, promoting profound transformations, enhancing the emancipation of the subjects. Therefore, a successful pedagogical practice considers in

pedagogical planning the reality of both the school and the students, as well as the social and affective context in which the production and circulation of scientific knowledge takes place, ethically and politically committed to the common well-being. In these terms, it is desirable that it be intentionally conceived and structured, teleologically directed to a holistic education: to the human learning of students. For the development of pedagogical practices, in this scenario, it is essential to qualify teachers,

[...], from the perspective of a critical, reflective education, which provides the creation, planning and interpretation of the intentionalities of the curricula, of the social phenomena, the educational needs of the students, of the use of dialogue as a pedagogical principle to be able to develop differentiated, successful and meaningful practices (Anjos; Guedes, 2021, p. 30-31).

Based on this understanding, successful pedagogical practice is conceived as an action based on the construction and continuous reconstruction of knowledge, both by the teacher and the students, breaking with the idea of a transmissive view of teaching focused only on the educational needs of the students. In this case, in pedagogical planning, it requires the selection of various strategies and procedures to deal with the diversity that surrounds it, using differentiated resources, adaptive approaches, inclusive methodologies and, if necessary, differentiated activities, considering the students' learning levels, requiring teacher training "[...] emancipatory, in which teachers are understood as unfinished human beings, in movement and in constant evolution" (Bezerra, 2025, p. 27552).

Still, in relation to successful pedagogical practice, another pertinent aspect in Andrade's (2021) ideas is that it is related to the teacher's ability to be reflective and creative in their approaches, which by unveiling the strategies and procedures they use, not only makes their practice conscious and intentional, but also creates a learning environment that recognizes and values students' individual differences. This reality can increase the chances that all students, despite their diversity, will achieve the desired learning, even if in different ways and at different times.

Corroborating this understanding of successful pedagogical practice, the author goes further and suggests the teacher's willingness to create different teaching conditions continuously, in response to the needs of each student, with the objective of providing a truly inclusive development and learning. It is necessary to consider, therefore, the notes that successful practices collaborate in the search for solutions to the difficulties encountered, make use of strategies and significant experiences built by teachers in the school routine, catalysts for new directions and experiences in pedagogical action, both for the teacher and for the school.

Its relevance lies in its ability to promote dialogue, creating a collaborative environment that meets the pedagogical challenges arising from the local and educational reality. It emphasizes, therefore, the importance of transdisciplinary planning, which integrates various areas of knowledge and favors rich and connected learning, contributing to quality teaching. Thus, intentionally planned, successful pedagogical practice is presented as a determining factor for the progressive improvement of teaching, promoting meaningful and contextualized learning, stimulating the active and collaborative participation of students.

Next, we weave theoretical reflections on pedagogical planning in the teaching of Mathematics, highlighting its representativeness as a guiding instrument of teaching action, relating planning to successful pedagogical practices with emphasis on the articulation of theory and practice, reinforcing the need for a continuous process of adaptation and contextualization of pedagogical actions.

2.1 PEDAGOGICAL PLANNING AND PEDAGOGICAL PRACTICE IN MATHEMATICS TEACHING

When discussing pedagogical planning, we consider the importance of careful preparation according to the needs of the students, which allows for a successful pedagogical practice. In this sense, it is as Viana (2016, p. 85) states: "It is up to didactics to plan and organize the conditions for teaching. Thus, the pedagogical practice requires adequate planning to the intentionality of the student's future learning". According to the author, didactics is in charge of the guidelines related to the planning and organization of the necessary conditions for teaching, which includes intentional and constant preparation. In fact, it is as Andrade (2021, p. 17-18) points out,

We believe that even if the teacher contemplates in his planning the aspects that we consider to characterize a successful teaching practice, there will be no guarantee that all students develop in the same way, achieving learning. As efficient as teaching planning is, it does not reach all students at the same time. Therefore, the teacher has to resort to various strategies that aim to contemplate the diversity presented by the students. Unveiling the strategies and procedures used by teachers to achieve their intentions and pedagogical objectives are configured as our purpose.

These considerations raise a fundamental point about successful pedagogical practice: the idea that, while teaching planning is crucial, it does not guarantee that all students will achieve the same learning outcomes. This is due to the diversity intrinsic to students, whether in terms of learning styles, developmental paces, or social and cultural contexts. He adds that, no matter how meticulous the planning is, it needs to be flexible to meet the specific needs of each student. It cannot be seen as a fixed script, but as a basis

that can be adjusted according to the dynamics of the classroom, suggesting that it is not limited to the content or the way it is taught, but to the educator's ability to perceive and accept diversity.

Pedagogical planning reflects a commitment to the intentionality that the activities and resources used are aligned with the established educational objectives. It therefore requires a critical and reflective view of educational practices, incorporating adjustments and improvements based on the analysis of the results and the emerging needs of the students. As an instance that supports pedagogical practice, at the same time it enables an educational environment that promotes the integral development of students and responds to the dynamics/demands of the context in which it is carried out.

Among its multiple benefits, it collaborates with the autonomy and responsibility of the teacher in the educational process and with the need for a critical reading of reality, considering the limits of their individual and collective responsibility in contexts that are sometimes marked by structural precariousness, excess of classes, high workload and reduced institutional support, which causes work overload to the teacher who, strictly speaking, it is considered the main or only responsible for the success of planning, teaching and learning (concretely, this is not the reality of CETI Augustinho Brandão).

This comprehensive focus is particularly necessary for the pedagogical planning of Mathematics, since strategies and contents require adequate conditions for the development of students' potentialities and alignment with the school's objectives. The Mathematics teacher, when participating in collaborative planning, accesses different perspectives and experiences, strengthening the perception of inclusive, productive and successful teaching, compatible with the school reality and the demands of students. Thus, the way of approaching Mathematics content plays a fundamental role in teaching, in the development of cognitive skills necessary for the understanding of mathematical concepts, positively impacting their ability to solve problems and apply concepts.

An effective approach in this area involves the integration of pedagogical methods and strategies that go beyond the mere transmission of formulas and procedures, articulating with practices that encourage the active exploration of content, problem solving and research, aligning with the needs and interests of students, with regard to the promotion of activities that challenge them to think critically, developing a solid understanding of concepts, among other advantages of mathematics present both in school studies and in the different contexts of daily life.

When associated with the teaching of Mathematics, Viana (2016) stresses that pedagogical practice must go beyond the simple application of methods and techniques.

Instead, it is essential that planning is guided by clear and detailed objectives regarding the development of mathematical knowledge. According to this understanding, planning requires that we observe the needs and expectations of students in the structuring of activities, taking into account the context in which teaching is developed.

As mentioned by Viana (2016), with regard to successful pedagogical practices, adequate planning not only organizes Mathematics content in a logical and accessible way, it also integrates it into strategies that meet the various forms of student learning. This means that pedagogical practice includes a variety of approaches and resources that, as suggested by D'Ambrósio (1993), allow a broader understanding of the problem-solving process, associated with the investigation and dynamic exploration of mathematical situations.

D'Ambrósio (1993) points out that pedagogical practice is characterized by its purposes and intentionalities expressed in the effective approaches to Mathematics contents, which is why planning needs to be aligned with the learning objectives and with the reality that characterizes the group of students. Intentionality in pedagogical practice implies that planning is not an isolated exercise, but a continuous and reflective activity that aims to guarantee students the necessary knowledge to achieve the proposed objectives and the development of solid mathematical skills.

Thus, the congruence of Viana's (2016) ideas and the approach to Mathematics contents pointed out by D'Ambrósio (1993) strengthen the understanding that a well-structured pedagogical planning is fundamental for a successful pedagogical practice. It is a planning that considers not only the contents to be taught, but also the ways in which these contents are presented and worked on in order to meet the needs and potentialities of students, with regard to the promotion of their learning.

By the way, these theorists, consensually, emphasize the role of the teacher in creating a favorable learning atmosphere that is indispensable to planning, which involves establishing an environment in which students feel motivated, safe to express their doubts and encouraged to face possible challenges, without fear of making mistakes. A careful and committed pedagogical practice focused on the teaching of Mathematics requires, therefore, combining pedagogical planning, active methodologies with a positive classroom climate, in which students can feel instigated to develop integrally.

The second component to be considered by the teacher in his planning, according to the authors in question, is the object of knowledge, that is, the educator, himself, needs to think critically, reflect and research on the content to be taught, seeking to update himself regarding the debate to be addressed, its advances, reformulations, among others, paying attention to the context in which the pedagogical action is substantiated, that is, the factual

situation in the classroom, the results of the evaluations, considering them from a formative perspective, in order to reflect on their practice, their adaptations and necessary flexibilities. This implies that the teacher, in these circumstances, is involved in a dialectical movement that includes the pedagogical plan in its initial abstract form and the materiality of the empirical situation in the classroom.

Guimarães and Santos (2017), in line with what the aforementioned theorize, with regard to the desirable characteristics of critical, reflective, globalized and humanized pedagogical practice, with orientation towards democratic formation. These qualities imply that successful pedagogical practice incorporates an approach that values critical analysis, constant reflection, and consideration of the global context of the human dimensions of education. We add that pedagogical practice needs to be contextualized, which means taking into account the specific environment in which it occurs, including local, social and cultural circumstances. It requires, therefore, that teaching is adjusted to the realities and needs of students, providing the evaluation process with important guiding elements.

Thus, it is not appropriate to disregard its historical component, recognize and integrate it into the temporal, political and evolutionary dimensions of education, paying attention to the influences and impacts of educational and social policies on the teaching-learning process. With regard to the cultural component, it provides the opportunity to reflect and respect the multiculturalism peculiar to the community and, consequently, to the students as well. In short, thinking and articulating the planning and pedagogical practice reflects and responds to the complexities of the educational context, in breadth and development that characterize the teaching of a subject, in this case, we speak of mathematics in high school.

3 PLANNING AND SUCCESSFUL PEDAGOGICAL PRACTICES IN THE TEACHING OF MATHEMATICS – CETI AUGUSTINHO BRANDÃO: NARRATIVES OF TEACHERS AND MANAGERS

The analysis of how planning contributes to the effectiveness of successful pedagogical practices in the teaching of Mathematics in the aforementioned State Center of Full-Time, covers elements that characterize the culture of planning in the school, favoring success in pedagogical practices, aspects confirmed in the narratives of teachers and managers of this institution. When undertaking the analytical process of the data, we start from the assumption that planning, in the context in question, goes beyond the merely technical or bureaucratic character. Its configuration expresses an intentional, critical and collaborative practice aimed at teaching quality mathematics, committed to learning and the integral development of its students.

When asked about the pedagogical practices developed and that lead to successful results in the study and learning of students, as stated in the fabric of their narratives, teachers and managers reveal the nature of their structuring, as observed in the data presented in the following Tables.

Figure 1

Narratives of teachers and managers about school planning

[...] Okay, a great advantage of the school is that, thank God, we have teachers trained in the area, all mathematics teachers are trained in mathematics, physics teachers are also teachers trained in physics, so pedagogical planning already has a great advantage in this sense. I believe that the training of the professional is the most relevant, in terms of pedagogical planning, there is a phrase of the great thinker, [...] the first thing you have to know is what you are going to teach and the second thing you have to know a little more than what you are going to teach. So, I think that great pedagogical planning starts with continuing education. [...] Sometimes we get together here at school, in a collective planning activity [...] pedagogical planning is more than knowing a content, it's knowing how to put yourself in the place of the student who is taking that class. When I go to teach, I always make the following reflection: would the class I am teaching here be the class I also wanted to attend? [...]. You have to know if your best class is that class that the student wants to attend. [...]. (Professor Gama – Narrative Interview, 2024).

The teachers who teach at this school, the majority, have been [...] Our motto here is to see the transformation of the place we live. As all teachers are from here, because those who did not found the school were students of the school. So, like this, planning is very free because it already has a consolidated work. So, you don't need the management, it's picking on anyone, because they are teachers that you have to put the red carpet for them to walk because they are so competent and so dedicated. [...] especially in the area of mathematics [...] I usually share things together with the coordinator who is full-time, so I leave this pedagogical part, this pedagogical autonomy to them [...], the meeting agenda, planning, the pedagogical part, is very linked to it. [...], my coordinator to give all the assistance in the planning, in the pedagogical guidelines. [...] I have full confidence in her. [...]. It is great knowledge and very didactic, very pedagogical, very explanatory. [...] so, it turns out that mathematics is an area of knowledge where students have no difficulty in ENEM (Alpha/Director – Narrative Interview, 2024).

The school's pedagogical planning is done at the beginning of the year, right, we analyze the data, see our results and in our first meeting it is a feedback and from there, our planning begins articulated with the teacher, who already plans and organizes everything he needs to do with the students during the school period. Everything in the school is designed to ensure learning, everything we do, both the management and the teacher, we have a very good dialogue. So, like this, we are always talking, sometimes even formally, not only in meetings. The planning, we meet, often bimonthly, to do it, but like this, our planning is daily, the teacher, we have a conversation, if the teacher needs it, has a need and says this week I need to work on a certain subject, I need certain material, it is possible. We look at this week, this month we are going to work, for example, in the third year, Enem questions from the year such-and-such, and then we already plan, we take it out for the students, we prepare the teacher, the teacher already does the correction and everything. So, like, everything that the teacher needs, everything that the teacher plans, that we understand is necessary, that is important, that will generate knowledge and generate knowledge, the school has support, so, we have thanks to God, our teachers, we have a very good dialogue, teachers committed and concerned with learning, So, always seeking to develop strategies for student performance to help them well in relation to these strategies you just talked about. (Beta/Pedagogical Coordinator - Narrative Interview, 2024).

Source: Data produced in the Narrative Interview with teachers and the management team (2023).

Professor Gama's narrative dialogues directly with the idea that the student should be the center of the educational process, requiring learning environments that favor investigation and application of knowledge, shifting the focus from the mere transmission of content to the

active construction of knowledge. In a complementary way, it highlights the importance of pedagogical planning that considers the interest and motivation of students, recognizing them as subjects with a "thirst for knowledge". This perspective reinforces the need for a reflective and intentional teaching practice, which breaks with routine activities, valuing student protagonism, locating the development of critical thinking and meaningful learning of students.

In his conception, he highlights that pedagogical planning requires more than mastering the content, as it involves the ability to understand and critically reflect on one's own practice. By stating that "pedagogical planning is more than knowing a content, it is putting oneself in the student's place", the teacher expresses a posture aligned with the vision of Vasconcellos (2002), whose understanding is that pedagogical practice emerges from the concrete reality of the subjects, the object of knowledge and the school context.

Professor Gama clarifies that there is a collective planning that takes place at the beginning of the year. This information is confirmed by teacher Somatório and Principal Alfa and, in her narrative, coordinator Beta attests to her existence in the school. Alfa, the school's manager, says that the collective planning of the team at CETI Augustinho Brandão has the purpose of developing the community. We understand from the narratives that refer to the Pedagogical Political Project (PPP) that, according to Veiga (2011), it is a theoretical-methodological instrument that the school elaborates, in a participatory way, with the purpose of pointing out the direction and the path it will take to carry out its educational function and, at its core, the pedagogical dimension of the teaching action.

Thus, the PPP presents the proposals for the fulfillment of the educational purposes of the educational establishment for the training of its students, contemplating the political dimension of education, in addition to the definition, for the scope of methods, resources and pedagogical strategies. In general, it is as Veiga (2011, p. 1) expresses

[...] The political-pedagogical project goes beyond a simple grouping of teaching plans and various activities. The project is not something that is built and then filed or forwarded to the educational authorities as proof of the fulfillment of bureaucratic tasks. It is built and experienced at all times, by all those involved with the school's educational process.

Veiga's (2011) analysis highlights the central importance of the Political-Pedagogical Project (PPP) as a living and collective instrument of school practice. By stating that the PPP "goes beyond a simple grouping of teaching plans and various activities", the author breaks with a technician or bureaucratic view of school planning, emphasizing that it should not be a static document, filed or prepared only to comply with legal requirements, but built and

experienced continuously, by all the subjects who participate in the educational process. with a political character (because it expresses conceptions of society, of human beings and of education) and a pedagogical character (because it guides teaching and learning practices). In it, the concept of evaluation is also present, revealing itself to be formative when Beta, pedagogical coordinator, emphasizes in the narrative presented in Figure 01, "Everything in school is designed to guarantee learning". Student learning is the center of all thoughtful actions, whether at the school level or in pedagogical planning.

As a subsidy to the teaching action, the pedagogical planning is present in the daily life of CETI Augustinho Brandão, presenting as a foundation the reality for the delineation of the teaching work routine. It is important to draw attention to what Professor Gama says, it is not enough just to know the content, but the student has to be the focal point of the teaching action. Therefore, the reflection carried out by the teacher about his class, at the time of planning, contributes to the class taught achieving the pedagogical objectives, according to the narratives in Figure 01.

As we have seen, Professor Gama associates pedagogical planning with continuing education. We understand that, when it makes this association, it imputes to continuing education the attribute of airing the practice, since it provides spaces for reflection on pedagogical action by analyzing the action developed and thinking about new strategies and forms of action, in addition to the need for continuing education of teachers, school planning, teacher-student and school-family relationship, among others.

The availability of *online* documents is also important to guide the daily action of teachers, by providing clear guidelines and practical resources for the development of teaching activities and strategies. This contributes to greater uniformity and consistency in pedagogical practice, ensuring that teachers align with the school's pedagogical proposal and students' learning expectations.

Alfa goes on to say that, after this moment of individual production of the specific pedagogical planning of each area of knowledge, the Pedagogical Coordination has a time with the teachers of each area to talk. The intervention of the principal occurs when some action escapes the purposes of the school, that is, the political base on which the pedagogical action is based. Thus, the daily planning, called "pedagogical routine", according to the narrative of the coordinator Beta, results from the bimonthly pedagogical planning.

Pedagogical planning, designed within the school as a support for successful practices, involves several steps: definition of objectives, selection of content, development of teaching strategies, evaluation of student learning and continuous review of the plan. As for the participants in this planning, teachers are usually the main responsible, since they are

executors who think and outline the proposal to be implemented, develop the lesson plan, based on the learning objectives, the needs of the students and the available resources.

In view of the narratives of teachers and managers, the understanding emerges that pedagogical planning is carried out by teachers, with the support of the management team, which collaborates for the development of the projected actions, providing resources, guidance and material and logistical support. Another highlighted aspect, contributing to successful pedagogical practices, is that in school all teachers have a degree in the area of their training and, therefore, in the discipline they teach, referring to their own condition and that of the Somatorium Teacher, also a mathematics teacher, but we emphasize that it is not enough to know the contents, because pedagogical knowledge is essential to carry out this mediation.

Professor Gama's narrative emphasizes the value of the content to be taught: "you have to know what you are going to teach and the second thing you have to know is a little more than what you are going to teach", he points out that, "[...] more than knowing a content, it is knowing how to put yourself in the place of the student who is taking that class [...]" and that "[...] the student has to be remembered when you do the pedagogical planning", overcoming the perspective of simple transmission of content, to put the focus back on student learning. It proposes to make planning a moment of evaluation of its pedagogical practice based on various questions, transforming it into a formative moment.

It requires, as we see, a reflective and critical approach, which allows professionals to make decisions based on relevant and ethical information, in relation to educational objectives, contents and methods. This should be the path that the teacher takes to not only learn about teaching strategies, but to integrate them in a meaningful way into their practice, which involves understanding them in depth, adjusting them to their classroom reality, granting them a new purpose, articulating theory and practice. We reaffirm, in this way, that school planning is fundamental for the promotion of a transformative pedagogical practice.

But, in planning, to adjust the pedagogical practice to the reality of the classroom, directing them to the learning objective to be achieved, it is necessary to have access to information about the students' learning. In this aspect, evaluation comes into play, as an essential component of pedagogical practice, by assuming the formative intention. This happens, according to Hadji (2001, p.21), when evaluation provides information that collaborates with the regulation of learning, producing changes in the pedagogical practices of teachers, in order to promote a "[...] better articulation between the collection of information and the mediating action". In addition to the teacher, evaluation with formative intent situates the learner on his own learning process, in order to favor the reorientation around his activity.

From this perspective, Professor Gama's narrative reveals characteristics of evaluation with formative intention when he exposes the relationship between pedagogical planning and learning evaluation. Let's look at the following table.

Figure 2

Mathematics Teacher Narratives: learning planning/evaluation relationship

Learning assessments serve to show how much the student has really learned. Qualitative evaluations, specifically, guide, will always guide our pedagogical planning. [...] I have no way of knowing what my class will be like if I don't have a qualitative assessment, if a student took a test here, the student didn't learn certain content, I can't pass it on. [...] My pedagogical planning is based on qualitative evaluation, it is on the feedback I receive from the students' tests. [...] my practice is basically this, we have achieved, thank God, great results. (Professor Gama – Narrative Interview, 2023).

Source: Data produced in the Narrative Interview with teachers (2023).

We observed characteristics of a formative conception of learning assessment as the use of the results to guide the pedagogical planning, to determine the pace of the process, always striving to ensure that none of the students falls by the wayside in relation to learning. Therefore, the evaluation guides the pedagogical planning by the qualitative analysis of the results. For Hadji (2001, p. 21), "An evaluation that is not followed by a modification of the teacher's practices has little chance of being formative!".

In addition, Hadji (2001) says that it is unnecessary for the evaluation process to be attached to some methodological standard to be formative, that is, from this perspective, the fact of carrying out a qualitative analysis of the data does not prevent one from proceeding with a quantitative analysis of the results, presenting a grade, as the teacher does, because it is a requirement of the state education system, to which the school is linked. In fact, according to the author, what makes an evaluation formative is to be truly useful, pedagogically helping both the student to learn, and offering information to the teacher to guide the effectiveness of teaching.

For Hadji (2001), in order to be formative, evaluation must have some characteristics: it must be informative, which is the main one, in addition to being informative for students and teachers, the two main subjects, and allow the correction of the course of the process. In Professor Gama's narrative we verify that these characteristics are present, resulting in the effectiveness of the teaching and learning processes.

Still regarding the evaluation processes, we can also see that there is a reference from Alfa, regarding the performance of the Class Council as an evaluation instrument with formative intention that offers valuable subsidies for pedagogical intervention, in order to enable the consolidation of learning.

Figure 3*Narratives of the School Director about the Class Council*

[...] In the class council, we discuss all the problems to see if this is having repercussions on learning or on non-intervention. The class council has a frequency every two months. [...]. We point out everything, I have a person who writes everything down, so-and-so arrived and the teacher speaks [...], I'm here writing and then what we're going to do [...]. Everyone reaches a consensus [...] and I schedule everything to do and give the demand to the teachers. [...] each one knows their students what is happening, how it was done, [...] it was discussed. So, after we do this whole process of diagnosing [...] that he has learning difficulties for several things [...]: tutoring, monitoring, there will be those cases that unfortunately we will not be able to. (Alfa (School Director) - Narrative Interview, 2024).

Source: Data produced in the Narrative Interview with managers (2023).

It is, therefore, the Class Council used as a space for the analysis of the problems faced by students, as well as for the proposition of pedagogical actions and interventions. This reflects a systematic approach to assessing and monitoring students' progress, identifying potential difficulties and seeking appropriate solutions. It also shows an understanding of the complexity of educational issues and the need for an integrated approach to provide support.

Corroborating this understanding, Dubiela and Ferreira (2012) understand the Class Council as a collegiate instance that brings together educational processes in which the student should be the central axis of the discussions, not being restricted only to the issues of grades and inappropriate behaviors, but to the needs of the subjects, for the reorganization of the pedagogical work, this instance being a strengthening of the formative conception of school evaluation.

Still on evaluation with formative intent and on the instrument of the Class Council, we have the narrative of Beta, the school's pedagogical coordinator, part of the management team, in Figure 04, below.

Figure 4

Beta's narrative about the school's evaluation processes

So our class councils, for example, we analyze student by student and in this analysis we realize look at these students, we see all the subjects, how it is, which subjects have the greatest difficulties. [...] We select the monitor that is easier and that can help colleagues [...]. [...] The class council as I said to you, we analyze the performance of all students, when we start our class council we spend a day at school doing this analysis and not only analyzing the student's report card, not only analyzing the performance, but analyzing the student as a whole [...]. (Beta/Pedagogical Coordinator - Narrative Interview, 2024).

Source: Data produced in the Narrative Interview with the Management Team (2024).

Beta's narrative reveals that the student's evaluation in the Class Council is carried out collectively, observing not only the internal factors that interfere with learning, but also the external ones, an analysis in an integral way. It fulfills its function in relation to the guarantee of learning, seeking collective solutions, since from the analysis of the student as a whole, it seeks appropriate strategies, such as extending the time to approach certain content, as well as offering support or monitoring material, among many other possible ones, corroborating the ideas of Dubiela and Ferreira (2012, p. 7) that this school body "has the responsibility of formulating proposals regarding educational action".

4 CONCLUSION

By presenting these considerations about the analysis carried out, we recognize planning as an intentional and reflective act, which transcends the mere organization of contents and procedures, configuring itself as an ethical, political and creative instrument for the construction of emancipatory and contextually significant learning.

The evaluation of learning also stood out as an essential component, assuming an eminently formative perspective, in which the main purpose is the diagnosis of difficulties, in order to support pedagogical planning. The Class Council is one of the instruments used for analysis and collective decision-making to promote learning, showing that the focus is on ensuring that everyone learns.

At the end of this article, we reinforce that pedagogical planning is an essential element for a successful pedagogical practice, as a moment of reflection carried out by teachers with the support of the management team, involving the school collective, always with the purpose of promoting learning.

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AESTHETIC LITERACY IN EARLY CHILDHOOD EDUCATION AND ELEMENTARY SCHOOL IN THE PUBLIC SCHOOL SYSTEM: A LITERATURE REVIEW

LETRAMENTO ESTÉTICO NA EDUCAÇÃO INFANTIL E NO ENSINO FUNDAMENTAL DA REDE PÚBLICA: UMA REVISÃO DE LITERATURA

ALFABETIZACIÓN ESTÉTICA EN LA EDUCACIÓN INFANTIL Y EN LA EDUCACIÓN PRIMARIA DE LA RED PÚBLICA: UNA REVISIÓN DE LA LITERATURA



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ABSTRACT

Early Childhood Education and the early years of Elementary Education constitute foundational stages of human development, in which the bases of language, sensitivity, and children's symbolic constitution are consolidated. In this context, literacy, understood as a social practice, expands toward the notion of aesthetic literacy, integrating language, art, and sensory experience as constitutive dimensions of learning. However, educational policies marked by curricular standardization and large-scale assessments have prioritized measurable outcomes, which may restrict the space for artistic languages and aesthetic experiences in everyday school life. In light of this scenario, the present article aimed to analyze, through a literature review, how aesthetic literacy has been discussed within Early Childhood Education and Elementary Education in the public school system, highlighting its implications for teacher education and pedagogical practices. The research is characterized

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as qualitative, theoretical, and bibliographic in nature, grounded in the deductive-analytical method. The methodological procedure consisted of a systematized literature review guided by the PRISMA protocol and analyzed through Bardin's Content Analysis. The results reveal theoretical consensus regarding the centrality of aesthetic education for integral development, as well as the importance of teacher education for the consolidation of intentional aesthetic practices. However, tensions are identified between the discursive recognition of integral education and the predominance of instrumentalizing approaches. It is concluded that aesthetic literacy constitutes an integrative category capable of articulating literacy, sensitivity, and critical thinking, making it essential to strengthen educational policies that systematically incorporate it into the public education system.

Keywords: Teacher Education. Curriculum Policy. Integral Human Development. Literary Mediation. Educational Accountability.

RESUMO

A Educação Infantil e os anos iniciais do Ensino Fundamental constituem etapas estruturantes da formação humana, nas quais se consolidam as bases da linguagem, da sensibilidade e da constituição simbólica das crianças. Nesse contexto, o letramento, compreendido como prática social, amplia-se para a noção de letramento estético, integrando linguagem, arte e experiência sensível como dimensões constitutivas da aprendizagem. Entretanto, políticas educacionais marcadas por padronização curricular e avaliações em larga escala têm priorizado resultados mensuráveis, o que pode restringir o espaço das linguagens artísticas e das experiências estéticas no cotidiano escolar. Diante desse cenário, o presente artigo teve como objetivo analisar, por meio de uma revisão de literatura, como o letramento estético tem sido discutido no âmbito da Educação Infantil e do Ensino Fundamental da rede pública, destacando suas implicações para a formação docente e para as práticas pedagógicas. A pesquisa caracteriza-se como qualitativa, de natureza teórica e bibliográfica, fundamentada no método dedutivo-analítico. O procedimento metodológico consistiu em revisão de literatura sistematizada, orientada pelas diretrizes do protocolo PRISMA e analisada à luz da Análise de Conteúdo de Bardin. Os resultados evidenciam consenso teórico quanto à centralidade da educação estética para o desenvolvimento integral, bem como à importância da formação docente para a consolidação de práticas estéticas intencionais. Contudo, identificam-se tensões entre o reconhecimento discursivo da formação integral e a predominância de abordagens instrumentalizantes. Conclui-se que o letramento estético constitui categoria integradora capaz de articular alfabetização, sensibilidade e criticidade, sendo imprescindível fortalecer políticas formativas que o incorporem de maneira sistemática na rede pública de ensino.

Palavras-chave: Formação Docente. Política Curricular. Desenvolvimento Humano Integral. Mediação Literária. Responsabilização Educacional.

RESUMEN

La Educación Infantil y los primeros años de la Educación Primaria constituyen etapas estructurantes de la formación humana, en las que se consolidan las bases del lenguaje, la sensibilidad y la constitución simbólica de los niños. En este contexto, el alfabetismo, entendido como práctica social, se amplía hacia la noción de alfabetización estética, integrando lenguaje, arte y experiencia sensible como dimensiones constitutivas del aprendizaje. Sin embargo, las políticas educativas marcadas por la estandarización curricular y las evaluaciones a gran escala han priorizado resultados medibles, lo que puede restringir el espacio de los lenguajes artísticos y de las experiencias estéticas en la vida cotidiana escolar. Ante este escenario, el presente artículo tuvo como objetivo analizar, mediante una revisión de literatura, cómo la alfabetización estética ha sido discutida en el ámbito de la Educación Infantil y de la Educación Primaria en la red pública, destacando sus

implicaciones para la formación docente y para las prácticas pedagógicas. La investigación se caracteriza como cualitativa, de naturaleza teórica y bibliográfica, fundamentada en el método deductivo-analítico. El procedimiento metodológico consistió en una revisión de literatura sistematizada orientada por las directrices del protocolo PRISMA y analizada a la luz del Análisis de Contenido de Bardin. Los resultados evidencian un consenso teórico en torno a la centralidad de la educación estética para el desarrollo integral, así como la importancia de la formación docente para la consolidación de prácticas estéticas intencionales. No obstante, se identifican tensiones entre el reconocimiento discursivo de la formación integral y el predominio de enfoques instrumentalizadores. Se concluye que la alfabetización estética constituye una categoría integradora capaz de articular alfabetización, sensibilidad y pensamiento crítico, siendo imprescindible fortalecer políticas formativas que la incorporen de manera sistemática en la red pública de enseñanza.

Palabras clave: Formación Docente. Política Curricular. Desarrollo Humano Integral. Mediación Literaria. Responsabilidad Educativa.

1 INTRODUCTION

Early Childhood Education and the initial years of Elementary School constitute structuring stages of human formation, as they consolidate the bases of language, sensitivity, imagination and the symbolic constitution of children (Silva; Sousa; Days, 2025; Feitosa et al., 2026). It is a period in which the child expands his forms of expression and understanding of the world through play, literature, visual arts, music, movement and other languages that articulate sensitive experience and cognitive construction. In this context, aesthetic experiences assume a central role, since they enable the expansion of the cultural repertoire, the development of perception, the production of meanings and the formation of symbolic links with social and cultural reality.

The concept of literacy, understood as a historically situated social practice, goes beyond the technical dimension of literacy and involves the production of meanings, the critical reading of reality and active cultural participation (Amado; Silva; Melo, 2020). In this sense, in the light of Freire's thought, reading the word implies reading the world, so that the educational process must promote the formation of subjects capable of interpreting, dialoguing and transforming reality (Freire, 1996). When this conception is articulated with the aesthetic dimension, it expands to what is called aesthetic literacy, a concept that integrates language, art, sensibility, and cognition in the formative process (Araújo, 2020). From this perspective, the aesthetic experience is not configured as an accessory element of the curriculum, but as a constitutive dimension of learning and integral formation.

However, the contemporary educational scenario has been marked by the intensification of accountability policies, large-scale evaluations and curriculum standardization, which tend to prioritize measurable results and instrumental skills (Sousa; Alvarenga, 2021). Such a context can restrict the space destined to artistic languages and sensitive experiences, especially in the early stages of schooling, in which learning occurs in an integrated way and mediated by multiple languages. Although normative documents recognize the importance of comprehensive education, in practice there is a tension between the development of evaluable skills and the promotion of meaningful aesthetic experiences (Dias et al., 2025).

It is in this scenario that the problem of how aesthetic literacy has been approached in scientific production on Early Childhood Education and Elementary Education in the public school system emerges, and how does the specialized literature evidence its relationship with teacher training and pedagogical practices? Such problematization becomes relevant in view of the need to understand whether the aesthetic dimension has been treated in a structuring way in educational studies or if it remains secondary to the instrumental demands of teaching.

Despite the advance of discussions on literacy as a social practice and the expansion of debates on aesthetic education, a gap is identified in the literature regarding the theoretical systematization that articulates, in an integrated way, aesthetic literacy, teacher training and pedagogical practices in the initial stages of Basic Education (Zulusuwan; Chansirisira, 2025). Many studies approach literacy from a linguistic or sociocultural perspective, while others discuss aesthetic education in isolation, without establishing consistent connections with the processes of literacy and literacy. Likewise, there is a lack of reviews that critically analyze how these dimensions have been treated in the public school system, especially in contexts that show advances in literacy indicators, but lack qualitative analyses on the sensitive formation of children.

Thus, this article aimed to analyze, through a literature review, how aesthetic literacy has been discussed in the context of Early Childhood Education and Elementary Education in the public network, highlighting its implications for teacher training and pedagogical practices.

2 METHODOLOGY

The present research is characterized as a study with a qualitative approach, of theoretical and bibliographic nature, based on the method of deductive-analytical argumentation. Such an approach made it possible to start from assumptions consolidated in the scientific literature about literacy as a social practice, aesthetic education and aesthetic literacy, for the construction of interpretative inferences aimed at understanding its pedagogical implications in Early Childhood Education and in the early years of Elementary Education in the public network. The option for the deductive method proved to be pertinent because it allowed the articulation between broad theoretical references and the critical analysis of the contemporary conditions of implementation of these conceptions in the educational context.

The central methodological procedure consisted of a systematized literature review, guided by the PRISMA (*Preferred Reporting Items for Systematic Reviews and Meta-Analyses*) guidelines, adapted to the qualitative and interpretative nature of the study (Page et al., 2022).

The bibliographic survey was carried out in the Google Scholar, Scientific Electronic Library Online (SciELO), CAPES Journal Portal and ScienceDirect databases, selected for their academic relevance and international coverage. Descriptors in Portuguese and English were used, combined through Boolean operators (AND/OR), such as "aesthetic literacy", "early childhood education", "teacher training", "art", "*aesthetic literacy*", "*early childhood*

aesthetic education" and *"literacy and arts education"*. The detailed report by database showed 142 records in Google Scholar for the descriptors *"aesthetic literacy"* AND *"early childhood aesthetic education"*; 18 records in SciELO for *"aesthetic literacy"* AND *"early childhood education"*; 34 records in the CAPES Journal Portal from the intersection between *"teacher training"* AND *"art"*; and 22 registrations in ScienceDirect for related terms in English. The gross total identified in the identification stage corresponded to 216 records.

In the screening phase, duplicates were removed and initial filters were applied, including document type, language, publication period, and reading of titles and abstracts, resulting in 85 studies potentially adhering to the research object. Then, in the eligibility stage, 42 texts were analyzed in full to verify alignment with the previously established inclusion criteria, which are: focus on the public school system, centrality in the initial stages of Basic Education (Early Childhood Education and early years of Elementary School), articulation between literacy, aesthetics and pedagogical practices, and theoretical-methodological consistency. At the end of this process, 24 studies composed the definitive corpus of the review.

Literature review is widely recognized as an effective method for understanding complex and interdisciplinary phenomena (Marconi; Lakatos, 2017). Considering the exponential growth of scientific production and the expanded access to digital databases, it has become essential to adopt rigorous selection criteria, in order to ensure validity, reliability, and academic relevance to the findings. In this sense, we sought to balance recent empirical productions with classical theoretical references, ensuring conceptual density and analytical timeliness.

For the treatment and interpretation of the selected sources, Content Analysis was adopted, according to the systematization proposed by Bardin (2016). This technique proved to be adequate because it enables a systematic and interpretative analysis of the texts, allowing the identification of thematic recurrences, conceptual convergences, theoretical tensions and investigative gaps. Content Analysis was developed in three stages: a) pre-analysis, with floating reading and delimitation of the corpus; b) exploration of the material, with coding and thematic categorization of the units of meaning; and c) treatment of the results, inference and interpretation, articulating the categorized data to the theoretical framework adopted, as shown in Table 1.

Table 1

Characteristics of the studies included in this study.

LEAD AUTHORS	YEAR	DOCUMENT TYPE	MAIN FOCUS
Freire	1996	Book	Reading the world, language as an emancipatory practice and critical formation.
Beloved; Silva; Melo	2020	Scientific Article	Literacy as a social practice and formation of literary readers.
Araújo	2020	Book	Foundations of aesthetic literacy and articulation between language and art.
Rabbit	2021	Scientific Article	Aesthetic education and integral human formation.
Sousa; Alvarenga	2021	Scientific Article	Curricular policies and impacts of standardization on the teaching of Art.
Silva; Sousa; Days	2025	Scientific Article	Integral development and multiple languages in childhood.
Tian; Isa	2024	Scientific Article	Aesthetic education practices in Early Childhood Education.
Zulusuwan; Chansirisira	2025	Scientific Article	Aesthetic skills in teacher training.
Dias et al.	2026	Scientific Article	Expanded literacy and formative dimensions in basic education.
Feitosa et al.	2026	Scientific Article	Aesthetic awareness and socio-environmental training in childhood.

Source: The authors (2026).

The analytical categories were delineated from an inductive-deductive movement, articulating, on the one hand, the theoretical assumptions previously established in the conceptual framework and, on the other hand, the thematic recurrences identified in the selected corpus. This procedure allowed the categories not to be imposed exclusively a priori, nor derived only empirically, but constructed in dialogue between theory and analyzed material. From this process, five structuring axes emerged: a) literacy as a social practice; b) aesthetic education and integral human formation; c) aesthetic literacy as an articulation between sensitive and cognitive; d) curricular tensions and accountability policies; and e) teacher training and aesthetic practices. These categories guided the organization of the analysis and supported the interpretative stage of the results.

The articulation between the PRISMA protocol and Content Analysis, as systematized by Bardin (2016), gave methodological consistency to the study, ensuring traceability in the selection of sources and coherence in the interpretation of data. While PRISMA ensured transparency and rigor in the stages of identification, screening, eligibility and inclusion of studies, Content Analysis enabled interpretative deepening, evidencing convergences, gaps and tensions in the scientific production examined.

3 LITERATURE REVIEW

3.1 LITERACY AS A SOCIAL PRACTICE

The concept of literacy has been consolidated in contemporary educational literature as an analytical category that shifts the focus of learning to write from the merely technical domain to its sociocultural dimension. Unlike literacy, traditionally understood as the appropriation of the alphabetic-orthographic system and coding and decoding skills, literacy refers to the insertion of the subject in social practices that involve reading and writing in historically situated contexts (Amado; Silva; Melo, 2020). Thus, literacy is not reduced to knowing how to read and write, but implies understanding what one reads for, why one writes, in what situations, with what purposes and under what power relations.

This perspective broadens the understanding of language as a social practice that mediates human relations, forms of cultural participation, and the production of meanings (Araújo, 2020). By considering that reading and writing practices are culturally organized and socially regulated, literacy comes to be understood as a plural phenomenon, situated and crossed by ideological, political and identity dimensions. In this sense, talking about literacy means recognizing that subjects are constituted in the interaction with different textual genres, supports, languages and social spheres, building symbolic repertoires that guide their performance in the world.

Paulo Freire's contribution is fundamental to this conception. By stating that the reading of the word is inextricably linked to the reading of the world, Freire emphasized the political and emancipatory character of language (Freire, 1996). For the author, teaching requires understanding that knowledge is built in the dialogical relationship between historical subjects, and that literacy, and, by extension, literacy, should enable the problematization of reality and the construction of critical autonomy. From this perspective, language is not neutral, but an instrument of social participation and transformation of the concrete conditions of existence.

Literacy, therefore, implies critical participation in written culture, production of meanings and exercise of citizenship. It is a process that involves the ability to interpret texts, position oneself in front of them, dialogue with different discourses and produce utterances that circulate socially. This conception shifts the center of the educational process from the mere acquisition of technical skills to the formation of subjects capable of acting reflexively in different contexts.

Such an understanding takes on even greater relevance in the initial stages of schooling. In Early Childhood Education and in the early years of Elementary School, language learning occurs in an integrated way with bodily, playful, sensory, and imaginative

experiences. The child interacts with oral, written and multimodal texts even before formal literacy, appropriating social practices that involve narratives, songs, stories, drawings, dramatizations and other forms of symbolic expression. In this context, literacy is manifested in active participation in significant communicative situations, in which language is articulated with play, imagination and aesthetic experience (Tian; Isa, 2024).

Understanding literacy as a social practice in the early stages implies recognizing that the child's linguistic formation is not restricted to the acquisition of codes, but involves the construction of meanings in interaction with the other and with the world (Dias et al., 2026). The school, in this sense, assumes a decisive role in creating literate environments that favor the circulation of different texts, sensitive listening, dialogue and authorship. Thus, literacy becomes the foundation for the constitution of critical, creative and culturally situated subjects, preparing the ground for broader discussions, such as the articulation between language and aesthetic experience, the central axis of this study.

3.2 AESTHETIC EDUCATION AND HUMAN FORMATION

Aesthetic education is a structuring dimension of integral human formation, as it involves the development of sensitivity, perception, imagination, creativity and the ability to attribute meanings to the world. Far from being restricted to the appreciation of beauty or the formal teaching of artistic content, aesthetic education refers to the formation of the ability to experience, interpret, produce and resignify cultural manifestations in their multiple languages. It is, therefore, a formative process that integrates emotion and thought, sensitivity and rationality, experience and reflection (Coelho, 2021).

In the context of Early Childhood Education and the early years of Elementary School, this dimension takes on an even more decisive character. It is during this period that the child builds his first symbolic relationships with the world, appropriating narratives, images, sounds, gestures and movements that structure his perception of reality (Silva; Sousa; Dias, 2025). Systematic contact with children's literature, visual arts, music, dramatizations, bodily experiences and playful practices expands the cultural repertoire of children, favoring the constitution of identities, the expression of feelings and the development of language in its multiple forms.

From this perspective, the aesthetic experience cannot be understood as a complementary or peripheral element of the curriculum, but as a constitutive dimension of the educational process. As discussed by Araújo (2020), the articulation between language and aesthetic experience enhances pedagogical practices that promote authorship, imagination, and criticality. By experiencing mediated aesthetic experiences, the child learns

to perceive nuances, establish symbolic relationships, elaborate narratives and produce meanings about himself and the world. Aesthetics, in this sense, expands the field of literacy by incorporating expressive forms that go beyond verbal text, including visual, sound and body languages.

Recent studies reinforce the relevance of aesthetic education for integral development, highlighting that practices that integrate art and sensibility favor not only cognitive skills, but also socio-emotional skills, empathy, and cultural awareness (Tian; Isa, 2024). This understanding dialogues with the notion of integral education present in normative documents, although its implementation depends on the institutional conditions and pedagogical conceptions that guide the teaching work.

However, the contemporary educational scenario presents significant tensions. Policies based on accountability, curriculum standardization, and large-scale evaluations tend to prioritize skills that can be measured, which can result in a reduction in the time and space allocated to artistic languages (Sousa; Alvarenga, 2021). In this logic, the arts are often subordinated to instrumental objectives or treated as auxiliary resources for the teaching of content considered central, emptying their formative power (Coelho, 2021). Such a movement can weaken the consolidation of meaningful aesthetic experiences, especially in the public school system, where the demands for academic performance are usually intensified (Santos, Franqueira, Viana, 2025).

This tension highlights the need to reaffirm aesthetic education as an inseparable component of human formation. By recognizing that children learn through sensitive experience and symbolic interaction with the world, the school expands its commitment to an education that is not limited to the transmission of content, but that promotes the development of critical, creative, and culturally situated subjects (Coelho, 2021). Thus, aesthetic education is configured as an indispensable theoretical basis for the understanding of aesthetic literacy, the central theme of this review, as it evidences that the process of literacy and literacy must intentionally incorporate the sensitive dimension as a constitutive element of learning.

3.3 AESTHETIC LITERACY: ARTICULATION BETWEEN SENSITIVE AND COGNITIVE

Aesthetic literacy emerges, in contemporary literature, as an integrating concept that articulates language, art and sensitive experience within the social practices of knowledge production. By recognizing artistic and expressive languages as legitimate ways of reading and interpreting the world, aesthetic literacy broadens the conception of literacy as a social practice (Amado; Silva; Melo, 2020), incorporating the aesthetic dimension as a constitutive component of human formation. From this perspective, aesthetics is not configured as a

curricular ornament or complementary activity, but as an epistemological axis that sustains processes of signification, authorship, and criticality (Araújo, 2020).

By dialoguing with Freire's conception that the reading of the word is intrinsically linked to the reading of the world, aesthetic literacy reaffirms that learning involves not only the decoding of linguistic signs, but the ability to interpret cultural symbols, images, narratives and bodily expressions that structure the human experience (Freire, 1996). Thus, reading aesthetically implies perceiving nuances, establishing symbolic relationships and positioning oneself critically in the face of cultural manifestations that circulate socially.

This understanding broadens the understanding of literacy by incorporating literary fruition, imagination, ethical sensitivity and creative production of meanings. Literacy is no longer conceived as a mere technical acquisition of the alphabetic system and becomes part of broader processes of symbolic and cultural construction (Araújo, 2020). In Early Childhood Education and in the early years of Elementary School, this articulation becomes even more evident, since the child learns through the interaction between verbal language, images, sounds, gestures and movements (Silva; Sousa; Dias, 2025). Aesthetic literacy, therefore, articulates the sensitive and the cognitive, overcoming dichotomies that have historically separated emotion and reason in the educational field.

Children's literature is a privileged example of this integration. By providing contact with symbolic narratives, complex characters and imaginative universes, literature not only favors linguistic development, but also expands children's cultural and ethical sensitivity (Amado; Silva; Melo, 2020). Through literary fruition, the child exercises empathy, understands conflicts, elaborates emotions and builds identity references. Such a process contributes to the formation of critical and culturally situated subjects, in line with the perspective of integral education discussed by Coelho (2021).

Recent studies reinforce that pedagogical practices that integrate aesthetic education and literacy promote cognitive development articulated with socio-emotional and cultural skills (Tian; Isa, 2024). In addition, international research on aesthetic literacy highlights that aesthetic competence involves critical perception, cultural sensitivity, and expanded interpretive capacity (Zulusuwan; Chansirisira, 2025). These findings converge to the understanding that aesthetic literacy is not limited to the teaching of artistic content, but constitutes a formative process that integrates experience, language and reflection.

In this sense, aesthetic literacy is consolidated as a fundamental theoretical category to understand the articulation between aesthetic education and human formation in the initial stages of schooling. By integrating multiple languages in the educational process, the horizon of literacy is broadened beyond the verbal dimension, incorporating experiences that favor

the production of meanings, creativity and critical participation in culture. This approach reaffirms the commitment of public schools to an education that articulates literacy, literacy and sensitivity, consolidating pedagogical practices consistent with the integral education defended throughout this review.

3.4 TEACHER TRAINING AND AESTHETIC PRACTICES

Teacher training is a structuring axis for the consolidation of pedagogical practices aimed at aesthetic literacy, since the conceptions of teaching, language, childhood and learning are directly influenced by the formative paths experienced by teachers. It is not only about the acquisition of specific techniques or methodologies, but also about the construction of theoretical and ethical references that guide pedagogical intentionality in everyday school life. In this sense, the way in which the teacher understands art, literature, the body, play, and multiple languages directly impacts the quality and depth of the aesthetic experiences offered to children (Araújo, 2020; Dias et al., 2026).

Training paths that value the integration between language, art, and culture tend to favor more dialogical, creative, and sensitive pedagogical practices, in which literacy is not limited to the instrumental dimension, but is articulated with the production of meanings and critical training (Araújo, 2020). By recognizing aesthetics as a constitutive dimension of learning, the teacher expands the repertoire of pedagogical mediations, incorporating children's literature, oral narratives, visual arts, music, body expression and interdisciplinary practices as structuring components of the formative process (Amado; Silva; Melo, 2020).

On the other hand, training marked by technicist approaches or excessively focused on quantitative results can restrict teaching work to evaluative goals and performance indicators, reducing the space for meaningful aesthetic experiences. In contexts crossed by accountability policies and large-scale evaluations, there is a risk that continuing education prioritizes strategies aimed at achieving indices and goals, relegating the sensitive dimension of learning to the background (Sousa; Alvarenga, 2021). This tension has a direct impact on the organization of pedagogical planning, influencing the selection of contents, methodologies and school times.

In the context of the public network, initiatives such as the Program for Continuing Education in Reading and Writing in Early Childhood Education (LEEI), carried out in the city of Araguaína-TO, show institutional investment in literacy and in the strengthening of language practices. Such policies demonstrate a commitment to the qualification of teaching work and to the improvement of educational indicators. However, in the light of the discussion on aesthetic literacy, the need emerges to problematize the extent to which these formations

incorporate, in an intentional and systematic way, the aesthetic dimension of literacy or whether they remain predominantly guided by quantitative goals and measurable results (Amado; Silva; Melo, 2020).

Recent literature points out that educational excellence requires the development of aesthetic skills in educators, understood as the capacity for critical perception, cultural sensitivity and creative mediation of languages (Zulusuwan; Chansirisira, 2025). In this sense, teacher training focused on aesthetic literacy is not limited to the offer of specific artistic workshops, but presupposes a continuous reflective process that articulates theory and practice, curriculum and experience, evaluation and sensitivity. It is about training teachers capable of recognizing aesthetics as an epistemological dimension of learning, and not just as an auxiliary didactic resource.

Thus, discussing teacher training in the context of aesthetic literacy implies understanding that the qualification of pedagogical practices depends on the articulation between public policies, curricular conceptions and critical professional development. By investing in training that integrates language, art and sensibility, public schools strengthen their capacity to promote an integral education, in which literacy, literacy and aesthetic experience are inseparable dimensions of the training process. This articulation proves to be fundamental to overcome dichotomies between content and expression, cognition and emotion, performance and sensitivity, reaffirming the commitment of basic education to full human formation.

4 RESULTS AND DISCUSSION

The analysis of the literature evidenced significant theoretical convergences around the understanding of literacy as a social practice and aesthetic education as a constitutive dimension of human formation, while revealing structural tensions related to contemporary educational policies and the concrete conditions of implementation of these conceptions in the public school system.

Initially, there is a consensus among the authors regarding the overcoming of the instrumental perspective of literacy. At first, authors such as Amado, Silva and Melo (2020) argue that literacy should be understood as a cultural practice mediated by language, involving the production of meanings and social insertion. This conception dialogues directly with Freire (1996), for whom the reading of the word is intrinsically linked to the reading of the world, emphasizing the political and emancipatory character of the act of reading and writing. In this sense, literacy is not reduced to the technical mastery of the written code, but implies critical participation in culture, construction of autonomy and reflective positioning in

the face of reality. By articulating this understanding to the aesthetic dimension, it is inferred that the debate holds that aesthetic literacy integrates language, art, and sensitive experience as legitimate modes of knowledge production (Araújo, 2020).

Furthermore, it is evident that literacy, when conceived in an expanded way, requires pedagogical practices that integrate multiple languages and symbolic experiences. This requirement becomes even more evident in Early Childhood Education and in the early years of Elementary School, stages in which learning occurs inseparably from playing, imagination, the body and sensory experiences (Silva; Sousa; Dias, 2025). In this context, the child interacts with narratives, images, sounds and movements that structure his understanding of the world, so that verbal language cannot be dissociated from other forms of expression. Thus, aesthetic literacy emerges as a theoretical category capable of explaining this integration between sensible and cognitive, overcoming historically established dichotomies between reason and emotion.

With regard to aesthetic education, studies converge in recognizing its centrality for integral development. In this sense, it is verified that human education cannot be understood only under the logic of content transmission, but must integrate sensitivity, creativity, and critical reflection (Coelho, 2021). In addition, studies show that aesthetic practices in childhood favor not only cognitive development, but also socio-emotional and cultural skills (Tian; Isa, 2024). Children's literature, in this sense, is an emblematic example of the articulation between language and aesthetic experience, as it expands the symbolic repertoire of children and favors the construction of identities, empathy and cultural awareness (Amado; Silva; Melo, 2020).

However, the analysis also revealed significant tensions between the theoretical recognition of aesthetic education and its effectiveness in school practices. It was found that curriculum standardization policies and large-scale evaluations tend to prioritize skills that can be measured, which can reduce the space allocated to artistic languages (Sousa; Alvarenga, 2021). This logic is reinforced by institutional contexts that intensify the search for quantitative results, producing a scenario in which the aesthetic dimension can be subordinated to instrumental objectives (Santos, Franqueira and Viana, 2025). Thus, although normative documents defend integral education, there is a tension between academic performance and significant aesthetic experiences in practice (Dias et al., 2025).

In this scenario, teacher training plays a decisive role. In this sense, it can be said that the incorporation of aesthetic literacy in pedagogical practices depends on formative references that intentionally integrate language, art, and culture (Araújo, 2020). In a convergent way, Zulusuwan and Chansirisira (2025) argue that educational excellence

requires the development of aesthetic skills in educators, understood as the capacity for critical perception, cultural sensitivity and creative mediation of languages. The literature analyzed indicates that, without an education that recognizes aesthetics as an epistemological dimension of learning, practices tend to be limited to specific or complementary actions, without effective integration into the curriculum.

Thus, the results of this review demonstrate that aesthetic literacy is consolidated as an integrative category capable of articulating literacy, aesthetic education and teacher training, especially in the initial stages of Basic Education. By integrating multiple languages and sensitive experiences to the literacy process, the formative horizon of the public school is broadened, reaffirming its commitment to the constitution of critical, creative and culturally situated subjects. However, the effectiveness of this perspective depends on overcoming instrumentalized approaches and strengthening teacher training policies that value aesthetics as a constitutive dimension of learning.

Thus, the authors demonstrated that the contemporary challenge does not lie in the absence of a theoretical foundation on the importance of aesthetic literacy, but in the need for its practical consolidation in the daily life of public schools. The articulation between language, art and criticality is, therefore, an indispensable path for an education that integrates literacy, literacy and full human formation.

5 FINAL CONSIDERATIONS

It is concluded that scientific production recognizes aesthetic literacy as an integrating dimension between language, art and sensitive experience, overcoming restricted conceptions of literacy centered only on technique. Literature converges in understanding that integral human formation, especially in the initial stages of schooling, requires the articulation between sensible and cognitive, reading the word and reading the world, aesthetic fruition and critical production of meanings.

Among the main findings, the theoretical consensus about the centrality of aesthetic education for the integral development of children stands out, favoring not only linguistic skills, but also creativity, empathy, cultural awareness and authorship. However, the review evidenced structural tensions in the context of the public network, marked by the predominance of educational policies guided by goals and large-scale evaluations, which can restrict the space of artistic languages and sensitive experiences. It was also observed that teacher training is a determining factor for the consolidation of intentional aesthetic practices integrated into the curriculum, and that training approaches that treat aesthetics only as a complementary didactic resource are insufficient.

Therefore, it is recommended to strengthen initial and continuing education policies that systematically integrate the foundations of aesthetic literacy, articulating theory, practice and critical reflection. In addition, it is suggested the expansion of empirical research that investigates how public schools have been operationalizing this dimension in the pedagogical routine, contributing to overcoming the dichotomy between academic performance and sensitive education.

Finally, it reaffirms the need for curricula and educational policies to recognize aesthetics as an epistemological dimension of learning, consolidating practices that integrate literacy, literacy and aesthetic experience as inseparable expressions of full human formation.

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SCHOOL MANAGEMENT AS AN INVESTIGATIVE PRACTICE: CONTRIBUTIONS OF PAULO FREIRE'S THOUGHT TO A CRITICAL AND REFLECTIVE MANAGEMENT ACTION

GESTÃO ESCOLAR COMO PRÁTICA INVESTIGADORA: CONTRIBUIÇÕES DO PENSAMENTO DE PAULO FREIRE PARA UMA AÇÃO GESTORA CRÍTICA E REFLEXIVA

LA GESTIÓN ESCOLAR COMO PRÁCTICA INVESTIGATIVA: APORTES DEL PENSAMIENTO DE PAULO FREIRE A UNA ACCIÓN GERENCIAL CRÍTICA Y REFLEXIVA



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ABSTRACT

This article aims to discuss school management as an investigative practice, understanding the school manager as a reflective subject and producer of knowledge about the daily life of the school. Based on the thought of Paulo Freire and contemporary contributions from the field of educational management, the study defends research as an educational principle inseparable from managerial action. Methodologically, it is a qualitative research, of a bibliographic and analytical nature, constructed from the review of works that deal with critical pedagogy, research methodology, and school management, with an emphasis on the articulation between theory and practice. The results indicate that the adoption of an investigative posture by the school manager contributes to overcoming merely bureaucratic practices, favoring more critical, ethical, and contextualized decision-making processes. It is evident that research enables the manager to understand the school as a space for training, dialogue, and social transformation, strengthening democratic and participatory practices. It is concluded that school management, when guided by investigative principles, expands its capacity to intervene in educational reality, improving pedagogical work and contributing to the construction of a school committed to critical thinking and the emancipation of individuals, reaffirming the centrality of research in management practice.

Keywords: School Management. Research in Education. Investigative Practice. Paulo Freire.

RESUMO

Este artigo tem como objetivo discutir a gestão escolar como prática investigadora, compreendendo o gestor escolar como sujeito reflexivo e produtor de conhecimentos sobre

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o cotidiano da escola. Fundamentado no pensamento de Paulo Freire e em contribuições contemporâneas da área da gestão educacional, o estudo defende a pesquisa como princípio educativo indissociável da ação gestora. Metodologicamente, trata-se de uma pesquisa de abordagem qualitativa, de caráter bibliográfico e analítico, construída a partir da revisão de obras que tratam da pedagogia crítica, da metodologia da pesquisa e da gestão escolar, com ênfase na articulação entre teoria e prática. Os resultados indicam que a adoção de uma postura investigativa pelo gestor escolar contribui para a superação de práticas meramente burocráticas, favorecendo processos de tomada de decisão mais críticos, éticos e contextualizados. Evidencia-se que a pesquisa possibilita ao gestor compreender a escola como espaço de formação, diálogo e transformação social, fortalecendo práticas democráticas e participativas. Conclui-se que a gestão escolar, quando orientada por princípios investigativos, amplia sua capacidade de intervenção na realidade educacional, qualificando o trabalho pedagógico e contribuindo para a construção de uma escola comprometida com a formação crítica e a emancipação dos sujeitos, reafirmando a centralidade da pesquisa na prática gestora.

Palavras-chave: Gestão Escolar. Pesquisa em Educação. Prática Investigativa. Paulo Freire.

RESUMEN

Este artículo tiene como objetivo discutir la gestión escolar como una práctica investigativa, entendiendo al gestor escolar como sujeto reflexivo y productor de conocimiento sobre la vida cotidiana de la escuela. Basado en el pensamiento de Paulo Freire y contribuciones contemporáneas del campo de la gestión educativa, el estudio defiende la investigación como un principio educativo inseparable de la acción gerencial. Metodológicamente, es una investigación cualitativa, de naturaleza bibliográfica y analítica, construida a partir de la revisión de trabajos que abordan la pedagogía crítica, la metodología de la investigación y la gestión escolar, con énfasis en la articulación entre la teoría y la práctica. Los resultados indican que la adopción de una postura investigativa por parte del gestor escolar contribuye a superar las prácticas meramente burocráticas, favoreciendo procesos de toma de decisiones más críticos, éticos y contextualizados. Es evidente que la investigación permite al gestor comprender la escuela como un espacio de formación, diálogo y transformación social, fortaleciendo las prácticas democráticas y participativas. Se concluye que la gestión escolar, cuando se orienta por principios investigativos, amplía su capacidad de intervención en la realidad educativa, perfeccionando el trabajo pedagógico y contribuyendo a la construcción de una escuela comprometida con el pensamiento crítico y la emancipación de los individuos, reafirmando la centralidad de la investigación en la práctica gerencial.

Palabras clave: Gestión Escolar. Investigación en Educación. Práctica Investigativa. Paulo Freire.

1 INTRODUCTION

This article originates from the final synthesis of the discipline of Scientific Methodology of the Specialization Course in School Management at the Federal University of São Carlos - UFSCar, whose formative proposal included studies on research ethics, the functioning of the ethics committee and the prevention of academic plagiarism, as well as the delimitation of the object of investigation of the definition of the theme, problem, justification and objectives, the literature review with emphasis on the state of the art, and the discussion of methodological strategies, highlighting the complementarity between qualitative and quantitative approaches, the types of research focused on case studies and intervention projects, the techniques and instruments of data collection, in addition to the treatment, analysis and presentation of the results, always guided by ABNT standards.

In this path, the reflection developed resulted from the study of the work "Methodology of Scientific Research for School Managers: Research as a Practice of Training and Transformation" by Chiari (2025) articulated with the thought of Freire (2002) especially from the work "Pedagogy of Autonomy: Knowledge Necessary for Educational Practice", grounding the understanding of contemporary school management, as a research practice, critical and reflective.

In the context of the contemporary demands of public education, it is problematized to what extent school management has been constituted, in fact, as an investigative practice guided by critical and reflective principles, or if it remains restricted to technical-bureaucratic procedures that empty its formative and transformative potential.

Although the normative frameworks emphasize democratic and participatory management, it is observed, in the reality of school institutions, the predominance of administrative routines that have little dialogue with the systematic investigation of practice and with the collective construction of knowledge. In this sense, the present reflection is justified by the need to strengthen a conception of management based on research as a formative principle, articulating the methodological contributions discussed in the training in school management to the thought of Freire (2002), especially in this work, in which he defends the educational practice as a permanent exercise of critical reflection on action.

Thus, it is based on the hypotheses that (i) the incorporation of research as a constitutive dimension of management enhances more democratic and contextualized decision-making processes; (ii) the critical appropriation of Freire's foundations contributes to resignifying the role of the manager as a political-pedagogical subject; and (iii) the articulation between research and practice favors the construction of an institutional culture guided by autonomy, ethics and social transformation.

Thus, understanding school management as an investigative practice, in the light of Freire's thought, implies recognizing research as a constitutive principle of management action and as a path to the construction of a democratic, critical and socially committed school. This article aims to discuss school management as a space for investigation, highlighting the centrality of research for the qualification of management practice and for the strengthening of the school as a locus of knowledge production and human emancipation.

2 METHODOLOGY

The present research is characterized, as to the approach, as qualitative, as it seeks the understanding and critical interpretation of theoretical conceptions related to educational public policies and the training of school managers. Such an approach is adequate to the objective of the study, which consists of critically reflecting on the influence of educational policies on the performance of the school manager and on the realization of the right to education, considering the social contexts and ideological disputes that permeate its formulation and implementation.

Regarding the nature, it is a basic research, since it is dedicated to the expansion of theoretical knowledge on the subject, without the immediate intention of practical application or direct intervention in specific educational contexts. The study seeks to contribute to the deepening of academic discussions about the relationship between the State, public policies and school management.

As for the objectives, the research has an exploratory and descriptive character. Exploratory, in that it investigates and problematizes different theoretical approaches to public educational policies and the training of school managers; and descriptive, as it systematizes and presents the main ideas, convergences and divergences among the authors analyzed, as discussed in the development of the article.

Regarding the technical procedures, the study is configured as a bibliographic research, based on the analysis of books, scientific articles and didactic materials that address the themes of the State, public policies, education and school management. The study is based on the contributions of Chiari (2025) and Freire (2002) and authors who are composed of the discussion and substantiation of opinions such as: .

The analysis of the bibliographic material occurred through systematic, interpretative and comparative reading, seeking to articulate the theoretical assumptions of the selected authors with the objective proposed in the article. This procedure made it possible to identify different conceptions about public educational policies, as well as to understand their impacts

on the formation and performance of school managers, establishing relationships between theory and practice in the context of Brazilian public education.

3 RESULTS AND DISCUSSIONS

For Chiari (2025) and Freire (2002), school management, in the context of contemporary basic education, faces the challenge of overcoming an action restricted to the administrative and bureaucratic dimensions, assuming a pedagogical, critical and formative role. The complex demands of the school routine require from the manager competencies that go beyond compliance with standards, requiring the ability to interpret reality, problematize practices and make decisions based on reflective and investigative processes. From this perspective, the school is configured as a legitimate space for the production of knowledge, and management comes to be understood as an educational and political practice.

Freire's (2002) thought offers consistent theoretical foundations for the understanding of school management as a research practice. In *Pedagogy of Autonomy: necessary knowledge for educational practice*, the author states that "there is no teaching without research and research without teaching", indicating that investigation is an inseparable principle of educational practice and the process of human formation. For the author, educating implies epistemological curiosity, methodological rigor and critical reflection on practice, elements that apply not only to teaching, but also to the performance of the school manager.

In this logic, the manager cannot be conceived as a mere executor of institutional policies and guidelines. On the contrary, it assumes itself as a historical, ethical and political subject, capable of critically reading the school reality and intervening in a conscious and transformative way. Freire (2002) also highlights that every educational practice requires ethical commitment, dialogue and responsible decision-making, understanding education as a form of intervention in the world.

In line with this approach, Chiari (2025) argues that research, within the scope of school management, should be understood as a continuous practice of training and transformation, articulating theory, ethics, listening, and action in the daily life of the school. The author emphasizes that the investigation allows the manager to overcome an isolated and bureaucratic performance, assuming himself as a reflective educator and producer of knowledge about his own practice.

The correlation between the work of Chiari (2025) and the work of Freire (2002), especially the concept of "Teaching requires research on the Pedagogy of Autonomy",

reveals a deep and fundamental synergy for educational practice, particularly in school management. Both perspectives converge on the idea that the act of educating, and especially that of managing a school, is intrinsically linked to the investigative posture, although often masked by the practical needs of urgent situations and growing and specific demands of the school.

We must analyze these two works from the point of view where the research has aspects of Genesis of Practice and Autonomy. The text on the *Methodology of Scientific Research for School Managers* argues that research is not an activity restricted to the formal academic universe, but a daily practice of training and transformation within the school context. He argues that, by systematizing observation, data collection and analysis of the challenges and solutions found, the manager becomes a researcher of his own doing. This enables them to reflect critically, organize ideas, identify patterns, and propose more effective strategies, moving from the mere execution of tasks to strategic and grounded action.

In this perspective of the authors, the production of reports, projects and articles, in this sense, is not bureaucracy, but a means of generating local knowledge and improving management, starting from a pre-assumption that storing data is collecting information that, when analyzed, generates indicators that can serve as a basis for interventions, being completely aligned with the understanding of Freire's Pedagogy of Autonomy texts (2002, p. 14), where when addressing the requirement of research for teaching, he highlights that:

[...] There is no teaching without research and research without teaching. Those who do are found in each other's bodies. While I teach I keep searching, searching. I teach because I seek, because I inquired, because I inquire and I inquire myself. I research to verify, verifying, I intervene, intervening, I educate and I educate myself. I research to know what I don't know yet and communicate or announce the news.

This perspective dialogues directly with Freire's (2002) principle that teaching requires research. For the author, research is not an appendix of the educational process, but its own condition of existence. He argues that the educator is not a mere transmitter of content, but a subject who, when teaching, is constantly learning and researching the reality of his students, their previous knowledge, their difficulties and their potentialities. Research, for Freire, is an act of epistemological curiosity that drives pedagogical practice, making it alive, contextualized and liberating. The central correlation between the two texts lies in the idea that both teaching and managing are acts that demand an active, reflective and investigative posture. Both jobs invite us to go beyond the mere execution of tasks. Whether the manager reflects on the daily challenges of the school or the teacher investigates the reality of his students, research emerges as the essential tool for critical understanding, the

systematization of knowledge and the proposition of innovative solutions. This convergence shows us that academic rigor is not far from the school floor; on the contrary, it is what allows education to be a living practice, in constant improvement and, above all, liberating. The result is a more conscious, effective and truly transformative management and teaching. Within this assumption we can see that both works are complementary, theory and practice of an education that seeks quality.

Authors such as Demo (2003) corroborate this perspective by stating that educating through research presupposes that the educator and, consequently, the manager recognizes himself as a researcher of his own practice. For the author, the research promotes reconstructive questioning and the formation of critical consciousness, essential elements for the emancipation of subjects and for the transformation of school reality, in line with Freire's pedagogy

In the same way, Schön (1995) contributes to the understanding of the manager as a reflective professional, by highlighting that knowledge is built in and about action. Reflection-in-action and reflection-on-action strengthen the manager's ability to interpret complex situations, make reasoned decisions and re-signify practices, which dialogues with Freire's conception of critical reflection as a requirement of educational practice (Freire 2002).

In the methodological field, Minayo (2001) reinforces that every investigation carries an intentionality and a specific way of understanding reality, showing that the methodological choice is also an ethical and political choice. This understanding converges with Denzin and Lincoln (2006), when they state that the methodology reveals the researcher's position in relation to the world, to the subjects and to the knowledge, reaffirming the political character of research in education.

The discussion also points to the relevance of ethics in the investigative practice of school management. Severino (2013) highlights that educational research is, above all, a pedagogical and ethical act, based on respect for the subjects, sensitive listening and the social relevance of the investigation. This conception dialogues directly with Freire (2002) when he defends the universal ethics of the human being as an inseparable principle of educational practice and transformative action.

In addition, Marconi and Lakatos (2003) contribute by emphasizing the importance of methodological rigor in the organization of research, enabling the manager to transform empirical observations into structured scientific knowledge. Such rigor is not opposed to the reflective practice defended by Freire, but strengthens it, by avoiding activism devoid of theoretical foundation.

Finally, Franco (2005) emphasizes the centrality of active listening in the investigative

process, emphasizing that the subjects involved in the research should be understood as interlocutors and not as objects. This perspective reaffirms the principle of dialogue defended by Freire (2002) and reinforces the conception of democratic, participatory and investigative school management.

4 CONCLUSION

The present study allowed us to understand school management as an essentially investigative practice, showing that the exercise of the management function cannot be limited to technical-administrative or bureaucratic actions. Throughout the analysis, it was evident that research, understood as an educational principle, constitutes a central element to qualify the performance of the school manager, favoring more critical, ethical and coherent decision-making processes with the concrete reality of the school.

In the light of Paulo Freire's thought, it is concluded that the management practice, as well as the teaching practice, requires epistemological curiosity, methodological rigor and permanent critical reflection on daily practice. Research, in this sense, is not presented as an accessory activity or restricted to the academic environment, but as a constitutive dimension of educational action and human formation, enabling the manager to assume himself as a historical subject and transformer of the school reality. This understanding reinforces the idea that there is no educational management without research, just as there is no pedagogical practice disconnected from the ethical and political commitment to social transformation.

The objectives proposed in this study were achieved by showing that school management, when based on an investigative posture, expands its capacity for critical reading of the context, listening to the subjects and articulation between theory and practice. The contributions of Chiari and the secondary authors analyzed corroborate this perspective, by demonstrating that research strengthens the training of managers, promotes intellectual autonomy and enables the construction of more democratic and participatory practices in the school space.

Thus, it is concluded that assuming school management as an investigative practice represents a necessary path for the construction of a school committed to critical education, social justice and the emancipation of subjects. Such understanding implies recognizing research as a permanent instrument of reflection, action and transformation, requiring investments in public policies aimed at the academic training of managers and the financing of research in school management, in order to strengthen the public school as a space for the production of knowledge and qualified social intervention.

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PIBID AND TEACHER TRAINING: KNOWLEDGE UNDER CONSTRUCTION IN MATHEMATICAL LITERACY

PIBID E FORMAÇÃO DOCENTE: SABERES EM CONSTRUÇÃO NA ALFABETIZAÇÃO MATEMÁTICA

PIBID Y FORMACIÓN DOCENTE: SABERES EN CONSTRUCCIÓN EN LA ALFABETIZACIÓN MATEMÁTICA



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ABSTRACT

This article presents a reflective analysis of a teacher education experience developed within the Programa Institucional de Bolsas de Iniciação à Docência (PIBID – Institutional Program for Teaching Initiation Scholarships), Pedagogy subproject, carried out at Escola Municipal Flávio Vilela, in the municipality of Jataí, Goiás, Brazil, from November 2024 to July 2026, with a focus on mathematical literacy processes in the early years of elementary education. The study is theoretically grounded in the contributions of Maurice Tardif, António Nóvoa, Paulo Freire, and Magda Soares, in dialogue with contemporary perspectives from Mathematics Education and mathematical literacy. A qualitative methodological approach was adopted, based on participant observation, the production of didactic materials, collective planning, and pedagogical interventions conducted with a second-grade class. The findings indicate that PIBID constitutes a privileged space for articulating theory and practice, fostering the construction of professional teaching knowledge, particularly in relation to instructional planning, pedagogical mediation, formative assessment, and collaborative work. In the field of mathematical literacy, the results highlight the consolidation of problem solving as a central methodological axis and the strengthening of the integration between language and mathematical thinking in classroom practices. The study concludes that teaching initiation experiences mediated by PIBID contribute significantly to the education of reflective, critical, and socially committed teachers, capable of developing inclusive pedagogical practices and promoting the democratization of mathematical knowledge in the early years of schooling.

Keywords: Teacher Education. PIBID. Mathematical Literacy. Problem Solving. Early Years of Elementary Education.

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RESUMO

Este artigo apresenta uma análise reflexiva da experiência de formação docente desenvolvida no âmbito do Programa Institucional de Bolsas de Iniciação à Docência (PIBID), subprojeto Pedagogia, realizada na Escola Municipal Flávio Vilela, no município de Jataí (GO), no período de novembro de 2024 a julho de 2026, com foco nos processos de alfabetização matemática nos anos iniciais do Ensino Fundamental. O estudo fundamenta-se nos aportes teóricos de Maurice Tardif, António Nóvoa, Paulo Freire e Magda Soares, articulados a referenciais da Educação Matemática e do letramento matemático. Metodologicamente, adotou-se uma abordagem qualitativa, baseada em observação participante, produção de materiais didáticos, planejamento coletivo e intervenções pedagógicas desenvolvidas junto a uma turma de 2º ano do Ensino Fundamental. Os resultados evidenciam que o PIBID se configura como espaço privilegiado de articulação entre teoria e prática, favorecendo a construção dos saberes docentes, especialmente no que se refere ao planejamento, à mediação pedagógica, à avaliação formativa e ao trabalho colaborativo. No campo da alfabetização matemática, destacam-se avanços na compreensão da resolução de problemas como eixo estruturante do letramento matemático, bem como na integração entre linguagem e pensamento matemático. Conclui-se que a iniciação à docência, mediada pelo PIBID, potencializa a formação de professores reflexivos, críticos e socialmente comprometidos, capazes de promover práticas pedagógicas inclusivas e de contribuir para a democratização do conhecimento matemático nos anos iniciais.

Palavras-chave: Formação de Professores. PIBID. Alfabetização Matemática. Letramento Matemático. Anos Iniciais.

RESUMEN

Este artículo presenta un análisis reflexivo de una experiencia de formación docente desarrollada en el marco del Programa Institucional de Bolsas de Iniciação à Docência (PIBID – Programa Institucional de Becas de Iniciación a la Docencia), subproyecto de Pedagogía, realizada en la Escola Municipal Flávio Vilela, en el municipio de Jataí, estado de Goiás, Brasil, en el período comprendido entre noviembre de 2024 y julio de 2026, con énfasis en los procesos de alfabetización matemática en los primeros años de la educación primaria. El estudio se sustenta teóricamente en los aportes de Maurice Tardif, António Nóvoa, Paulo Freire y Magda Soares, en diálogo con referentes de la Educación Matemática y del letramiento matemático. Metodológicamente, se adoptó un enfoque cualitativo, basado en la observación participante, la elaboración de materiales didácticos, la planificación colectiva y la realización de intervenciones pedagógicas en una clase de segundo grado de la educación primaria. Los resultados evidencian que el PIBID se configura como un espacio privilegiado para la articulación entre teoría y práctica, favoreciendo la construcción de los saberes docentes, especialmente en lo que se refiere a la planificación pedagógica, la mediación didáctica, la evaluación formativa y el trabajo colaborativo. En el ámbito de la alfabetización matemática, se destacan la consolidación de la resolución de problemas como eje metodológico central y el fortalecimiento de la integración entre lenguaje y pensamiento matemático en las prácticas de aula. Se concluye que las experiencias de iniciación a la docencia mediadas por el PIBID contribuyen de manera significativa a la formación de profesores reflexivos, críticos y socialmente comprometidos, capaces de desarrollar prácticas pedagógicas inclusivas y de promover la democratización del conocimiento matemático en los primeros años de escolarización.

Palabras clave: Formación Docente. PIBID. Alfabetización Matemática. Resolución de Problemas. Primeros Años de la Educación Primaria.

1 INTRODUCTION

The initial training of teachers is a field of debates and investigations in the educational area, especially with regard to the articulation between the theoretical knowledge developed in the university and the pedagogical practices experienced in the school routine. In this context, the Institutional Program for Teaching Initiation Scholarships (PIBID), created in 2007 by the Coordination for the Improvement of Higher Education Personnel (CAPES), emerges as a strategic public policy to qualify the training of future teachers.

PIBID seeks to promote the insertion of undergraduates in the daily life of public schools, providing them with opportunities to create and participate in methodological, technological and teaching practices of an innovative and interdisciplinary nature, which seek to overcome problems identified in the teaching-learning process (BRASIL, 2013). In this way, the program allows undergraduate students to experience the school reality during their initial training, contributing to a more contextualized and meaningful training.

This article presents a reflective analysis of the experience of participation in PIBID developed in a school in the southwest of the State of Goiás, from November 2024 to January 2026, in a Subproject of the Pedagogy Course of a federal university. The work focused on mathematical literacy in the early years of Elementary School, in a 2nd grade class of the morning period for the recomposition of learning.

The objective of this text is to analyze the contributions of PIBID to the construction of teaching knowledge necessary for pedagogical practice in mathematical literacy, as well as to reflect on the multiple dimensions of teacher training experienced during the program. To this end, a qualitative approach was adopted, based on participant observation, production of didactic materials, pedagogical interventions and reflective records of the activities developed. The relevance of this study is justified by the need to understand how teaching initiation programs contribute to the formation of reflective, critical teachers committed to quality education. In addition, it intends to contribute to the debate on mathematical literacy in the early years, a central theme for the guarantee of the right to education and for the integral development of students.

This article is structured in six sections and this introduction. The second section presents the theoretical framework that underlies the research, addressing concepts about teacher training, teaching knowledge and mathematical literacy. The third section describes the methodology used in the study. The fourth section characterizes the institutional context of the participating school. The fifth section presents and analyzes the activities developed and the results obtained. Finally, the sixth section brings the final considerations, synthesizing the main contributions of PIBID to teacher training.

2 TEACHER TRAINING AND PROFESSIONAL KNOWLEDGE

Teacher training is a continuous process that begins in initial training and extends throughout the professional career. According to Tardif (2014), teaching knowledge is plural, heterogeneous and temporal, constituting itself from several sources: knowledge from professional training (from educational sciences and pedagogical ideology), disciplinary knowledge, curricular knowledge and experiential knowledge. It is in the articulation of these different types of knowledge that the teacher builds his professional identity and develops his pedagogical practice.

Nóvoa (2017) emphasizes the importance of establishing one's position as a teacher and affirming the teaching profession, highlighting that training must go beyond the acquisition of technical knowledge, also involving the development of a reflective, critical and ethical posture. The author argues that teacher training should be anchored in three fundamental axes: knowledge (mastery of specific knowledge), professional culture (insertion in the profession) and pedagogical tact (ability to act in complex and unpredictable situations).

The perspective of reflective education, developed by Schön (1992), proposes that teachers be trained as reflective professionals, capable of reflecting on their own practice, critically analyzing their actions and making reasoned decisions. This approach values practical knowledge and the ability to learn from experience, recognizing that professional practice involves complex situations that require more than the application of pre-established theories.

Freire (1996) presents important contributions to thinking about teacher training from a critical and emancipatory perspective. The author highlights that teaching requires critical reflection on practice, recognition and assumption of cultural identity, respect for the autonomy of the student, humility, tolerance and conscious decision-making. For Freire, the permanent training of teachers should be centered on critical reflection on practice, because it is by thinking critically about the practice of today or yesterday that the next practice can be improved.

In the Brazilian context, PIBID emerges as an innovative public policy that seeks to bring the university closer to basic school, providing undergraduates with teaching initiation experiences under the supervision of experienced teachers. This immersion in the daily school life during initial training enables the development of practical knowledge and the construction of a more solid and contextualized professional teaching identity (NÓVOA, 2019).

3 MATHEMATICAL LITERACY: THEORETICAL PERSPECTIVES

Mathematical literacy is a fundamental process for the development of logical-mathematical thinking and for the insertion of subjects in mathematical culture. According to Danyluk (2002), mathematical literacy means teaching how to read and write mathematical language, understanding its symbols, signs and meanings. It is a process that goes beyond the simple memorization of algorithms, involving the understanding of concepts, the development of logical reasoning and the ability to solve problems.

Smole and Diniz (2001) emphasize that mathematical literacy must be articulated with everyday situations, allowing children to establish relationships between mathematical knowledge and their reality. The authors highlight the importance of pedagogical practices that value problem solving, games, play, and contextualized situations as strategies to promote meaningful mathematical learning.

The National Common Curriculum Base (BNCC) establishes that, in the early years of Elementary School, students must develop skills related to the following axes of mathematics: numbers, algebra, geometry, quantities and measures, and probability and statistics (BRASIL, 2018). The document emphasizes that mathematics teaching should promote the development of mathematical literacy, defined as the competencies and abilities to reason, represent, communicate and argue mathematically.

Lorenzato (2006) highlights the importance of mathematics education in the early years, arguing that it is at this stage that the foundations for the development of mathematical thinking are established. The author emphasizes that the teacher of the early years plays a fundamental role in mathematical literacy, and must have not only mastery of mathematical content, but also specific didactic knowledge to teach mathematics to children.

Nacarato, Mengali and Passos (2009) point out that the initial training of teachers who teach mathematics in the early years often presents gaps, with future teachers arriving at university with conceptual weaknesses and negative attitudes towards mathematics. The authors argue that Pedagogy courses should provide formative experiences that allow undergraduates to reframe their relationships with mathematics, developing solid mathematical knowledge and confidence to teach.

4 METHODOLOGY

This research is characterized as a qualitative study of descriptive and reflective nature, developed in the context of participation in PIBID, subproject Pedagogy. The research adopted action research as a methodological strategy, which, according to Thiollent (2011), is a type of social research with an empirical basis that is conceived and carried out

in close association with an action or resolution of a collective problem, in which researchers and participants representing the situation or problem are involved in a cooperative or participatory way. The study was carried out based on the teaching provided by Pibid scholarship holders in a municipal school in the city of Jataí, Goiás, from November 2024 to January 2026. The school serves students in the early years of Elementary School and is characterized by being located in a peripheral region of the municipality, predominantly serving children from families in situations of socioeconomic vulnerability.

The participating group consisted of a 2nd year class of Elementary School, in the morning, composed of approximately 25 students, aged 7 to 8 years. The choice of this class was justified by the relevance of the 2nd year in the process of mathematical literacy, a time when children must consolidate fundamental numerical concepts and progressively develop autonomy in solving mathematical problems.

The methodological procedures included: (a) participant observation of the pedagogical practices developed by the teacher in charge of the class/class; (b) documentary analysis of the school's Pedagogical Political Project and teaching plans; (c) application of diagnostics to identify students' mathematical knowledge; (d) planning and execution of pedagogical interventions, including the production of teaching materials; (e) reflective records in a field diary about the experiences lived; (f) participation in planning and training meetings with the area coordinator and the supervisor; and (g) participation in academic events related to teacher training and mathematics education.

The data analysis was carried out in an interpretative way, seeking to understand the contributions of PIBID to the construction of teaching knowledge and to the development of professional skills necessary for pedagogical practice in mathematical literacy. The records in the field diary, the students' productions and the didactic materials prepared constituted important sources for the reflective analysis of the experience.

5 CHARACTERIZATION OF THE INSTITUTIONAL CONTEXT

The Municipal School, hereinafter referred to as "FV" is located in a peripheral neighborhood of the municipality of Jataí, Goiás, and serves students in the early years of Elementary School. The institution is characterized by receiving children from families in situations of socioeconomic vulnerability, many of whom face challenges related to access to material and cultural resources.

The school's Pedagogical Political Project (PPP), prepared collectively with the participation of teachers, managers, employees and families, is based on the principles of democratic management and is aligned with the guidelines of the Curriculum Document for

Goiás (DC-GO) and the National Common Curriculum Base (BNCC). The PPP defines the school's mission as promoting quality education, forming critical, creative, autonomous citizens committed to social transformation.

The school has basic infrastructure, including classrooms, library, computer room, sports court and cafeteria. However, it faces challenges related to the limitation of material and pedagogical resources, requiring creativity and commitment from teachers to ensure quality educational practices. The pedagogical team is composed of permanent and contracted teachers, pedagogical coordinators and managers, all committed to improving the quality of teaching.

The socioeconomic context of the families served by the school directly influences the educational process. Many children experience situations of vulnerability, with limited access to books, educational games, technologies and other cultural tools. This context requires teachers to develop pedagogical practices that are sensitive to the realities of students, valuing their prior knowledge and promoting inclusive and democratic education.

6 ACTIVITIES DEVELOPED AND ANALYSIS OF RESULTS

During the period of participation in PIBID, several pedagogical activities were developed aimed at the mathematical literacy of 2nd year students. These activities were planned considering the previous knowledge identified in the diagnostic evaluations and based on consolidated theories about the teaching of mathematics in the early years.

6.1 INITIAL DIAGNOSIS

At the beginning of the activities, diagnostic evaluations were carried out to identify the students' mathematical knowledge. Activities involving counting, numerical writing, simple problem solving, identification of geometric shapes and notions of measurement were applied. The results revealed significant heterogeneity in the class, with students presenting different levels of development of mathematical thinking.

Approximately 35% of the students had difficulties in numerical writing and in understanding the decimal numeral system, confusing the order of the digits or not understanding the place value. About 40% demonstrated partial mastery, being able to perform simple operations, but presenting difficulties in problem situations that required interpretation. The remaining 25% already demonstrated greater autonomy, solving problems appropriate to the school year.

6.2 PRODUCTION OF TEACHING MATERIALS

One of the most significant aspects of the experience at PIBID was the opportunity to produce contextualized teaching materials appropriate to the different levels of mathematical understanding of students. Pedagogical games, manipulable materials, activity sheets, problem notebooks and various visual resources were elaborated.

Among the materials produced, the following stand out: (a) number track games to work on counting and numerical sequence; (b) gold material adapted with recyclable materials to work with decimal numbering system; (c) mathematical domino games involving addition and subtraction operations; (d) illustrated problem sheets contextualized in the students' reality; (e) material for the construction of geometric notions (tangram, geometric solids); (f) games involving non-standard and standardized measures; and (g) calendars and clocks to work on temporal notions.

The production of these materials required theoretical study on mathematics education, creativity, planning and collaborative work. This experience contributed to the understanding that the teacher needs to be a producer of knowledge and not just an executor of ready-made proposals, developing autonomy and criticality in relation to the available materials.

6.3 PEDAGOGICAL PRACTICES IN MATHEMATICAL LITERACY

The pedagogical interventions were planned considering the principles of problem solving, contextualization, the use of manipulable materials and the valorization of students' previous knowledge. Systematic activities were developed involving the different axes of mathematics: numbers and operations, geometry, quantities and measurements, and information processing.

In the numbers and operations axis, concepts of decimal numbering system, composition and decomposition of numbers, numerical sequence, comparison of quantities, addition and subtraction with different meanings (join, add, remove, compare) were worked on. Diversified strategies were used, including oral counting, use of concrete material, recording of operations, mathematical games and solving of contextualized problems.

In the geometry axis, activities were developed to identify and classify plane and spatial geometric shapes, explore the properties of the figures, spatial location and notions of symmetry. Manipulable materials, folding, constructions with sticks and playdough, and exploration of shapes in the environment were used.

In the quantities and measures axis, we worked with measures of time (calendar, clock, duration of events), length (non-standard and standardized measures), capacity and

mass. The activities were contextualized in situations of the children's daily life, such as measuring objects in the room, comparing heights, checking the time of activities.

6.4 PROBLEM SOLVING AS AN AXIS OF MATHEMATICAL LITERACY

Problem solving was the methodological axis of the pedagogical interventions developed, being understood not as a mere application of previously taught procedures, but as a practice that favors the construction of mathematical concepts through reflection, investigation and the mobilization of different cognitive strategies by students. From this perspective, problem solving plays a central role in the development of mathematical literacy, understood as the ability to use knowledge, procedures and mathematical languages to interpret, represent, communicate and solve situations arising from school and social daily life (Galvão; Nacarato, 2013; Brazil, 2018).

The problems elaborated in the pedagogical activities were contextualized in the students' reality, contemplating situations linked to the school and family environment and different additive and subtractive structures. Such an approach is based on the understanding that significant situations favor the attribution of meaning to mathematical concepts and contribute to children recognizing Mathematics as an instrument to understand and intervene in their social context (Galvão; Nacarato, 2013).

During the interventions, it was observed that a significant part of the students presented difficulties that went beyond the operative procedures, manifesting themselves, above all, in the reading and interpretation of the problem-situations and in the identification of the relationships between the data and the question formulated. This finding shows that, in the early years of Elementary School, the teaching of Mathematics demands the systematic articulation between language and mathematical thinking, since understanding a problem implies interpreting texts, selecting relevant information, establishing relationships and planning resolution strategies (Smole; Diniz, 2001; Galvão; Nacarato, 2013). In this sense, the development of mathematical literacy necessarily involves practices that integrate reading, writing, orality, and argumentation in working with problems (Brasil, 2018).

In view of this scenario, didactic strategies were proposed aimed at expanding the understanding of problem situations and the construction of meanings, such as: collective reading of the statements, explicit identification of the data and the question, representation of the situations through drawings and concrete materials, discussion and comparison of different resolution procedures, socialization of the strategies used by the peers and production of problems by the children themselves. Such practices value the students' reasoning, promote the explicitness of ideas and shift the focus from the correct answer to

the analysis of the thought processes mobilized in the resolution, favoring the construction of intellectual autonomy (Smole; Diniz, 2001).

The reflections produced throughout the experiences within the scope of the Institutional Scholarship Program for Initiation to Teaching (PIBID) corroborate these analyses. As recorded in the final report, the students' difficulties in solving problems were strongly related to the fragility in reading and understanding the statements, requiring systematic mediation from the teacher, especially in evaluative situations and in activities that required interpretation and decision-making (Lima, 2025). It was also observed that many students showed insecurity and fear of making mistakes, which reinforces the importance of interventions that respect the different learning rhythms, without compromising autonomy, contributing to the construction of confidence and the development of mathematical reasoning (Lima, 2025).

The report also points out that the integration between linguistic literacy and mathematical literacy, through playful activities, games, reading texts with problem situations, and the use of concrete materials, favored significant advances in problem solving, while strengthening students' orality, interaction, and participation in class (Lima, 2025). In addition, collective planning, pedagogical meetings and the production of didactic materials aimed at the recomposition of learning proved to be fundamental for the organization of proposals centered on literacy and mathematical literacy, with an emphasis on reading fluency in problem solving, especially in classes with learning gaps (Lima, 2025).

This formative experience dialogues with the understanding that teaching is built on the articulation between reflection and action, requiring constant re-elaboration of pedagogical practices, as defended by Paulo Freire (1996). Thus, the systematic work with problem solving, articulated with the perspective of mathematical literacy, proved to be a powerful way to expand conceptual understanding, strengthen argumentation and promote greater autonomy and confidence of students in the face of mathematical challenges, enabling them to recognize themselves as subjects capable of producing strategies, validating procedures and communicating mathematical ideas in different contexts.

6.5 EVALUATION AND MONITORING

Evaluation was conceived as a formative, continuous and diagnostic process, as proposed by Hoffmann (2001) and Luckesi (2011). Different evaluation instruments were used, including periodic diagnoses, observation of performance in activities, analysis of productions, records in individual files and portfolios.

The individualized monitoring of students was essential to identify advances and

difficulties, enabling specific interventions and replanning of pedagogical practices. It was observed that students who received individualized attention, especially those with greater difficulties, showed significant progress throughout the school year.

The results of the evaluations showed that most students advanced in their mathematical knowledge. Students who had initial difficulties in the decimal numeral system were able to better understand the place value. Those who already demonstrated mastery of basic concepts advanced in more complex operations and in solving challenging problems.

7 THE MULTIDIMENSIONALITY OF TEACHER TRAINING IN PIBID

The experience at PIBID made it possible to understand teacher training as a multidimensional process, which involves technical, political, ethical and aesthetic dimensions. This expanded understanding of teaching was fundamental for the construction of a solid professional identity and for the exercise of the profession with autonomy and criticality, as defended by Veiga and Silva (2012) when they highlight that teaching in higher education, and we can extend it to other levels of education, is characterized by relationships between individuals who teach, learn, research and evaluate, practices linked to broader sociocultural contexts.

The multidimensionality experienced here dialogues directly with the perspective presented by Rivas and Silva (2017, p.10), who emphasize the need to configure teaching "as a space for connecting knowledge, subjectivities and cultures, which requires highly specialized scientific, technological or artistic content oriented towards the training of critical, ethical and socially inserted professionals". In the context of PIBID, this multidimensionality gains specific contours, articulating initial training, pedagogical practice and social commitment.

The *technical dimension* refers to the mastery of the specific knowledge of the teaching profession, including mathematical knowledge, knowledge about mathematics didactics, teaching methodologies, evaluation strategies and classroom management. During the participation in PIBID, it was possible to develop essential technical skills, such as the preparation of lesson plans, selection and production of teaching materials, application of different methodological strategies and use of assessment instruments.

This technical dimension is in line with what Oliveira-Mendes and Leite (2024, p.8) identify in Brazilian curriculum policies as necessary for quality mathematical literacy. The authors point out that the BNCC (2018), despite its contradictions, "emphasizes the explicit teaching of the code, not the alphabetic writing system", which, transposed to mathematical

literacy, means working not only with mechanical procedures, but with the understanding of the decimal numbering system and mathematical operations.

The direct contact with the pedagogical practice allowed us to understand that the technical domain is not limited to the mechanical application of techniques, but involves the ability to make informed decisions, adapt strategies to the needs of students and critically evaluate the results of interventions. This critical reflection on practice is supported by Rivas and Silva (2017), when they state that "literacy through literacy" (Soares, 2020, p.4) demands "different pedagogical strategies and mediations carried out by teachers in the use of their power of agency".

The experience showed the importance of solid mathematical and didactic knowledge to teach mathematics with quality in the early years. As the VSL scholarship holder pointed out in her report on participation in the program, "(...) it is essential to start from common sense, from the students' previous knowledge and from the context in which the object of study is carried out" (PIBID Report, 2025, p. 17), establishing bridges between everyday knowledge and mathematical scientific knowledge.

The *political dimension* of teaching concerns the understanding of education as a social and political practice, committed to the transformation of reality and the construction of a more just and democratic society. During the experience at PIBID, it was possible to perceive how pedagogical practices reflect conceptions of education, mathematics and human beings.

Oliveira-Mendes and Leite (2024) warn of the historical-epistemological-didactic blackout present in recent curricular policies, highlighting that "the university has been undergoing transformations and adapting its functions according to the requirements of what the university is capable of offering for economic and scientific development" (p. 2). This market logic has also impacted basic education, reducing mathematical literacy to minimum measurable competencies, disregarding its broader formative role.

Working in a public school, serving children in vulnerable situations, required the understanding that the teacher has a social commitment to the democratization of access to mathematical knowledge and the promotion of equity. As the authors point out, 54.73% of Brazilian students in the 3rd year remained at insufficient levels of reading, according to the 2016 ANA (Brasil, 2018), indicating that school failure is not natural, but the result of political and pedagogical choices.

Mathematical literacy is the right of all children and is an essential tool for the exercise of citizenship and for the critical understanding of reality. The National Literacy Policy (PNA), as analyzed by Oliveira-Mendes and Leite (2024, p.7), represents a "clear setback" by

reducing the literacy process from three to one year, imposing "in an arbitrary way, the phonic method, which breaks with what we have been advocating for approximately four decades in the field of literacy in Brazil". This imposition disregards the contributions of the psychogenesis of writing and the specificities of mathematical literacy.

The *ethical dimension* refers to the values, principles and commitments that guide the teacher's professional performance. During the participation in PIBID, ethical issues were present in several situations: respect for the dignity and uniqueness of each student, care for the self-esteem of children (especially those with difficulties in mathematics), commitment to the planning and execution of activities, and the establishment of respectful relationships.

Veiga and Silva (2012) highlight among the principles that guide pedagogical innovations: "affectivity; autonomy; participation; contextualization; dialogicity; dynamism; diversity; ethics; equality; comprehensiveness; playfulness; reflexivity/creativity and transience" (p. 33). These principles underpin a teaching practice committed not only to the transmission of content, but to the integral formation of students.

The experience in the classroom allowed us to understand that the teacher performs a social function of great responsibility, influencing the formation of children's values and attitudes in relation to mathematics. It is essential to combat negative beliefs about mathematics (such as the idea that it is difficult or that some people do not have the ability) and to promote a positive relationship with mathematical knowledge.

The pibidian report evidences this ethical concern by describing planned activities "seeking to transform them, the knowledge of common sense, configuring them with the contributions of science" (PIBID Report, p. 50), respecting the children's previous knowledge while promoting their expansion and systematization. Rivas and Silva (2017, p.10) complement this reflection by stating that "the teaching and learning processes that occur at the university are related to the values defended by scientific fields", and that these values of rigor, intellectual honesty, respect for diversity should permeate all teacher training.

The *aesthetic dimension* of teaching is related to sensitivity, creativity and the ability to promote meaningful and pleasurable learning experiences. During PIBID, the aesthetic dimension was manifested in the production of attractive and playful teaching materials, in the organization of stimulating learning spaces, and in the care with the quality of the experiences provided to children.

Although not explicitly mentioned in the texts of Veiga e Silva (2012, p.33) and Oliveira-Mendes and Leite (2024), the aesthetic dimension permeates the founding relationships identified by the authors: "movement-affectivity; time-space". The aesthetics of the classroom, the playfulness of the materials, the harmonious organization of the

pedagogical space-time are fundamental elements for the creation of a favorable environment for mathematical learning.

The work with mathematical games, for example, was developed with aesthetic concern, creating colorful, attractive materials that are appropriate to the children's interests. This attention to the sensitive aspect of learning is supported by the scholarship holder's report when she describes the use of "games and projects" as pedagogical resources that articulate cognitive and affective dimensions (PIBID Report, p. 28).

The understanding of the aesthetic dimension contributed to a broader view of teaching, valuing mathematics education as a full human experience, which involves reason, emotion, imagination and sensitivity. Rivas and Silva (2017, p.7) reinforce this perspective by highlighting that "the cognitive, affective and psychomotor dimensions are worked on in a complementary way", overcoming false dichotomies between thinking and feeling, between knowing and creating.

The experience at PIBID made it possible to understand teacher training as a multidimensional process, which involves technical, political, ethical and aesthetic dimensions. This expanded understanding of teaching is fundamental for the construction of a solid professional identity and for the exercise of the profession with autonomy and criticality.

8 FINAL CONSIDERATIONS

Participation in the Institutional Program of Scholarships for Initiation to Teaching (PIBID) represented a formative experience of great relevance for the construction of the teacher's professional identity and for the development of knowledge and skills essential to the exercise of teaching in the early years of Elementary School, especially in the field of mathematical literacy.

The results of this research show that PIBID is a privileged space for articulation between theory and practice, enabling licentiate students to experience the school daily life in a monitored, reflective and theoretically grounded way. Insertion in basic school allows the development of a more contextualized, critical education committed to the Brazilian educational reality.

In the specific field of mathematical literacy, participation in the program allowed us to understand the complexity of the teaching-learning process of mathematics and the need for a solid theoretical foundation for the development of effective pedagogical practices. The study of theories of mathematics education was fundamental for the planning and execution of successful interventions.

The production of didactic materials proved to be an important training strategy, requiring study, creativity, planning and collaborative work. This experience contributed to the development of teacher autonomy and to the understanding that teachers need to be producers of knowledge, capable of creating resources appropriate to the specific needs of their students.

The understanding of the multidimensionality of the teaching work was one of the main lessons provided by the PIBID. The experience in the classroom made it possible to realize that teaching is not reduced to the technical dimension, but also involves political, ethical and aesthetic dimensions, all equally important for a competent and committed professional performance. The challenges faced during the experience, such as the heterogeneity of the students' mathematical knowledge, learning difficulties, limitations of material resources and the complexities of classroom management, contributed to the development of resilience, creativity and problem-solving skills, essential skills for the exercise of the teaching profession.

The collaborative work between scholarship holders, supervising professor and area coordinator proved to be fundamental for professional development. The moments of joint planning, study meetings, exchanges of experiences and shared reflections enriched the training and demonstrated the importance of collaboration in the teaching profession.

It is noteworthy that teacher training does not end with the completion of the degree or with participation in programs such as PIBID, but is a permanent process of professional development. The experience in the program made it possible to build solid foundations for professional practice, but also aroused awareness of the need for continuous training and commitment to critical reflection on practice.

It is hoped that this work will contribute to the debate on teacher training in Brazil and on the importance of public policies that value the articulation between university and basic school. The strengthening of programs such as PIBID is fundamental for the qualification of teacher training and, consequently, for the improvement of the quality of mathematics education in the early years.

It is concluded that PIBID plays a strategic role in the training of reflective, critical, technically competent and ethically committed teachers with a democratic, inclusive and quality mathematics education, contributing to the affirmation of teaching as an intellectual profession and to the construction of a truly transformative education.

9 AI STATEMENT AND AI-ASSISTED TECHNOLOGIES IN THE WRITING PROCESS

During the preparation of this work, the authors used Claude 3.5 Sonnet from Anthropic in January 2026 to assist in structuring the academic text, grammar review, formatting bibliographic references, and improving the clarity of the essay. After using this tool, the authors have reviewed and edited the content in accordance with the scientific method and assume full responsibility for the content of the publication.

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CONTEXTUALIZATION OF MATHEMATICAL CONCEPTS: POSSIBILITIES AND CHALLENGES

CONTEXTUALIZAÇÃO DE CONCEITOS MATEMÁTICOS: POSSIBILIDADES E DESAFIOS

CONTEXTUALIZACIÓN DE CONCEPTOS MATEMÁTICOS: POSIBILIDADES Y DESAFÍOS



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ABSTRACT

Brazil has not achieved good results in the learning indices of its students, a fact confirmed in 2009 when the Programme for International Student Assessment (PISA) was conducted, in which Brazil ranked 53rd among sixty-one countries evaluated in Mathematics. In 2012 a new result was released and Brazil's position improved slightly: among the 65 countries evaluated, Brazil ranked 58th with 391 points in Mathematics, and the most recent result placed Brazil in the 66th position among the 70 countries evaluated. With the current result it is clear that the expected standards regarding the quality of Mathematics education in the country have not yet been achieved. In other major learning assessment examinations such as SAEB, SPAECE, among others, the averages obtained are very low when compared with results from other countries with levels of development similar to Brazil. It has been clearly observed that Brazilian students' learning in Mathematics has been unsatisfactory, especially regarding their ability to interpret mathematical texts. One of the major challenges in the National High School Examination (ENEM) has been precisely the amount of information contained in a single item that must be interpreted in order for the question to be correctly solved, a situation that also occurs in other national-scale examinations and that has raised concern throughout Brazil, especially among Mathematics teachers, since it has become evident that the current work is not on the right path and that something needs to be done to change this reality. This study aims to identify the difficulties found in the pedagogical practices of a group of teachers from lower secondary education and high school regarding the use of contextualized mathematical practice as a teaching tool, as well as the teachers' knowledge about the issue addressed: contextualization. The methodology used in this study is descriptive research, in which data were collected about current practices or opinions of the Mathematics teachers involved through questionnaires, interviews and observations, taking into account the contextualization of mathematical content and the difficulties faced.

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The results show that teachers who teach in the early grades face fewer difficulties in contextualizing Mathematics and in stimulating students' interest in the classes when compared with teachers who teach in later grades, especially in high school. Throughout this work the problem of Mathematics teaching will be widely discussed and suggestions will be presented for a more interactive teaching approach that provides students with better learning and greater satisfaction with their studies. It is expected that this work may inspire or at least encourage a new moment for Mathematics in which students feel part of it and use it as a tool in their daily lives.

Keywords: Mathematics. Contextualization. Teaching. Basic Education.

RESUMO

O Brasil não tem alcançado bons resultados nos índices de aprendizagem dos nossos alunos, fato esse comprovado em 2009, quando da realização do Programa Internacional de Avaliação de Alunos (Pisa), o Brasil figurou no cenário mundial em 53º lugar num grupo de sessenta e um países avaliados, no que se refere à Matemática. Em 2012, um novo resultado foi divulgado e a posição do Brasil melhorou um pouco, dos 65 países avaliados, o Brasil ficou na 58ª posição com 391 pontos alcançados em Matemática e o mais recente resultado colocou o Brasil na 66ª posição dentre os 70 países avaliados. Com o resultado atual fica claro que ainda não estamos alcançando o esperado no que se refere à qualidade do ensino de Matemática em nosso país. Nos outros principais exames de avaliação de aprendizagem tais como Saebe, Spaece, dentre outros, as médias obtidas são muito baixas se comparadas à resultados de outros países com desenvolvimento semelhante ao Brasil. Tem-se percebido nitidamente que a aprendizagem dos alunos brasileiros em Matemática tem sido insatisfatório principalmente quanto à capacidade de interpretação de textos matemáticos. Um dos grandes vilões para realização do Exame Nacional do Ensino Médio - ENEM, tem sido exatamente a quantidade de informações em um único item que precisa ser interpretado a fim de que questão seja corretamente resolvida, fato esse que ocorre também em outros exames de escala nacional e que tem preocupado o Brasil como um todo e principalmente nós professores de Matemática, pois estamos percebendo que o trabalho não está no caminho certo e que algo precisa ser feito para mudar essa realidade. Esse trabalho tem por objetivo geral identificar as dificuldades encontradas nas práticas pedagógicas de um grupo de professores do Ensino Fundamental II e Ensino Médio sob a utilização como ferramenta de ensino de um fazer matemático contextualizado, bem como o conhecimento desses professores sobre a problemática abordada: contextualização. A metodologia utilizada nesse estudo trata-se de uma pesquisa descritiva, na qual foi realizado um levantamento de dados sobre práticas ou opiniões atuais dos professores de Matemática envolvidos na pesquisa, através de questionários, entrevistas e observações, levando-se em consideração a questão da contextualização dos conteúdos matemáticos e as dificuldades enfrentadas. Os resultados mostram que os professores que ensinam em séries iniciais enfrentam menos dificuldades em contextualizar a Matemática, em despertar o interesse dos seus alunos pela aula, se comparamos com as opiniões dos professores que lecionam em séries finais, principalmente no Ensino Médio. Ao longo desse trabalho a problemática do ensino de Matemática será amplamente discutida e sugestões serão dadas para um ensino mais interativo, que proporcione ao aluno um melhor aprendizado e uma maior satisfação quanto aos seus estudos. Espero poder despertar, ou pelo menos incentivar, um novo momento para a Matemática em que o aluno se sinta parte dela e a use como ferramenta do seu dia a dia.

Palavras-chave: Matemática. Contextualização. Ensino. Educação Básica.

RESUMEN

Brasil no ha alcanzado buenos resultados en los índices de aprendizaje de sus estudiantes, hecho comprobado en 2009 con la realización del Programa Internacional para la Evaluación de Estudiantes (PISA), en el cual Brasil ocupó el puesto 53 entre sesenta y un países evaluados en Matemáticas. En 2012 se divulgó un nuevo resultado y la posición de Brasil mejoró ligeramente: de los 65 países evaluados Brasil ocupó el puesto 58 con 391 puntos en Matemáticas y el resultado más reciente colocó a Brasil en la posición 66 entre los 70 países evaluados. Con el resultado actual queda claro que aún no se están alcanzando los niveles esperados en lo que respecta a la calidad de la enseñanza de las Matemáticas en el país. En otros exámenes importantes de evaluación del aprendizaje como SAEB, SPAECE, entre otros, los promedios obtenidos son muy bajos en comparación con los resultados de otros países con niveles de desarrollo similares a Brasil. Se ha observado claramente que el aprendizaje de los estudiantes brasileños en Matemáticas ha sido insatisfactorio, especialmente en lo que se refiere a la capacidad de interpretación de textos matemáticos. Uno de los principales problemas en la realización del Examen Nacional de la Enseñanza Media (ENEM) ha sido precisamente la cantidad de información contenida en un único ítem que debe ser interpretado para que la pregunta sea correctamente resuelta, situación que también ocurre en otros exámenes a escala nacional y que ha generado preocupación en todo Brasil, especialmente entre los profesores de Matemáticas, ya que se percibe que el trabajo no está siguiendo el camino correcto y que algo necesita hacerse para cambiar esta realidad. Este trabajo tiene como objetivo identificar las dificultades encontradas en las prácticas pedagógicas de un grupo de profesores de la educación básica, específicamente de los años finales de la enseñanza fundamental y de la enseñanza media, en relación con el uso del quehacer matemático contextualizado como herramienta de enseñanza, así como el conocimiento de estos profesores sobre la problemática abordada: la contextualización. La metodología utilizada en este estudio corresponde a una investigación descriptiva, en la cual se realizó un levantamiento de datos sobre prácticas u opiniones actuales de los profesores de Matemáticas involucrados en la investigación mediante cuestionarios, entrevistas y observaciones, considerando la contextualización de los contenidos matemáticos y las dificultades enfrentadas. Los resultados muestran que los profesores que enseñan en los primeros años enfrentan menos dificultades para contextualizar las Matemáticas y despertar el interés de sus estudiantes por las clases si se comparan con los profesores que enseñan en los años finales, especialmente en la enseñanza media. A lo largo de este trabajo se discutirá ampliamente la problemática de la enseñanza de las Matemáticas y se presentarán sugerencias para una enseñanza más interactiva que proporcione al estudiante un mejor aprendizaje y una mayor satisfacción con sus estudios. Se espera poder despertar o al menos incentivar un nuevo momento para las Matemáticas en el que el estudiante se sienta parte de ellas y las utilice como una herramienta en su vida cotidiana.

Palabras clave: Matemáticas. Contextualización. Enseñanza. Educación Básica.

1 INTRODUCTION

Brazil has not achieved good results in the learning rates of our students, a fact that was proven in 2009, when the Program for International Student Assessment (PISA) was carried out, Brazil was ranked 53rd in the world scenario in a group of sixty-one countries evaluated, with regard to Mathematics. In 2012, a new result was released and Brazil's position improved slightly, of the 65 countries evaluated, Brazil was in the 58th position with 391 points achieved in Mathematics and the most recent result placed Brazil in the 66th position among the 70 countries evaluated. With the current result, it is clear that we are still not achieving what is expected in terms of the quality of Mathematics teaching in our country.

From these conceptions, it is perceived that there are no desired satisfactions in the different spheres of Mathematics Education in Brazilian education, due to the paradox between such low results, showing that something is wrong, that palpable and urgent attitudes need to be taken so that the teaching of Mathematics can get out of this valley that has been perpetuated for decades.

It cannot be denied that much has already been proposed in this area, however, the context of the classroom remains the same, and it is up to us teachers, together with the entire school community, to take the initial step towards an urgent awakening in order to give mathematical content a real meaning for its learning.

When we return to the competencies that are required of the student who proposes to take the New ENEM, it is clear that they revolve around the reading and interpretation of mathematical texts combined with the mother tongue.

In view of this urgent need, and taken by a feeling of change that has been awakened both by daily practice in the classroom, and by studies by authors who defend new strategies for the teaching of mathematical contents, highlighting the studies of D'Ambrósio (1996), the work proposed here will be based on a case study carried out with a group of eight Mathematics teachers, taken by sampling, in schools 1 Professor: PhD, UFERSA -Mossoró-RN, nunesag@ufersa.edu.br; 2 Mathematics Course – UFERSA - Mossoró-RN euclidesnn@gmail.com; ISSN: 2358-8829 private schools in the city of Fortaleza/CE, in order to identify the real causes of the difficulty in contextualizing the teaching of Mathematics from the educator's point of view, having as a guiding question: What are the difficulties of implementing a contextualized teaching in the conception of mathematics teachers?

In addition, the objective is not limited to understanding causes or pointing out errors, on the contrary, it is the main objective to bring a perception and reflection on this problem, in order to contribute to the enrichment of the teaching of Mathematics and to seek, together with this group of teachers, new methodological alternatives for the teaching of Mathematics,

although I am aware that this process will not occur by magic, but with a lot of struggle and persistence.

In view of the above, this article has the general objective of analyzing the difficulties found in the pedagogical practices of Mathematics teachers in the application of contextualized teaching. The specific objectives are:

- Outline the profile of the group of Mathematics teachers of Elementary School II and High School in relation to their pedagogical practices.
- Identify the difficulties faced by a group of teachers in the process of contextualization in the teaching of mathematics.
- Verify the perception of the observed teachers about the contextualization of mathematical content

2 METHODOLOGY (OR MATERIALS AND METHODS)

The methodology used in this study is a descriptive research, in which a survey of data on current practices or opinions of the Mathematics teachers involved in the research was carried out, through questionnaires, interviews and observations, taking into account the issue of contextualization of mathematical content and the difficulties faced.

The research was developed in the city of Fortaleza/CE, directed to a group of eight mathematics teachers from Elementary School II and High School, from two private schools and one public school in the Municipality of Fortaleza/CE. Data collection was carried out through 01 questionnaire with 10 questions to know the profile of the group under study and direct interviews to know the difficulties in relation to the contextualization of Mathematics teaching

3 THEORETICAL FRAMEWORK

In the ideas of Mathematics Education and its main defenders such as D'Ambrosio (1996), it is possible to teach Mathematics content in a differentiated way in the teaching practice. According to Druck (2006), former president of the Brazilian Mathematical Society, "the quality of mathematics teaching has perhaps reached its lowest level in the country's educational history".

Our schools have spent a lot of time teaching math, social science, and other content to their students, and little time has been devoted to showing them how to share feelings and thoughts with others. The result is there, from the school itself: a large group of alienated, lonely, anxious, nervous, aggressive, irritated people, who do not know how to communicate effectively and who do not know why they are unhappy (MINICUCCI, 2001, p 54)

These difficulties are not recent, because for Vitti (1999, p.19),

The failure of mathematics teaching and the difficulties that students present in relation to this discipline is not a new fact, as several educators have already listed elements that contribute to the teaching of mathematics being marked more by failures than by successes.

Vasconcelos and Rego (2010, p.4) argue:

Although everyday situations are of great importance in the sense of favoring the construction of meanings for many contents to be studied, it is necessary to consider the possibility of constructing meanings from internal issues of Mathematics itself, otherwise, many contents would be discarded because they do not have concrete and immediate applicability. In addition, many reasons explain a basic education for all people and the utilitarian aspect is just one of them.

Contextualization aims to give meaning to what is intended to teach the student (...) it helps in the problematization of the knowledge to be taught, making the student feel the need to acquire knowledge that he does not yet have. (Ricardo, 2003, p. 11).

4 RESULTS AND DISCUSSIONS

The survey was carried out in August and December 2018 and consisted of questions directed to the theme under analysis that consist of understanding what are the main difficulties that teachers feel to teach Mathematics, giving it a more practical focus, that is, contextualized teaching.

At first, all the teachers approached were solicitous in answering the questionnaire, although it was very visible on the part of some that they were not interested in the subject ISSN: 2358-8829 under study, manifesting themselves in the absence of the justifications requested in some questions of the questionnaire. Even so, it was possible to arrive at the expected data, which were collected and organized and analyzed.

One of the questions asked to the group of teachers was: what did they understand and what was the view that each one had about the central theme of our study: Contextualization in Mathematics. The answers were as varied as possible and organized, in full, as follows:

- Universal interrelation.
- It is to produce as much information as possible, where the student can have greater support to reach a conclusive and correct result.
- I understand that it is the application of what is studied in the classroom in the students' daily lives.

- Use mathematics in everyday situations.
- Relate the content to everyday life.
- Insert in certain contents its applicability in everyday life.
- Try to bring mathematical content as close as possible to what is used on a daily basis.
- Relate the contents addressed with reality, giving "meaning" to the discipline.

It can be observed, from the answers of the interviewees, that the theoretical knowledge on the subject is quite broad and, although they are different answers, they all converge to the real meaning of what Contextualization in Mathematics really is. With this, we can conclude that what is lacking in Brazilian classrooms with regard to the teaching of Mathematics in a contextualized way is not the knowledge of the subject by teachers, but the minimum application that is made, in practice, of this knowledge.

With this, I do not defend the idea of omission on the part of Brazilian educators, I believe that the lack of human preparation for the implementation of this teaching model in classes, the scarce resources that most schools offer, among others, are very decisive for the absence of a more meaningful teaching of Mathematics for our students. It is also necessary to highlight that there are teachers who are already taking the first steps in this new teaching, and this fact only drives us to fight for more teachers to put into practice a teaching that combines theory and daily experience, whenever possible.

Following the research that has as its main purpose to discuss the main problems faced by Mathematics teachers when it comes to contextualization of the contents taught, the surveyed teachers were asked about the intensity of ISSN: 2358-8829 times that they brought the contents taught in the most diverse grades of action to a reality closer to the student, giving them a more significant meaning.

What can be concluded is that the opinion of the teachers when asked about the possibilities of contextualizing the contents of Mathematics and they pointed out that only some contents were possible to do this. And it is directly linked to what the authors themselves in Mathematics think.

5 CONCLUSION

It is not new that the need for a profound change of paradigms within education, and teaching itself, has been perceived. In Mathematics it is no different. The teaching of Mathematics in Brazilian schools has been losing its meaning, the results show this fact, due to the lack of teaching that shows the significance that it can have in the lives of students, a fact that has distanced the student from the object of study and has caused a huge aversion to the point that this, I quote: Mathematics has become a discipline rejected by most students.

The lack of preparation of many of the teachers has also been a very strong cause when it comes to teaching Mathematics, and this has been presented by the absence of a class that goes far beyond the mere memorization of formulas and concepts, as well as the presence of large lists of exercises in order to occupy the students' time. For many, teaching that values the reason for what is being taught has not been part of the school reality.

However, a lot of material has been published on how we should proceed methodologically so that the teaching of Mathematics, as well as its learning, achieves better results. We can no longer live and teach in the twenty-first century as if we were still in times before ours. The moment requires us to do something concrete in our classroom so that we can recover the prestige that Mathematics has in itself in the daily life of each one of us.

Based on the hope of seeing better days in terms of learning in Mathematics, I proposed the study in question, not only to point out problems that are part of most Brazilian schools, but mainly to discuss, in the light of experts on the subject, possible solutions for teaching that values the meaning of its study for the student. We can no longer hide from a teaching that tells the student where Mathematics can and will be a tool for solving problems in their daily lives, and that it makes perfect sense to learn it. ISSN: 2358-8829.

I believe that this process will not occur suddenly, but with a lot of effort on the part of the entire school community, but especially of Brazilian teachers, the results and the satisfaction rate in learning Mathematics can improve much more. This is our fight.

In this sense, I hope that this text can serve as a motivator for the current reality to be changed by the effort and work of each one of us, Mathematics teachers. We can never give up on seeing our discipline reaching the level it should have in our society.

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AUDITORY SKILLS IN SCHOOLCHILDREN AND THEIR IMPACT ON LEARNING
COMPETÊNCIAS AUDITIVAS EM ESCOLARES E SEU IMPACTO NA APRENDIZAGEM
HABILIDADES AUDITIVAS EN ESCOLARES Y SU IMPACTO EN EL APRENDIZAJE



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ABSTRACT

Considering the importance of evaluating auditory interventions to improve learning, the objective was to investigate the efficacy of two therapeutic procedures, Acoustically Controlled Auditory Training (ACAT) and the NeuroAuditory Stimulation System (NASS), analyzed individually and in combination, to verify the influence of the order of application on the effects of stimulation. To this end, 30 children aged 8 to 11 years, equally distributed by sex and age, were assessed using pure-tone audiometry, behavioral auditory processing tests (dichotic listening TDD, monotic listening PSI, temporal resolution GIN, and temporal ordering TPD), short (FFR) and long-latency auditory evoked potentials (P300), as well as the Visual Perception Assessment (DTVP-2) and the SAB Scale, before and after the interventions. Thus, it was observed that, in the isolated intervention, ACAT was effective in the electrophysiological procedures (FFR and P300), in the behavioral auditory tests (PSI and TPD) and in the SAB Scale;. At the same time, NASS showed a positive effect on FFR, the PSI test and item 4 of the SAB Scale. The combined interventions showed greater efficacy, especially when ACAT was applied before NASS, suggesting that NASS potentiates the effects of ACAT. This allowed us to conclude that the combined use of both protocols constitutes a promising approach for auditory and cognitive rehabilitation, by promoting behavioral and neurophysiological advances, and broadening the understanding of neural plasticity mechanisms and their implications for the learning process.

Keywords: Auditory Evoked Potentials. Spatial Processing. Auditory Perception. Acoustic Stimulation. Rehabilitation.

RESUMO

Considerando a importância de avaliar intervenções auditivas para a melhoria da aprendizagem, objetivou-se investigar a eficácia de dois procedimentos terapêuticos, o Treinamento Auditivo Acusticamente Controlado (TAAC) e o Sistema de Estimulação NeuroAuditiva (SENA), analisados individualmente e combinados, a fim de verificar a influência da ordem de aplicação sobre os efeitos da estimulação. Para tanto, procedeu-se à avaliação de 30 crianças de 8 a 11 anos, igualmente distribuídas por sexo e idade, por meio de audiometria tonal, testes comportamentais de processamento auditivo (escuta dicótica TDD, escuta monótica PSI, resolução temporal GIN e ordenação temporal TPD),

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potenciais evocados auditivos de curta (FFR) e longa latência (P300), além da Avaliação da Percepção Visual (DTVP-2) e da Escala SAB, antes e após as intervenções. Desse modo, observou-se que, na intervenção isolada, o TAAC foi eficaz nos procedimentos eletrofisiológicos (FFR e P300), nos testes comportamentais auditivos (PSI e TPD) e na Escala SAB; enquanto o SENA apresentou efeito positivo no FFR, no teste PSI e no item 4 da Escala SAB. As intervenções combinadas evidenciaram maior eficácia, especialmente quando o TAAC foi aplicado antes do SENA, sugerindo que o SENA potencializa os efeitos do TAAC. Foi possível concluir que o uso combinado de ambos os protocolos constitui uma abordagem promissora para a reabilitação auditiva e cognitiva, ao promover avanços comportamentais e neurofisiológicos e ampliar a compreensão sobre os mecanismos de plasticidade neural e suas implicações no processo de aprendizagem.

Palavras-chave: Potenciais Evocados Auditivos. Processamento Espacial Visual. Percepção Auditiva. Estimulação Acústica. Reabilitação.

RESUMEN

Considerando la importancia de evaluar intervenciones auditivas para mejorar el aprendizaje, se objetivó investigar la eficacia de dos procedimientos terapéuticos, el Entrenamiento Auditivo Acústicamente Controlado (TAAC) y el Sistema de Estimulación NeuroAuditiva (SENA), analizados individualmente y en combinación, con el fin de verificar la influencia del orden de aplicación en los efectos de la estimulación. Para ello, se procedió a evaluar a 30 niños de 8 a 11 años, igualmente distribuidos por sexo y edad, mediante audiometría tonal, pruebas conductuales de procesamiento auditivo (escucha dicótica TDD, escucha monótica PSI, resolución temporal GIN y ordenación temporal TPD), potenciales evocados auditivos de corta (FFR) y larga latencia (P300), así como la Evaluación de la Percepción Visual (DTVP-2) y la Escala SAB, antes y después de las intervenciones. De este modo, se observó que, en la intervención aislada, el TAAC resultó eficaz en los procedimientos electrofisiológicos (FFR y P300), en las pruebas conductuales auditivas (PSI y TPD) y en la Escala SAB; mientras que el SENA mostró un efecto positivo en el FFR, en la prueba PSI y en el ítem 4 de la Escala SAB. Las intervenciones combinadas evidenciaron una mayor eficacia, especialmente cuando el TAAC se aplicó antes que el SENA, lo que sugiere que el SENA potencia los efectos del TAAC. Lo que permitió concluir que el uso combinado de ambos protocolos constituye un abordaje prometedor para la rehabilitación auditiva y cognitiva, al promover avances conductuales y neurofisiológicos, y ampliar la comprensión sobre los mecanismos de plasticidad neural y sus implicaciones en el proceso de aprendizaje.

Palabras clave: Potenciales Evocados Auditivos. Procesamiento Espacial Visual. Percepción Auditiva. Estimulación Acústica. Rehabilitación.

1 INTRODUCTION

The presence of normal auditory thresholds does not guarantee the ability to properly process and interpret verbal and nonverbal sounds. Many children diagnosed with central auditory processing disorder (CAPD) have alterations in auditory behavioral tests, as well as difficulties in language and cognitive processes, raising questions about the clinical validity of the diagnosis (Bellis; Jorgensen, 2014; Neijenhuis *et al.*, 2019).

Central Auditory Processing (CAP) refers to the "Perceptual processing of auditory information in the central nervous system and the neurobiological activity responsible for the generation of auditory electrophysiological potentials" (ASHA, 2005). The British Society of Audiology (BSA) adds the participation of other neural processing systems that contribute to the modulation of *bottom-up* processing (BSA, 2018). This definition evidences the participation of subcortical and cortical structures in the decoding and interpretation process of the fast and transient acoustic elements of speech and in the construction of learning, indicating the interference of PAC in language development (Martzog *et al.*, 2019).

Individuals with CAPD have low performance in two or more auditory abilities: sound localization and lateralization, auditory discrimination, auditory pattern recognition, temporal aspects of hearing, figure-ground, auditory closure, binaural aspects of hearing (ASHA, 2005; Geffner, 2019). It is estimated that 2% to 5% of school-age children with learning complaints have primary CAPD, while in adults the prevalence can reach up to 17% between 50–54 years of age and exceed 70% after 60 years of age (Bellis; Jorgensen, 2014). Risk factors include prenatal/neonatal factors, recurrent otitis media, genetic factors, and neurological disorders (Chermak *et al.*, 2014; Geffner, 2019).

The impact of CAPD on hearing, communication, and academic performance reinforces the need for interventions based on cognitive neuroscience, exploring the plasticity of the central nervous system (CNS) and promoting cortical reorganization, since improvements reflect on learning (De Wit *et al.*, 2018). Auditory and cognitive training demonstrate positive effects on working memory and general cognition, although follow-up evaluation is recommended to verify long-term efficacy (Lawrence *et al.*, 2018; Stropahl *et al.*, 2020).

Several studies suggest that brainstem responses generate direct information about how the sound structure of a spoken syllable is decoded by the auditory system, highlighting the importance of the brainstem in decoding speech sounds (Skoe; Kraus, 2010).

Changes in CAP can be assessed by behavioral and electrophysiological testing. The behavioral battery investigates attention, organization, memory and perception of auditory details, with verbal and non-verbal, monaural or binaural stimuli. Electrophysiological tests

complement the assessment, allowing the measurement of neuroelectrical activity and differentiating CAPD from other disorders, especially in children under seven years of age (ABA, 2016).

According to international and national recommendations, the evaluation of PAC should consist of a set of tests that evaluate monaural listening, dichotic listening, temporal ordering, temporal resolution and binaural interaction, considering the age, cognitive and linguistic development of the individual. Regarding the diagnosis of the disease, there is no unanimity regarding the characterization of the individual with CAPD (De Wit *et al.*, 2018).

Auditory training protocols, especially combined with cognitive tasks, have been shown to improve auditory communication and functional skills, with greater benefit when associated with sensory rehabilitation or hearing aids. However, the long-term effects still need to be investigated (Stropahl *et al.*, 2020). Studies such as the one by Sharma *et al.* (2019) reinforce the importance of evaluating specific CAP tasks, such as the frequency pattern test, in children with reading or spelling disorders.

The NeuroAuditory Stimulation System (SENA) is a technology developed by Jordi Gazeran Expósito, by the Spanish company Sena System S.L.U. The project began in 2000, focusing on the relationship between hearing and learning difficulties. Its proprietary software was launched in 2005, evolving into a web platform in 2022, which integrates tools for assessment, stimulation and training of auditory skills, with an international presence in several countries, including Brazil. SENA emerges as a resource to assist existing treatments, incorporating digital technology into NeuroAuditory stimulation (SENA, 2022). As it is a relatively new procedure, studies are being carried out to reinforce the clinical findings, in the search for another resource based on scientific evidence.

In this context, the objective of the present study was to test the efficacy of TAAC and SENA, alone and in combination with each other, in schoolchildren with learning difficulties, analyzing whether the order of application influences the clinical results.

2 METHODOLOGY

2.1 PARTICIPANTS

The study included 30 children aged eight to eleven years, who met the inclusion criteria proposed for the study and were matched by age in the constitution of the groups. The sample was selected from among the patients treated at a speech-language therapy service in a public hospital in the city of São Paulo. The individuals presented characteristics resulting from risk factors (Table 2) important for learning disorders, with more than one risk factor per participant: genetic factors (73.3%), prenatal (26.6%), perinatal (26.6%), drug use

during pregnancy (6.6%), neurological disorders (13.3%), metabolic disorders (6.6%) and emotional factors (86.6%).

The initial screening consisted of a brief anamnesis of the patient, to survey the audiological history, general health, use of medications, neurological and/or cognitive disorders. In addition, a basic audiological evaluation (pure tone threshold audiometry, vocal audiometry and immittance testing) was performed.

2.2 INTERVENTION PROGRAMS AND DISTRIBUTION OF GROUPS

The intervention program was carried out with three groups of patients: CONTROL (n=10), SENA (n=10) and TAAC (n=10), who were submitted to the NeuroAuditory Stimulation System (SENA) and the Acoustically Controlled Auditory Treatment (TAAC). The control group did not undergo treatments during the study, however, after its conclusion, all individuals received appropriate treatment, according to ethical and scientific principles. In the SENA and TAAC groups, two sequential stimulations were performed, evaluated at two different times.

The TAAC was adapted based on the methodology proposed by Ziliotto; Gil (2011). The tasks of each session of auditory training were organized with progressive complexity, starting with simpler stimuli and progressing to more difficult ones as the individual's performance improved. The signal-to-noise ratio followed the same principle, going from more favorable (positive) to less favorable (negative). The use of earphones allowed for separate training of the right and left ears. In the dichotic listening activities, the intensity of the main stimulus was maintained, and the intensity of the competitive stimulus was varied, which should be ignored. The tasks with verbal stimuli started with the right ear, and the non-verbal ones, with the left. During the sessions, the repetition of items was allowed when requested or indicated by the speech therapist. The criterion for increasing difficulty was to reach 70% or more of correct answers, and activities with less than 30% indicated the need to go back one level (Musiek; Schochat, 1998). The acoustically controlled auditory training was performed in ten weekly sessions of 45 minutes, totaling about eight hours of sensory stimulation, in a soundproof booth.

SENA used musical and speech stimuli, composed of excerpts from classical music (Mozart) and a narrative in Brazilian Portuguese told by a male announcer. These stimuli were modified by a frequency modulator that reduces bass sounds and intensifies high sounds, alternating with a low-pass system that regulates the speed of exchange between both, making stimulation intermittent and preventing habituation. The software has an equalizer that was activated in the stimulation of each individual at frequencies from 125 to

8000 Hz, with reference to the normal hearing pattern (0 dBHL). The maximum intensity did not exceed 90 dBNPS, with a mean volume of 60 dBNS per ear. The music and speech stimuli were mixed, and the same stimulus was presented in both ears via headphones (Sennheiser HD 559), whose harmonic distortion was $<0.2\%$ (1kHz, 100dbspl) and a frequency response curve of 14 to 26KHz coupled to a traktor audio 6 analog digital converter (DAC). The stimulation occurred with the individual sitting, performing a motor activity (using a cell phone or tablet with the volume at zero), without reading or writing. Stimulation was performed in a quiet place, without interference from external noises. The protocol comprised 10 sessions of 45 min, with reprogramming after five sessions based on the audiological thresholds obtained through new audiometry and equalization and intensity adjustments, taking into account, in addition to the audiological thresholds, the individual sensitivity of each individual (SENA, 2022).

2.3 EVALUATION PROCEDURES

The following electrophysiological evaluation tests were used as study procedures: Brainstem Auditory Evoked Potential - BAEP P300 (Schochat, 2004) and *Frequency-Following Response* - FFR (Skoe; Kraus, 2010); *Gaps-in-noise* - GIN (Musiek *et al.*, 2005), Pediatric Speech Intelligibility Test - PSI(MCI) (Ziliotto *et al.*, 1997), Duration Standard Test - TPD (Musiek *et al.*, 1990), Dichotic digit test - TDD (Collela-Santos; Pereira, 1997); visual perception assessment: Evolutionary Test of Visual Perception, second edition - DTVP-2 (Brown, 2002) and the SAB Scale - *Scale of Auditory Behavior* (Domitz; Schow, 2000). As described in Table 1, the study groups underwent an initial evaluation and evaluations with the study procedures at three different times: at the beginning of the intervention program, after each type of stimulation (SENA or TAAC) and at the end of the intervention program.

Table 1

Schedule of activities developed in the intervention programs

INTERVENTION PROGRAM					
Initial Assessment	Time 1	Stimulation	Time 2	Stimulation	Time 3
Consent form, Anamnesis, Diagnostic evaluation	Audiometric thresholds; Behavioral assessment of auditory processing: GIN, PSI-MCI, TPD, TDD; Behavioral assessment of visual perception: DTVP - 2; SAB Scale; Evaluation of short-latency (FFR) and long-latency evoked potential (P300)	SENA Group TAAC Group 10 sessions	Audiometric thresholds; Behavioral assessment of auditory processing: GIN, PSI-MCI, TPD, TDD; Behavioral assessment of visual perception: DTVP - 2; SAB Scale; Evaluation of short-latency (FFR) and long-latency evoked potential (P300)	TAAC Group SENA Group 10 sessions	Audiometric thresholds; Behavioral assessment of auditory processing: GIN, PSI-MCI, TPD, TDD; Behavioral assessment of visual perception: DTVP - 2; SAB Scale; Evaluation of short-latency (FFR) and long-latency evoked potential (P300)

Source: Prepared by the author

2.4 SAMPLE CHARACTERIZATION

The term "learning disabilities" involves multiple factors: cognitive, social, economic, physical, and mental, which are directly related to learning. The emotional and cognitive dimensions are profoundly affected by all these factors and exert an influence on student learning (Konstantinidis, 2024).

Thus, the following inclusion criteria were established for the composition of the sample of this study: presence of learning difficulties; hearing thresholds of up to 15 dB HL; age between 8 and 11 years; and changes in the assessment of auditory processing and visual perception. Individuals who presented evidence of neuropsychiatric conditions that could prevent the performance of the planned procedures were excluded, as well as those who were unavailable to attend the intervention sessions.

2.5 ETHICAL APPROVAL AND CONSENT

The study was approved by the institutional ethics committee under opinion number 2.521.264 and is registered in Plataforma Brasil under CAAE number 81971418.0.0000.5505. The national law was complied with and the appropriate ethical precautions were taken. The volunteers or their guardians signed a free and informed consent form, as well as a consent form.

2.6 STATISTICAL ANALYSIS

The continuous and semicontinuous data were initially compared with the Gauss curve, determining the normality for each variable. As the sample size in each group was considered small ($n=10$), parametric analysis was chosen. When the data had parametric behavior, mean and standard deviation were used, compared cross-sectionally by the unpaired Student's t-test. Categorical data were represented by absolute (n) and relative (%) frequencies and compared using Pearson's chi-square test. The correlation between the variables and continuous and semicontinuous data was performed using Pearson's correlation test. For all studies, the risk $\alpha \leq 0.05$ of committing a type I or 1st type error and a risk $\beta \leq 0.20$ of committing a type II or 2nd type error were considered. The SPSS 23.0 Statistics program (IBM)® and the FigurePad Prism 9.5 program (FigurePad Software, LLC) were used.

3 RESULTS AND DISCUSSION

3.1 AUDITORY PLASTICITY: FFR RESULTS

The Frequency Following Response (FFR) is an auditory evoked potential that reflects the encoding of acoustic traces of the stimulus, especially speech sounds, in the nuclei of the auditory brainstem (Skoe; Kraus, 2010). FFR has a predominantly subcortical origin and its expression can be modulated by cognitive and attentional factors, especially in auditory learning contexts (White-Schwoch *et al.*, 2019).

As shown in Figure 1, the combined protocols (TAAC + SENA and SENA + TAAC) showed significant reductions in the latencies of waves V, A, D, E, F, O, and VA, with emphasis on the SENA + TAAC group in the VA complex (0.14 ms). These findings suggest that the combination of protocols promotes more efficient functional reorganization, possibly by synergistic activation of subcortical and cortical mechanisms, with SENA acting as an intensifier of the TAAC effect. The findings related to the VA complex, a marker of temporal accuracy and integrity of auditory response, reinforce the efficacy of the combination of protocols. The combined groups, especially SENA + TAAC, showed optimized performance, which suggests that the order of application can influence the efficiency of neural reorganization, although both combinations were effective.

while the peaks between waves D and E represent phase blocking at the frequencies of the first formant (F1) and the peaks between waves E and F represent the frequencies of the second formant (F2). D, E, and F waves provide information about the neural phase-locking of the fundamental frequency and harmonic components of the stimulus (Skoe; Kraus, 2010). According to White-Schwoch; Kraus (2017), FFR has a "double face": it reveals both the effects of past auditory experiences and also the potential for future communicative development. The authors argue that FFR is a reflection of the auditory system's adaptations to significant sound exposure, arguing that rich, repeated, and engaging auditory experiences are crucial to shaping brainstem physiology.

For the O wave, which represents the coding of the *offset* (termination) of the sound stimulus, being one of the last waves to appear in the register, usually between 40 and 50 ms. It reflects the neural activity associated with the end of the vowel of the syllable, indicating late neural synchrony in the auditory pathway. The O wave is relevant because it provides information on the temporal precision in the closure of the acoustic stimulus (Skoe; Kraus, 2010; White-Schwoch *et al.*, 2019). In this study, in the isolated intervention, only the TAAC group presented statistically significant results. The effect of TAAC on the O wave may be related to the protocol's emphasis on temporal precision, rhythm, and fine acoustic discrimination tasks, which directly stimulate stimulus offset coding. Unlike SENA, which promotes alternating and diffuse auditory stimulation. TAAC requires active response and sustained focus, favoring delayed neural synchronization, explaining its efficacy in modulating this component of FFR (Skoe; Kraus, 2010; Kraus; White-Schwoch, 2015).

These findings indicate an improvement in neural synchronization and temporal accuracy of subcortical auditory processing, suggesting that the proposed interventions are capable of inducing functional plasticity in the auditory brainstem. This interpretation is supported by the literature that recognizes FFR as a sensitive marker of auditory experience and neural efficiency (Skoe; Kraus, 2010; White-Schwoch; Kraus, 2017).

The results confirm that combined auditory interventions are more effective than isolated interventions in modulating FFR and that the complementary use of SENA can potentiate the effects of TAAC. The data reinforce current models of auditory plasticity, which consider the auditory system as dynamic, distributed, and highly responsive to meaningful sound experience (White-Schwoch; Kraus, 2017; White-Schwoch *et al.*, 2019; Ross *et al.*, 2020).

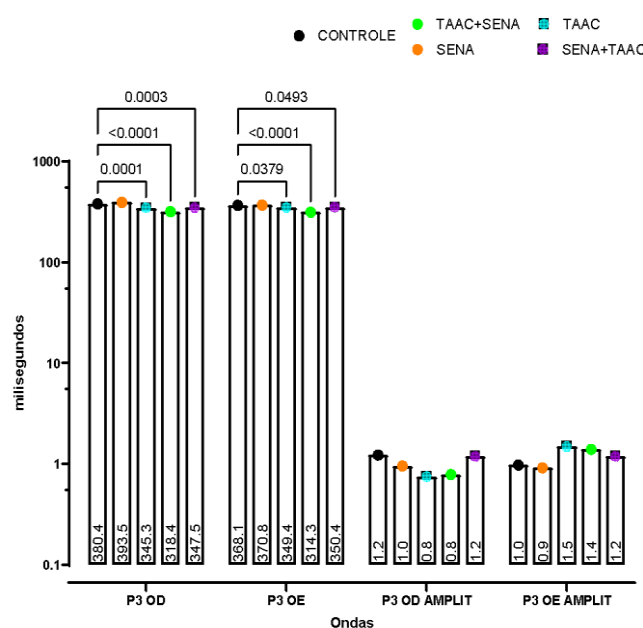
3.2 CORTICAL PROCESSES: P300 RESULTS

The PEALL P300 is a long-latency auditory evoked potential related to cognitive activities such as attention, discrimination, recognition, naming, and memorization of auditory information (Riggins; Scott, 2020). Its elicitation requires the performance of an active task by the individual, reflecting the functional use of the stimulus, so it is considered an endogenous potential. Its generators involve structures such as the auditory, prefrontal, centroparietal and hippocampal cortex, as well as associative regions such as the thalamus and temporoparietal cortex, interconnected to the brainstem and reticular formation (Sowndhararajan *et al.*, 2018).

P300 has been widely used as a complementary marker in the diagnosis and follow-up of cognitive and attentional alterations, as well as in monitoring the effectiveness of interventions such as auditory training (De Medeiros *et al.*, 2020). In the present study, the results of the P300 (Figure 2) showed that the SENA protocol, when applied in isolation, did not produce statistically significant changes in latency in any of the ears. On the other hand, TAAC alone generated significant bilateral improvement, demonstrating its effectiveness in modulating cortical activity.

Figure 2

Comparison of the Control, TAAC, SENA and combinations (TAAC+SENA; SENA+TAAC) for the P3 wave of the PEALL P300 test



Legend: TAAC - Acoustically controlled auditory training; SENA – NeuroAuditory Stimulation System; BAEP P300 - Long-latency auditory evoked potential; OD - Right ear; OE - left ear. Data expressed as arithmetic mean marked with the statistical difference between groups through Two-Way Analysis of Variance with Fisher's post-test (LSD). $P \leq 0.05$ was considered significant.

Source: Authors.

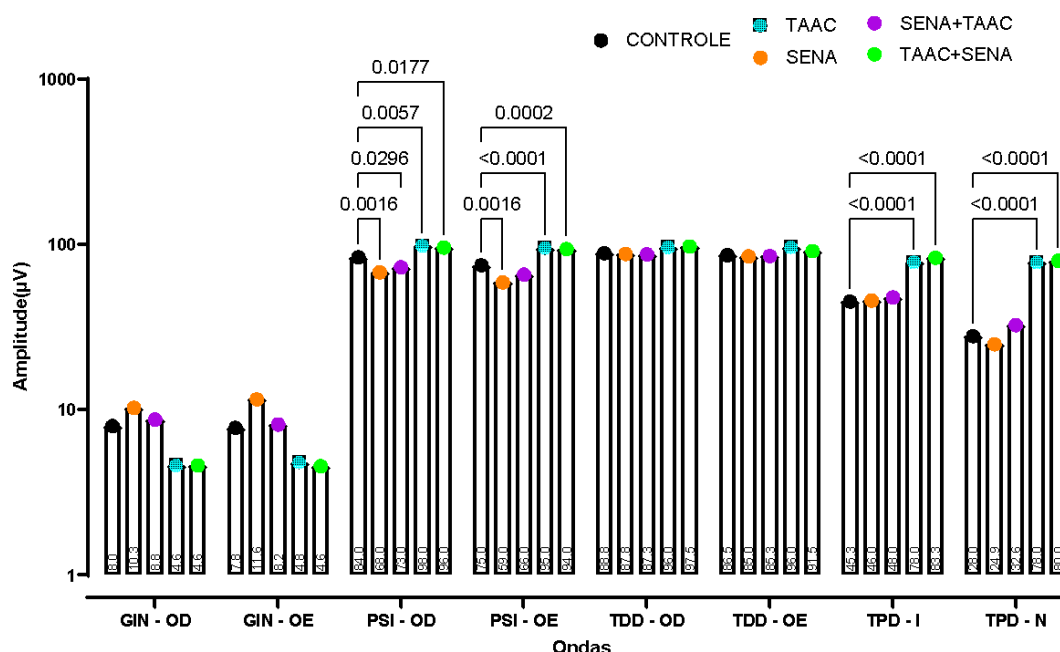
The combined protocols (TAAC + SENA and SENA + TAAC) also showed significant reductions in P300 latency, indicating a faster and more efficient cortical response. These findings suggest that, although SENA alone did not promote measurable changes in this electrophysiological marker, its association with TAAC potentiated the effects of auditory stimulation, especially with regard to the engagement of superior cortical mechanisms. This corroborates the idea that auditory interventions involving structured tasks and temporal control, such as TAAC, are more effective in promoting neural plasticity in regions associated with attention and auditory integration (Riggins; Scott, 2020; De Medeiros *et al.*, 2020). This result is particularly relevant in the context of children with learning difficulties, in whom deficits in temporal processing and low efficiency in the identification of brief and successive acoustic stimuli are frequently observed (Riggins; Scott, 2020).

3.3 CENTRAL AUDITORY PROCESSING (CAP)

Central auditory processing (CAP) has been widely studied and refers to the individual's ability to analyze and interpret auditory information effectively and efficiently. This process involves a set of fundamental auditory skills, such as sound detection, localization and discrimination, recognition, temporal ordering, figure-ground for verbal and non-verbal sounds, auditory synthesis, binaural integration, interaction and separation, auditory closure and recognition of temporal patterns. These skills are essential for understanding the acoustic stimuli captured by the peripheral auditory system (Avanzi; Cardoso, 2023). In the CAP tests (Figure 3), significant differences were observed in PSI, TPD, and TPD-N for groups with TAAC alone or in combination. The GIN and TDD tests did not show significant changes, indicating the absence of a measurable effect of the interventions in these aspects.

Figure 3

Comparison between Control, TAAC, SENA and combinations (TAAC+SENA; SENA+TAAC) in the GIN, PSI, TDD, TPD-I and TPD-N tests



Legend: TAAC - Acoustically controlled auditory training; SENA – NeuroAuditory Stimulation System; GIN – Gaps-in-noise; PSI - Pediatric Speech Intelligibility Test; TDD - Dichotic Digit Test; Duration pattern - TPD-I and TPD-N; OD - Right ear; OE - left ear. Data were expressed as arithmetic mean, marked with the statistical difference between groups through Two-Way Analysis of Variance with Fisher's post-test (LSD). $P \leq 0.05$ was considered significant.

Source: Authors.

The PSI test evaluates figure-ground ability for verbal stimuli (Chermak *et al.*, 2014), showing that unsatisfactory performances may indicate difficulties in speech discrimination in noisy environments (Jerger *et al.*, 1983). Electrophysiological studies demonstrate that this ability depends on the efficient processing of acoustic information in the brainstem (Jerger; Jerger, 1982; Skoe; Kraus, 2010). In the present study, the SENA, TAAC and TAAC+SENA groups presented statistically significant results in the performance of this skill, suggesting an improvement in auditory segregation after the interventions. This finding may be justified by the fact that, in children, the auditory system is still in the process of maturation, which makes the PSI especially sensitive to detect alterations in populations with learning difficulties or language disorders (Schochat *et al.*, 2010). In addition, Vellozo *et al.* (2015) demonstrated that the PSI is applicable and effective in different age groups, with increasing performance as the central auditory pathway develops. The study also highlights its clinical value in school and therapeutic contexts. In the dichotic digit test (TDD) and GIN no significant differences were identified between the groups.

The Duration Pattern Test (DPT), which evaluates the ability of temporal ordering (Musiek *et al.*, 1990), can help in the assessment of the perception and processing of rapid temporal characteristics, including in children who already have a diagnosis of language impairment (Balén *et al.*, 2019; Pires; Schochat, 2019). In this study, statistically significant differences were observed, with better performances in the groups that included TAAC, especially when the intervention was initiated by it. The SENA group, alone, and the SENA + TAAC combination did not show significant improvement. The findings suggest that combined protocols, especially starting with TAAC, promote more expressive gains in auditory processing skills.

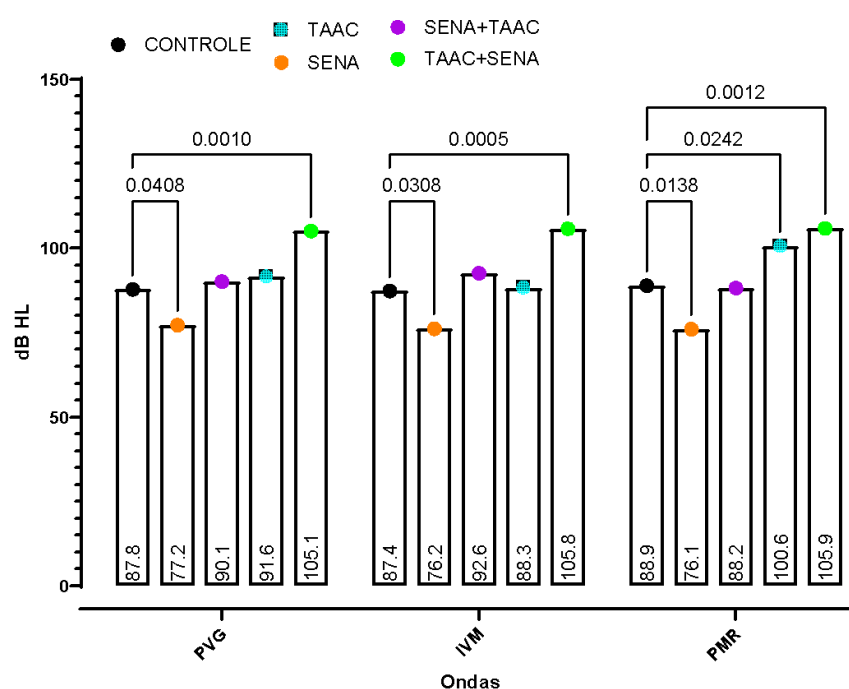
3.4 VISUOMOTOR SKILLS: DTVP-2

The *Developmental Test of Visual Perception – Second Edition* (DTVP-2) evaluates perceptual-visuomotor skills that are fundamental for school and daily performance. It is composed of functions of visual basis, position in space, figure-ground, visual closing, and constancy of form, and functions that require integrated motor components, such as visuomotor coordination, copying, spatial relationship, and visuomotor velocity (Brown, 2002). According to Figure 4, the best results in the quotients general visual perception, visuomotor integration and reduced motor perception (PVG, IVM and PMR) were observed in the combined TAAC + SENA protocol, with statistical significance in all measures. The isolated TAAC group showed intermediate performance, superior to the control in some domains, but without robust differences. On the other hand, SENA, when applied in isolation, showed inferior results to the control group.

In addition, it was found that the order of application influenced the scores: when SENA was performed after TAAC (TAAC + SENA), the results were higher than with SENA alone, suggesting a possible synergistic or sequence-dependent effect. Although all experimental groups outperformed the control, only the TAAC + SENA combination promoted consistent and statistically significant gains.

Figure 4

Comparison between Control, TAAC, SENA and combinations (TAAC+SENA; SENA+TAAC) in the PVG, IVM and PMR subtests of the visual perception assessment



Legend: TAAC - Acoustically controlled auditory training; SENA – NeuroAuditory Stimulation System; PVG - general visual perception; IVM - visuomotor integration; PMR - perception of reduced motor skills. Data were expressed as arithmetic mean, marked with the statistical difference between groups through Two-Way Analysis of Variance with Fisher's post-test (LSD). $P \leq 0.05$ was considered significant. Source: Authors.

The results obtained reinforce the influence of auditory and visual integration on learning. In natural environments, auditory signals are rarely processed in isolation, and are often accompanied by redundant or complementary visual information (Opoku-Baah, 2021). From a neurophysiological perspective, the inferior colliculus (IC) is known to receive visual inputs, with recent animal studies suggesting that these inputs increase sensitivity in auditory processing (Chen et al., 2019). In addition, vision plays a dominant role in auditory spatial plasticity, guiding the maturation of auditory neuron response properties and ensuring the alignment of spatial maps in the superior colliculus (Opoku-Baah, 2021).

In the school context, visuomotor integration is equally decisive, since the efficiency of learning depends largely on the proficiency of this skill, built on postural and body bases from the first years of life. The perception of reduced motor skills, assessed by the DTVP-2, reflects precisely the sum of the scores obtained between visual perception and the visuomotor component, pointing to the relevance of this integration in learning (Opoku-Baah, 2021).

Thus, the superiority of the TAAC + SENA protocol may be related to the combination of auditory and visual stimuli that strengthens connectivity between brain areas and recruits

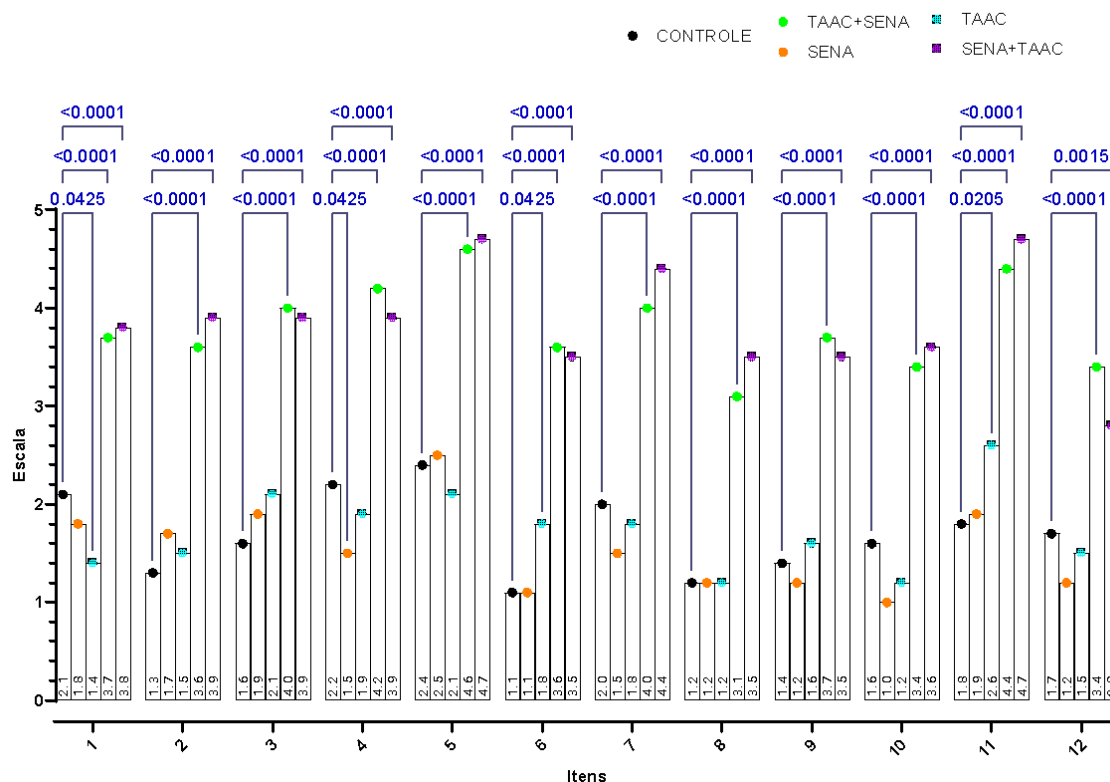
wider networks, resulting in more accurate and stable perceptions (Opoku-Baah, 2021). Using training methods based on complementary stimuli can enhance both auditory perceptual learning and visuomotor development, which justifies the more expressive gains in the combined group.

3.5 FUNCTIONAL AUDITORY BEHAVIOR: SAB SCALE

The SAB Scale is a questionnaire that allows quantifying, in the perception of parents and/or guardians, the child's auditory behavior in the demands of daily life, considering the information received through hearing (Viacelli *et al.*, 2018). In this study, a significant improvement was observed in all 12 items evaluated in the groups submitted to hearing interventions, with emphasis on the combined protocols, which promoted broader benefits in the auditory behavior perceived or reported by caregivers, compared to the isolated interventions (Figure 5).

Figure 5

Comparison between Control, TAAC, SENA and combinations (TAAC+SENA; SENA+TAAC) in the 12 items of the SAB Scale



Legend: TAAC - Acoustically controlled auditory training; SENA – NeuroAuditory Stimulation System; SAB Scale - *Scale of Auditory Behavior*. Data expressed as arithmetic mean marked with the statistical difference between groups through Two-Way Analysis of Variance with Fisher's post-test (LSD). $P \leq 0.05$ was considered significant.

Source: Authors.

Recent studies reinforce the sensitivity of the SAB Scale to detect functional changes after intervention. In a study with children with auditory processing disorder, parents or guardians reported significant evolution in the hearing and attention domains after training with TAAC, evidencing the scale's ability to reflect perceived gains in daily life (Viacelli *et al.*, 2018). In addition, a study with adolescents indicated good agreement between self-perception and parental assessment through the SAB and correlation with results obtained in formal auditory processing tests, validating the use of the instrument as a diagnostic support (Nardez *et al.*, 2022). The consistency of the scores across the different domains of the scale in this study reinforces the effectiveness of integrated protocols in promoting functional auditory skills in the family and educational environment.

3.6 NEUROFUNCTIONAL INTEGRATION: LURIA'S THEORY

According to Luria (1981), conscious brain functioning results from the integration of three functional units, understood as complex systems that articulate several brain areas in a dynamic way (Mikadze *et al.*, 2019; Peña-Casanova, 2018). The first unit, responsible for regulating cortical tone, wakefulness, and attention, is supported by subcortical structures such as the brainstem, reticular formation, and mesial regions of the cortex, with connections to the limbic system (Peña-Casanova; Sigg-Alonso, 2020). The second unit, dedicated to receiving, processing, and storing sensory information, involves the temporal, parietal, and occipital lobes (Peña-Casanova; Sigg-Alonso, 2020; Sugahara *et al.*, 2021), where stimuli are organized and subsequently converted into thought and memory in the tertiary cortex (Sugahara *et al.*, 2021). Finally, the third unit, which will not be discussed in the context of this study, is related to the frontal lobes and refers to the programming, regulation, and verification of conscious activity, including functions such as impulse inhibition, planning, and monitoring of actions (Ramos-Galarza *et al.*, 2019).

In this sense, the hypothesis raised in the present study about the efficacy of SENA is based on the first functional unit described by Luria, which plays a fundamental role in the regulation of the state of cortical activity and the level of vigilance. This stimulation would favor the activation of subcortical circuits responsible for neural readiness, establishing a state of greater cortical organization necessary for the processing of auditory information (Peña-Casanova; Sigg-Alonso, 2020). Thus, SENA would act as a neurosensory preparer, contributing to the modulation of cortical arousal and primary care. The results obtained in the ipsilateral PSI tests in both ears, in the VA complex in the FFR and in item 4 of the SAB scale after the application of the SENA corroborate Luria's statements regarding the importance of subcortical regulation for attention and sensory processing.

In turn, the TAAC (Acoustically Controlled Auditory Training) protocol establishes a direct relationship with the second functional unit. Its structure requires the active execution of auditory tasks with a high degree of temporal and acoustic control, stimulating cortical regions involved in the analysis, discrimination and interpretation of sounds, especially the temporal and parietal lobes (Peña-Casanova; Sigg-Alonso, 2020; Sugahara *et al.*, 2021). By reinforcing sequential processing and auditory coding, TAAC contributes to the enhancement of perceptual and cognitive skills related to language and central auditory processing, strengthening the sensory systems that underpin learning. Clinical evidence shows that the protocol promotes significant improvement in children with central auditory processing disorder, especially in the areas of attention, listening, and communicative behavior (Viacelli *et al.*, 2018).

4 CONCLUSION

The study evaluated the effectiveness of TAAC and SENA protocols in children with learning disabilities. Applied alone, TAAC showed significant effects on central auditory processing and P300, while SENA showed more restricted but relevant gains in FFR markers and the PSI test, suggesting initial action on neural readiness and primary care. These results reinforce the complementarity of the protocols, with TAAC activating structured tasks with high temporal demand and SENA modulating subcortical activity and increasing neural responsiveness.

The combined interventions promoted superior and consistent effects in multiple domains, including subcortical neural synchronization, cortical plasticity, perceptual-visuomotor skills, and functional auditory behavior, as evidenced in electrophysiological and perceptual tests, and on the SAB scale. Although the order of application did not impact all electrophysiological markers, better performance was observed in auditory processing tests when TAAC preceded SENA, indicating that the sequence can enhance certain gains.

The results highlight the combined use of the protocols as a promising approach for auditory and cognitive rehabilitation, expanding the understanding of the mechanisms of neural plasticity and its implications for learning.

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GAMIFICATION AS A DIDACTIC RESOURCE: RECONCEIVING THE ROLE OF WOMEN IN BRAZILIAN LITERATURE

GAMIFICAÇÃO COMO RECURSO DIDÁTICO: RECONCEITUAR O PAPEL DA MULHER NA LITERATURA BRASILEIRA

LA GAMIFICACIÓN COMO RECURSO DIDÁCTICO: RECONCEPTUALIZANDO EL PAPEL DE LA MUJER EN LA LITERATURA BRASILEÑA



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ABSTRACT

The hypothesis of this study was based on the understanding that technologies and educational innovations contribute to the reformulation of the conception of women. The theoretical framework was grounded in the principles of literary analysis proposed by Cândido (1995, 2000, 2009, 2014, 2015), and in the competencies and skills established by the BNCC (2018). The general objective was to identify characteristics of oppression affecting Black women writers, while the specific objectives were: (i) to identify and compare actions related to narrative structure; (ii) to analyze forms of oppression directed at Black women writers; (iii) to analyze didactic methods; and (iv) to propose the development of teaching materials along with gamification-based exercise proposals. From this perspective, it was possible to observe that technological tools can foster new ways of understanding the feminine condition.

Keywords: Literature. Educational Technology. Gamification. Pas/UnB. High School.

RESUMO

A hipótese deste trabalho consistiu no entendimento de que as tecnologias e as inovações educacionais auxiliam na reformulação da concepção da mulher. A teoria fundamentou-se nos pressupostos de análise literária de Cândido (1995, 2000, 2009, 2014, 2015) e das competências e habilidades orientadas pela BNCC (2018). O objetivo geral foi identificar características de opressão a escritoras negras, e os objetivos específicos foram i) identificar

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e comparar as ações da estrutura narrativa; ii) analisar formas de opressão às escritoras negras; iii) analisar métodos didáticos; iv) propor a elaboração de material didático junto a propostas de exercícios de gamificação. Com isso, foi possível observar que as ferramentas tecnológicas podem orientar novas visões sobre o ser feminino.

Palavras-chave: Literatura. Tecnologia Educacional. Gamificação. Pas/UnB. Ensino Médio.

RESUMEN

La hipótesis de este trabajo fue que las tecnologías e innovaciones educativas contribuyen a transformar la concepción de la mujer. La teoría se basó en los supuestos del análisis literario de Cândido (1995, 2000, 2009, 2014, 2015) y en las competencias y habilidades de la BNCC (2018). El objetivo general fue identificar las características de la opresión contra las escritoras negras, y los objetivos específicos fueron: i) identificar y comparar las acciones de la estructura narrativa; ii) analizar las formas de opresión contra las escritoras negras; iii) analizar los métodos de enseñanza; iv) proponer el desarrollo de materiales didácticos junto con ejercicios de gamificación. Con esto, se observó que las herramientas tecnológicas pueden guiar nuevas perspectivas sobre la experiencia femenina.

Palabras clave: Literatura. Tecnología Educativa. Gamificación. Pas/UnB. Bachillerato.

1 INTRODUCTION

In this work, we aimed to discuss how the right to literature can reconceptualize, through the help of technologies, the role of women in Brazilian society and especially in the field of literature. In this sense, the hypothesis defended in this research was that the use of pedagogical resources such as gamification can promote new pedagogical practices in the teaching of literature. This investigation was justified by the understanding that the right to access literature needs to be consolidated in society, requiring pedagogical measures that promote them in an educational environment, especially at the secondary level. Therefore, the main function of this research was to present innovative pedagogical practices, whose development will guarantee the right to literature and the reconceptualization of women.

At first, it was necessary to understand the national literary panorama and the challenges faced by the educational system to consolidate it and to stimulate skills and competencies necessary for the acquisition of such knowledge. From this perspective, Cândido (1995, 2000, 2009, 2014, 2015) presents literature as a right to be consolidated in the Brazilian system, in addition to showing the national literary system as the result of a contradiction between external and internal forces, calling this contrast of advance and oppression as contradictions. Associated with Cândido's thought, Bosi (2015) also exposes his perception of the national literary scene, about its characteristics. Thus, the understanding of the national literary system and the need to consolidate literature as a right proved to be necessary foundations to be discussed.

With the understanding of the characteristics of the literary system, it is necessary to understand what are the reading skills and abilities required in the Brazilian educational system. In this sense, it is necessary to observe the legal provisions, such as the National Common Curricular Base (2018) and the Serial Assessment Program, of the University of Brasília (2023). With these understandings, it is possible to analyze which competencies and skills can be demanded in technological environments, with a view to remaking the conceptual perspective of women.

By understanding the literary system, the competencies and the educational skills required by reading, it is necessary to identify ways to overcome these gaps. In this context, it is specifically necessary to contrast the definitions of *i*: narrative structure; *ii*: the literary characteristics of Brazilian Romanticism and *iii*: characteristics of the author, in Cândido (1975, 2000, 2009, 2014, 2015), in Bosi (2015) and in Neves (2021). Subsequently, we sought to relate technological resources, such as Kahoot, to the needs to advance in technological pedagogical processes, as indicated by Silva (2022) and Lovato, Michelotti,

Silva and Loretto (2018). Based on this contrast, finally, it is possible to present new pedagogical processes that reformulate the vision of women writers.

2 NATIONAL LITERARY PANORAMA – BRIEF THEORETICAL PERSPECTIVE

The national literary system went through a process of universalist and particular tendencies, mainly in view of the colonial process, which began in 1530. Such a historical moment reflected a position of disadvantage to the national literary system: there was the imposition of European values, universal values, standing out from national values, particular values. Cândido (2014, p. 25) points out that, in the meantime, it is necessary to "[...] to begin by distinguishing literary manifestations, from literature properly so-called, considered here as a system of works linked by common denominators, which allow us to recognize the dominant notes of a phase". In the author's understanding, the first literary manifestations occurred due to the imposition of European culture in the Brazilian system, which means that Brazilian authors, at the time almost none, were subordinated, perhaps not even considered as literary producers.

In this sense, it became imperative to discuss which characteristics would transform literary manifestations into, in fact, literature. Cândido's (2014, p. 25) thought about the criteria that underlie a literary product shows that "these denominators are, in addition to the internal characteristics (language, themes, images), certain elements of a social and psychic nature, although literarily organized, which manifest themselves historically and make literature an organic aspect of civilization", also according to the author, "among them are distinguished: the existence of a group of literary producers, more or less aware of their role; a set of receivers, forming the different types of audience, without whom the work cannot live; a transmitting mechanism, (in general, a language, translated into styles), that connects one to the other."

Having these criteria organized, the teaching of literature, then, must permeate this understanding. It is important, in this context, to understand that this intersection between the subject – the literary producer with his sociological characteristics such as race, gender, sexual orientation and the ideology followed -, the receiver – the one who consumes the literary product, in this research, defined by students of the 2nd grade of High School – and the work – identified by its genre and its theme -. This theoretical perception of Cândido (2014, p. 26) results in the notion that "the set of the three elements gives rise to a type of inter-human communication, literature, which appears from this angle as a symbolic system" because, according to Cândido (2014, p. 26), "the individual is transformed into elements of contact between men, and of interpretation of the different spheres of reality", that is, it is

through this triad that literature, its study and its teaching, through technological resources, can reconfigure society's view of women, especially black writers marginalized in the course of time.

This understanding is consolidated by Cândido (2014), because

To get as close as possible to the exposed design, a broad and constant movement between the general and the particular, synthesis and analysis, erudition and taste is necessary. It is necessary to have a penchant for integrating contradictions, which are inevitable when one pays attention at the same time to the historical significance of the whole and the singular character of the authors. It is sometimes necessary to feel that an author and a work can be and not be something, being two opposite things simultaneously, because living works constitute an incessant tension between the contrasts of the spirit and the sensibility. The form through which the content is manifested, making expression with it, is a more or less happy and lasting attempt to balance these contrasts. But, even when relatively perfect, it allows a glimpse of the contradiction and reveals the fragility of balance. Therefore, anyone who wants to see in depth has to accept the contradictory, in the periods and in the authors, because, according to a fair phrase, it "is the very nerve of life" (Cândido, 2014, p. 32).

In view of the fact that the Brazilian literary system has been invaded by the European Portuguese literary system, the national literary system, especially with regard to the work – to the detriment of the producer and the receiver – presents a literature with two edges, that is, advances and setbacks in the literary product. On this premise, Cândido (2009, p. 2) is emphatic in stating that "[...] Let us begin by saying that in their formation our literatures are essentially European, insofar as they continue the research of the soul and society defined in the tradition of the metropolises" the author also completes by stating that "[...] we inherited relatively little of what was popular, magical-religious and spontaneous in the literature of the Middle Ages; and, quite the contrary, of an erudite literature, full of formal demands, open to a realistic and at the same time allegorical vision of life."

In view of the colonization process also in the literary sphere, Cândido (2009, p. 2) emphasizes that "as a result, literature was forced to imprint on the inherited expression certain inflections that made it capable of expressing the new natural and human reality as well.", the author also states that "in this way, a kind of experimentation took place within European culture, whose result was the national literatures of Latin America in terms of extension and novelty, copy and invention, automatism and spontaneity".

In Brazil, it is worth noting that

Literature played a prominent role in this process of cultural imposition, suffice it to remember that the chroniclers, historians, orators and poets of the first centuries were almost all priests, jurists, officials, soldiers, landlords obviously identified with the sanctioned values of metropolitan civilization. For them, the letters should express the

religion imposed on the primitives and the political norms embodied in the Monarchy; but even when devoid of an ostensible ideological aspect, they would be a form of mental discipline in Europe, which should be applied to the rustic environment by way of instruction (Cândido, 2014, p. 32).

The historical-literary perspective of the formation of Brazil, so far defended by Cândido (2009, 2014, 2015), allows us to affirm that the process of Brazilian literary production contains a mixture of European linguistic/structural traits, to the detriment of a more national content. In the works, the contrast between the trace of the colonizer, the universal feeling, the trace of the colonized and the particular feeling, in the works, provokes the so-called contradiction, because, as Cândido (2009, p. 5) states, "precisely because it maintains relations with social reality, literature incorporates its contradictions into the structure and meaning of the works". For this reason, Cândido (2009, p. 5) continues to state that

"[...] The works that most wish to accentuate and reinforce the dominant political and cultural order are, at the same time, those that use local suggestions with greater affection and discernment, ending up seeming to posterity that they affirmed our peculiarities and feelings against external overimposition. This had largely become an adaptation, and literature, in the whole of the Portuguese cultural heritage, was passing under the control of the new dominant groups, always as a factor of unity, continuity and an awareness of reality that adjusted to their interests and their designs (Cândido, 2009, p. 6).

Within this conjuncture of literary imposition, there will be a moment in which the rupture between colonizer and colonized needs to end, because literary manifestations, reproductions of European texts with colonizing intent, have come to configure a certain literary system, although, even in the texts in which Brazilian literature seems to be consolidated, there is the prospect of distinction between contradictions, universal and particular values, present in the criteria of literary systems, the triad of the producer, the consumed and the work.

In the point of view of Cândido (2009, p. 9), "after political independence, the idea spread among writers that literature was a form of national affirmation and construction of the homeland, hence the two aspects indicated subsist, as before". This requires the understanding that national values could, at a certain moment, represent, in fact, Brazilian society and the ideology from which the nation would actually emerge. On this issue, Cândido (2009, p. 9) is emphatic in pointing out that "my insistence on the eighteenth century is not fortuitous, since it was in it that the lines of our spiritual physiognomy were defined with a

certain clarity, configuring values that influenced all the subsequent evolution of society and culture".

The eighteenth century in Brazil is marked by important factors, such as the arrival of the press, allowing the development of literary products, giving producers the possibility of establishing, in fact, a literary system, in the style of Cândido (2014), by representing the triad of the producer, the consumer and the work. At this juncture, it is essential to take into account the position of Cândido (2015, p. 33) when discussing that "evidence such as these shows that from the middle of the eighteenth century onwards it is possible to speak at least of the outline of a literature as a configured cultural fact, and not only as individual productions of little repercussion", that is, the modification of literary manifestations by literary productions is configured, evidently when taking into account the formation of, in the Brazilian State, the triad necessary for literary production, the producer, the consumer and the work.

The choice of the object of analysis – the romantic work "A Escrava", by Maria Firmina dos Reis – is in line with Cândido's (2015, p. 44) ideal that the literary moment is the consolidation of literary expressions, as the author states that "between Arcadism and Romanticism there is an evident aesthetic rupture, but there is also historical continuity, as both are moments of solidarity in the formation of the literary system and in the desire to see a regular production functioning in the homeland.", reinforcing that "significantly, the Romantics considered their precursors the classical poets of the second half of the eighteenth century and the beginning of the nineteenth century who dealt with indigenous and religious themes."

However, although the formation of the literary system for Cândido (2015) is consolidated in the Romantic period, the works produced here must still highlight the contradictions between universal (European) and particular (national) values, and the tension of these forces is the key to literary criticism and its advancement. This is understood in view of the fact that Cândido (2015, p. 45) informs that "in Romanticism the localist tone predominates, with the effort to be different, to affirm the peculiarity, to create a new and if possible unique expression, to manifest the singularity of the country and of the self.", pointing out that "hence the development of confession and the picturesque, as well as the transformation into a national symbol of the indigenous theme, considered essential to define the Brazilian character, and, therefore, legitimate, of the text.

Although the indigenous was elevated to the icon of Brazilian representation by the literary writers of the time – mostly men and whites, as Cândido (2015) points out when mentioning several important authors to the movement, such as Gonçalves de Magalhães, Gonçalves Dias, Álvares de Azevedo, José de Alencar and Castro Alves, the local setting,

mostly in Rio de Janeiro, disregarded two significant powers that were quite representative of Brazilian society: the woman and the black. This is quite evident in Cândido (2015, p. 52), because "in addition to this sentimental poetry, Brazilian Romanticism knew the humorous and ironic, the satanic and the social, forming a very extensive range that increased the possibility of penetration with broad audiences". Again, there was no room for women and blacks.

The problem of the predilection of important themes is a direct result of the Brazilian colonial system, as indicated by Cândido (1975, p. 15), such an obstacle originated "[...] of a convergence of local factors and external suggestions, is at once national and universal." In this sense, Cândido (1975, p. 22) emphasizes that "Romanticism emerges as a moment of negation, negation, in this case, and in Luso-Brazilian literature, deeper and more revolutionary, because it aimed to redefine not only the poetic attitude, but the very place of man in the world and in society". In order to define the place of man in the world and in society, one can never neglect that, at that moment, the Brazilian reality imprisoned black men and women, although the mutual understanding of having, in the national territory, the indigenous, although mutilated by the Europeans, the so-called national hero, an idealistic configuration, disconnected from reality, is reinforced.

This initial theoretical perspective begins to delimit which contradictions – external and internal – mark the thematic content and structure of the work. From another theoretical perspective, Bosi (2015) presents more specific concepts about the characteristics of Romanticism, which can be subsidies for the analysis of romantic texts in the classroom environment, both in terms of content and in terms of structures, always remembering that both present, as already seen, contradictions between external and internal values. In terms of content, Bosi (2015, p. 95) points out that "love and homeland, nature and religion, people and the past, which emerge so often in romantic poetry, are raw contents, spread throughout the history of literature", but he still draws attention to a problem, because, even in this perception, these characteristics "teach little to the interpreter of the text, except when they are put into a situation, thematized and read as aesthetic structures".

This aesthetic structure in terms of content derives from the philosophical moment that permeated the eighteenth century, since, according to (Bosi, 2015, p. 96) the perspective was that the romantic work was "still immersed in the muteness of unconsciousness, in those for whom the hour of Liberty-Equality-Fraternity had not struck". Now, this perspective of liberty-equality-fraternity, as an Enlightenment movement, is a central piece in the analysis of the text "The Slave", by Maria Firmina dos Reis, as already seen, the author was ignored by almost every canon of literary critics. Based on this conjuncture of Bosi (2015, p. 96), one

can understand that "Romanticism expresses the feelings of those dissatisfied with the new structures: the nobility, which has already fallen, and the petty bourgeoisie that has not yet risen: from whence, the nostalgic or vindictive attitudes that punctuate the entire movement", but not with regard to two classes: women and blacks.

In structural terms, the novel, which appears as an opposition to the lyrical-poetic texts, presents itself, in the period, as the new bourgeois epic. Without this exchange,

[...] we do not touch the core of romantic art until we understand the codes that encode the new messages. It is the last circle, the aesthetic Poetry, the novel and the theater come into existence at the moment when the ideas and feelings of a group take the form of compositions, intentional arrangements of signs, structures or even, to use the old term rich in human meanings, at the moment when the subjects become works (Bosi, 2015, p. 100).

In the codes of romantic literary texts, the codes emphasized the presence of religiosity, intimacy and nationalism, as already seen, but this occurs, and only if, if it is not possible to read the product of texts written by black women of the time, such as the great Maria Firmina dos Reis. Certainly, the romantic code is idealized, because the new national conjuncture would require a new aesthetic, a new system of control cannot be admitted without the new system of art, but neither can one erase from the Brazilian scenario the great contribution of Maria Firmina dos Reis on the understanding of the contradictions exposed from the feminine point of view, the black feminine.

The change of the code as a system of symbols marks above all, the text of Maria Firmina dos Reis, as it is a short story, a text of the narrative genre, which, at the time, was quite innovative and promising, even with the refusal of the most consecrated authors to accept the feminine capacity to also represent, through art, the ideals of a pseudo-nation, like Brazil, at the time. Regarding this code exchange, Bosi (2015, p. 101) argues that "a new writing had replaced the classical codes in the name of the subject's creative freedom. The liberations were made on several fronts", the author also adds that "the epic, a heroic expression already in crisis in the eighteenth century, is replaced by the political poem and the historical novel, free from the constraints of internal organization that marked the narrative in verse".

As a result of external disputes, in the romantic works, and in Maria Firmina's text, it should be evident, based on Bosi (2015, p. 105), in terms of contradiction, that "the Indian, the source of the national nobility, would be, in principle, the analogue of the "barbarian", who had imposed himself in the Middle Ages and built the feudal world: this is the thesis that links the past-time of America to that of Europe.", the theorist also states that "Romanticism

remade in its likeness the image of the Middle Ages, giving it "novelistic" characters that were largely nourished by the fantasy of poets, narrators and scholars for almost half a century". In the case of Maria Firmina dos Reis, the Indian will not be elevated as a hero, in his place, there will be another evident contradiction.

With this in mind, Maria Firmina's writing did not find a specific readership, since, according to Bosi's thought

the Brazilian romantic novel was aimed at a more restricted audience than the current one: they were young men and women from the upper classes, and, exceptionally, the middle classes, they were the liberal professionals of the court or dispersed throughout the provinces: they were, in short, a type of reader looking for entertainment, who did not perceive very well the difference in degree between a Macedo and an urban Alencar (Bosi, 2015, p. 135).

For this reason, Maria Firmina's literature, at the time, was not valued, given that it was not generally a matter of defending the elite, of presenting the Indian as a hero or of being the joy of the bourgeoisie, but of denouncing, with content and innovative structures, the process of whitening Brazil and the systematic erasure of black people, especially the first female novelist and the first black female novelist in Brazil.

These literary theoretical reflections are important because, next, it will be necessary to discuss which language skills and abilities are necessary to identify and, above all, criticize the systematic erasure of this type of rich material. Therefore, it is necessary, as soon as possible, to identify the competencies and skills, the orientations produced in didactic materials and to propose, in a gamified way, exercises that can reflect the condition, in Romanticism, of female and black subservience.

3 VALUING MARGINALIZED BLACK WOMEN'S LITERATURE – LANGUAGE SKILLS AND ABILITIES IN HIGH SCHOOL

In view of the theoretical concepts about Romanticism established at this point, it is imperative to discuss how the Brazilian education system, both at the national level, through the BNCC (2018), and at the regional level, through the Serial Assessment Program of the University of Brasilia, present the competencies and skills related to literature, especially in the production of knowledge of women writers in times of oppression. It is understood that, according to Brasil (2018, p. 482), "in High School, the area has the responsibility of providing opportunities for the consolidation and expansion of the skills of use and reflection on languages", because "it is essential that students can assume the role of protagonists as appreciators and as artists, creators and curators" and, Above all, students "must be able to

make use of conventional, alternative and digital materials, instruments and resources, in different media and technologies".

From this perspective, it is worth highlighting three specific language skills that can guide the development of gamified pedagogical activities that develop language skills and abilities for the recognition and appreciation of women writers in times of oppression. Table one shows three general skills that are important for the execution of activities, as seen below.

Table 1

Language Skills and Abilities

Competencies	Contents
1	To understand the functioning of different languages and cultural practices (artistic, bodily and verbal) and to mobilize this knowledge in the reception and production of discourses in the different fields of social action and in the various media, to expand the forms of social participation, the understanding and the possibilities of explanation and critical interpretation of reality and to continue learning.
2	Understand the identity processes, conflicts and power relations that permeate the social practices of language, respecting the diversities and plurality of ideas and positions, and act socially based on principles and values based on democracy, equality and Human Rights, exercising self-knowledge, empathy, dialogue, conflict resolution and cooperation, and fighting prejudice of any kind.
3	Use different languages (artistic, body and verbal) to exercise, with autonomy and collaboration, protagonism and authorship in personal and collective life, in a critical, creative, ethical and solidary way, defending points of view that respect the other and promote Human Rights, socio-environmental awareness and responsible consumption, at the local, regional and global levels.

Source: Brazil (2018)

These language competencies were listed, as they can be related to the investigative processes on Brazilian literature that were defined by Cândido (1975, 2000, 2009, 2014, 2015), both in the tripartite analysis of producer, consumer and work, as well as to understand the existing contradictions – in universal and particular terms – especially in the literary work, which is the focus of this work. Such competencies present specific skills for the understanding of literary content and for the production of critical thinking based on literary content. In Table 2, below, the skills that will support the pedagogical proposition can be observed.

Table 2

Specific language skills in terms of literary field

(EM13LGG102) Analyze worldviews, conflicts of interest, prejudices and ideologies present in the discourses conveyed in different media, expanding their possibilities of explanation, interpretation and critical intervention of/in reality.
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(EM13LGG104) Use the different languages, taking into account their functioning, for the understanding and production of texts and discourses in various fields of social action.
(EM13LGG201) Use the various languages (artistic, body and verbal) in different contexts, valuing them as a social, cultural, historical, variable, heterogeneous phenomenon and sensitive to the contexts of use.
(EM13LGG202) To analyze interests, power relations and perspectives of the world in the discourses of the various language practices (artistic, bodily and verbal), critically understanding the way in which they circulate, constitute themselves and (re)produce meaning and ideologies.
(EM13LGG203) To analyze the dialogues and the processes of dispute for legitimacy in language practices and in their productions (artistic, bodily and verbal).
(EM13LGG302) To position oneself critically in the face of different worldviews present in discourses in different languages, taking into account their contexts of production and circulation.
(EM13LGG304) Formulate proposals, intervene and make decisions that take into account the common good and Human Rights, socio-environmental awareness and responsible consumption at the local, regional and global levels.
(EM13LGG401) Critically analyze texts in order to understand and characterize languages as a (geo)political, historical, social, cultural, variable, heterogeneous phenomenon and sensitive to the contexts of use.
(EM13LP46) To share meanings constructed in the reading/listening of literary texts, perceiving differences and possible tensions between personal and collective forms of apprehension of these texts, to exercise cultural dialogue and sharpen the critical perspective.
(EM13LP49) To perceive the structural and stylistic peculiarities of different literary genres (the personal apprehension of everyday life in the chronicles, the free and subjective manifestation of the lyrical self in the face of the world in the poems, the multiple perspective of human and social life in the novels, the political and social dimension of texts from marginal and periphery literature, etc.) in order to experience the different angles of apprehension of the individual and the world by literature.
(EM13LP52) Analyze significant works of Brazilian literature and those of other countries and peoples, especially Portuguese, indigenous, African and Latin American, based on tools of literary criticism (structure of composition, style, discursive aspects) or other criteria related to different cultural matrices, considering the context of production (worldviews, dialogues with other texts, insertions in aesthetic and cultural movements, etc.) and the way they dialogue with the present.
(EM13LP53) Produce appreciative and critical presentations and comments on books, films, records, songs, theater and dance performances, exhibitions, etc. (reviews, vlogs and literary and artistic podcasts, commented playlists, fanzines, e-zines, etc.).

Source: Brazil (2018)

The Language skills of the BNCC are directly articulated with the theoretical discussion developed in this work, insofar as they guide the critical reading of literary, pedagogical and media discourses that have historically sustained power relations, prejudices and ideologies responsible for the erasure of black women writers in the Brazilian literary system. The skills EM13LGG102, EM13LGG202, EM13LGG203, EM13LGG302 and EM13LGG401 dialogue with the notion of literature as a symbolic system crossed by contradictions, as discussed in the light of C ndido and Bosi, by enabling the analysis of worldviews, interests and disputes for legitimacy present in language practices. In this sense, the reading of romantic works and didactic materials allows us to understand how certain ideologies were naturalized and how the circulation of literary discourses contributed to the marginalization of black female voices, requiring from the student an interpretative and critical posture historically and socially situated.

In a complementary way, the skills EM13LGG104, EM13LGG201, EM13LGG304, EM13LP46, EM13LP49, EM13LP52 and EM13LP53 support the proposal of using technological resources and gamified practices as pedagogical strategies aimed at the resignification of the teaching of literature. By mobilizing different languages and discursive genres, these skills favor the understanding of literature as a cultural, historical phenomenon that is sensitive to the contexts of use, as well as encourage the production of critical comments, presentations and interventions that consider Human Rights and the common good. In this way, the articulation between literary theory, language skills and gamification enables not only the analysis of the structures and styles of the works, but also the reconstruction of meanings that value black female production and promote new forms of critical participation of students in the educational process.

In order to more specifically comply with the competencies and skills guided by the Ministry of Education, the University of Brasília specifically deepens which language competencies and skills should be required in the Serial Assessment Program, a three-year evaluation mechanism in which students undergo three sequential tests to enter university. Thus, it is presented that

With regard to the reading of the literary text, in a gradation that goes from the understanding of the discursive aspects of the work to the analysis of its formal composition and the comparison between different works, the analysis of the dynamic relationship that literature establishes with society, whether in its modes of production, circulation and reception, whether in aspects related to identities, the environment and the materiality of subjectivities. The scope of the literatures to be addressed was also expanded beyond Brazilian literature, considering Latin American literatures in general, as well as indigenous, African, and European literatures for the assessment of skills (University of Brasília, 2022, p. 31).

The general competencies charged by the university are as follows, as shown in Table

3

Table 3

Language Skills for the University of Brasília

Competencies
[06] Read, interpret, locate, retrieve and reflect, in a critical way, on information in texts of different genres, through verbal and non-verbal resources, analyzing and relating texts to form an understanding of the meaning conveyed in the text or in parts of it;
[07] Identify, analyze, interpret, apply and reflect, in a critical way, on elements that give expressiveness and style to texts, relating them to their contexts, through the nature, function, organization, structure of the manifestations, according to the conditions of production and reception;
[09] Understand, use, analyze and reflect, in a critical way, on the symbolic systems of different languages as means of cognitive organization of reality through the constitution of meanings, expression, communication and information, in interdisciplinary contexts;

Source: Universidade de Brasília (2022).

The competencies [06] and [07] of the Serial Assessment Program (PAS/UnB) are directly articulated with the competencies and skills of Languages of the BNCC that emphasize critical reading, textual analysis and the understanding of the mechanisms of construction of meaning in discourses. Competence [06], by proposing the reading, interpretation and critical reflection on texts of different genres, verbal and non-verbal, dialogues with skills such as EM13LGG102, EM13LGG104, EM13LGG302 and EM13LP46, which guide the analysis of worldviews, the meanings produced and the forms of circulation of texts in different social contexts. Competence [07], on the other hand, by focusing on the elements of expressiveness and style related to the conditions of production and reception, is close to EM13LP49, EM13LP52 and EM13LGG401 skills, since these presuppose the analysis of the structures, styles and discursive aspects of literary genres, considering their historical, cultural and ideological contexts.

The competence [09] of the PAS, in turn, establishes a transversal dialogue with the competences of the BNCC that conceive language as a symbolic system and social, cultural and historical phenomenon. In this sense, it is especially articulated with EM13LGG201, EM13LGG202, EM13LGG401 and EM13LGG304 skills, by promoting the critical understanding of languages as instruments of cognitive organization of reality, production of meanings and expression of ideologies. Thus, both the PAS and the BNCC converge in the defense of a reading and discursive education that goes beyond textual decoding, favoring the interdisciplinary analysis of discourses, the recognition of the power relations that cross them and the development of a critical and ethical posture in the face of language practices that circulate socially.

In terms of skills, it is also possible to harmonize those proposed by the BNCC (2018) with those proposed by the PAS/UnB, as can be seen below, in Table 4

Table 4

Language Skills for the University of Brasilia

Skills
[04] Systems of circulation of artistic production;
[09] Reading and writing skills in Portuguese in texts of different types and textual genres;
[16] Relations between languages, biology, culture and society;
[17] Period styles in Portuguese-language literature: Romanticism, Realism, Naturalism, Symbolism, Parnassianism;
[18] Brazilian literary system and literary field (conditions of production, circulation and reception of the literary text and its relationship with history);
[19] Literary genres: lyrical, epic, drama, and modern prose;
[20] Figures of speech in lyrical and narrative texts;
[22] Formation of Brazilian society, linguistic and cultural relations;
[23] Literature and social engagement;
[24] Identities in literature (gender, lgbtqi+, Afro-Brazilian, indigenous, European, among others);

[27] New technologies and literature at different moments in history (techniques and representations).

Source: Universidade de Brasília (2022).

The skills of the PAS related to the circulation systems of artistic production [04], the skills of reading and writing in different textual genres [09] and the relations between languages, biology, culture and society [16] harmonize with the competencies of the BNCC that conceive languages as social, historical and culturally situated practices. In this sense, they are articulated with EM13LGG104, EM13LGG201 and EM13LGG401 skills, which guide the understanding of the functioning of languages in different fields of social action and recognize language as a heterogeneous phenomenon, sensitive to the contexts of use and crossed by sociocultural factors. The reading and production of texts, verbal and non-verbal, come to be understood not only as technical exercises, but as discursive practices inserted in systems of circulation, reception and signification, which favors an interdisciplinary and critical approach to language.

In a complementary way, the skills of the PAS that deal with period styles [17], the Brazilian literary system and the literary field [18], literary genres [19], figures of speech [20], the formation of Brazilian society [22], literature as social engagement [23], identities in literature [24] and new technologies and literature [27] converge directly with the skills of the BNCC aimed at the critical analysis of literary works and their contexts of production and circulation, such as EM13LP49, EM13LP52, EM13LGG102, EM13LGG202, EM13LGG203 and EM13LGG304. This harmonization makes it possible to understand literature as a symbolic system marked by disputes of legitimacy, power relations and identity constructions, while recognizing the role of technologies in the reconfiguration of reading and teaching practices. Thus, PAS and BNCC align themselves in the defense of a reading education that integrates aesthetic analysis, social criticism and historical reflection, because it promotes the appreciation of multiple voices and experiences in the literary field.

4 PROPOSAL FOR DIDACTIC ACTIVITY: LITERARY LITERACY BASED ON GAMIFICATION

A problem concerning the practice of Brazilian literature, according to Cereja (2005, p. 57) is that "as can be seen, the text, which should be the center of the activities of a literature class, a space for the negotiation of different readings and constructions of meaning, usually ends up assuming a peripheral role in relation to these possibilities", the author also states that "in practice, the teaching of literature in high school has not achieved the objectives

proposed by the school programs [...]", because "the development of students' reading skills has been limited to promoting the appropriation of a didactic discourse on literature".

Cosson's perspective (2015, p. 47) is similar to that of Cereja (2005), because the author argues that the learning of literature "[...] it consists fundamentally in experiencing the world through the word; learning about literature, which involves knowledge of history, theory and criticism; and learning through literature, [...] the knowledge and skills that the practice of literature provides".

In order to implement this understanding and present the text as the focus of the class, in the interest of promoting access to literature, Cosson (2015, p. 51) presents that there may be a "basic sequence of literary literacy in school, as we propose here, consists of four steps: motivation, introduction, reading and interpretation", presented in Table 5 below.

Table 5

Basic sequence of literary literacy adapted to gamification

Procedure	Contents
1	Motivation: reason why the teacher and the student chose the text.
2	Introduction: the presentation of the author and the work
3	Reading: When indicating the text, it is convenient for the teacher to negotiate with his students the period necessary for everyone to read and, within this period, it is advisable to mark the breaks
4	Interpretation: starts from the interweaving of the statements, which constitute the inferences, to arrive at the construction of the meaning of the text, within a dialogue that involves author, reader and community. In the field of literature or even the human sciences, questions about interpretation and its limits involve practices and postulates as numerous as they are apparently impossible to reconcile, not least because every reflection on literature implicitly or explicitly brings a conception of what an interpretation is or how one should proceed to interpret literary texts.

Source: Cosson (2014)

The Serial Evaluation Program of the University of Brasília has mandatory works, taking into account literary texts that should be better known, such as the works of Maria Firmina dos Reis, an author who is so important and, at the same time, so marginalized. In this sense, it is understood that the steps of motivation, introduction and reading must be performed individually, because the students, when they learn about this planning of the university, have already gone through these three processes. In this article, therefore, it will be appropriate to propose gamified issues that are based on the competencies and skills of the PAS/UnB, in view of the fact that, in this space, there is already the formalization of equity between the competencies and skills of both the BNCC (2018) and those of the PAS/UnB (2022).

From Silva's perspective (2022, p. 54) on gamification as a way to give visibility to women writers in times of oppression, the author argues that "taking into account this context of teaching as a social practice in socio-historically situated contexts, we perceive a paradigmatic change in such a field of action and investigation". The author also reinforces that "research in AL began to focus not only on the mastery of techniques, but on the variables involved in the context, and the games (inter)face this (new) context of language learning." Although the focus of the work is the development of techniques for Applied Linguistics, there is a gap as a potential to discuss issues of contradictions – external and internal – in literary works, in addition to serving as a field for studies of techniques that involve the interpretation of the text, as proposed by Cosson (2015), when addressing the fourth aspect of study, that of interpretation.

In the understanding of the theorist,

The language teacher must be prepared to act not only in the face-to-face and virtual spheres, but especially in other discursive spheres that the games (inter)face, because it is in these socio-historically situated contexts that emerge specificities that are part of this context and that can be driving forces for what the teaching and learning of languages does (SILVA, 2022, p. 54)

As a concept, Lovato, Michelotti, Silva and Loretto (2018, p. 157) present that "what constitute the so-called 'active learning methodologies'? They are methodologies in which the student is the central protagonist, while the teachers are mediators or facilitators of the process", because, in the perception of the authors, "he is thus removed from a comfortable position, purely a receiver of information, to a context in which he can develop new skills, becoming the center of the teaching-learning process".

In this sense, Lovato, Michelotti, Silva and Loretto (2018, p. 158) argue that "active learning occurs through the student's interaction with the subject studied, listening, speaking, asking, discussing, doing and teaching, being stimulated to build knowledge instead of passively receiving it", but they promote a very important reflection, a gap that this work aims at, in part, work, as theorists point out that "[...] It is important that teachers know what skills and abilities they want to be developed in the student."

It is in this perspective that gamification is inserted, considering that, according to Lovato, Michelotti, Silva and Loretto (2018, p. 165), "the combination of learning through challenges, real problems and games with the flipped class allows students to learn by doing, together and at their own pace" and also present that "game tournaments are based on question and answer games, using multiple choice questions, true or false, or other types of objective questions."

In the meantime, a pedagogical resource is Kahoot!, a digital game-based learning platform that is part of the field of educational gamification by transforming curricular content into interactive, dynamic and participatory experiences. Based on the logic of games — such as challenges, scoring, response time, and immediate feedback — Kahoot enables the construction of activities that mobilize students' cognitive and emotional engagement, favoring active learning. In the context of teaching literature, the tool makes it possible to break with traditional practices centered on content exposition, by creating learning situations in which the student assumes a leading role in the interpretation, analysis and problematization of literary texts and their historical, cultural and ideological contexts.

Regarding the available features, Kahoot allows the creation and application of objective quizzes, multiple-choice, true or false questions, short discursive questions, polls and word clouds, in addition to the possibility of inserting images, videos and textual excerpts to support the questions. The platform also offers features such as automatic scoring, participant ranking, time control, immediate feedback and performance reports, which help the teacher monitor learning. Associated with the gamification proposal, these functionalities enable the elaboration of activities aimed at the critical analysis of historically marginalized works and authors, by tensioning the literary canon and evidencing contexts of oppression and silencing. In this way, the pedagogical use of Kahoot contributes to making female writers visible in times of oppression, promoting the active participation of students and the construction of a critical, reflective and socially situated literary reading.

5 RESEARCH METHODOLOGY

This research has a qualitative approach, of an applied nature, with descriptive and explanatory objectives, using documentary procedures, since it articulates the critical investigation of the Brazilian literary system to the proposition of pedagogical practices mediated by educational technologies. From the methodological point of view, the study is anchored in documentary and bibliographic analysis, as guided by Maconi and Lakatos (2004) and Gil (2002), based on theoretical works of Brazilian literary criticism, especially on the assumptions of Antônio Candido and Alfredo Bosi, as well as on normative documents of national education, such as the National Common Curricular Base (BNCC) and the Serial Assessment Program of the University of Brasília (PAS/UnB). The qualitative approach is justified by allowing the understanding of the historical, social and ideological contradictions that cross the production, circulation and reception of the literary text, especially with regard to the erasure of black women writers in the national canon.

With regard to the literary corpus, the short story "A escrava", by Maria Firmina dos Reis, was selected due to its historical, aesthetic and social relevance, as well as its critical potential for the problematization of power relations in the Brazilian slave system. The analysis of the work was carried out in the light of the categories proposed by Cândido, notably the conception of literature as a right, the notion of literary system and the humanizing function of literature, considering the triad producer-work-receiver and the contradictions between universal and particular values.

An analytical reading of the text was carried out, with emphasis on narrative, discursive and symbolic elements that evidence processes of oppression, silencing and resistance, articulating them with the period styles of Brazilian Romanticism and the historical conditions of production and reception of the work. In a second moment, the articulation between literary analysis and the competencies and skills of Languages foreseen in the BNCC and PAS/UnB was carried out, with the objective of identifying convergences between the theoretical assumptions of literary criticism and the current curricular guidelines.

From this articulation, pedagogical activities were elaborated — right and wrong questions (five), multiple choice (five) and discursive question (one) — explicitly related to the skills of the two evaluation systems, in order to favor critical reading, discursive analysis and reflection on identities, power relations and social engagement in literature. Such activities were conceived as instruments of didactic mediation, aimed at High School, respecting the conditions of production and reception of the literary text in the school context.

Finally, the research incorporates gamification as a methodological strategy, using the Kahoot platform as a technological resource to enhance student engagement and promote active learning practices. Gamification was used not as an end in itself, but as a pedagogical means to tension the literary canon, increase the visibility of women writers in historical contexts of oppression and stimulate the construction of a critical and ethical stance towards literary discourses.

Thus, the methodology adopted seeks to integrate literary theory, curriculum policies and educational technologies, reaffirming the teaching of literature as a space for humanizing, critical and socially committed training.

6 RESULT AND DISCUSSION

Based on this theoretical-methodological perspective, the following activities can be proposed, in order to highlight the external and internal contradictions in the new literary system at the time. In addition, it is possible to contribute, succinctly and briefly, as activities

of this nature can be more extensively worked on, with the mechanisms of expanding the use of active methodologies, such as gamification.

In this context, it is necessary to understand that Reis (2021) presents that Maria Firmina dos Reis is recognized as the first Brazilian novelist and one of the first black writers of national literature, having produced her work in a historical context marked by slavery, patriarchy, and the systematic silencing of female and Afro-descendant voices. Her writing is uniquely inserted in Brazilian Romanticism by tensioning the aesthetic and ideological limits of the period, since it shifts the traditional focus of the white male hero to the experience of the enslaved black woman, giving centrality to the denunciation of violence, dehumanization and the moral contradictions of the slave system. In doing so, Maria Firmina dos Reis breaks with the dominant literary canon of her time and inscribes her work as an ethical, political and humanizing gesture in the Brazilian literary system.

In terms of literary content, the short story "The Slave" presents itself as a narrative with a strong critical and abolitionist content, structured from the account of a narrator who witnesses and intervenes in situations of extreme violence imposed on the enslaved black population. The text constructs, through detailed descriptions and a markedly emotional discourse, the opposition between perpetrator and victim, evidencing the power relations that sustain the slave regime.

The story follows the escape of an enslaved woman and her son Gabriel, pursued by the overseer, exposing the brutal character of the system and the absence of humanity in the figure of the master and his representatives, while highlighting gestures of solidarity and resistance.

Throughout the tale, the trajectory of Joana, Gabriel's mother, gains special importance, whose story is marked by the loss of the children sold, by the fraud of the false letter of manumission and by the consequent madness and death, elements that synthesize the structural violence of captivity. The narrative culminates in Gabriel's liberation, not as an idealized resolution of the historical problem of slavery, but as a symbolic gesture of justice and affirmation of human dignity. In this way, *The Slave* articulates romantic sentimentality and social criticism, converting the individual experience of pain into collective denunciation and reaffirming literature as a space for the revelation of social contradictions and the humanization of the historically oppressed subject. Below, there are questions based on the theoretical-methodological proposition already exposed.

1. () The discourse of the abolitionist lady evidences the humanizing function of literature, according to the conception of Antonio Candido.

BNCC: EM13LGG102, EM13LGG202 | PAS: [06], [18], [23]

2. () The opposition between "executioner" and "victim" reveals the ideological neutrality of the text.

BNCC: EM13LGG102 | PAS: [06], [23]

3. () The figure of the overseer represents the criticism of the power relations of the slave system.

BNCC: EM13LGG202, EM13LGG302 | PAS: [07], [18], [23]

4. () The false letter of manumission demonstrates the use of written language as an instrument of oppression.

BNCC: EM13LGG401 | PAS: [09], [16], [22]

5. () The presence of a female narrator tensions the traditional national literary system.

BNCC: EM13LP49, EM13LP52 | PAS: [17], [18], [24]

II. Multiple Choice Questions

1. The abolitionist discourse has as its main function:

- a) Strengthening religious morality
- b) illustrate romantic sentimentality
- c) denounce slavery as a dehumanizing system
- d) justify the current order
- e) neutralize ideological conflicts

Correct answer: c

BNCC: EM13LGG102 | PAS: [06], [23]

2. The figure of the overseer symbolizes:

- a) Institutional neutrality
- b) mediation between master and slave
- c) structural violence of the slave system
- d) social benevolence
- e) resignation

Correct answer: c

BNCC: EM13LGG202 | PAS: [18], [23]

3. The false letter of manumission shows:

- a) fragility of literary writing
- b) language as an instrument of domination
- c) childish naivety
- d) Bankruptcy of romanticism
- e) absence of conflict

Correct answer: b

BNCC: EM13LGG401 | PAS: [09], [22]

4. Gabriel represents:

- a) Slave resignation
- b) animalization of blacks
- c) ethical awareness and resistance
- d) total submission
- e) social neutrality

Correct answer: c

BNCC: EM13LP52 | PAS: [18], [23]

5. The narrator is distinguished by:

- a) social indifference
- b) critical and interventionist posture
- c) reinforcement of slavery
- d) Narrative neutrality
- e) absence of subjectivity

Correct answer: b

BNCC: EM13LGG302 | PAS: [23], [24]

III. Discursive Question

From the short story "The slave", analyze how the narrative evidences the contradictions of the Brazilian slave system and dialogue with the conception of literature as a right and as an instrument of humanization, according to Antônio Candido.

BNCC: EM13LGG202, EM13LGG302, EM13LP52

PAS: [06], [18], [23], [24]

7 FINAL CONSIDERATIONS

Due to the broad interpretative and analytical productivity of the short story *The Slave*, it was methodologically opted for the elaboration of five multiple-choice questions, five questions of right and wrong and one discursive question, as a way to ensure greater qualitative depth in the exploration of the literary text. Such delimitation is justified by the understanding that the work of Maria Firmina dos Reis has a high thematic, symbolic and discursive density, which would make it possible to formulate an excessive number of questions without necessarily increasing the quality of critical reading.

As a final consideration, it is noteworthy that the present work advanced by articulating the critical analysis of the short story *The Slave*, by Maria Firmina dos Reis, to reflections on the Brazilian literary system, to the competencies and skills provided for in the BNCC and PAS/UnB and the use of pedagogical strategies mediated by digital technologies. The proposal contributes to the appreciation of a historically marginalized author, by highlighting the social and ideological contradictions of the slave regime and by reaffirming literature as a space for humanization, according to the perspective of Antônio Candido.

However, the study also paves the way for relevant future developments. Among them, the expansion of the *corpus* of analysis stands out, contemplating other works by Maria Firmina dos Reis and black Brazilian writers, from different historical periods, in order to deepen the discussion on identity, gender, race and literature. In addition, future investigations may contemplate the empirical application of the proposed activities in different school contexts, analyzing the impacts of gamification on reading education, student participation and the construction of critical thinking. It is also pertinent to explore other digital platforms and active methodologies, as well as to articulate the proposal to interdisciplinary projects, involving History, Sociology and Philosophy, expanding the formative reach of literature.

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PAYOTIAN FOUNDATIONS OF INTELLECTUAL WORK AND SCIENTIFIC WRITING IN UNIVERSITY EDUCATION

FUNDAMENTOS PAYOTIANOS DO TRABALHO INTELECTUAL E DA ESCRITA CIENTÍFICA NA FORMAÇÃO UNIVERSITÁRIA

FUNDAMENTOS PAYOTIANOS DEL TRABAJO INTELECTUAL Y DE LA ESCRITURA CIENTÍFICA EN LA FORMACIÓN UNIVERSITARIA



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ABSTRACT

The contemporary debate on university education has been marked by concerns related to cognitive dispersion, informational acceleration, and the weakening of study habits in the context of digital culture. In this scenario, it becomes pertinent to revisit pedagogical foundations that emphasize intellectual discipline and formative rigor in academic work. This research is guided by the following question: What contributions does the pedagogical thought of Jules Payot offer to the development of intellectual work and scientific writing in the contemporary university, especially within the context of digital culture? The general objective is to analyze the Payotian foundations of the education of the will, the art of writing, and intellectual work, investigating their relevance for contemporary university education. Methodologically, this study adopts a qualitative approach of bibliographic nature and hermeneutic-interpretative orientation, based on the analysis of the works *The Education of the Will* (1895), *The Art of Learning to Write* (1914), and *Intellectual Work: After the Education of the Will* (1921), in dialogue with authors from the philosophy of education, educational psychology, and the epistemology of academic work. The results indicate that Payot conceives intellectual development as a formative process sustained by self-discipline, the methodical organization of study, and the cultivation of enduring habits of reflection and writing. It is concluded that Payotian pedagogy offers relevant contributions to strengthening intellectual autonomy, research ethics, and the consolidation of more rigorous formative practices in higher education, especially in view of the challenges imposed by digital technologies and the contemporary economy of attention.

Keywords: Self-Discipline. Study Habits. Research Ethics. Scientific Methodology. Digital Culture.

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RESUMO

O debate contemporâneo sobre a formação universitária tem sido marcado por preocupações relativas à dispersão cognitiva, à aceleração informacional e à fragilização dos hábitos de estudo no contexto da cultura digital. Nesse cenário, torna-se pertinente revisitar fundamentos pedagógicos que enfatizem a disciplina intelectual e o rigor formativo no trabalho acadêmico. Esta pesquisa parte da seguinte questão norteadora: quais contribuições o pensamento pedagógico de Jules Payot oferece para a formação do trabalho intelectual e da escrita científica na universidade contemporânea, especialmente no contexto da cultura digital? O objetivo geral consiste em analisar os fundamentos payotianos da educação da vontade, da arte de escrever e do trabalho intelectual, investigando sua pertinência para a formação universitária contemporânea. Metodologicamente, trata-se de uma pesquisa qualitativa, de natureza bibliográfica e de orientação hermenêutico-interpretativa, baseada na análise das obras *A educação da vontade* (1895), *A arte de aprender a escrever* (1914) e *Trabalho intelectual: depois da educação da vontade* (1921), em diálogo com autores da filosofia da educação, da psicologia da educação e da epistemologia do trabalho acadêmico. Os resultados indicam que Payot concebe o desenvolvimento intelectual como processo formativo sustentado pela autodisciplina, pela organização metódica do estudo e pelo cultivo de hábitos duradouros de reflexão e escrita. Conclui-se que a pedagogia payotiana oferece contribuições relevantes para o fortalecimento da autonomia intelectual, da ética da pesquisa e da consolidação de práticas formativas mais rigorosas no ensino superior, especialmente diante dos desafios impostos pelas tecnologias digitais e pela economia contemporânea da atenção.

Palavras-chave: Autodisciplina. Hábitos de Estudo. Ética da Pesquisa. Metodologia Científica. Cultura Digital.

RESUMEN

El debate contemporáneo sobre la formación universitaria ha estado marcado por preocupaciones relacionadas con la dispersión cognitiva, la aceleración informacional y el debilitamiento de los hábitos de estudio en el contexto de la cultura digital. En este escenario, resulta pertinente revisitar fundamentos pedagógicos que destaquen la disciplina intelectual y el rigor formativo en el trabajo académico. Esta investigación parte de la siguiente pregunta orientadora: ¿Qué contribuciones ofrece el pensamiento pedagógico de Jules Payot a la formación del trabajo intelectual y de la escritura científica en la universidad contemporánea, especialmente en el contexto de la cultura digital? El objetivo general consiste en analizar los fundamentos payotianos de la educación de la voluntad, del arte de escribir y del trabajo intelectual, examinando su pertinencia para la formación universitaria contemporánea. Metodológicamente, se trata de una investigación cualitativa, de naturaleza bibliográfica y orientación hermenéutico-interpretativa, basada en el análisis de las obras *La educación de la voluntad* (1895), *El arte de aprender a escribir* (1914) y *Trabajo intelectual: después de la educación de la voluntad* (1921), en diálogo con autores de la filosofía de la educación y de la epistemología del trabajo académico. Los resultados indican que Payot concibe el desarrollo intelectual como un proceso formativo sustentado por la autodisciplina, la organización metódica del estudio y el cultivo de hábitos duraderos de reflexión y escritura. Se concluye que la pedagogía payotiana ofrece aportes relevantes para fortalecer la autonomía intelectual, la ética de la investigación y prácticas formativas rigurosas en la educación superior frente a los desafíos contemporáneos.

Palabras clave: Autodisciplina. Hábitos de Estudio. Ética de la Investigación. Metodología Científica. Cultura Digital.

1 INTRODUCTION

Contemporary university education is inserted in a profoundly challenging scenario, marked by the expansion of digital technologies, the intensification of information flows and the growing acceleration of the processes of production and circulation of knowledge. Digital culture, characterized by hyperconnectivity, the instantaneity of communications and the multiplicity of cognitive stimuli, has significantly transformed the practices of study, reading and writing in higher education. In this context, the rapid diffusion of technologies based on artificial intelligence is also noteworthy, which have come to occupy an increasing place in the processes of research, textual production, data organization, and systematization of academic information. Generative AI tools, capable of synthesizing content, producing texts, and assisting in the analysis of large volumes of data, expand the possibilities of investigation and can contribute to the development of new research methodologies.

However, the growing use of these technologies also raises relevant epistemological and pedagogical questions, especially with regard to the intellectual autonomy of the researcher, methodological rigor and authorship in the process of producing scientific knowledge. If, on the one hand, such resources expand access to information and enhance new forms of academic investigation, on the other hand, they also produce important challenges for the consolidation of rigorous intellectual habits, for the critical training of the researcher and for the development of a reflective scientific writing, capable of articulating interpretation, argumentation and conceptual elaboration of its own. In this sense, the contemporary scenario requires rethinking the foundations of intellectual education in the university, especially with regard to the cultivation of attention, the discipline of study and epistemological responsibility in the production of knowledge.

In the field of education and contemporary culture, authors such as Sibilia (2012) and Kenski (2012) point out that the expansion of digital technologies has intensified the acceleration of informational flows and the dispersion of attention, creating unfavorable conditions for in-depth thinking and reinforcing fragmented and superficial forms of knowledge appropriation.

In this context, traditional practices of intellectual work, such as prolonged reading, reflective concentration, conceptual elaboration and systematic writing, start to face obstacles related to the fragmentation of time and informational overload. The academic experience itself tends to be impacted by such transformations, since students and researchers are constantly exposed to multiple cognitive demands, digital platforms, and continuous flows of information. As Han (2015) observes, the society of performance and hyperactivity tends to

produce subjects who are permanently connected, but often deprived of favorable conditions for deep thinking and critical reflection.

In this scenario, it becomes pertinent to revisit pedagogical and philosophical traditions that have reflected on the intellectual formation of the student-researcher, on the discipline of thought and on the ethics of academic work. Among these authors, Jules Payot (1859-1940) stands out, a French educator and academic whose work is inserted in the context of the moral and republican pedagogy of the French Third Republic. A doctor of philosophy and active in French educational administration, Payot dedicated a significant part of his intellectual production to reflection on the formation of character, the cultivation of will, the art of writing and the discipline of intellectual work.

In works such as *The Education of the Will* (1895), *The Art of Learning to Write* (1914) and *Intellectual Work: After the Education of the Will* (1921), Payot develops a systematic reflection on the relationship between self-discipline, method and intellectual production. For the author, success in the field of knowledge does not depend exclusively on natural talents or innate cognitive capacities, but above all on the formation of consistent intellectual habits, the exercise of will and the methodical organization of academic work. Intellectual work, in this sense, constitutes a formative practice that involves not only technical skills, but also ethical, psychological and moral dimensions.

The relevance of these reflections becomes particularly relevant in the face of the challenges imposed by digital culture on university education. In an environment marked by the speed of information and the multiplication of contents, the construction of a rigorous intellectual attitude requires the development of disciplined study practices, systematic reading methods and scientific writing capable of articulating conceptual clarity, argumentative rigor and reflective autonomy. Returning to Payot's work, therefore, allows us to put back into debate pedagogical foundations that value the formation of intellectual character, perseverance in study and the progressive construction of critical thinking habits.

In this context, this research starts from the following guiding question: - what contributions does Jules Payot's pedagogical thought offer to the formation of intellectual work and scientific writing in the contemporary university, especially in the context of digital culture?

In view of this problem, the general objective of this research is to **analyze the pedagogical foundations present in the works of Jules Payot, *The Education of the Will* (1895), *The Art of Learning to Write* (1914) and *Intellectual Work: After the Education of the Will* (1921), investigating their contributions to the formation of the student-researcher and to the development of scientific writing in university education contemporary.**

To achieve this general objective, three specific objectives were established: **a) to examine the Payotian conception of the education of the will and its relationship with the formation of intellectual habits; b) to analyze the understanding of intellectual work as a methodical practice of organizing the study and production of knowledge; and c) to investigate the formative function of writing in the elaboration of scientific thinking and in the construction of the intellectual autonomy of the student-researcher.**

The research seeks to identify conceptual elements present in Payot's work that can contribute to the understanding of contemporary academic practices, especially with regard to the formation of the university student-researcher, the education of the will, the organization of intellectual work and the development of scientific writing as a formative practice.

Methodologically, the research adopts a qualitative approach (Minayo, 2012), of a bibliographic nature (Gil, 2008), guided by a hermeneutic-interpretative method (Gadamer, 1999), suitable for the analysis of philosophical and pedagogical texts. The *central corpus* of the investigation consists of three works by Jules Payot, *The Education of the Will* (1895), *The Art of Learning to Write* (1914) and *Intellectual Work: After the Education of the Will* (1921). The analysis of these three works is carried out through exploratory and analytical reading, followed by the identification and thematic categorization of central concepts, such as will, intellectual discipline, study method and writing practice. In a later stage, a critical interpretation of these concepts is carried out, articulating them with contemporary contributions from the philosophy of education, the psychology of education and the epistemology of scientific work.

In this theoretical dialogue, classical and current references are mobilized that discuss intellectual formation, the autonomy of the subject and the processes of knowledge construction, such as Kant (2003), when dealing with the formation of autonomy; Bourdieu (1996), when analyzing the constitution of the *academic habitus*; Foucault (2004), about the practices of the self and the ethical formation of the subject; and Han (2015), when problematizing the impacts of the performance society on attention and concentration.

In the field of educational psychology, there is also dialogue with authors who investigate the cognitive and motivational processes involved in learning and intellectual formation, such as Vygotsky (2007), when emphasizing the sociocultural dimension of cognitive development; Zimmerman (2002), on self-regulation of learning; Hattie (2017), about the factors that influence academic performance; and Dweck (2017), when discussing the importance of the conceptions of effort and growth mindset in the development of intellectual skills.

In addition to these contributions, contemporary reflections on university education and academic work are present in authors such as Charlot (2000), Morin (2000), Sennett (2009), Severino (2016) and Eco (2017), who discuss the epistemological, methodological and formative conditions of scientific production. This analytical procedure allows Payot's thought to be placed in critical dialogue with current debates about the formation of the student-researcher, the intellectual habits and the ethical and methodological requirements of academic work in the contemporary university.

The relevance of this research is justified by the need to strengthen the ethical-philosophical, psychological, and methodological foundations of university education in a context marked by the expansion of digital technologies, the growing use of artificial intelligence in academic processes, and the challenges that such transformations impose on intellectual autonomy, authorship, and rigor in the production of scientific knowledge. By revisiting the thought of Jules Payot, this research seeks to contribute to the debate on the formation of the student-researcher, highlighting the importance of cultivating self-discipline, the methodical organization of intellectual work and scientific writing as a practice of conceptual elaboration, critical reflection and construction of one's own thought. In this sense, it is intended to offer theoretical-practical foundations that contribute to the strengthening of more rigorous, critical and reflective formative processes in higher education, reaffirming the formative value of intellectual work and the autonomy of thought in the contemporary university.

To develop this investigation, the article is organized into five sections, the first section being this **Introduction**. The second section, **The pedagogy of the will and the formation of intellectual habits**, which examines the pedagogical foundations present in the work *The education of the will* (1895). The analysis discusses the relationship between self-discipline, formation of intellectual character and construction of study habits, elements considered essential for the development of intellectual work.

The third section, **Intellectual work, method and formation of the student-researcher**, analyzes the work *Intellectual work: after the education of the will* (1921), investigating the Payotian conception of intellectual work as a methodical practice of organizing study and scientific production.

The fourth section, **Scientific writing and the elaboration of one's own thought**, examines the work *The Art of Learning to Write* (1914), understanding writing as a formative exercise of conceptual clarity and organization of one's own thought. Finally, the fifth section presents the **Final Considerations**, resuming the research question and synthesizing the

contributions of Payot's pedagogy to the university education of the student-researcher in the digital age.

2 THE PEDAGOGY OF THE WILL AND THE FORMATION OF INTELLECTUAL HABITS

This section aims to examine the pedagogical foundations of the education of the will, in the work *The Education of the Will* (1895), by Jules Payot, analyzing its contribution to the formation of intellectual habits, to the self-discipline of study and to the development of intellectual work in contemporary university education. It is assumed that, in the digital age, the training of the student-researcher faces significant challenges related to the dispersion of attention, the fragmentation of study time and the pulverization of will in contexts marked by hyperconnectivity (SIBILIA, 2012; KENSKI, 2012).

The analysis developed in this section follows the methodological procedure adopted in the research, based on the exploratory and analytical reading of Payot's work and the identification of central categories of analysis, especially the concepts of will, intellectual discipline, study method and formation of intellectual habits.

Digital culture has exponentially expanded access to information and profoundly transformed the forms of production, circulation and appropriation of knowledge. However, studies indicate that this new communicational environment has also intensified processes of cognitive dispersion, superficiality of reading and instability of attention, directly affecting the conditions of intellectual formation in the contemporary world (SIBILIA, 2012; KENSKI, 2012). The multiplication of informational stimuli and the speed of digital interactions tend to favor fragmented reading practices and rapid consumption of content, shifting the focus from activities that require continuity, reflection, and more rigorous conceptual elaboration.

In this scenario, the contemporary informational environment, marked by incessant notifications, multiple platforms, and continuous data flows, contributes to the weakening of intellectual practices that depend on prolonged concentration and systematic reflection.

Authors such as Han (2015) and Carr (2011) have highlighted that the crisis of attention is one of the great challenges of contemporary intellectual formation, since the logic of hyperconnectivity and the permanent circulation of information tends to fragment the cognitive experience and hinder slower and more reflective processes of knowledge construction. Carr (2011) observes that the continuous navigation between multiple digital stimuli alters the ways of reading and processing information, favoring quick forms of apprehension of content, but often superficial.

In a convergent perspective, Han (2015), when analyzing the so-called "performance society", argues that the multiplication of stimuli and demands produces subjects who are

permanently active and connected, but often unable to sustain prolonged experiences of attention and interiority. Thus, Jules Payot's reflection on the discipline of the mind and the cultivation of intellectual attention acquires renewed relevance, emphasizing the need to form habits of concentration, perseverance, and self-direction of thought as fundamental conditions for intellectual work and scientific writing.

The contemporary crisis of attention has a direct impact on the organization of the intellectual will. What is observed, with increasing frequency, is a process that can be described as **pulverization of the will**, that is, the difficulty of orienting and sustaining intellectual effort around long-term formative objectives. The culture of instantaneity and immediate gratification tends to weaken study practices that require continuity, rigor and reflective maturation, favoring fragmented and discontinuous modes of learning. As Sennett (2009) observes, intellectual work, as well as any form of skilled work, depends on prolonged processes of dedication, patience and gradual improvement, conditions that come into tension with the accelerated logic of contemporary capitalist culture. In this sense, the category of will becomes central to understanding intellectual work not only as a cognitive activity, but as a formative practice that requires self-discipline, persistence, and conscious organization of intellectual effort over time.

In this context, it becomes particularly relevant to revisit pedagogical reflections that emphasize the function of will, intellectual discipline and character formation in the educational process. It is in this horizon that the work of the French pedagogue and academic Jules Payot is inserted. In *The Education of the Will*, originally published in 1895, the author develops a systematic reflection on the psychological and pedagogical foundations of intellectual work, arguing that success in studies depends less on natural talents and more on the formation of disciplined mental habits. **The work can be understood as an investigation into the psychological, ethical-philosophical, and pedagogical mechanisms that make possible the formation of lasting intellectual dispositions, fundamental for the consolidation of scientific work.**

In order to understand more precisely the foundations of this pedagogical proposal, it is necessary to briefly present the conceptual structure of the work, *The Education of the Will*, in which Payot organizes his reflection into two major dimensions: a theoretical part, dedicated to the psychological analysis of the will, divided into three books and eleven chapters; and a practical part, focused on the formation of intellectual habits in the daily study, divided into two books and six chapters.

In the theoretical part of *The Education of the Will*, Jules Payot develops a systematic reflection on the psychological and pedagogical foundations of intellectual effort and

character formation. Book I, *Preliminaries*, composed of the first three chapters, introduces the central problem of the work: the observation that many students fail in their studies not because of lack of intelligence, but because of the inability to organize and strengthen their own will and discipline intellectual work. Payot identifies in human nature a recurrent tendency to disperse attention, lack of bodily hygiene, daydreams, vices of sensuality, passivity and abandonment of prolonged intellectual effort.

In his analysis, many failures in the training path do not result from the absence of intelligence, but from the fragility of the will, laziness and the difficulty of sustaining intellectual work in a constant and disciplined way. The author observes that what often manifests itself as disinterest, levity or dissipation corresponds, to a large extent, to a human inclination to avoid prolonged effort, revealing a kind of structural intellectual laziness that tends to distance the student from the demands of concentration, perseverance and rigor typical of intellectual work (Payot, 1895).

In Book II, *The Psychology of the Will*, the author deepens this analysis by examining the internal mechanisms that structure voluntary action. In the three chapters of this part, Payot discusses the relationship between will, mental habits and affective life, demonstrating that it is not a spontaneous or natural faculty, but a capacity that is progressively formed through exercise and disciplined repetition. This conception is close to the idea that intellectual work depends on the formation of relatively stable cognitive and affective dispositions, capable of sustaining the continuity of the study effort over time.

The category of will appears, therefore, as the central explanatory principle of intellectual formation. For Payot, it can manifest itself as a weak will, subject to immediate inclinations and the dispersion of effort, or as a strong will, capable of consciously guiding the student's conduct towards higher formative goals. It is this strong will that allows us to discipline attention, organize intellectual work and consolidate lasting habits of study. In this sense, the formation of the will is close to a broader philosophical tradition that understands habit as a structuring dimension of the intellectual character, since, according to Aristotle, human dispositions are formed by the repetition of practices and the discipline of actions (Aristotle, 2010). In the educational field, this process contributes to the constitution of relatively long-lasting dispositions of thought and action, close to what Bourdieu calls *habitus*, that is, systems of incorporated dispositions that guide practices and ways of thinking within certain social fields (Bourdieu, 1996).

In Book III, *The Inner Means*, consisting of five chapters, the author explores the psychological resources that allow the will to be strengthened, such as the cultivation of intellectual ideals, the formation of stable mental habits, discipline in the management of time,

the mastery of distractions and entertainment, the control of daydreams, sensuality and hedonistic inclinations, as well as the constant exercise of reflection guided by reality. From this perspective, the education of the will appears as an inner formative process, in which the student-researcher learns to govern his own intellectual life through self-discipline, constancy, patience and the methodical organization of study. At this point, the second central category of this analysis clearly emerges: intellectual discipline, understood as the ability to guide one's own thinking through regular research practices, critical reading of reality, systematic reflection, and one's own writing.

The practical part of the work, in turn, translates these theoretical foundations into concrete guidelines aimed at the organization of intellectual work. In Book IV, *Private Mediations*, structured in four chapters, Payot presents specific strategies aimed at strengthening the discipline of study, emphasizing practices such as the organization of time, the regularity of intellectual activities, the careful choice of readings and the fight against distractions that compromise concentration. The author insists on the need to transform study into a daily habit, supported by intellectual routines that favor the continuity of effort and the stability of attention. **At this point, the third analytical category identified in the methodology becomes evident: the study method, understood as a set of organized practices that structure intellectual work and enable the consolidation of lasting learning habits.**

In Book V, *The Resources of the Environment*, composed of two chapters, Payot expands the analysis by considering the influence of the social and institutional environment on the formation of the will. In this part, the author discusses the social function of educational institutions, teachers and the cultural conditions of the environment in the construction of intellectual habits. The formation of the will, therefore, does not depend only on the individual decision of the student, but also on educational contexts capable of stimulating intellectual work, the discipline of thought and the cultivation of high formative ideals. **This perspective allows us to understand that the formation of intellectual habits involves not only individual dimensions, but also social and institutional mediations that favor the consolidation of academic culture.**

According to Payot (1895), intelligence, by itself, does not guarantee intellectual success. For the author, the failures in the students' educational path do not necessarily result from the lack of intellectual capacity, but above all from the fragility of the will, laziness and the difficulty of sustaining the prolonged effort required by intellectual work. From this perspective, the will constitutes a formative force that must be progressively educated through exercises of discipline, perseverance and organization of study time. Thus,

intellectual work is understood as a practice of inner formation that requires time, self-knowledge, self-criticism, self-discipline, patience, constancy, care and methodical effort.

The pedagogy of the will proposed by Payot is close, in several aspects, to classical traditions of the philosophy of education that emphasize the social function of autonomy and moral formation in the educational process. Kant (2003), for example, when reflecting on education, states that the purpose of the formative process is to lead the individual to autonomy, that is, to the ability to govern one's own conduct according to rational principles. For the philosopher, education is not limited to the transmission of knowledge, but involves the formation of the subject's capacity for self-determination. In this sense, intellectual discipline can be understood as an essential dimension of the autonomous formation of the individual.

Payot's reflection can also be understood in the light of the notion of the formation of lasting dispositions discussed by Bourdieu (1996). For the French sociologist, educational processes contribute to the constitution of *habitus*, understood as systems of relatively stable dispositions that guide perceptions, practices and ways of thinking. In the academic field, the development of study habits, critical reading and organization of intellectual work is a fundamental part of the formation of scientific *habitus*. Thus, the pedagogy of the will can be interpreted as a process of formation of intellectual dispositions that favor the consolidation of academic work.

In addition, Payot's reflections can be approximated to Foucault's (2004) analyses of the so-called "practices of the self". For the philosopher, the formation of the subject involves processes of exercise and self-conduction through which the individual learns to govern his own actions and thoughts. Intellectual work, in this sense, can be understood as an ethical practice of self-formation, in which the student learns to discipline attention, organize time and cultivate habits of reflection.

In the field of educational psychology, contemporary reflections have also highlighted the importance of self-regulation of learning in the development of intellectual work. Zimmerman (2002) defines self-regulation as the process by which students plan, monitor, and evaluate their own learning strategies. This process involves cognitive, motivational, and behavioral dimensions that allow the subject to organize their own study in a conscious and systematic way.

Similarly, Vygotsky (2007) emphasizes that cognitive development occurs through processes of cultural and social mediation that enable the internalization of higher forms of thought. The formation of intellectual habits is not only the result of individual capacities, but

also of educational practices and cultural contexts that favor the development of reflection and critical thinking.

The pedagogy of the will, therefore, is not reduced to a simple defense of individual effort. It involves the progressive construction of formative conditions that allow the student to develop capacity for concentration, patience, perseverance and intellectual organization. In this sense, Payot highlights the importance of forming daily study habits, arguing that intellectual work should be incorporated into the student's concrete life as a regular and disciplined practice, similar to other formative activities that require constancy and dedication (Payot, 1895). **The systematic repetition of these practices constitutes the foundation of the formation of intellectual habits and the consolidation of the dispositions necessary for scientific work.**

When considering the contemporary context of university education, marked by challenges related to the dispersion of attention and the instability of study practices, the pedagogy of will proposed by Payot is particularly current. In an academic environment in which access to information has become practically unlimited, the central problem no longer resides only in the availability of content, but in the ability to organize thought, sustain attention and elaborate rigorous reflections based on reality.

In this way, resuming the Payotian reflection allows us to put back at the center of the educational debate the importance of intellectual discipline, the formation of study habits and the development of the will as fundamental dimensions of university education. The education of the will, far from representing a moralistic or individualistic perspective, can be understood as a formative process that articulates contributions from psychology, philosophy and sociology. In this horizon, intellectual education is close to what Michel Foucault (1985; 2006) calls **self-care**, understood as a set of reflective practices through which the subject learns to govern himself, organize his own time, guide his conduct and cultivate ethical and intellectual dispositions indispensable to the exercise of freedom and reflective life.

In the light of these considerations, it becomes possible to understand that the pedagogy of the will constitutes a structuring element of intellectual work. The training of the student-researcher is not reduced to the acquisition of content or the mastery of academic techniques, but involves the development of lasting intellectual dispositions, such as attention, perseverance, self-discipline and conscious organization of the cognitive effort. In this sense, the work of Jules Payot offers important subsidies for contemporary reflection on university education, especially with regard to the construction of intellectual habits capable of sustaining rigorous, reflective and ethically committed academic practices with the production of scientific knowledge, both at the undergraduate and graduate levels.

3 INTELLECTUAL WORK, METHOD AND TRAINING OF THE STUDENT-RESEARCHER

This section aims to analyze the conception of intellectual work present in the work *Intellectual work: after the education of the will* (1921), by Jules Payot, investigating how the author understands academic work as a methodical practice of intellectual formation. The analysis follows the methodological procedure adopted, in the identification and categorization of central concepts, especially intellectual work, study method, discipline of thought, time management and writing practice, and in the critical interpretation of these categories in dialogue with contemporary contributions from the philosophy of education, the psychology of education and the epistemology of scientific work.

In the university tradition, intellectual work constitutes one of the pillars of academic training. However, in the contemporary context marked by informational acceleration, the multiplication of knowledge sources and the growing presence of digital technologies and artificial intelligence in research processes, it is increasingly necessary to reflect on the methodological foundations that support the production of scientific knowledge. The abundance of available information does not guarantee, by itself, the construction of rigorous knowledge, since the development of scientific thinking depends on the formation of disciplined intellectual habits, systematic study methods and reflective practices of critical reading and self-writing. As Morin (2000) observes, one of the central challenges of contemporary education is to overcome the fragmentation of knowledge and develop forms of thought capable of articulating complexity, critical reflection and intellectual rigor.

In this scenario, Jules Payot proposes to understand intellectual work as an activity that requires methodical organization, discipline of attention, and continuity of effort. For the author, study cannot be reduced to occasional moments of inspiration or disordered and superficial reading practices, but must constitute a systematic activity that structures the intellectual life of the student-researcher. Payot argues that academic training requires objectivity and method, as intellectual progress results from the continuity of disciplined effort over time (PAYOT, 1921). This conception is close to the idea that scientific knowledge is developed through cumulative processes of investigation and reflection, in which the student progressively learns to organize his thinking and structure his relationship with knowledge.

The work, *Intellectual Work: After the Education of the Will*, represents a methodological deepening of the pedagogical reflections developed by Payot in his previous work, dedicated to the education of the will. While in that first moment the author emphasizes the formative function of will and self-discipline in intellectual life, in this book he dedicates himself to examining in a more systematic way the concrete

conditions that allow transforming this disposition into effective practice of intellectual work.

Book I, entitled *Loving work and knowing how to work*, brings together four chapters in which Payot analyzes the ethical and pedagogical foundations of intellectual activity. In the first chapter, the author states that all intellectual progress depends on the development of a positive disposition in relation to work, arguing that the student must learn to recognize in the intellectual effort not a weight, but a constitutive dimension of his own education. In the following chapter, when discussing the difference between true intelligence and pseudo-work, Payot criticizes superficial academic practices based on the disordered accumulation of information or the mechanical repetition of contents, arguing that true intellectual work requires reflection, organization of thought and critical elaboration of knowledge based on the researched reality (PAYOT, 1921).

In the subsequent chapters, dedicated to the idea of "knowing how to work" and to the study of some great men, the author seeks to demonstrate that intellectual development does not depend exclusively on natural talents, but above all on the incorporation of methodological habits that structure intellectual life. Thus, the work shows that categories such as the discipline of thought, regularity of study and methodical organization of work are central elements of intellectual formation.

The second part of the book, gathered under the title, *The psychological foundations of a good working method*, shifts the analysis to the properly psychological plane of intellectual activity. In this part, Payot examines cognitive processes that are fundamental to the development of intellectual work, such as attention, memory, and active reading.

In the chapter dedicated to attention, the author argues that concentration is one of the essential conditions of intellectual life, because only through prolonged attention is the mind able to deepen ideas and integrate them into more complex conceptual structures.

Then, when dealing with memory, Payot criticizes purely mechanical conceptions of memorization, arguing that intellectual memory is strengthened, especially when associated with understanding, experiences and experiences of reality and in-depth reflection. The chapter dedicated to learning through books deepens the analysis of reading as a central formative practice of intellectual work, highlighting that the student-researcher needs to learn to read actively, comparing ideas, elaborating syntheses and recording their own interpretations, in order to avoid the so-called pseudo-

readings, marked by intellectual inertia and superficial and uncritical assimilation of the contents.

Finally, when discussing the method in the various disciplines, the author demonstrates that, although each field of knowledge has specific investigation procedures, they all share common methodological principles, such as analytical rigor, organization of thought and intellectual discipline. In this way, Payot builds a true pedagogy of method, in which intellectual work is understood as a systematic practice that articulates will, reality, attention, memory, reflective reading and methodical organization of study.

The category of study method occupies a central place in Payot's reflection. For the author, the method should not be understood only as a set of techniques external to the learning process, but as an organizing principle of thought. The student-researcher needs to develop intellectual routines that favor the continuity of reflection and the progressive construction of knowledge. This involves practices such as analytical reading, questioning, debates, organization of notes and systematization of ideas. Payot emphasizes that disorganized study compromises intellectual development, as it prevents the formation of stable cognitive structures. The author argues that the strengthening of the will depends on the adoption of methodical practices that allow ordering the work and persevering in it (PAYOT, 1921).

This conception dialogues directly with contemporary reflections on the epistemology of scientific work. Severino (2016) states that academic production requires rigorous methodological organization, as scientific knowledge results from systematic processes of investigation, analysis and argumentation. For the author, the university student needs to learn to build a research path that articulates problematization, analysis of sources and conceptual elaboration, developing methodological skills that support intellectual work. In this sense, the method constitutes a structuring element of scientific practice and of the student-researcher's training.

Another fundamental aspect in Payot's reflection refers to the organization of study time. For the author, time management is an essential dimension of the intellectual discipline. The student who wants to develop consistent academic work needs to learn to distribute his activities in a balanced way, reserving specific periods for reading, reflection and writing. The lack of organization of time often leads to the dispersion of intellectual energies and the fragmentation of study. Payot notes that many students fail not because of a lack of ability, but because of the inability to establish stable intellectual routines. The author points out that

poor time management, lack of focus and weak will compromise the development of intellectual work (PAYOT, 1921).

This reflection is echoed in the analyses of Richard Sennett (2009), who discusses the relationship between work, discipline and the formation of skills. For the author, the development of intellectual skills is similar to artisanal work, in which excellence results from prolonged dedication, repetition and constant improvement. Knowledge is not formed instantaneously, but through slow gradual processes of learning and practice. Thus, intellectual work requires time, patience, continuity and commitment to the improvement of thought.

Another central element in Payot's reflection concerns the practice of unhurried reflective reading. For the author, unhurried reading is one of the main tools of intellectual formation, as long as it is carried out in an active, reflective and critical way. Reading does not only mean accumulating information, but developing the capacity for analysis, comparison, dialogue and conceptual synthesis. Academic reading requires time, concentrated attention, interpretive capacity and willingness to confront different ideas. Payot maintains that hasty and superficial reading compromises the development of scientific thought, as it prevents the construction of consistent and proper conceptual structures.

This perspective is close to the reflections of Bernard Charlot (2000) on the relationship between the subject and knowledge. For the author, knowledge is not simply transmitted, but appropriated by the subject through active learning processes. The student builds his relationship with knowledge from intellectual experiences that involve curiosity, effort and reflection. In this sense, intellectual work is not limited to the acquisition of contents, but implies the construction of a meaningful relationship with knowledge based on historically contextualized reality.

In addition, the practice of intellectual work involves the ability to elaborate and systematize ideas through one's own academic writing. Although Payot develops this theme in more depth in another work, his reflection on intellectual work already indicates that writing is a fundamental instrument for organizing one's own thought. The elaboration of academic texts allows the student-researcher to structure arguments, develop conceptual clarity and explain relationships between different ideas. In this sense, self-writing functions as a practice of intellectual elaboration and not only as a means of communicating knowledge.

The reflections of Umberto Eco (2017) reinforce this understanding by stating that writing is an essential part of the scientific investigation process. For the author, the act of writing forces the researcher to organize his ideas and to make his arguments explicit,

allowing greater rigor in the elaboration of thought. According to Eco (2017, p. 33), "writing is a way of thinking", as the writing process requires conceptual clarity and logical coherence.

The analysis of the central categories present in this work by Payot (1921), intellectual work, study method, discipline of time and reflective reading, allows us to understand that the formation of the student-researcher involves the construction of lasting intellectual habits. Scientific knowledge is not developed only through isolated cognitive capacities, but through the progressive incorporation of practical research experiences that structure intellectual activity.

In the contemporary context of university education, marked by the expansion of digital technologies and the growing presence of artificial intelligences in knowledge production processes, this reflection becomes particularly relevant. Although such technologies expand the possibilities of access to information and support for research, they also pose new challenges for the training of the student-researcher. The ease of obtaining data can favor superficial academic practices, in which the effort of intellectual elaboration is replaced by the simple reproduction of available contents.

In this sense, the pedagogy of intellectual work proposed by Payot contributes to placing the importance of knowing how to work methodologically, of reflective effort and intellectual discipline at the center of university education. By emphasizing the methodical organization of the study, the formation of active reading habits and the systematic practice of self-writing, the author offers important elements to understand the formative foundations of scientific work.

The in-depth analysis carried out in this section shows that intellectual work is a structuring dimension of university education. By dialoguing with contemporary contributions from the philosophy of education, the psychology of learning and the epistemology of knowledge, it becomes possible to understand that the formation of the student-researcher depends not only on the acquisition of contents, but on the construction of intellectual dispositions that sustain rigorous and reflective academic practices. In this sense, Payot's reflections remain current in demonstrating that the development of scientific thinking requires method, knowledge of reality, perseverance, and ethical commitment to the construction of knowledge.

4 SCIENTIFIC WRITING AND THE ELABORATION OF ONE'S OWN THINKING

This section aims to examine the conception of writing developed by Jules Payot in his work, *The Art of Learning to Write* (1914), understanding scientific writing as an essential formative practice for the organization of one's own thought and for the consolidation of

intellectual work. The analysis follows the same methodological procedure adopted in the previous sections, in the identification of central categories, especially conceptual clarity, method of observation, organization of thought, style and choice of themes, and in the critical interpretation of these concepts in dialogue with contemporary contributions from the philosophy of education, the psychology of education and the epistemology of scientific work.

In the university tradition, writing occupies a central position in the production and circulation of knowledge. However, in contemporary academic education, it is common to treat writing only as the final stage of research, as if writing simply meant recording previously elaborated ideas. Payot proposes a radically different perspective by arguing that writing is a constitutive part of the very process of thinking. For the author, writing implies knowing in depth, experimenting, experiencing, organizing the intellectual experience, clarifying concepts and disciplining thought through language. In this sense, he states that "to write well is, above all, to think well" (PAYOT, 1914, p. 21). Writing appears, therefore, as a formative exercise that forces the mind to order ideas, examine arguments, and confront thought with experienced reality and the demands of rational clarity.

The structure of the work reveals the breadth of this pedagogical proposal. In Book I, entitled, *The Principles*, Payot presents the philosophical foundations of intellectual formation. In the chapters that make up this part: *The culminating line of human thought; Need for a revolution in education; The triple servitude; How to liberate the spirit? and To free oneself from drift through confrontation with reality*; The author critically analyzes the limits of education based on the mechanical repetition of knowledge.

Payot argues that much of traditional education traps thinking in forms of intellectual dependence that prevent the development of autonomy. According to him, true intellectual progress requires freeing the mind from uncritical submission to authority and from the illusions produced by imprecise language. In this sense, writing becomes an instrument of intellectual emancipation, as it requires the subject to rigorously examine his objectives and his own ideas, consciously guiding the path of thought and avoiding intellectual drift, that is, wandering aimlessly in the vast ocean of knowledge. As Payot observes, "thought only becomes truly ours when we are able to express it clearly" (PAYOT, 1914, p. 34).

In Book II, called *Methods of Observation*, Payot shifts reflection to the cognitive foundations of intellectual elaboration. In this part of the work, the author investigates the psychological processes that sustain the ability to observe and interpret reality. In the chapters devoted to the observation of phenomena, the analysis of emotions, the perception of differences, and the understanding of causality, Payot argues that scientific writing is born of the ability to observe the concrete world with disciplined attention. For him, clarity of

thought depends on the accuracy of observation, because confused ideas often result from poorly examined perceptions, out of reality. In this sense, he states that "the art of writing rests on the art of observing" (PAYOT, 1914, p. 76). The method of attentive and guided observation thus becomes the foundation of scientific writing, as it allows the transformation of experience into organized knowledge.

Book III, entitled, *The Two Cycles of Organization of Thought*, deepens the analysis of the intellectual structure of writing itself. Payot argues that human thought is organized into two complementary movements: a cycle of analysis, in which the mind distinguishes and examines elements of reality; and a synthesis cycle, in which these observations are reorganized into coherent conceptual frameworks. Writing constitutes the privileged space of this organization of thought, because in it the author needs to transform dispersed perceptions into intelligible arguments. In this process, reason plays a central role in establishing relationships between ideas and ordering the flow of reflection. Scientific writing appears, therefore, as an exercise in the rationality of attentively observed reality, in which thought is disciplined and becomes communicable.

The practical dimension of writing is developed in Book IV of the work, dedicated to the concrete guidelines for the formation of the student-researcher writer. In this part, Payot addresses topics such as intellectual economy, formative reading, style and choice of themes. The author points out that writing requires experience with the researched reality, concentration and discipline of attention, as the dispersion of thought compromises the clarity of expression. For Payot, attentive reading is an indispensable foundation of writing, since it is through contact with well-prepared works that the student learns to recognize argumentative structures and rigorous forms of exposition of ideas.

The issue of style plays a particularly relevant role in this reflection. For Payot, style is not simple rhetorical ornamentation, but a direct expression of clarity of thought. An obscure style often reveals misunderstood ideas, while clarity of writing indicates conceptual mastery. In this sense, the author states that "the obscurity of style almost always denounces the obscurity of thought" (PAYOT, 1914, p. 142). Scientific writing therefore requires vocabulary precision, logical organization and argumentative coherence.

This conception is close to Arthur Schopenhauer's reflections on philosophical writing. In *On Writing and Style*, the German philosopher states that clarity is the fundamental virtue of thought, because only those who think accurately are able to write with simplicity. Schopenhauer observes that "the first rule for a good style is to have something to say" (SCHOPENHAUER, 2005, p. 17), indicating that the quality of writing depends directly on the quality of thought. For the author, obscure texts often hide fragile or poorly elaborated ideas.

The convergence between Schopenhauer and Payot reveals a common conception of writing as an exercise in intellectual rigor.

The relationship between language and thought is also the subject of Ludwig Wittgenstein's reflections. In his work, *Philosophical Investigations*, the philosopher states that the limits of language correspond to the limits of understanding the world (WITTGENSTEIN, 1999). This perspective reinforces the idea that language precision plays a central role in the construction of knowledge. In the context of scientific writing, this conception implies recognizing that conceptual elaboration depends on the ability to use language in a rigorous and disciplined way. Academic writing thus becomes a space for conceptual clarification and organization of thought.

Reflection on writing can also be enriched by the contributions of Roland Barthes. In *The Zero Degree of Writing*, Barthes argues that writing is not only a neutral instrument of communication, but a cultural practice that expresses certain forms of relationship with knowledge and language (BARTHES, 2004). For the author, writing involves stylistic and epistemological choices that reveal ways of thinking and interpreting reality. This perspective allows us to understand scientific writing as a historically situated practice, in which the student-researcher builds his relationship with knowledge through language.

In the field of psychology of learning about language and literacy, writing has been understood as a fundamental intellectual practice for the organization of thought and for the construction of knowledge. Soares (2002) demonstrates that literacy involves not only the technical mastery of writing, but the ability to use it as an instrument of cognitive elaboration and participation in social practices of production of meanings. In a convergent perspective, Kleiman (1995) argues that reading and writing practices constitute complex cognitive and social activities, through which the subject articulates information, organizes arguments and constructs interpretations. Rojo (2009), when discussing literacies in the contemporary educational context, highlights that textual production requires processes of planning, reflection and revision that mobilize cognitive operations of analysis, synthesis and argumentation. In this sense, academic writing is not reduced to the formal registration of contents, but is configured as an intellectual practice that requires conceptual organization, argumentative elaboration and progressive mastery of discursive forms typical of the production of scientific knowledge.

Similarly, Dweck (2017) argues that the development of intellectual competencies depends on the construction of a growth mindset, characterized by the appreciation of effort and persistence. Academic writing is a privileged exercise in this process, as it requires constant revisions, reorganization of arguments, and progressive improvement of thought.

These reflections become even more urgent in the contemporary context marked by the expansion of digital technologies and the growing presence of generative artificial intelligences in academic textual production. Although such tools expand access to information and can assist in the initial organization of data and references, their uncritical use can shift the student from the place of author to that of a simple copyist of content previously structured by algorithmic systems. In this scenario, writing ceases to be an exercise in personal intellectual elaboration and becomes a mere reproduction of ready-made discourses. As a consequence, the time dedicated to reflection, the construction of one's own arguments and conceptual maturation is reduced, compromising the development of intellectual autonomy and the ability to produce original thought and text.

At this point, Han's (2015) criticisms of the so-called performance society help to understand the effects of digital culture on cognitive processes. According to the author, the multiplication of informational stimuli tends to fragment attention and hinder prolonged concentration processes. Scientific writing, because it requires careful reflection and rigorous organization of thought, constitutes a form of resistance to this logic of cognitive superficiality.

In this scenario, the pedagogy of writing proposed by Jules Payot is particularly current. By understanding writing as an exercise in defining the object of study, planned observation, experimentation with reality and rational organization of thought, the author demonstrates that intellectual development requires discipline of attention, conceptual clarity and commitment to argumentative rigor. Scientific writing, in this sense, cannot be reduced to a mere academic formality or reproduction of contents, but must be understood as a continuous formative practice, through which the student learns to order ideas, problematize reality and build reasoned arguments.

The analysis developed in this section shows that writing is a structuring dimension of intellectual work and the formation of the student-researcher. Through textual elaboration, the researcher in training learns to organize concepts, establish relationships between problems and sustain consistent arguments. Such a process is close to what Aristotle (2010) understood as the formation of lasting intellectual dispositions, resulting from the exercise and practice of reflection. In this horizon, academic writing can be understood as a formative activity that requires time, discipline and perseverance, allowing the subject to develop intellectual habits that support critical thinking and the production of knowledge.

In this context, Payot's contribution goes beyond the limits of a simple technique of textual composition, approaching a true ethics of intellectual work. By emphasizing the discipline of attention, the cultivation of the will and the conscious organization of intellectual effort, his reflection dialogues with the Foucaultian notion of self-care, understood as a

reflective practice through which the subject learns to govern his own intellectual conduct and to guide his formative process (FOUCAULT, 2006). At the same time, this perspective finds resonance in Gaston Bachelard's reflection on the formation of the scientific spirit, according to which scientific knowledge requires a break with immediate evidence and the progressive construction of habits of conceptual rigor. As the author observes, "the scientific spirit must be formed against nature, against what is, in us and outside of us, nature's impulse and instruction" (BACHELARD, 1996, p. 18). Thus, the pedagogy of writing proposed by Payot contributes to understanding university education as a process of scientific literacy in which learning to write also means learning to think with method, intellectual discipline and epistemological responsibility.

5 FINAL CONSIDERATIONS

This investigation sought to analyze what contributions Jules Payot's pedagogical thinking offers to the formation of intellectual work and scientific writing in the contemporary university, especially in the context of digital culture. To this end, the study analyzed three of his central works: *The Education of the Will* (1895), *The Art of Learning to Write* (1914) and *Intellectual Work: After the Education of the Will* (1921), seeking to identify the categories and fundamental concepts that structure his pedagogy of intellectual work.

In section 2, dedicated to the analysis of the work *The Education of the Will*, the notion of education of the will as the foundation of intellectual work was identified as a central category of Payot's thought. The investigation showed that, for the author, academic success does not depend exclusively on natural intellectual capacities, but, above all, on a strong will, on the formation of disciplined intellectual habits, built through perseverance, the organization of study and the constancy of effort. The analysis of this work highlighted fundamental concepts such as will, self-discipline, intellectual habit and character formation, demonstrating that the development of intellectual life requires an inner formative process that involves mastery of attention, time management and cultivation of lasting mental dispositions. By dialoguing with contributions from Kant, Bourdieu, Foucault, Vygotsky and Zimmerman, the section demonstrated that the pedagogy of the will can be understood as a process of formation of intellectual autonomy and constitution of cognitive dispositions necessary for scientific work.

In section 3, the analysis of the work *Intellectual work: after the education of the will*, deepened the understanding of the methodological dimension of academic training. In this part of the research, the concept of intellectual work was examined as a methodical practice of organizing thought and scientific investigation. The analysis showed that Payot conceives

the study as a systematic activity that requires planning, contact with reality, continuity of effort and discipline of attention. Among the central categories identified in this work are study method, time management, reflective reading and discipline of thought. The discussion established a dialogue with contemporary reflections on the epistemology of scientific work present in authors such as Charlot, Morin, Sennett and Severino, showing that the formation of the student-researcher depends on the construction of intellectual practices that articulate investigation, reality, reflection and conceptual elaboration.

Section 4, in turn, analyzed the work *The Art of Learning to Write*, highlighting scientific writing as an essential dimension of the elaboration of thought. The investigation showed that, for Payot, writing does not consist only in recording previously formed ideas, but constitutes an active process of organization and clarification of thought. Among the central categories identified in this work are observation, experience of reality, causality, organization of thought, conceptual clarity and intellectual style. By dialoguing with reflections by Schopenhauer, Wittgenstein and Barthes on language and thought, the section showed that scientific writing plays a fundamental social role in the formation of the researcher, as it forces the author to order ideas, develop arguments and build rigorous interpretations of reality. The analysis also incorporated contemporary contributions from educational psychology, especially Hattie and Dweck, underscoring the importance of intellectual effort and persistence in developing enduring cognitive competencies.

Considered together, the three works analyzed reveal the existence of a consistent pedagogy of intellectual work in Jules Payot's thought. The education of the will, the method of study and scientific writing appear as complementary dimensions of the same formative process, oriented to the construction of the student's intellectual autonomy. University education, in this perspective, is not limited to the transmission of knowledge, but involves the development of intellectual dispositions capable of sustaining rigorous, reflective and methodologically consistent academic practices.

In the contemporary context of the digital age, these reflections take on even greater importance. The expansion of information technologies and artificial intelligence has significantly expanded access to knowledge and transformed the forms of textual production. However, such transformations also raise relevant challenges for the training of the student-researcher. The ease of access to content and the automatic generation of texts can favor superficial academic practices, in which the effort of conceptual elaboration is replaced by the simple reproduction of available information. In this scenario, the pedagogy of intellectual work proposed by Payot contributes to placing the importance of intellectual discipline, the

autonomy of thought and epistemological responsibility in the production of knowledge based on the critical investigation of the reality studied at the center of university education.

Thus, the research concludes that Jules Payot's pedagogical thinking offers **significant and current contributions to the analysis of the challenges of contemporary university education**. By emphasizing the education of the will, the method of study and reflective writing as the foundations of intellectual work, the author offers important subsidies to rethink the formative processes in the university in a critical and responsible way. In a context marked by the abundance of information and the acceleration of knowledge flows, the training of the student-researcher requires, more than ever, the construction of intellectual habits capable of sustaining rigorous, critical and ethically committed academic practices with the production of scientific knowledge.

Thus, more than a set of pedagogical recommendations on study and writing, Jules Payot's work reveals an instigating philosophy of intellectual work, in which will, method and writing are inseparable dimensions of the formation of the scientific spirit. By recovering these foundations, this research shows that university education cannot do without the construction of rigorous intellectual habits, the discipline of attention and responsibility in the elaboration of one's own thought. In a time marked by informational abundance, the acceleration of digital flows, and the growing mediation of algorithmic systems in textual production, the central challenge of the university remains the formation of subjects capable of thinking autonomously, critically interpreting reality, and producing their own knowledge capable of improving the researched reality. In this sense, revisiting Payot's thought does not represent a nostalgic return to the past, but an opportunity to reaffirm the formative value of intellectual work, reflective writing, and the autonomy of thought in the contemporary university.

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STRATEGIC MANAGEMENT, SCHOOL-FAMILY PARTNERSHIP AND STUDENTS RETENTION: THE EXPERIENCE OF THE SOCIO-SPORTIVE AND CULTURAL PROJECT “FELIPÍADAS 2025” IN A PRIVATE SCHOOL

GESTÃO ESTRATÉGICA, ESCOLA-FAMÍLIA E RETENÇÃO DE ALUNOS: A EXPERIÊNCIA DO PROJETO SÓCIO-ESPORTIVO E CULTURAL “FELIPÍADAS 2025” EM UM COLÉGIO PRIVADO

GESTIÓN ESTRATÉGICA, RELACIÓN ESCUELA-FAMILIA Y RETENCIÓN ESTUDIANTIL: LA EXPERIENCIA DEL PROYECTO SOCIODEPORTIVO Y CULTURAL “FELIPÍADAS 2025” EN UN COLEGIO PRIVADO



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ABSTRACT

This article presents a practice-based case study on the strategic role of the CEO in the design and implementation of a socio-sportive and cultural project, the “Felipíadas 2025”, in a Brazilian K–12 private school. Conceived by the author in 2014 and continuously developed since then, the project was strategically reconfigured in 2025 to operate as a core device for strengthening school–family partnerships, promoting student engagement and supporting student retention. Drawing on qualitative data (institutional documents, observations and internal feedback) and descriptive quantitative indicators, the study analyzes key management decisions regarding thematic design, student leadership structures, multi-stage events and family participation strategies. Results show that 86% of families attended at least one major event related to the project and that the overall reenrolment rate reached 82% for the subsequent school year, suggesting a strong level of community fidelity. These findings are discussed in light of literature on strategic educational leadership, school–family partnerships and permanence policies, indicating that long-term flagship projects, when intentionally aligned with institutional goals and led from the top, can become powerful levers for engagement and retention in basic education. The study highlights implications for school leaders who seek to position themselves as strategic CEOs in the educational field.

Keywords: Strategic Educational Management. School–Family Partnership. Student Engagement. Student Retention. Leadership.

RESUMO

Este artigo apresenta um estudo de caso de natureza prática sobre o papel estratégico do CEO na concepção e implementação do projeto pedagógico socioesportivo-cultural Felipíadas 2025 em um colégio privado de educação básica. Concebido pelo autor em 2014 e desenvolvido de forma contínua desde então, o projeto foi estrategicamente reconfigurado em 2025 para operar como dispositivo central de fortalecimento da parceria escola–família, promoção do engajamento estudantil e suporte à retenção de alunos. A partir de dados

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qualitativos (documentos institucionais, observações e registros de devolutivas internas) e de indicadores quantitativos descritivos, analisam-se decisões de gestão relativas à definição do tema anual, à estruturação de lideranças estudantis, à organização de etapas sucessivas do evento e às estratégias de participação das famílias. Os resultados apontam que 86% dos responsáveis participaram de pelo menos um dos eventos principais vinculados ao projeto e que a taxa geral de renovação de matrículas alcançou 82% para o ano letivo subsequente, sugerindo elevado nível de fidelização da comunidade. Tais achados são discutidos à luz da literatura sobre liderança educacional estratégica, relação escola–família e políticas de permanência, indicando que projetos institucionais de longa duração, quando intencionalmente alinhados a objetivos organizacionais e conduzidos a partir da alta gestão, podem se constituir em potentes alavancas de engajamento e retenção na educação básica.

Palavras-chave: Gestão Escolar Estratégica. Liderança Educacional. Engajamento e Retenção. Integração Escola–Família. Relato de Experiência.

RESUMEN

Este artículo presenta un estudio de caso práctico sobre el rol estratégico del CEO en la concepción e implementación del proyecto pedagógico sociodeportivo-cultural Felipíadas 2025 en una escuela privada de educación básica. Concebido por el autor en 2014 y desarrollado continuamente desde entonces, el proyecto se reconfiguró estratégicamente en 2025 para operar como un dispositivo central para fortalecer la alianza escuela-familia, promover la participación estudiantil y apoyar la retención estudiantil. Con base en datos cualitativos (documentos institucionales, observaciones y registros de retroalimentación interna) e indicadores cuantitativos descriptivos, se analizan las decisiones de gestión relacionadas con la definición del tema anual, la estructuración del liderazgo estudiantil, la organización de las sucesivas etapas del evento y las estrategias para la participación familiar. Los resultados indican que el 86% de los padres/tutores participaron en al menos uno de los principales eventos vinculados al proyecto y que la tasa general de renovación de la matrícula alcanzó el 82% para el año escolar posterior, lo que sugiere un alto nivel de lealtad comunitaria. Estos hallazgos se analizan a la luz de la literatura sobre liderazgo educativo estratégico, relaciones escuela-familia y políticas de retención, lo que indica que los proyectos institucionales a largo plazo, cuando se alinean intencionalmente con los objetivos organizacionales e impulsados por la alta dirección, pueden ser potentes palancas para la participación y la retención en la educación básica.

Palabras clave: Gestión Escolar Estratégica. Liderazgo Educativo. Participación y Retención. Integración Escuela-Familia. Informe de Experiencia.

1 INTRODUCTION

Contemporary basic education faces the permanent challenge of engaging students in a scenario marked by multiple educational offers, competition between private institutions, changes in family dynamics, and new forms of relationship with the school mediated by technologies and social networks. In this context, the permanence of the enrolled student is no longer just an automatic result of satisfaction with teaching and starts to depend on intentional strategies of belonging, engagement and qualification of the school experience, articulated by a school management guided by strategic vision, data and long-term goals.

Several studies have pointed out that school management, when organized in a strategic and participatory way, plays a central role in the articulation of pedagogical, administrative and community bond objectives, influencing both learning outcomes and retention rates. In private institutions, this strategic dimension is added to the need to differentiate themselves in a competitive market, retain families and consolidate a recognized institutional identity.

At the same time, there is a growing recognition that the relationship between school and family is one of the pillars for the construction of successful school trajectories, directly influencing engagement, performance and decision to stay. The literature shows that cooperation between these two contexts expands opportunities for academic and affective support, reducing the risk of dropping out and school failure. In the case of private schools, this partnership also takes on a brand dimension, as it impacts the institution's reputation, word-of-mouth referrals and the decision to renew enrollments.

In this scenario, the role of the school CEO as the top leader responsible for articulating pedagogical project, institutional sustainability, and student and family engagement strategies gains relevance. More than managing routines, the figure of the CEO is called upon to conceive and conduct structuring projects that express the school's identity and function as concrete devices for building bonds and loyalty.

Felipíadas is a socio-sporting-cultural pedagogical project authored by the CEO himself, implemented in 2014 at Colégio Dom Felipe and maintained uninterruptedly since then. Over the years, the project has consolidated itself as an identity mark of the institution, articulating sport, art and culture in a collective experience of great repercussion among students and families. As of 2023, and more intensively in 2025, the project began to be strategically repositioned as a structuring axis of school-family integration and student retention, with greater prominence of the CEO's management and with the definition of explicit indicators of engagement and permanence.

This article aims to present and analyze the role of the CEO of Colégio Dom Felipe in the conception and implementation of the Felipíadas 2025 project, discussing how strategic management materializes in concrete decisions that favor school-family integration, student protagonism and the permanence of students in the institution. In doing so, it seeks to show that long-term institutional projects, when re-signified from a strategic perspective, can become powerful levers of engagement and retention in basic education.

2 THEORETICAL FRAMEWORK

2.1 STRATEGIC SCHOOL MANAGEMENT AND LEADERSHIP

Contemporary school management has been understood as the ability to organize people, processes and resources around a pedagogical project that produces significant learning and sustainable institutional results. From a strategic perspective, management is no longer just administrative and starts to involve a vision of the future, reading context, data-driven decision-making, and aligning the community with a clear institutional identity.

The literature highlights that school leadership, when distributed and guided by learning and retention goals, directly influences the engagement of teachers and students, in addition to creating conditions for institutional projects to gain coherence and continuity. In private schools, the role of the maximum leader – here represented by the CEO – includes, in addition to pedagogical responsibilities, brand management, economic sustainability, and the construction of competitive differentials, requiring that decisions about projects and events are also thought of in terms of family loyalty and consolidation of institutional identity.

2.2 SCHOOL-FAMILY INTEGRATION, ENGAGEMENT AND PERMANENCE

The relationship between school and family is pointed out by the literature as a central dimension for school success, both in terms of performance and permanence. Studies indicate that parental engagement is associated with improved learning indicators, reduced absenteeism, and strengthened positive attitudes toward school. Cooperation between school and family expands the student support network, favors the monitoring of the school path and increases the probability that difficulties will be identified and faced jointly.

Brazilian authors have also highlighted that the participation of families is part of a conception of democratic and participatory management, in which the school recognizes the community as a partner in the construction of the educational project. In contexts of strong vulnerability and risk of dropout, structured partnership programs with families tend to function as a protective factor, contributing to the permanence of students and to the construction of more stable school trajectories. In private institutions, this cooperation adds value to the

school experience offered and strengthens the perception that the school takes care of the students integrally.

2.3 DROPOUT, PERMANENCE, AND RETENTION STRATEGIES

In recent decades, educational research has shifted the focus from "dropout" to "permanence", understood as the result of articulated policies of pedagogical, social and institutional support. Studies on permanence in high school and in integrated modalities show that initiatives that strengthen ties with the school, qualify the formative experience and expand opportunities for participation tend to reduce the intention to drop out.

In basic education, permanence strategies include attendance monitoring actions, pedagogical support, psychosocial follow-up, and the development of projects that value the identity and talents of students. The literature also points out that participatory management, with the involvement of different segments in decision-making, increases the effectiveness of actions aimed at confronting dropout. In this scenario, integrative projects, such as sporting, artistic, and cultural events, can be configured as retention devices by promoting belonging, recognition, and affective bonds with the school.

3 METHODOLOGY

It is a report of school management experience, with a qualitative approach based on descriptive quantitative indicators. The study is set at Colégio Dom Felipe, a private institution of basic education that serves students from Kindergarten to High School, organized in two units. The experience analyzed refers to the cycle of conception, planning and realization of Felipíadas 2025, the institution's annual socio-sporting-cultural pedagogical project.

The Felipíadas project was conceived by the CEO in 2014 and since then has been held annually. However, the analysis presented here focuses on the 2025 edition, understood as a milestone of strategic reconfiguration under his leadership as CEO. Structuring elements accumulated along the trajectory (opening ceremonies, week of games, closing) were maintained, but deliberate changes were introduced related to the strengthening of student leadership, the expansion of family participation and the systematic use of institutional indicators of engagement and renewal of enrollments.

Data sources included: institutional documents (project dossier, regulations, schedules, job descriptions, terms of commitment), records of meetings with coordinators and teaching teams, direct observations of the implementation process, and records of internal evaluation with families and students. From a quantitative point of view, two main

institutional indicators were considered: (a) engagement and participation of families in events linked to Felipíadas 2025; and (b) enrollment renewal fee for the subsequent year.

Family engagement was calculated based on the percentage of parents or guardians present at at least one of the main events (opening ceremonies, War Cry and closing ceremony), in relation to the total number of students enrolled, resulting in an overall rate of 86% of family participation. The renewal of enrollments was obtained from the number of students who enrolled for the following year, in relation to the total number of students eligible for renewal, reaching 82%.

The analysis was conducted based on three axes: (a) strategic decisions for the design of the project; (b) leadership strategies and mobilization of people (students, families, internal team); and (c) perceived institutional impacts in terms of engagement and permanence, articulating quantitative data with the literature on school management, school-family and permanence. The emphasis is on understanding how the CEO's performance materialized in concrete choices of project design, resource allocation, and process conduction.

3.1 THE STRATEGIC CONCEPTION OF FELIPÍADAS 2025

3.1.1 Long-term vision and definition of the theme

By directly assuming the conception of Felipíadas 2025, it was based on the understanding that the project should dialogue not only with the school calendar of that year, but with the medium and long-term trajectory of the institution. The intention was to reinforce the identity of Colégio Dom Felipe as a school that values bonds, memory and life project, positioning the event as an expression of this culture and as an axis of community loyalty.

In this context, the theme "Charms of Time: Memory, Presence and Future – Because to live is to celebrate each time of the heart" was defined, in dialogue with the pedagogical team. The purpose of this choice was to articulate three central dimensions: memory (history of the school, family trajectories, students' memories), presence (concrete experience lived in the here and now, especially in events) and the future (personal, academic and professional projects of the students). By connecting these dimensions, we sought to build a symbolic axis that would reinforce the idea of continuity and permanence in the institution, both for students and their families.

Based on the theme, the division into Futurize and Realize teams was organized, inviting students to reflect on the balance between dreaming and acting, designing and achieving. In this way, from the conception phase, Felipíadas 2025 was designed as a space for reflection on time, identity and life project, without losing its playful, sporting and artistic characteristic, and making explicit its strategic role in school culture.

3.1.2 Project architecture as a retention strategy

Another key strategic decision was the structuring of Felipíadas as a cycle of events distributed over a significant period of the year, in order to keep the project in evidence and sustain the emotional bond between the community and the school. Based on this vision, the project was organized in articulated stages: launch and dissemination of the theme; process of selection and training of captains; team draw; War Cry; opening ceremonies over three days (by segment); Games Week; and closing ceremony.

This architecture was designed to create multiple points of contact with students and families. By planning three distinct opening days, segmenting audiences (Early Childhood Education and Early Years; Final Years; High School), it was sought to maximize the participation of those responsible, adapting schedules and formats to the characteristics of each segment. By defining that the closing would take place in an external club, with a structure for a ceremony, parade, dance performances and announcement of the champion team, the character of a large institutional event was reinforced, capable of generating affective memories and perception of added value to the school experience.

Decisions regarding the acquisition of t-shirts, distribution of invitations and organization of tickets were made with a focus on transparency, feasibility and identity, as the adoption of the official Felipíadas 2025 t-shirts as an element of participation visually reinforced belonging to the teams and the school. These choices are in line with the understanding that structuring projects can become retention devices by strengthening bonds and creating rituals of belonging.

3.2 STRATEGIC LEADERSHIP AND STUDENT PROTAGONISM

3.2.1 System of captains, sub-captains and student council

One of the decisions with the greatest impact on the project's dynamics was the creation and formalization of a structured system of student leadership, composed of captains, sub-captains and participation of the student council. The design of this system was intended to expand the role of students and, at the same time, create communication channels that would bring management closer to the student base.

A process for selecting captains was established with clear and documented criteria. High school students could apply, in both units, by filling out a form with personal data and justification about the desire to assume the position. The evaluation was carried out by an internal committee, based on criteria such as responsibility, family involvement, respect for standards, school performance, positive leadership spirit, communication and participation in

school events. After the selection, 12 captains were appointed – six for each team – whose list was officially released in the launch video of Felipíadas 2025.

Then, training meetings were organized conducted by responsible teachers and the school's psychologist, in which aspects such as leadership, empathy, conflict resolution, efficient communication, relationship with parents and appropriate use of official channels were worked on. These meetings were formalized through dossiers and Terms of Commitment, giving institutionality to the function performed by the students. In structuring this system, the aim was not only to ensure an efficient organization of the Futurize and Realize teams, but also to form a network of young leaders identified with the school, capable of multiplying institutional values and mediating the participation of colleagues in the project.

3.2.2 Mobilization of the internal team and people management

The mobilization of the internal team was another central axis of the leadership exercised at Felipíadas 2025. Together with the pedagogical coordinators of the two units, the responsibilities of Physical Education teachers, coordinators, teachers of different disciplines, events team and secretariat were clearly defined. Rehearsal and meeting schedules were built, validated with the management, in order to integrate the schedules into the school routine without emptying the pedagogical character of the other subjects.

In meetings with teachers, it was emphasized that the period of preparation and realization of Felipíadas should be recognized as a legitimate formative time, linked to the motor, artistic, social and emotional development of students. Specific functions were also defined for the days of the presentations (organization of students, aisle support, support to the sound team, monitoring of parents, records) and internal communication materials were produced (posted schedules, guidelines on bulletin boards, advance notices) to align expectations and reduce operational conflicts. This performance integrates the understanding of management as the coordination of collective efforts around common goals.

3.2.3 School-family integration as the axis of the strategy

From the beginning of the conception of Felipíadas 2025, school-family integration was treated as a central axis, not just as an eventual consequence of the project. This materialized in decisions aimed at facilitating, valuing and making visible the participation of families.

On the communication level, it was ensured that information about the project, schedules, days and times of opening, War Cry, Game Week and closing were disclosed in advance and through multiple channels (circulars, digital messages, face-to-face meetings),

allowing parents and guardians to organize themselves. Transparent criteria were defined for the acquisition of T-shirts and invitations, limits on tickets per student and absence of ticket sales on the day of the event, which reduced uncertainties and encouraged planning.

In the face-to-face events, the program was designed to provide moments of strong emotional impact for families: dance performances by class, parade of categories (little prince and little princess, princess and prince, boy and girl, miss and mister), solemn entries of flags with the participation of the captains, awards and final celebration of the champion team. By involving families in the preparation of costumes, authorization for participation, organization of the children's and young people's agenda, educational co-responsibility was expanded and the perception that the school is concerned with the integral development of students was strengthened.

4 INSTITUTIONAL RESULTS AND IMPACTS

The analysis of the results of Felipíadas 2025 shows relevant impacts in three dimensions: engagement and belonging, school-family integration, and maintenance of enrollments.

4.1 STUDENT ENGAGEMENT AND BELONGING

Internally, there was a high level of adherence of the students to the different stages of the project: expressive applications for the functions of captain and sub-captain, intense participation in the rehearsals conducted by the Physical Education teachers, creative involvement in the War Cry and consolidated presence in the Games Week. Teachers' reports indicated an increase in the sense of belonging, especially among students in Elementary School II and High School, segments that are often more susceptible to demotivation and dropout in private contexts. For many students, Felipíadas 2025 was pointed out, in internal evaluation records, as one of the most significant moments of the school year.

These findings dialogue with studies that associate participation in integrative projects with higher levels of engagement and identification with the school, reinforcing the idea that collective experiences of high symbolic impact contribute to the permanence of students.

4.2 SCHOOL-FAMILY INTEGRATION

With regard to the involvement of families, the institutional participation indicator pointed out that approximately 86% of those responsible were present at at least one of the main events linked to Felipíadas 2025. This expressive data suggests that the strategy of

early communication, the segmentation of the opening ceremonies by segments and the symbolic structure of the closing were effective in mobilizing the community.

In subsequent meetings and in internal evaluation records, many parents or guardians reported that the project reinforced their confidence in the school, both for the organization and safety of the events and for the perception that their children had educational experiences rich in values such as cooperation, respect, empathy and overcoming. This level of family participation is consistent with the literature, which points to parental engagement as a factor associated with improved performance, reduced absenteeism and student permanence in school. It also converges with analyses that highlight the importance of institutional events as spaces for symbolic approximation between family and school, strengthening institutional identity.

4.3 MAINTAINING ENROLLMENT AND STRENGTHENING CEO AUTHORITY

In the field of permanence, the enrollment renewal rate reached 82% of students eligible for renewal in the period following *Felipíadas 2025*. Although other institutional factors also influence this result, the percentage obtained, articulated with the high rates of family participation, indicates a scenario of important loyalty of the school community. These data are in line with studies that associate the articulation between permanence policies, qualification of the school experience and family-school involvement with the reduction of dropout and the increase in permanence.

In addition to the numbers, institutional evaluation instruments used by the school pointed out positive perceptions of families and students in relation to the project, which was often cited as a differential of Colégio Dom Felipe in comparison with other institutions. From the point of view of leadership, the direct conduct of *Felipíadas 2025* by the CEO — present at the launch, the training of captains, the opening and closing ceremonies — contributed to consolidating his image as a strategic leader and articulator of the institutional culture. This visibility, combined with the consistency between discourse and practice, strengthened trust in management and reinforced the perception that the school moves with purpose, intentionality, and commitment to the integral development of students.

Taken together, the quantitative results (86% family participation and 82% enrollment renewal) and qualitative evidence (reports of belonging, recognition of the project as a school brand, strengthening of the CEO's authority) suggest that *Felipíadas 2025* has consolidated itself as a strategic management device with relevant institutional impact.

5 FINAL CONSIDERATIONS

The experience of Felipíadas 2025, as conceived and implemented under the leadership of the CEO of Colégio Dom Felipe, highlights the potential of socio-sporting-cultural pedagogical projects when treated as strategic management instruments and not just as one-off events. By articulating a long-term vision, school-family integration, student protagonism and strengthening of institutional culture, the project was configured as a device for engaging and retaining students in basic education.

The results observed – increased student engagement, increased participation of families, recognition of Felipíadas as the school's identity mark and positive signs in the maintenance of enrollments – indicate that the CEO's strategic leadership, close and intentional, is decisive for initiatives of this nature to achieve relevant institutional impact. By taking over the design and coordination of the project, it was possible to align pedagogical, administrative and symbolic decisions with a common goal: to strengthen the bond between the community and the school, consolidating Colégio Dom Felipe as a space of memory, presence and project for the future.

As a result, it is considered pertinent to deepen the analysis with longitudinal quantitative data on dropout, enrollment renewal, and family satisfaction, as well as to compare this experience with similar initiatives in other institutions or education networks. Even so, the report presented here already allows us to affirm that strategic school management, exercised by the CEO in dialogue with the team and the community, can transform long-term institutional projects into powerful levers of engagement and institutional impact.

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ETHICAL EDUCATION IN MOZAMBIQUE: BETWEEN NORMATIVE DISCOURSES AND THE CHALLENGES OF PEDAGOGICAL PRACTICE IN BASIC SCHOOLING

EDUCAÇÃO ÉTICA EM MOÇAMBIQUE: ENTRE OS DISCURSOS NORMATIVOS E OS DESAFIOS DA PRÁTICA PEDAGÓGICA NO ENSINO BÁSICO

EDUCACIÓN ÉTICA EN MOZAMBIQUE: ENTRE LOS DISCURSOS NORMATIVOS Y LOS DESAFÍOS DE LA PRÁCTICA PEDAGÓGICA EN LA EDUCACIÓN BÁSICA



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ABSTRACT

Ethical education in primary and secondary schooling is a fundamental pillar for building just and democratic societies. This study is justified by the need to understand how ethics is conceived and applied within the Mozambican educational system, in dialogue with experiences from the Portuguese-Speaking African Countries (PALOP). Its objective is To analyze the convergences and divergences between the normative guidelines of ethical education and their effective pedagogical implementation in primary education in Mozambique. To this end, a bibliographic-documentary investigation was conducted, complemented by qualitative content analysis in academic databases and institutional repositories. The results show that, although national legislation and policies recognize ethics as a central component of integral education, significant challenges remain, such as curricular fragmentation, insufficient teacher preparation, and a lack of contextualized methodologies. Thus, it is observed that transversal integration of ethics into political-pedagogical projects, strengthening continuous teacher training, and the use of contextualized pedagogical practices such as dramatizations, palaver, and community projects, emerge as promising pathways. It is concluded that this work provides a critical synthesis and practical recommendations for educational policies and school practices that foster the effective experience of values in Mozambican schools (Guimarães, 2005).

Keywords: Ethics. Educational Policies. Teacher Training. Basic Education. Mozambique.

RESUMO

A formação ética na educação básica e média constitui um pilar essencial para sociedades justas e democráticas. Este estudo se justifica pela necessidade de compreender como a ética é concebida e aplicada no sistema educativo moçambicano, em diálogo com experiências dos Países Africanos de Língua Oficial Portuguesa (PALOP). Tem como objetivo analisar as convergências e distanciamentos entre as diretrizes normativas da educação ética e a sua efetiva implementação pedagógica no ensino básico em Moçambique. Para tanto, procede-se a uma investigação bibliográfica-documental,

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complementada por análise qualitativa de conteúdo em bases académicas e repositórios institucionais. Os resultados evidenciam que, embora a legislação e as políticas nacionais reconheçam a ética como componente central da formação integral, persistem desafios significativos, como a fragmentação curricular, a insuficiente preparação docente e a escassez de metodologias contextualizadas. Desse modo, observa-se que a integração transversal da ética nos projetos político-pedagógicos, o fortalecimento da formação contínua de professores e o uso de práticas pedagógicas contextualizadas como dramatizações, palaver e projetos comunitários, se apresentam como caminhos promissores para a formação ética. Conclui-se que este trabalho oferece uma síntese crítica e recomendações práticas para políticas e práticas escolares que promovam a vivência efetiva de valores no espaço escolar moçambicano.

Palavras-chave: Ética. Educação Básica. Formação Docente. Políticas Educativas. Moçambique.

RESUMEN

La formación ética en la educación básica y media constituye un pilar esencial para sociedades justas y democráticas. Este estudio se justifica por la necesidad de comprender cómo la ética es concebida y aplicada en el sistema educativo mozambiqueño, en diálogo con experiencias de los Países Africanos de Lengua Oficial Portuguesa (PALOP). Tiene como objetivo Analizar las convergencias y distanciamientos entre las directrices normativas de la educación ética y su efectiva implementación pedagógica en la enseñanza básica en Mozambique. Para ello, se procede a una investigación bibliográfica-documental, complementada con análisis cualitativo de contenido en bases académicas y repositorios institucionales. Los resultados muestran que, aunque la legislación y las políticas nacionales reconocen la ética como componente central de la formación integral, persisten desafíos significativos, como la fragmentación curricular, la insuficiente preparación docente y la escasez de metodologías contextualizadas. De este modo, se observa que la integración transversal de la ética en los proyectos político-pedagógicos, el fortalecimiento de la formación continua de los docentes y el uso de prácticas pedagógicas contextualizadas como dramatizaciones, palaver y proyectos comunitarios se presentan como caminos prometedores. Se concluye que este trabajo ofrece una síntesis crítica y recomendaciones prácticas para políticas y prácticas escolares que promuevan la vivencia efectiva de valores en el espacio escolar mozambiqueño.

Palabras clave: Ética. Políticas Educativas. Formación Docente. Educación Básica. Mozambique.

1 INTRODUCTION

Ethical training in basic education in Mozambique is recognized in public educational policies as an essential component of integral education and the construction of democratic citizenship. More than the transmission of rules of conduct, ethics must be understood as a formative process that promotes critical awareness, social responsibility, and commitment to the common good.

In this context, normative and strategic instruments, such as the National Education System Law (Mozambique, 2018) and the Education Policy and Strategy 2020–2029 (Mozambique, 2020), define ethics as the structuring axis of integral education. However, the specialized literature points out that the effectiveness of this principle in the school routine remains limited by institutional and pedagogical weaknesses, which requires critical and in-depth analysis.

In view of this problem, the following research question arises: How is ethics education conceived in normative discourses and implemented in the pedagogical practices of basic education in Mozambique? Based on this problem, the objective of the research is to analyze the convergences and distances between the normative guidelines of ethics education and its effective pedagogical implementation in basic education in Mozambique.

The justification for this study lies in the need to understand the limits and possibilities of ethical education in an educational system marked by tensions between official policies and school practices. Authors such as Vieira & Menezes (2016), Cardoso, Silva & Jesus (2020), Bozzo (2023) and Bianchessi (2020) reinforce ethics as a living and contextual practice, differentiating it from normative and prescriptive morality. In the Mozambican context, studies by Papel (2020), Tovela (2021) and the report by MINEDH – Ministry of Education and Human Development (Mozambique, 2022) highlight the distance between normative discourse and school practice, pointing out weaknesses in teacher training and curricular operationalization. From an international perspective, documents from the United Nations Educational, Scientific and Cultural Organization (UNESCO, 2016) and the *United Nations Office on Drugs and Crime* (UNODC, 2021) advocate participatory methodologies and universal values such as justice, cooperation and global citizenship.

From a methodological point of view, this study is inspired by Silva (2015) and Severino (2013), who defend the relevance of the bibliographic and documentary approach, aiming to understand formative processes and social practices in their relational density. This critical perspective allows us to capture nuances that escape quantitative methods, favoring the construction of analytical categories and conceptual deepening.

This article is organized into four parts: the introduction presents the contextualization, the research question and the relevance of the study; the theoretical foundation discusses the main references on school ethics and intercultural epistemologies; the methodology describes the procedures of documentary and bibliographic analysis; and the analysis and discussion section articulates the findings with the theoretical and normative frameworks. The final considerations summarize the results and propose ways to strengthen ethical training in Mozambican basic education.

2 THEORETICAL FRAMEWORK

Ethics, conceived as a reflective and relational practice, constitutes an essential foundation for education and for the consolidation of democratic societies, being differentiated from morality by its critical and transformative character. While authors such as Lima (2025) and Vieira & Menezes (2016) highlight ethics as a principle of coexistence and morality as a formative process of participation and autonomy, others such as Cardoso, Silva & Jesus (2020) and Bozzo (2023) reinforce its contextual and living dimension, promoting social awareness and collective responsibility. In contrast, Bianchessi (2020) observes morality as a system of inherited and prescriptive, often uncritical, rules. In the Mozambican context, studies by Papel (2020) and Tovela (2021) highlight the distance between normative discourse and school practice, pointing to the need for methodologies that articulate universal values and local cultural references.

The MINEDH report (Mozambique, 2022) confirms weaknesses in curricular operationalization, while international documents from UNESCO (2016) and UNODC (2021) defend participatory methodologies and universal values such as justice, cooperation, and global citizenship. In summary, the literature converges in stating that ethics education must overcome authoritarian and transmissive approaches, promoting situated, critical and participatory practices capable of responding to social, cultural and global challenges.

2.1 THEORETICAL PERSPECTIVES ON ETHICS AND MORALS

Ethics, conceived as a reflexive, relational and guiding practice of human actions, is an essential foundation for education and for the consolidation of democratic societies. Contemporary literature distinguishes ethics and morality as complementary, though not identical, dimensions. In this sense, Lima (2025) argues that ethics corresponds to principles that guide human coexistence, developing through dialogue, critical reflection, and community life.

In a convergent way, Vieira & Menezes (2016) add that moral education should be understood as a formative process that involves participation, criticism and autonomy, highlighting the role of the school in the construction of values capable of questioning unjust norms. In the same direction, Cardoso, Silva & Jesus (2020) and Bozzo (2023) underline that ethics is a living, contextual and transformative practice, promoting social awareness and collective responsibility. In contrast, Bianchessi (2020) observes that morality is configured as a system of rules culturally constructed and often inherited uncritically, distinguishing itself from ethics by its prescriptive character.

The literature also emphasizes that ethics and morals interact in the formation of personality, and should be stimulated from childhood through educational processes that favor fair coexistence, critical reflection and dialogue. This perspective is reinforced by Mussaque (2018), who defends ethics as a practice articulated with citizenship and community traditions, and by Pacho & Zimbico (2022), who attribute to the teacher the role of ethical mediator and moral reference in educational practices.

In this debate, Papel (2020) analyzes the educational dynamics in Mozambique from concrete school practices. The author shows that, although official documents proclaim ethics as the structuring axis of integral education, in practice it tends to be reduced to normative and transmissive contents, with no space for critical dialogue and student participation. This finding reinforces the need for methodologies that promote autonomy, reflection and practical experience of ethical values, preventing discipline from being limited to the memorization of rules.

In addition, Tovela (2021) argues that ethics education should be conceived as a dynamic and contextual process, capable of articulating universal values with local cultural references. For the author, the Mozambican school faces the challenge of reconciling community traditions, marked by solidarity and reciprocity, with contemporary demands of democratic and global citizenship. This perspective suggests that school ethics cannot be understood only as the transmission of norms, but as a situated practice, which values local knowledge and promotes the construction of critical and participatory identities.

The Curriculum Implementation Monitoring Report (Mozambique, 2022) adds empirical evidence to the debate, showing that, although ethics is recognized as a transversal axis in curricula, its operationalization remains fragile. The document points out gaps in the definition of institutional responsibilities, insufficient pedagogical resources and the absence of consistent methodologies, confirming that the distance between normative discourse and school practice continues to be one of the greatest challenges of Mozambican education.

From an international perspective, the UNODC handbook (2021) reinforces the relevance of participatory methodologies and universal values such as honesty, justice and cooperation. By proposing pedagogical strategies such as moral dilemmas, dramatizations and community projects, the document shows that school ethics must be lived as a daily practice, aimed at global citizenship, integrity and a culture of peace. This perspective broadens the debate by connecting Mozambique's local challenges with international agendas, showing that building a transformative school ethic requires both institutional coherence and alignment with universal principles of justice and social responsibility.

Thus, both Papel (2020) and Tovela (2021), in dialogue with MINEDH (Mozambique, 2022) and UNODC (2021), converge in pointing out that ethics education in Mozambique requires coherence between discourse and practice, as well as methodologies that favor the active participation of students. Their contributions broaden the debate on the need to overcome authoritarian and normative approaches, proposing a school ethic that is lived in the daily life of the educational community and that responds to the social, cultural and global challenges of the country.

2.2 ETHICS IN THE MOZAMBICAN SCHOOL CONTEXT

In the Mozambican context, the presence of ethics in school is supported by the main regulatory documents of the educational system. The National Education System Law (Mozambique, 2018) and the Education Policy and Strategy 2020-2029 (Mozambique, 2020) recognize ethics as a structuring axis of integral education and democratic citizenship, proposing participatory methodologies, intercultural dialogue and valuing diversity.

However, several recent studies show discrepancies between the proclaimed values and the reality of school practices. Papel (2020) observes that the discipline of Moral and Civic Education is often treated in a marginal way, with reduced didactic time and transmissive approaches that are poorly aligned with students' experiences. Insufficient teacher training, curricular rigidity, and the absence of contextualized methodologies reinforce this discrepancy (Mozambique, 2022; Bianchessi, 2020).

The specialized literature also reveals tensions between normative discourses and institutional practices. Bozzo (2023) identifies pedagogical practices marked by symbolic violence and authoritarianism, which contradict the ideals of democratic coexistence present in official documents. In this sense, school ethics depends not only on discursive policies, but on the coherence between proclaimed values and lived practices. Lima (2025) and Santos (2025) reinforce this idea by stating that ethics only materializes when incorporated into school culture and democratic management.

Comparative experiences in the PALOP offer relevant contributions. In Angola, Cape Verde and São Tomé and Príncipe, pedagogical practices have been developed that integrate traditional narratives, proverbs, dramatizations, moral dilemmas and community projects as resources for teaching ethics (Mussaue, 2018; Vieira & Menezes, 2016). In the same direction, Tovela (2021), inspired by Morin's complex thinking, proposes interdisciplinary projects that articulate community values with contemporary challenges, overcoming curricular fragmentation.

International organizations such as UNESCO (2016) and UNODC (2021) reinforce the relevance of participatory methodologies and universal values such as honesty, justice, and cooperation, advocating ethical education aimed at global citizenship, peace, and sustainability.

We also add the contribution of Cardoso, Silva & Jesus (2020), who underline the importance of ethics as a community practice and as an element of social cohesion. The authors argue that, in African contexts marked by cultural diversity and social inequalities, school ethics should be built from community values and local practices, avoiding the imposition of decontextualized external models. This perspective, coming from Angola, reinforces the debate in the PALOP and broadens the understanding of ethics as a situated, relational and transformative practice.

Despite these advances, structural challenges persist in Mozambique that condition the effectiveness of ethics education. Initial teacher training remains insufficient for a critical approach to ethical content; the curricula have a normative orientation, but lack operationalization; and institutional culture sometimes reproduces authoritarian practices that weaken ethical experience (Barros & Choti, 2020; Papel, 2020). In addition, Pacheco & Zimbico (2022) underline the impact of globalized modernity on the erosion of traditional ethical-cultural references, pointing out the need for an intercultural ethic that reconciles local knowledge and universal values.

The review of the contemporary literature shows that, although there is theoretical consensus on the centrality of ethics in integral education, the Mozambican educational reality still expresses tensions between normative discourse and school practice. This finding reinforces the relevance of this study, which seeks to critically understand the place of ethics in basic education and identify ways to strengthen it in the context of educational policies and practices.

3 METHODOLOGY

This study adopts a qualitative approach, exploratory and descriptive in nature, aimed at a deep understanding of the meanings, challenges and practices related to ethics education in Mozambican schools. The methodological choice is justified by the complexity of the educational contexts, which involve political, pedagogical, cultural and institutional dimensions.

According to Silva (2015) and Severino (2013), qualitative research is adequate to capture formative processes and social practices in their relational density. The critical perspective is inspired by Siena et al. (2024), who conceive educational processes as socially situated practices, requiring reflective and interpretative analysis. This approach allows capturing nuances that escape quantitative methods, as Creswell (2010) and Bueno (2018) argue.

The investigation combined documentary analysis and bibliographic research, both conducted in a systematic and transparent manner. The documentary analysis consisted of the interpretation of legal and normative provisions, such as Law No. 18/2018 (Mozambique, 2018), the curricula of Basic Education and institutional documents of MINEDH (Mozambique, 2020), with the aim of identifying legal foundations and political guidelines on ethics education in Mozambique. The review protocol began with the identification of 184 documents, including laws, plans, curriculum guides, reports and academic articles, located in databases such as SciELO, Google Scholar, Redalyc, INDE, MINEDH and university repositories. Inclusion criteria were established, such as direct relevance to ethics education, relationship with basic education, connection to the Mozambican context or the PALOP and publications between 2009 and 2025.

The exclusion criteria covered duplicate documents, opinion pieces or outdated ones. After screening, 33 final documents were selected, characterized by author, year, type of publication, context of application and main contributions. The bibliographic research complemented this process, guided by the theoretical references that support the critical approach, following stages of search, screening, full reading and synthesis, with inclusion and exclusion decisions justified according to the theoretical and methodological relevance.

The content analysis followed the model proposed by Bardin (2016), operationalized in four stages: pre-analysis, with floating reading and organization of the corpus; coding, carried out manually, with full reading and thematic marking, resulting in 23 initial codes; categorization, which grouped the codes into three central categories, legal foundations, pedagogical practices, and institutional challenges; and interpretation, which articulated the

empirical data with the theoretical references. To ensure validity, the categories were cross-reviewed by two researchers, reducing biases and increasing interpretative consistency.

All steps were documented in analysis protocols, ensuring traceability of methodological decisions. The triangulation between documentary analysis and literature search reinforced the reliability of the results, allowing a more robust understanding of ethics education in Mozambique.

The research respected ethical principles of academic integrity, methodological transparency, and responsible use of sources, in line with the reflections of Diniz and Guerreiro (2015), which emphasize the social responsibility of research, and with the ANPEd guidelines (2024), which reinforce scientific integrity in research in education. There was no direct involvement of human participants, which minimized ethical risks, and the treatment of the information followed scientific rigor and respect for citation and authorship standards. The database analysis followed treatment and interpretation methodologies proposed by Zanetti Neto (2020), which highlight the importance of systematization, coding, and categorization of data to ensure consistency and validity of the results.

Among the limitations of the study, we highlight the dependence on documents available in digital and institutional databases, the absence of empirical data collected directly in schools, and the possibility of interpretative biases, mitigated through triangulation and cross-review. Thus, the methodology adopted ensures replicability, reliability, and a solid basis for the interpretation and generalization of the findings.

4 RESULTS AND DISCUSSIONS

The documentary and bibliographic analysis allowed the identification of three central categories related to the understanding and implementation of ethics education in Mozambican basic education. The results presented reflect exclusively the elements emerging from the normative documents, curricula, legislation and specialized literature that constituted the corpus of this study.

4.1 ETHICS IN THE MOZAMBICAN CONTEXT

In Mozambique, ethics occupies a central position in normative discourses, but its effectiveness in pedagogical practice continues to face structural and methodological obstacles. Although official documents proclaim values such as respect, solidarity and democratic coexistence, the absence of specific methodological guidelines weakens their implementation.

This distance between discourse and practice confirms the criticism of Papel (2020), who identifies the marginalization of the discipline of Moral and Civic Education, and converges with Barros & Choti (2020), when he highlights that insufficient teacher training and the lack of methodological innovation compromise ethical experience in schools. From the curricular point of view, the values appear in a generic way, without definition of observable competencies, which limits their operationalization.

We perceive incoherence between institutional discourses and the real conditions of functioning of schools, already denounced by Mussaque (2018), remains current, and the absence of continuous training strategies compromises the construction of ethical skills, as highlighted by UNESCO (2016). In school practices, a transmissive approach predominates, little articulated with the students' daily lives, which reinforces the decontextualization of ethics and its reduction to normative contents. Despite these weaknesses, promising prospects emerge.

Vieira & Menezes (2016) suggest participatory methodologies, such as debates and dramatizations, that align with the needs identified in the Mozambican context. Tovela (2021), dialoguing with Morin's complex thinking, emphasizes interdisciplinary and collaborative practices that stimulate students' protagonism. Bozzo (2023) reinforces the importance of understanding educational processes as socially situated practices, highlighting that school ethics only becomes effective when articulated with community and cultural experiences.

4.2 EDUCATIONAL EXPERIENCES IN THE PALOP COUNTRIES

The challenges facing Mozambique are not isolated. In Angola, ethics is linked to citizenship programs, but curricular centralization and scarcity of resources make it difficult to operationalize them (Cardoso, Silva & Jesus, 2020). Insufficient teacher training and the absence of clear methodologies limit the ability of schools to translate proclaimed values into consistent practices, bringing the Angolan context closer to Mozambican weaknesses.

In Cape Verde, on the other hand, there is a greater appreciation of community practices and local knowledge. Silva & Fernandes (2018) highlight the use of traditional narratives, proverbs and cultural projects as pedagogical tools of ethical transmission. This approach shows that school ethics is not limited to normative content, but emerges as a living practice, rooted in local knowledge and community participation.

The connection with Mozambique is clear: valuing cultural and community practices can be a way to overcome curricular fragmentation and methodological rigidity. In São Tomé and Príncipe, institutional fragility and the absence of consistent policies bring this context

closer to the Mozambican reality, revealing convergences in the difficulty of transforming normative values into consistent pedagogical practices (Silva & Fernandes, 2018).

Ethics is formally recognized, but the lack of structural mechanisms and teacher training compromises its effectiveness. From a theoretical point of view, Lima (2025) deepens the discussion by emphasizing that ethics should be conceived as a shared responsibility, requiring institutional coherence and democratic management. Santos (2025) adds that the school of the future needs to incorporate innovative and inclusive practices, capable of responding to the demands of globalized modernity without losing sight of community values. This tension between universality and locality is also highlighted by Pacho & Zimbico (2022), who underline the role of the teacher as an ethical mediator and agent of social transformation.

4.3 ETHICS EDUCATION IN MOZAMBIKAN SCHOOLS

Documents such as Law No. 18/2018 (Mozambique, 2018) and the Basic Education Curriculum Programs (MINEDH, 2020), recognize ethics as a fundamental axis of the integral formation of students, situating it as part of the educational mission aimed at citizenship and democratic coexistence.

However, these documents present only generic references to values such as respect, solidarity, responsibility and democratic coexistence, without offering specific methodological guidelines for the implementation of ethics in everyday school life. This gap evidences what Severino (2013) calls "normative fragility", in which principles are affirmed at the discursive level, but are not translated into systematized pedagogical practices.

The curricular plans (Mozambique, 2020) reinforce the presence of ethics as a transversal component, but lack concrete didactic strategies, which can be related to the needs of transforming abstract categories into observable pedagogical practices.

The literature also points to evidence of poor teacher preparation and the absence of regular continuing education programs, confirming Creswell's (2010) analysis, according to which the quality of implementation depends on the training of educational agents. In this sense, Bueno (2018) argues that ethical training requires reflective and dialogical processes, which are not sufficiently contemplated in official documents.

The school practices described in recent studies (Siena et al., 2024) reveal a predominance of transmissive approaches, focused on the exposition of values in a normative way, poorly articulated with the daily lives of students. This finding dialogues with Silva (2015), who defends the need for contextualized pedagogical practices, capable of relating ethical principles to the concrete experiences of students. The absence of

participatory methodologies and curricular integration strategies reinforces the distance between official discourse and school practice, limiting the effectiveness of ethics education as an instrument of integral formation.

4.4 ETHICS IN EDUCATIONAL POLICIES

Instruments such as Law No. 18/2018 (Mozambique, 2018), the Strategic Plan for Education 2020–2029 (Mozambique, 2020) and the curricular documents for basic education (Mozambique, 2022) affirm ethics as a transversal component and guiding principle of citizenship. These normative frameworks recognize the importance of ethical training as part of integral education, but the analysis highlighted gaps in the operational mechanisms that should ensure effective transversality. This finding dialogues with Severino (2013), who warns of the distance between normative discourses and their materialization in consistent pedagogical practices.

We also found the persistence of weaknesses in the definition of institutional responsibilities, in the articulation between school and community and in the availability of adequate pedagogical resources. This lack of clarity and structural support confirms Silva's (2015) critique, according to which educational policies tend to enunciate universal values without offering concrete means for their implementation. In addition, the implementation of ethical guidelines depends on organizational conditions that many schools do not yet have, such as infrastructure, teacher training and community support, which limits the effective implementation of the established guidelines.

Siena et al. (2024) argue that educational processes only become socially significant when articulated with everyday practices and the real conditions of school institutions. In this sense, Bardin (2016) highlights that abstract categories, such as ethical values, need to be operationalized in observable and evaluable pedagogical practices. The absence of participatory methodologies and continuous training strategies for teachers, identified both in official documents and in empirical studies, confirms the analysis of Creswell (2010) and Bueno (2018), who defend the need for teacher training and reflective approaches so that ethics becomes an effective part of the school experience.

Thus, although official documents recognize ethics as a fundamental axis of citizenship education, the lack of operational mechanisms, institutional clarity and structural conditions reveals a distance between normative discourse and pedagogical practice. This tension between ideal and reality reinforces the need for more consistent educational policies, capable of articulating ethical values with concrete strategies for teaching and teacher training.

4.5 STRATEGIES IDENTIFIED FOR THE PROMOTION OF ETHICS EDUCATION

The strategies for promoting ethics education identified in official documents appear in a punctual and poorly systematized way. Among them, the valorization of participatory activities, the encouragement of community projects, the incorporation of traditional narratives and local cultural practices, as well as the use of methodologies that favor dialogue, conflict resolution and cooperation stand out.

Authors such as Vieira & Menezes, 2016; Mussaque, 2018; Tovela, 2021; Bozzo, 2023A reinforce the relevance of these practices, especially when articulated with the active participation of students and the educational community (Vieira & Menezes, 2016; Mussaque, 2018; Tovela, 2021; Bozzo, 2023).

However, we observe that such initiatives are not organized in consistent guidelines in the normative documents, which compromises their effective implementation and confirms the criticism of Papel (2020) and the findings of the Curriculum Implementation Monitoring Report (Mozambique, 2022).

However, the official recognition of ethics as a fundamental axis of the integral education of students is present in the main normative documents, such as Law No. 18/2018 and the Education Policy and Strategy 2020–2029 (Mozambique, 2020). This normative consensus, however, does not translate into consistent pedagogical practices, revealing a gap between discourse and operationalization. Mussaque (2018) had already pointed out this incoherence, highlighting that the absence of clear mechanisms compromises the effective experience of ethical values in everyday school life.

In the curricular sphere, values appear in a generic way, with references to respect, solidarity, responsibility and democratic coexistence. However, such values are presented in an abstract way, without definition of observable competencies, which makes their practical application difficult (Barros & Choti, 2020; Papel, 2020). This finding reinforces the need for methodologies that articulate universal values with local knowledge, as defended by Tovela (2021) and Cardoso, Silva & Jesus (2020), when emphasizing the importance of community and intercultural practices.

As for the methodological guidelines, no specific guidelines were identified for the implementation of ethics, which weakens the teaching action. The Curriculum Implementation Monitoring Report (Mozambique, 2022) confirms this absence, pointing to insufficient pedagogical resources and a lack of consistent methodologies. Vieira & Menezes (2016) suggest that participatory methodologies, such as debates and dramatizations, could fill this gap, favoring student protagonism and the practical experience of values.

Teacher training is another critical point. There is evidence of poor initial preparation and the absence of regular in-service training strategies, which limits teachers' ability to develop consistent and contextualised practices (UNESCO, 2016; Pacho & Zimbico, 2022). This formative insufficiency contributes to the reproduction of transmissive and normative approaches, rather than reflective and participatory practices.

Finally, the school practices described in the literature reveal a predominance of transmissive approaches, which are poorly articulated with the students' daily lives. Ethics, in this context, is worked on in a decontextualized way, with no connection to real student experiences (Papel, 2020; Bozzo, 2023). This finding reinforces the criticism of Vieira & Menezes (2016), who defend participatory and contextualized methodologies as a way to overcome curricular fragmentation and promote an ethics lived in the school space.

The analysis shows that, although there is normative consensus on the centrality of ethics in integral education, significant gaps persist in its operationalization. The absence of clear methodological guidelines, the insufficiency of teacher training and the predominance of transmissive practices compromise the consolidation of a transformative ethical education in Mozambique.

5 FINAL CONSIDERATIONS

The main objective of this study was to analyze the convergences and distances between the normative guidelines of ethics education and their effective pedagogical implementation in basic education in Mozambique. Based on the documentary and bibliographic methodological approach, it demonstrated that, although ethics is recognized as the structuring axis of integral education in legal and curricular devices (Mozambique, 2018, 2020), its effectiveness remains weakened by methodological gaps, insufficient teacher preparation, and institutional incoherence between proclaimed values and daily practices.

From a theoretical point of view, the specialized literature reinforces that ethics should be understood as a reflective, contextual, and transformative practice, articulated with citizenship and community traditions (Mussaue, 2018; Vieira & Menezes, 2016; Tovela, 2021; Bozzo, 2023). However, the data analysed reveal that, in the Mozambican school reality, transmissive and normative approaches prevail, poorly articulated with the daily lives of students, confirming the criticism of Papel (2020) and the findings of the Curriculum Implementation Monitoring Report (Mozambique, 2022).

The comparison with experiences in the PALOP showed that challenges are common, but also that there are differentiated and promising paths. In Angola, curricular centralization and scarcity of resources limit the operationalization of ethics (Cardoso, Silva & Jesus, 2020);

in Cape Verde, valuing local knowledge and community practices offers viable alternatives (Silva & Fernandes, 2018); in São Tomé and Príncipe, institutional fragility brings the context closer to Mozambican difficulties. This diversity reveals that, although there is normative consensus, practical implementation depends on specific structural and cultural conditions.

The critical analysis of the tensions between policies and practices reinforces the need for an intercultural, interdisciplinary and situated approach to school ethics. From a practical point of view, the study points out fundamental strategies: the transversal integration of ethics in the curricula, the continuous training of teachers as ethical and cultural mediators, the valorization of community traditions and the adoption of participatory methodologies that promote student protagonism and critical dialogue. These proposals respond directly to the dimensions analyzed, official recognition, curricula, methodologies, teacher training and school practices, converging to the construction of a democratic and solidary citizenship, capable of articulating universal values with local contexts.

This study offers subsidies for educational policies and practices that promote a lived and transformative ethic, strengthening the school as a space for critical reflection, inclusion and community participation. By proposing the articulation between theory and practice, and by integrating comparisons between Mozambique and the other PALOP countries, it contributes to broadening the academic debate and guiding concrete actions that respond to the contemporary challenges of ethics education in the Portuguese-speaking African region.

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THE USE OF INFORMATION TECHNOLOGY AND ITS CONTRIBUTIONS TO THE QUALITY OF EDUCATION FOR VISUALLY IMPAIRED STUDENTS: A CASE STUDY AT THE FEDERAL INSTITUTE OF EDUCATION, SCIENCE AND TECHNOLOGY OF AMAZONAS – HUMAITÁ CAMPUS

O USO DA TECNOLOGIA DA INFORMAÇÃO E SUAS CONTRIBUIÇÕES NA QUALIDADE DO ENSINO DE ALUNOS DEFICIENTES VISUAIS: UM ESTUDO DE CASO NO INSTITUTO FEDERAL DE EDUCAÇÃO, CIÊNCIAS E TECNOLOGIA DO AMAZONAS – CAMPUS HUMAITÁ

EL USO DE LAS TECNOLOGÍAS DE LA INFORMACIÓN Y SUS CONTRIBUCIONES A LA CALIDAD DE LA EDUCACIÓN DE ESTUDIANTES CON DISCAPACIDAD VISUAL: UN ESTUDIO DE CASO EN EL INSTITUTO FEDERAL DE EDUCACIÓN, CIENCIA Y TECNOLOGÍA DE AMAZONAS – CAMPUS HUMAITÁ



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ABSTRACT

This article presents the results of a field research that investigated the contributions of Information Technology (IT) to improving the quality of education for students with visual impairments. The study was an experiment conducted with visually impaired students at the Federal Institute of Education, Science and Technology of Amazonas – Humaitá Campus, involving teachers and students with visual impairments. The methodology adopted was a case study, using direct observation. The results showed that the use of technological resources, such as screen readers, accessible educational software, and adapted digital materials, contributes significantly to the teaching-learning process and to school inclusion. From this perspective, we understand that the insertion of IT in the educational context expands the possibilities of access to knowledge and promotes greater autonomy for students with visual impairments.

Keywords: School Inclusion. Assistive Technology. Visual Impairment. Education. Digital Accessibility.

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RESUMO

Este artigo apresenta os resultados de uma pesquisa de campo que investigou as contribuições da Tecnologia da Informação (TI) na melhoria da qualidade do ensino de alunos com deficiência visual. O estudo foi uma experiência realizado com alunos deficientes visuais do instituto federal de educação, ciências e tecnologia do Amazonas – campus Humaitá., envolvendo professores e estudantes com deficiência visual. A metodologia adotada foi de estudo de caso, utilizando observação direta. Os resultados evidenciaram que o uso de recursos tecnológicos, como leitores de tela, softwares educativos acessíveis e materiais digitais adaptados, contribui significativamente para o processo de ensino-aprendizagem e para a inclusão escolar. Sobre esse prisma compreendemos que a inserção da TI no contexto educacional amplia as possibilidades de acesso ao conhecimento e promove maior autonomia aos alunos com deficiência visual.

Palavras-chave: Inclusão Escolar. Tecnologia Assistiva. Deficiência Visual. Educação. Acessibilidade Digital.

RESUMEN

Este artículo presenta los resultados de una investigación de campo que investigó las contribuciones de las Tecnologías de la Información (TI) a la mejora de la calidad educativa de estudiantes con discapacidad visual. El estudio fue un experimento realizado con estudiantes con discapacidad visual en el Instituto Federal de Educación, Ciencia y Tecnología de Amazonas, Campus Humaitá, con la participación de docentes y estudiantes con discapacidad visual. La metodología adoptada fue un estudio de caso mediante observación directa. Los resultados mostraron que el uso de recursos tecnológicos, como lectores de pantalla, software educativo accesible y materiales digitales adaptados, contribuye significativamente al proceso de enseñanza-aprendizaje y a la inclusión escolar. Desde esta perspectiva, entendemos que la incorporación de las TIC al contexto educativo amplía las posibilidades de acceso al conocimiento y promueve una mayor autonomía para los estudiantes con discapacidad visual.

Palabras clave: Inclusión Escolar. Tecnología de Asistencia. Discapacidad Visual. Educación. Accesibilidad Digital.

1 INTRODUCTION

Throughout the world history of people with disabilities, the blind population was on the margins of society for a long time, because the absence of public policies, as well as their low representation in the organs of the republic, combined with medieval prejudices, ventilated before the population that these individuals were incapable in all senses for work activities and social life.

With the advancement of Information Technology in the world scenario, combined with the Globalization that we are experiencing, the demand for technological solutions is increasingly present in the school environment. However, little is discussed about this demand related to the blinded person who attends educational institutions, about digital inclusion.

The methodological use of Informatics to promote accessibility aims to develop alternative skills for the teaching-learning process of individuals with a specific special need or limitation. It also seeks to detail a discussion that contemplates several factors and overdeveloped competencies inherent to each type of disability.

In this aspect, the influence on the learning of each individual is related to the social context in which he is inserted. Considering that blindness is the least discussed, it was considered necessary to discuss this theme, it is relevant to highlight that the entire extension of the discussion will take place in the current national scenario, with a brief synthesis of the prejudices and segregalist policies that have occurred throughout universal history.

The present discussion takes into account research by several theorists who try in every way to discuss why even though there is a considerable range of legislation related to the matter and inclusive public policies, little is currently verified the protagonism of the blind individual in the educational environment, and therefore little effective digital and social inclusion occurs, which is the main objective of the State to promote. In view of the above, this study seeks to answer the following research question: **How does Information Technology contribute to the quality of teaching of visually impaired students?** The general objective is **to analyze the contributions of IT in the teaching-learning process of visually impaired students.**

2 THEORETICAL FOUNDATION

Blindness throughout Universal History is the object of stereotypes, marked by a feeling of rejection and intolerance based on religious beliefs and total disregard for knowledge.

In antiquity, until the beginning of the Modern Age, blindness was the cause of divine punishment for the family that received a blind individual (the result of the sin of the parents, grandparents or by virtue of the person's own sin, which had blindness as a punishment). The blind individual was subject to cruel and ignorant processes, such as his own sacrifice for being considered useless to the work of that time, abandonment, the death penalty and torture, as in the case of Prussia where the blind were seen as possessed by evil spirits.

The Jewish culture, today spread throughout the world, in the same vein, demonstrates how sin was considered a consequence of blindness, the passage from the Gospel of St. John demonstrates this issue, "And the disciples asked him, saying, 'Rabbi, who sinned, this man or his parents, that he was born blind?' Jesus answered, 'Neither he nor his parents have sinned; but it was so that the glory of God might be manifested in him...'" (JOHN 9:2-3).

In the nineteenth century, an invention by Louis Braille would completely change the view of the time in relation to the blind, until then, unable to read and work. The invention was inspired by a military code called Night Writing, used by Napoleon Bonaparte's soldiers to communicate silently at night and without a light source. The invention became known as the Braille System, which is still used today.

The Braille System consists of writing and reading, based on 64 symbols in relief, allowing the representation of letters, numerals and accent marks. In Brazil it has been recognized since 1856, it is key in the learning process and contact of the blind person not only in the educational environment, but also in the labor market.

Despite the historical milestone of the creation of the Braille System, in Brazil the blind continued to be underrepresented. Certainly, in recent decades there have been important advances regarding the human and social rights of blind people, recognized, until then, as incapable of work activities. After years of struggle, these individuals begin to enjoy their rights as human beings, holders of guarantees and fundamental rights, as well as specific ones, representing, therefore, a significant advance in the social development of the country.

The Brazilian Magna Carta mentions in 07 (seven) of its 250 (two hundred and fifty) articles on disability, applicable to blind people. With regard to social rights, any discrimination in relation to salary and admission criteria for workers with disabilities is prohibited; the reservation of a percentage of jobs every time a competition is held for the admission of civil servants, pertaining to the three branches of the Republic; ensures social assistance, in addition to specialized educational assistance, which is the obligation of the State and the family to provide, it is observed the concern of the constituent legislator to guarantee the

effectiveness of these rights to people wronged throughout history by irrational beliefs and senses from a logical point of view.

In the same perspective, with the objective of eradicating attitudinal barriers, such as detailing the rules that must be observed to ensure the effectiveness of the rights of people with disabilities, it focuses on a single law, a quasimodo regulatory object, marked by bringing together laws, decrees, ordinances, and attributing responsibility to each author in the inclusive perspective. The Brazilian Law for the Inclusion of Persons with Disabilities (Law No. 13,146, of July 6, 2015) was created, a historical milestone in the struggle for civil and human rights of persons with disabilities, as can be seen in chapter four.

IV – barriers: any obstacle, obstacle, attitude or behavior that limits or prevents the person's social participation, as well as the enjoyment, enjoyment and exercise of their rights to accessibility, freedom of movement and expression, communication, access to information, understanding, safe circulation, among others, classified as:

- a) urban barriers: those existing on roads and in public and private spaces open to the public or for collective use;
- b) architectural barriers: those existing in public and private buildings;
- c) barriers in transport: those existing in the systems and means of transport;
- d) Barriers in communications and information: any obstacle, obstacle, attitude or behavior that hinders or makes it impossible to express or receive messages and information through communication systems and information technology. (BRAZIL, 2015).

The law proposes a fairer recognition, asserting the dignity of the individual, in addition to requiring an active role of the State. It attests that disability does not incapacitate, but rather society and the space in which the individual is inserted, through social obstacles, attitudinal, architectural, technological, and communicational barriers, which must be eradicated.

Wanting children to be born healthy and without any disability or limitation is a legitimate desire of every father and mother, however nature and destiny do not follow the standards of perfection that we often have in our heads. We can give health, good nutrition, but children are what they are, there are things that we cannot shape or change, this is the case of the theme addressed here, and not everyone is open to acceptance. As a result, the main scope of LBI/2015 is to combat discrimination.

There is no doubt that, among the barriers mentioned above, attitudinal is the one that most negatively interferes in this process, since it prevents people from changing their behaviors and the change in conduct results in the elimination of other obstacles.

3 CONTRIBUTIONS OF INFORMATION TECHNOLOGY IN THE TEACHING OF VISUALLY IMPAIRED STUDENTS

In a globalized world, the use of technology has reached levels that were not expected by the capitalist world itself, as a result, some sectors of contemporary society have not been able to keep up with such a revolution. One of the sectors is the educational environment for people with special needs, especially the blind student.

When talking about the use of technology in the school setting, it is not about the mere use of the computer by students or teachers, it is about the use of technology for inclusive purposes, in the case of students with disabilities. Previously, it was found that the school, even in current times, is endowed with attitudinal barriers by its own agents. In the present context, it is not different, this fact requires special attention.

What is the use of an image projector device to help a blind person teach? The answer is simple, none. Limiting itself to this example, it is observed that the technological barriers, cited in the Brazilian Law of Inclusion of 2015, are clearly being ignored by the agents, which in this example, the teacher, it should be noted that the fault of such a barrier is not always the teacher, but rather the educational institution that does not have materials aimed at such inclusion. It should also be noted that when the teacher is attending higher education, the absence of teaching related to information technology contributes to this situation.

As a result, technologies have not changed the teaching paths in the classroom, nor have they replaced the presence of the teacher. The use of technological tools came in the form of a methodological revolution, to allow not only a solid model of support in daily activities, but also to create an interactive environment and, through its software, make activities that were not possible before accessible to some people, as well as to automate tasks that were developed exclusively through a human.

With regard to people with disabilities, according to the outline in question, information technology has fostered professional growth through the education where it is being applied. It happens that in public schools it is not very widespread, even though there is a large number of laws approved in favor of people with disabilities. From this perspective, it is observed, for example, the use of image projectors, computers without accessibility software, in classrooms, which in the inclusive perspective, takes care of a technological barrier.

4 METHODOLOGY

The research was in the field, with a qualitative and descriptive approach. The study was carried out in 2024 within the scope of the Federal Institute of Amazonas campus Humaitá-AM. The research was field, with a qualitative and descriptive approach. The

participants involved were visually impaired students, professors who committed to carrying out this important research and we also had an important participation of scholarship students from the Informatics course in an integrated way. Techniques and methodologies were applied with teachers and class observations to identify the appropriate use of technologies. The answers were analyzed through content analysis (BARDIN, 2011), seeking categories such as: accessibility, inclusion and learning. During the teaching process, several tools were used, such as screen readers, which are software that translate texts and graphic elements of the computer screen into synthesized voice. They allow blind people to use operating systems, programs and websites autonomously, another important NVDA (NonVisual Desktop Access) tool, is a free and open source screen reader, compatible with the Windows system. It reads texts, menus and commands, allowing the student to access digital content, produce texts and browse the internet. Because it is free, it is widely used in public schools, DOSVOX Brazilian system developed by the Federal University of Rio de Janeiro (UFRJ). It allows blind people to interact with the computer through sound commands. It includes a text editor, file reader and even accessible educational games, facilitating learning and digital inclusion, Braille Printers and Materials Braille continues to be fundamental in the process of literacy and literacy of students cegos.Com Braille printers, it is possible to convert typed texts into Braille dots printed on special paper. There are also electronic Braille displays, which allow tactile reading of texts in digital format, connecting to the computer via USB or Bluetooth. These resources allow the student to have access to the same content as their classmates, promoting autonomy and equity in learning. These were the resources used, since the set of these technologies provides the visually impaired student with autonomy, inclusion and equal opportunities, promoting new methodologies and supporting teachers in their pedagogical practices. Throughout the course, the research followed the ethical principles of Resolution No. 510/2016 of the National Health Council, with the free and informed consent of the participants.

5 PRESENTATION AND DISCUSSION OF RESULTS

The present study was developed at the Federal Institute of Technologies, Sciences and Education of Amazonas Humaitá campus focusing on the formative trajectory of a visually impaired student enrolled in the Integrated Technical Course in Informatics. This is a paradigmatic case, insofar as it articulates the challenges of technical professional education — highly dependent on visual and symbolic languages — with the construction of an educational environment mediated by assistive technologies and inclusive pedagogical practices.

The student, the first visually impaired student to enter the course, faced an institutional context that, at the time, lacked accessible infrastructure: there was no screen reading software, Braille printers, tactile materials and servers trained in specific technologies to support visual impairment. This initial lack mobilized teachers and technicians to move to training courses and to reorganize didactic practices, in a movement of institutional and pedagogical learning that transcended the individual case.

The course curriculum — strongly anchored in logic, algorithms, and programming content — imposed significant barriers to the student's full participation. However, with the progressive use of assistive technologies, curricular adaptations and the support of students of the Degree in Computing and Technology at the State University of Amazonas, it was possible to ensure the student academic autonomy, satisfactory performance and successful completion of the course.

The insertion of assistive technology resources — such as screen readers (Virtual Vision, Dosvox), Braille devices and audio description software — reconfigured the way students access knowledge and cognitive processes. As Bersch (2017) points out, assistive technology is not restricted to the functional compensation of disability, but constitutes a device for expanding cognitive and symbolic capacities.

The use of these resources allowed the student to develop new digital reading and writing strategies, adapting to the programming environment and the study of complex languages. In a convergent way, Amirilian (1997) highlights that, in the absence of sight, the blind subject develops alternative symbolic forms of representation, in which visual thinking is replaced by a highly structured verbal and tactile imagination. Thus, technology mediated the transposition of perceptual limitations to the field of abstract thinking, favoring the development of analytical skills compatible with the requirements of the course.

Alegre's (2003) perspective on "blindness and the vision of thought" theoretically illuminates this case, by stating that the absence of physical vision does not compromise the ability to see symbolically. On the contrary, blindness can enhance introspection and the ability to formulate complex mental images, when mediated by appropriate symbolic and technological instruments. In the student's case, assistive technology became the channel through which visual thinking was transformed into conceptual thinking.

The autonomy constituted throughout the training course was one of the most remarkable achievements of the experience. With the mastery of assistive technologies and digital platforms, the student achieved a high degree of independence in the study of theoretical disciplines, in the completion of the course completion work and in internship activities.

This autonomy is supported by the legal principle of the Brazilian Law for the Inclusion of Persons with Disabilities (Law No. 13,146/2015), which defines the right to self-determination and full social participation as axes of citizenship. In the educational sphere, this principle translates into the self-management of the learning process, allowing the student to conduct his trajectory in an active and self-regulated way.

The student's decision to continue her studies in the Distance Education (EAD) modality, after completing the technical course, reinforces this dimension of intellectual emancipation. The virtual environment, by allowing greater control over time, resources and access formats, has enhanced their autonomy and reinforced the link between technology and cognitive freedom, as Gil (2006) argues, when he defines accessibility as "a field of liberation through technical mediation".

The presence of the blind student had a significant impact on the institutional culture, prompting collective reflections on pedagogical practices, teacher training and diversity management. As Oliveira and Silva (2020) point out, the inclusion of visually impaired students, when supported by technological resources and significant curricular adaptations, reconfigures the school ethos, promoting more collaborative environments that are sensitive to human plurality.

This transformation is consistent with the principles of the Universal Design for Learning (UDL), expressed in the guidelines of the Law of Guidelines and Bases of National Education (Law No. 9,394/1996), which advocate the use of multiple forms of representation, engagement and expression. At IFAM, the experience shifted the notion of inclusion from a punctual practice to a training policy, based on principles of equity, accessibility and pedagogical innovation.

Despite the positive results, the experience revealed relevant structural and institutional weaknesses. The absence of specialized equipment — such as Braille printers, tactile displays and licensed screen reading software — constituted a deficit in instrumental accessibility (Queiroz, 2008; Costa, 2009). This limitation is symptomatic of the national scenario, in which the high cost of assistive technologies and the lack of public investment compromise the effectiveness of inclusion policies (Bersch, 2017).

In addition, insufficient teacher training emerged as a persistent obstacle. The need to move civil servants to training courses in assistive technologies, and the subsequent effort to replicate knowledge in pairs, show the absence of an institutionalized program of continuing education in accessibility. As Rabêllo and Masini (2003) state, authentic inclusion requires institutionalization and continuity, and not episodic or voluntarism-dependent actions.

These challenges reveal the gap between legal normativity (Brasil, 2015) and the materiality of inclusion in educational institutions, pointing to the urgency of policies that transform inclusive practices into permanent institutional routines, and not into exceptions.

The results presented here dialogue with the literature that conceives visual impairment not as an absence, but as a singular way of perceiving and constructing the world. Ochaíta and Rosa (1995) point out that, for blind children, knowledge is the result of an integration between action, language and representation, which extends to the adult who learns through tactile, auditory and symbolic mediations.

Camargo, Nardi and Veraszto (2008), when analyzing communication barriers of blind students in Physics classes, conclude that the main obstacle to inclusion lies in the lack of adequate symbolic mediation — and not in the disability itself. This finding reinforces that assistive technology acts as a cognitive mediator, and not as a substitute for vision.

Alegre's (2003) theory of "the view of thought" broadens this debate by suggesting that blindness, far from being a mere limitation, constitutes an epistemic condition capable of revealing new forms of intelligibility. This proposition is manifested in the analyzed experience, in which assistive technology not only allowed access to information, but stimulated the development of highly reflective and abstract thinking.

Bersch's (2017) contribution is also central: assistive technology should be understood as part of an articulated pedagogical project, whose intentionality defines its formative effects. Thus, it is not the tool that includes, but the pedagogical sense that guides it.

Experiences such as the Dosvox Project (UFRJ, 2018) and Virtual Vision (Rocha, 2016) illustrate national advances in digital accessibility and training of blind users, demonstrating that the development of public and low-cost technologies can reduce regional inequalities and democratize access to inclusive education.

The trajectory of the blind student at IFAM shows that educational inclusion is a social, cognitive and political process, which goes beyond mere curricular adaptation. The study confirms that the integration between assistive technology, teacher mediation and institutional commitment constitutes the indispensable triad for effective and emancipatory inclusion.

From the interaction between technology and symbolization, the student reconstructed her way of seeing the world, confirming the theses of Alegre (2003) and Amirilian (1997), according to which blindness is not the absence of vision, but another way of seeing, sustained by thought, language and imagination.

In this way, inclusion emerges not as a compensatory policy, but as a production of meaning and shared humanity, in which difference ceases to be an obstacle to become a formative power. The case under analysis reaffirms that technology, when guided by a

humanizing pedagogy, becomes an instrument of cognitive liberation — not only for the student with disabilities, but for the entire school community.

6 CONSIDERATIONS

The determining factor for the writing of this work was the experience of how the blind subject acts in the school, in observation of the students enrolled in the Technical Course in Informatics of the Federal Institute of Amazonas – Humaitá Campus. In view of this, the desire arose to research on the subject, initially to find out why few blind people attend school regularly.

In this bias, the objectives that were all met were established, regardless of their complexities, since it involves pedagogical methodologies that escape the cognitive reach at this school stage.

The research arose from the aspect of Informatics as an aid in the teaching-learning process from an inclusive perspective, given the legislation that obliges the State, the family and the whole society to promote. In the course of the course, it was found that even in the twenty-first century, the century of information and globalization, as defined by some authors, there are still medieval prejudices that prevent a more present protagonism of blind people in school, partly by the agent and, in another sense, by the State itself, which exempts itself from its obligations that it itself has implemented.

In this relevant research, it is explicit that Information Technology (IT) has been consolidated as an essential resource in the promotion of educational inclusion of people with visual impairment. According to Bersch (2017), assistive technologies represent a set of resources and services that aim to provide **independence, quality of life, and social inclusion** to people with disabilities. In the educational context, these resources favor access to knowledge and reduce pedagogical and communicational barriers.

Another relevant point is the positive impact of IT on student **motivation and engagement**. According to Oliveira and Silva (2020), technological tools allow for more interactive and participatory learning, contributing to the formation of critical and autonomous subjects. However, the effective use of these technologies requires **continued teacher training**. Bersch (2017) points out that assistive technology, by itself, does not guarantee inclusion, and the role of the educator in the mediation and adaptation of pedagogical practices is indispensable.

Thus, it can be stated that Information Technology, when applied in a planned and contextualized way, **raises the quality of teaching students with visual impairment**, promoting equity, accessibility and autonomy in the school environment, this was visible

during the research making the students involved finish the school year from access, ensuring their permanence and success in the educational environment.

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**TERRITORIES OF DEMOCRATIC MANAGEMENT OF EDUCATION FROM THE
PERSPECTIVE OF THE SELECTION PROCESS OF SCHOOL MANAGERS IN THE
MUNICIPALITY OF JOÃO PESSOA/PB**

**TERRITÓRIOS DA GESTÃO DEMOCRÁTICA DA EDUCAÇÃO SOB O VIÉS DO
PROCESSO SELETIVO DE GESTORES ESCOLARES DO MUNICÍPIO DE JOÃO
PESSOA/PB**

**TERRITORIOS DE LA GESTIÓN DEMOCRÁTICA DE LA EDUCACIÓN BAJO EL
ENFOQUE DEL PROCESO SELECTIVO DE GESTORES ESCOLARES DEL MUNICIPIO
DE JOÃO PESSOA/PB**



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ABSTRACT

This study is justified by the need to critically analyze Public Notice No. 001/2025 – SEDEC/JP, which regulates the selection process for school administrators in the Municipal Education Network of João Pessoa/PB, given the problem of its compatibility with the constitutional principle of democratic management of public education. The objective is to investigate to what extent the adopted model materializes the assumptions of participation, technical merit, leadership rotation, and school autonomy, as per the 1988 Federal Constitution, the Law of Guidelines and Bases of National Education (Law No. 9.394/1996), and Goal 19 of the National Education Plan (Law No. 13.005/2014). To this end, qualitative, exploratory-descriptive research is conducted, developed through document analysis of the public notice, based on the content analysis technique. Thus, it is observed that the process formally incorporates technical criteria and public consultation with the school community, representing progress compared to exclusively discretionary models. However, relevant tensions are identified, such as procedural asymmetry between incumbent principals and new candidates, the absence of explicit objective criteria for periodic evaluation, the lack of a clear limitation on successive reappointments, and reduced deadlines that may restrict the expansion of access to the position. This leads to the conclusion that the model approaches formal democratic management, but presents limitations regarding substantive democratization, especially concerning the effective redistribution of decision-making power and the guarantee of institutional alternation. The study contributes to the debate on school governance and the improvement of municipal regulations for the selection of managers.

Keywords: Democratic Management. School Management. Selection of Managers. Educational Policies. Community Participation. Educational Governance.

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RESUMO

O presente estudo justifica-se pela necessidade de analisar criticamente o Edital nº 001/2025 – SEDEC/JP, que regulamenta o processo seletivo para gestores escolares da Rede Municipal de Ensino de João Pessoa/PB, diante do problema de sua compatibilidade com o princípio constitucional da gestão democrática da educação pública. Objetiva-se investigar em que medida o modelo adotado materializa os pressupostos de participação, mérito técnico, alternância de lideranças e autonomia escolar, conforme a Constituição Federal de 1988, a Lei de Diretrizes e Bases da Educação Nacional (Lei nº 9.394/1996) e a Meta 19 do Plano Nacional de Educação (Lei nº 13.005/2014). Para tanto, procede-se à pesquisa qualitativa, de natureza exploratório-descritiva, desenvolvida por meio de análise documental do referido edital, com base na técnica de análise de conteúdo. Desse modo, observa-se que o processo incorpora formalmente critérios técnicos e consulta pública à comunidade escolar, configurando avanço em relação a modelos exclusivamente discricionários. Contudo, identificam-se tensionamentos relevantes, como assimetria procedimental entre diretores em exercício e novos candidatos, ausência de critérios objetivos explícitos para avaliação periódica, inexistência de limitação clara de reconduções sucessivas e prazos reduzidos que podem restringir a ampliação do acesso à função. O que permite concluir que o modelo se aproxima de uma gestão democrática formal, mas apresenta limites quanto à democratização substantiva, especialmente no que se refere à redistribuição efetiva do poder decisório e à garantia de alternância institucional. O estudo contribui para o debate sobre governança escolar e aperfeiçoamento de normativas municipais de seleção de gestores.

Palavras-chave: Gestão Democrática. Gestão Escolar. Seleção de Gestores. Políticas Educacionais. Participação Comunitária. Governança Educacional.

RESUMEN

Este estudio se justifica por la necesidad de analizar críticamente la Convocatoria Pública n.º 001/2025 – SEDEC/JP, que regula el proceso de selección de administradores escolares en la Red Municipal de Educación de João Pessoa/PB, dado el problema de su compatibilidad con el principio constitucional de gestión democrática de la educación pública. El objetivo es investigar en qué medida el modelo adoptado materializa los supuestos de participación, mérito técnico, rotación de liderazgo y autonomía escolar, según la Constitución Federal de 1988, la Ley de Directrices y Bases de la Educación Nacional (Ley n.º 9.394/1996) y el Objetivo 19 del Plan Nacional de Educación (Ley n.º 13.005/2014). Para ello, se realiza una investigación cualitativa, exploratorio-descriptiva, desarrollada a través del análisis documental de la citada convocatoria pública, con base en la técnica de análisis de contenido. Así, se observa que el proceso incorpora formalmente criterios técnicos y consulta pública con la comunidad escolar, lo que representa un avance en comparación con los modelos exclusivamente discrecionales. Sin embargo, se identifican tensiones relevantes, como la asimetría procedimental entre directores en ejercicio y nuevos candidatos, la ausencia de criterios objetivos explícitos para la evaluación periódica, la falta de una limitación clara a las reelecciones sucesivas y plazos reducidos que pueden restringir la ampliación del acceso al cargo. Esto lleva a la conclusión de que el modelo se acerca a la gestión democrática formal, pero presenta limitaciones en cuanto a la democratización sustantiva, especialmente en lo que respecta a la redistribución efectiva del poder de decisión y la garantía de la alternancia institucional. El estudio contribuye al debate sobre la gobernanza escolar y la mejora de las normativas municipales para la selección de directivos.

Palabras clave: Gestión Democrática. Gestión Escolar. Selección de Directivos. Políticas Educativas. Participación Comunitaria. Gobernanza Educativa.

1 INTRODUCTION

The construction of democratic management in Brazilian education is a constitutional principle and one of the pillars of public educational policies since the country's redemocratization. Provided for in Article 206 of the Federal Constitution of 1988, the democratic management of public education is formalized as one of the principles that should govern teaching, reflecting the aspiration for a more participatory and less hierarchical school, aligned with social aspirations for greater inclusion and justice (Brasil, 1988). This legal framework was the basis for a series of subsequent reforms that sought to operationalize this concept in education systems.

The consolidation of this principle in the legal-educational system occurred with the Law of Guidelines and Bases of National Education (LDB), Law No. 9,394/1996. The legal text reinforces democratic management, explicitly associating it with the participation of the school and local communities, and with the role of education professionals in the elaboration of the school's pedagogical project (Brasil, 1996). In this sense, the LDB not only reiterates the constitutional precept, but also advances by suggesting mechanisms for its implementation, albeit in a non-prescriptive way, delegating to the education systems the definition of specific norms.

Historically, the concept of democratic management in Brazil emerges in opposition to the authoritarian and centralizing model in force during the military regime (1964-1985) and is strengthened in the context of social mobilizations by *Diretas Já* and by the National Constituent Assembly itself. As Paro (2010) and Luck (2006) point out, the experiences of popular participation, such as the movements to choose principals by direct election in municipal and state networks, were fundamental to pressure and shape the incorporation of this principle into legislation, transforming a demand from civil society into State policy.

On the theoretical level, democratic management in Brazilian education dialogues deeply with the notion of school as a public space and the exercise of citizenship. For Gadotti (2009), the democratization of school management is a process inseparable from the social quality of education, as it implies not only administrative efficiency, but above all collective construction, respect for diversity and training for autonomy. Thus, its implementation requires overcoming a clientelist and patrimonialist political culture still rooted in many instances of public administration.

However, the trajectory of implementation of democratic management reveals a considerable distance between the normative discourse and the daily practices in schools. Challenges such as the fragile participatory culture, the overload of teachers' work, the lack of specific training for collegiate management and the persistence of centralizing bureaucratic

structures are pointed out as recurrent obstacles. As Dourado (2007) analyzes, there is a permanent tension between democratic-participatory and managerialist management models, the latter often hegemonic in educational policies, which results in contradictory and fragmented processes of real democratization of school units.

The research question that guides this study consists of analyzing to what extent the Public Notice No. 001/2025 – SEDEC/JP, which regulates the selection process for school managers of the Municipal Education Network of João Pessoa/PB, materializes the assumptions of the democratic management of public education. The general objective of the research lies in the relevance of understanding whether the normative mechanisms adopted favor participation, technical merit, alternation of leaderships and school autonomy, contributing to the improvement of municipal policies for the selection of managers. As specific objectives we seek: To identify the elements of participation, technical merit, alternation of leaderships and school autonomy present in the adopted model; to evaluate the weaknesses and procedural tensions that limit subjective democratization; contribute to the debate on school governance and to the improvement of municipal regulations for the selection of managers.

2 METHODOLOGY

This research is a basic study, with exploratory-descriptive objectives, developed through a qualitative approach. The methodological option is justified by the need to understand the meanings, intentions and structures that make up the selection process of school managers, going beyond the quantification of data (Gerhardt; Silveira, 2009). As the main technical procedure, documentary analysis is adopted, an appropriate method for the systematic investigation of official documents, allowing a critical apprehension of their content and context (Cellard, 2008).

The main source of data is the Public Notice of the Selection Process for School Managers of the Municipal Education Network of João Pessoa/PB, referring to the last contest held (2025). The document was selected because it constitutes the normative instrument that regulates access to the position of director, materializing, at the local level, the legal principles of democratic management. The analysis focuses on the structure of the process, the selection criteria established and the conditions of participation envisaged for the candidates.

The operationalization of the analysis followed the stages of content analysis as proposed by Bardin (2016). Initially, an exhaustive reading of the notice was carried out, followed by the organization of the material and the formulation of analysis indicators. In the

exploration phase, the content was systematically coded and categorized, based on the following analytical criteria, elaborated from the theoretical framework on democratic management: clarity of the rules and stages of the process; equity in the treatment between incumbent managers and new candidates; preparation time granted for the preparation of projects and participation in the stages; and the existence of provisions that favor or not the reelection of managers already in office.

As a complementary technique, a systematic bibliographic research was carried out in secondary sources, such as scientific articles, dissertations, theses and comparative educational legislation. This stage aimed to contextualize the analysis of the specific case of João Pessoa, confronting it with experiences of other Brazilian municipalities and states that adopt selection processes considered more transparent and participatory, thus identifying possible advances and weaknesses.

As this is a study based exclusively on the analysis of documents in the public domain, there was no direct involvement of human beings, and therefore the need for submission to a Research Ethics Committee does not apply, as provided for in CNS Resolution No. 510/2016. The interpretation of the data is of a critical-analytical nature, aiming not only to describe the public notice, but also to reflect on its implications for the materialization of the principles of democratic management within the municipal education network.

3 THEORETICAL FRAMEWORK

The democratic management of public education in Brazil is a structuring principle of the educational system, whose legal foundation is solid and progressive, emerging as a response to social demands for participation and quality in education. The constitutional genesis of this principle is based on the Magna Carta of 1988, which, in its Article 206, item VI, establishes the "democratic management of public education, in accordance with the law" as one of the principles on which education must be taught (Brasil, 1988). This provision reflects the context of redemocratization of the country and enshrines, at the highest normative level, the aspiration for an educational administration permeable to community participation.

The operationalization of the constitutional precept was implemented by the Law of Guidelines and Bases of National Education (LDB), Law No. 9,394/1996. In its articles 14 and 15, the LDB unfolds the principle, determining that education systems define the norms of democratic management, which must ensure the participation of education professionals in the elaboration of the school's pedagogical project and the participation of the school and local communities in school councils or equivalent (Brasil, 1996). The law, therefore,

advances by indicating fundamental mechanisms for the democratization of management, even though it delegates to the federative entities the task of specific regulation.

The implementation of the principle received a significant boost with the creation of the National Education Plan (PNE). The PNE 2014-2024, instituted by Law No. 13,005/2014, not only reiterates democratic management as a principle, but elevates it to the condition of a strategic goal. Specifically, Goal 19 of the Plan is dedicated to "ensuring conditions, within 2 years, for the effectiveness of the democratic management of education, associated with technical criteria of merit and performance and public consultation with the school community" (Brasil, 2014). The PNE also provides for detailed strategies, such as the guarantee of resources and the training of the actors involved, giving the character of a long-term State policy to the democratization of management.

In the field of basic education, the Fund for the Maintenance and Development of Basic Education and the Valorization of Education Professionals (FUNDEB), made permanent by Constitutional Amendment No. 108/2020 and regulated by Law No. 14,113/2020, also incorporates democratic management as one of its principles. The FUNDEB legislation links democratic management to the use of resources, determining that plans for the application of resources must be prepared in a participatory manner, ensuring transparency and social control over the financing of education (Brasil, 2020). Thus, the legal basis extends to the financial sphere, reinforcing the idea that democracy in school is also exercised over the allocation of resources.

The interpretation and legal enforceability of these grounds are reinforced by CNE/CEB Opinion No. 8/2021, which deals with the rules for the democratic management of public education. The document, prepared by the National Council of Education, reaffirms that democratic management is a right of the school community and a duty of the State, detailing its constituent elements, such as transparency, effective participation, school autonomy, and the appreciation of professionals (Brasil, 2021). The Opinion serves as a guideline for education systems, guiding the elaboration of their norms and giving greater conceptual density to the legal principle.

In summary, the democratic management of education in Brazil has a legal and robust framework that goes from the Federal Constitution to the infra-legal norms and guidelines of the education councils. This normative trajectory, however, as Dourado (2007) warns, evidences a permanent tension between formal provision and effective implementation, with legal advances sometimes being contrasted by management practices that are still centralizing or merely formal. Thus, the legal foundations represent both a historical

achievement and a permanent field of struggle for their full materialization in the education networks and in the daily life of schools.

4 RESULTS AND DISCUSSIONS

The analysis of Public Notice No. 001/2025 – SEDEC/JP shows a structure normatively aligned with the constitutional principles of public administration — legality, impersonality, morality, publicity and efficiency — as provided for in article 37 of the Federal Constitution of 1988 (Brasil, 1988). However, under critical examination, significant tensions emerge when the document is confronted with the foundations of the democratic management of public education, provided for in article 206, item VI, of the same Constitution, in Law No. 9,394/1996 (LDB) and in Goal 19 of the National Education Plan (Law No. 13,005/2014).

The Federal Constitution establishes that education will be provided based on the "democratic management of public education, in accordance with the law" (Brasil, 1988). The LDB, in turn, determines that education systems must ensure the "participation of education professionals in the elaboration of the school's pedagogical project" and the "participation of the school and local communities in school councils or equivalent" (BRASIL, 1996). The PNE 2014–2024, on the other hand, defines as a goal "to ensure conditions for the effectiveness of the democratic management of education, associated with technical criteria of merit and performance and public consultation with the school community" (Brasil, 2014).

It is observed, therefore, that the national legislation articulates three central dimensions: participation, technical merit and public consultation. The public notice analyzed formally incorporates these dimensions by providing for objective test, curriculum analysis, interview and consultation with the school community. However, the way in which such mechanisms are structured reveals ambiguities in the materialization of the democratic principle, especially with regard to the legal nature of the function of school management.

4.1 PURPOSE OF SELECTION AND NATURE OF THE FUNCTION

Item 1.2 of the notice defines selection as a mechanism of qualification for the exercise of a function of trust. Such classification is not merely terminological; It carries relevant political-administrative implications. In the scope of administrative law, the functions of trust are freely appointed and dismissed by the competent authority, even if restricted to permanent servants. This characteristic implies a bond of political or administrative trust, which can strain the principle of school autonomy.

Tragtenberg (2005, p. 82) states that: "The administration is not neutral. It expresses power relations and translates interests that materialize in the institutional organization." By applying this perspective to the educational context, it is understood that the school board is not only a technical management function, but a strategic space of mediation between the State, the community and the pedagogical project. Thus, by defining the position as a function of trust, the public notice can reinforce a verticalized logic of power, in which the permanence of the manager depends on the relationship with the central authority, even if there is community consultation.

Souza (2009, p. 130) argues that democratic school management implies "effective sharing of decision-making power and not just consultative or legitimizing participation in previously established decisions". The distinction is crucial. Merely formal participation does not alter the hierarchical structure; it only clothes it with a democratic appearance.

Paro (2010, p. 23) points out that: "The democratization of school management supposes the overcoming of the authoritarian and centralizing logic that has historically marked the administration of Brazilian public schools." By maintaining the management as a function of trust subject to dismissal "at any time", the public notice can produce a paradoxical effect: participation in the selection process is expanded, but the possibility of subsequent vertical control is preserved. This duality highlights the tension between the bureaucratic rationality of the State and the democratic rationality of the school.

In addition, Goal 19 of the PNE establishes that democratic management must be "associated with technical criteria of merit and performance and with public consultation with the school community" (Brasil, 2014). João Pessoa's model partially meets this command, by articulating objective testing, curriculum analysis and public consultation. However, the asymmetry between acting directors and new candidates, provided for in the notice itself, weakens the principle of isonomy and may compromise the effectiveness of merit as a universal criterion.

Dourado (2007) warns that recent educational reforms have been marked by a tension between democratic-participatory models and managerialist models. In the first, collective construction and autonomy are privileged; in the second, efficiency, control and accountability are emphasized. The public notice analyzed seems to be located in this zone of intersection: it incorporates participatory mechanisms, but maintains strong administrative centralization.

Therefore, the legal nature of the school management function is not a secondary element. It conditions the degree of autonomy of the manager, the stability of the pedagogical project and the democratic culture of the school itself. If the function remains essentially linked

to the trust of the central authority, school democracy tends to operate within structural limits previously defined by the state apparatus.

Therefore, we evidenced structural tensions derived from the classification of school management as a function of trust. Such a configuration requires critical reflection on the difference between procedural democratization and substantive democratization, in the context of municipal education networks.

4.2 ASYMMETRY BETWEEN INCUMBENT DIRECTORS AND NEW CANDIDATES

The systematic reading of item 1.3 and its sole paragraph of Notice No. 001/2025 – SEDEC/JP reveals an institutional design that establishes differentiated treatment between acting directors and new candidates. While they are fully submitted to the stages of curriculum analysis, interview with classification score and objective test, they only participate in the interview without assigning a score, and in the consultation with the school community, as long as they remain in the same unit and function. Such a normative distinction configures a procedural asymmetry that, although legally possible, produces concrete effects on the equity of the selection process.

From the constitutional point of view, the public administration must observe the principle of isonomy (Brasil, 1988), which implies equal treatment to those who are in an equivalent situation. In the case under analysis, candidates who compete for the same function are subject to different requirements, which relativizes the equality of conditions. In the field of educational management, Souza (2009, p. 133) argues that "democratic management presupposes equality of conditions of participation and a real possibility of alternation in the exercise of power". Alternation, in this sense, is not a mere procedural detail, but a structuring component of school democracy.

By favoring the permanence of managers in office, the public notice can reduce the institutional openness to the renewal of leadership. Paro (2010) recognizes that the election of principals represents an advance in the democratization of public schools, but warns that no model is immune to distortions. As already highlighted, "the process of electing directors [...] does not necessarily guarantee that the most competent candidate or the most committed to the community will be elected", and may even encourage populist practices. However, the solution to this risk does not lie in the creation of implicit barriers to alternation, but in the improvement of mechanisms for technical evaluation and community participation.

Dourado (2007) argues that contemporary Brazilian educational policies operate in tension between participatory democratization and managerial rationality. The model analyzed seems to fit into this hybrid logic: it incorporates public consultation and technical

criteria, but structures the process in such a way as to preserve administrative continuity. Asymmetry, therefore, is not only technical; it is structural, as it conditions the effective possibilities of circulation of power within the school. When democracy assumes predominantly confirmatory contours, that is, aimed at the ratification of the existing leadership, there is a risk that the democratic principle will become a legitimizing formality.

4.3 PERIODIC EVALUATION AND DISMISSAL "AT ANY TIME"

Items 1.13 and 1.13.1 of the notice establish that the approved principal will be periodically evaluated by the Department of Education, and may be exonerated "at any time" in case of low performance or practice of disciplinary acts. The performance evaluation provision is compatible with the principles of efficiency and accountability in public management; However, the absence of objective criteria explained in the public notice itself and of a clearly delimited appellate instance raises questions as to legal certainty and the autonomy of the function.

Tragtenberg (2005, p. 91) warns that "every administrative structure that concentrates decision-making power without control mechanisms tends to reproduce hierarchical relations of domination". In the school context, the centralization of evaluation exclusively in the Secretariat can produce political-administrative dependence on the manager, reducing his margin of autonomy to implement critical or innovative pedagogical projects.

Paro (2010) argues that democratic management requires effective social control, which presupposes the participation of the school community in the evaluation of the principal. The LDB itself provides for the performance of school councils as collegiate instances of deliberation (BRASIL, 1996). Thus, performance evaluations could incorporate participatory mechanisms and transparent pedagogical indicators, ensuring contradictory and ample defense.

Dourado (2007) emphasizes that accountability must be articulated with transparency and participation, otherwise it will become a unilateral instrument of control. The possibility of discretionary dismissal "at any time" can generate institutional instability, making it difficult to continue medium and long-term pedagogical projects. Instead of strengthening efficiency, such a mechanism can induce defensive behaviors and strategic alignments to the central authority, to the detriment of school autonomy.

4.4 TRAINING COURSE: PROGRESS WITH STRUCTURAL LIMITS

The provision of a mandatory training course for new candidates and optional for principals in office represents a relevant measure towards the professionalization of school

management. Luck (2006) emphasizes that effective educational leadership depends on the articulation between pedagogical, administrative and relational competencies, which requires specific and continuing education. From this point of view, the requirement of a structured course contributes to raising the technical standard of the function.

However, the exemption granted to the directors in office maintains a formative asymmetry. If training is considered essential for the quality of management, its obligation should reach all candidates, regardless of the precondition. Souza (2009) argues that democratic management involves continuous institutional learning, not restricted to the moment of access to office.

In addition, technical training, by itself, does not change the structure of distribution of decision-making power. Paro (2010) observes that the democratization of the school requires a transformation of the internal relations of authority, and not just administrative qualification. Thus, although the course strengthens the technical dimension of management, it does not eliminate the previously identified procedural asymmetries, configuring an important advance, but limited from a structural point of view.

4.5 CONSULTATION WITH THE SCHOOL COMMUNITY: THOUGHTFUL PARTICIPATION

The provisions that regulate the consultation of the school community institute a mechanism of weighted participation between segments, seeking a representative balance between teachers, technicians, students and parents. This provision is in line with article 206 of the Federal Constitution (Brasil, 1988) and the LDB (Brasil, 1996), which ensure community participation in school management.

Gadotti (2009, p. 71) argues that "the democratic school is the one that is built with the community, and not for the community". From this perspective, the consultative process represents a positive element, as it expands the legitimacy of the choice. The prohibition of undue advertising and the possibility of inspection by appointed representatives reinforce procedural transparency.

However, sociological analysis suggests that the prolonged permanence of managers can generate accumulation of symbolic capital. Bourdieu (1998) defines symbolic capital as the social recognition that legitimizes positions of power and authority. In contexts in which principals remain for long periods, affective bonds, political networks and care relationships can influence the community decision, even if formally the process is equitable.

Souza (2009) warns that school democracy cannot be reduced to a procedural ritual; it must ensure effective conditions of dispute and alternation. The absence of an objective

limitation of successive reappointments can consolidate almost permanent leaderships, weakening the democratic circulation of power.

4.6 TIMING AND TIMELINE: IMPLICIT BARRIER TO ENTRY

The selection process schedule establishes relatively short deadlines for registration, preparation of the management plan and completion of the evaluation stages. While such deadlines meet formal requirements of legality and publicity, their brevity can operate as an implicit barrier to entry for new applicants.

Dourado (2007) observes that democratic processes require adequate time for debate and collective construction. The elaboration of a consistent management plan requires institutional diagnosis, analysis of indicators and articulation with the school community. Reduced deadlines tend to favor candidates already in management, who have accumulated information and familiarity with administrative procedures.

Paro (2010) adds that effective participation requires objective conditions of preparation. When institutional time is compressed, competition can benefit those who already occupy a privileged position in the school structure. Thus, although the schedule is legally valid, its configuration can negatively impact the expansion of access to the function and the renewal of leadership, stressing the principle of democratic management.

5 DISCUSSION

The discussion that follows is based on the assumption that the democratic management of public education, as inscribed in the Federal Constitution of 1988 and regulated by LDB No. 9,394/1996, cannot be analyzed only from the perspective of normative compliance, but must be examined in its institutional materiality and in its concrete effects on school dynamics. As Paro (2010) warns, the democratization of the school is not limited to the creation of formal devices of participation, requiring an effective transformation of the power relations that structure the school organization. In this sense, the analysis of Public Notice No. 001/2025 – SEDEC/JP demands critical reflection on the tensions between technical merit, public consultation and administrative centralization, as well as on the limits and possibilities of achieving substantive democratic management at the municipal level.

5.1 IMPLICATIONS FOR DEMOCRATIC MANAGEMENT

Democratic management, as a constitutional principle inscribed in article 206 of the Federal Constitution (BRASIL, 1988) and regulated by LDB No. 9,394/1996 (BRASIL, 1996), is not reduced to the existence of formal participation procedures. It presupposes equal

access to management functions, alternation of leadership, effective social control and institutional autonomy articulated with public responsibility. Goal 19 of the National Education Plan reinforces this conception by associating democratic management with technical criteria of merit and performance and with public consultation with the school community (BRASIL, 2014).

The model analyzed in Public Notice No. 001/2025 – SEDEC/JP combines elements of technical merit: objective test, curriculum analysis and training course with public consultation with the school community. However, it preserves strong administrative centralization, especially in the final appointment and the possibility of dismissal. Such a configuration evidences the tension pointed out by Dourado (2007) between democratic-participatory models and managerialist models of educational management.

Souza (2009, p. 129) argues that democratic management implies "real sharing of power and institutionalization of mechanisms that guarantee effective participation". When participation is maintained within structural limits previously defined by the central administration, there is a risk of producing what can be called the bureaucratization of democracy: participatory procedures coexist with decision-making concentration.

Paro (2010) warns that the democratization of the school is not limited to the creation of formal instances of consultation; It is necessary to transform internal power relations. Otherwise, democracy becomes a symbolic formalization without substantive redistribution of authority. In this scenario, the combination of technical merit and administrative centralization can generate a hybrid model that preserves traditional hierarchies under the guise of participatory.

Thus, the implications of the analyzed model point to the risk of formalizing democratic management without structural transformation of power relations within the school, which can favor the perpetuation of leaderships and limit the democratic circulation of power.

5.2 LEADERSHIP RENEWAL

The literature on educational leadership highlights the importance of periodic renewal for institutional vitality. Luck (2006) argues that school leadership is a determining factor for the mobilization of the pedagogical team and for the construction of collaborative cultures. However, prolonged permanence in office can produce ambiguous effects: if, on the one hand, it ensures administrative continuity, on the other hand, it can reduce the capacity for innovation.

Paro (2010) states that the democratization of school management presupposes a real possibility of alternation in the exercise of management. The absence of an explicit limitation

on renewals, associated with the structural advantage of the directors in office provided for in the notice, may hinder the renewal of leadership.

From an organizational perspective, such a scenario can generate institutional immobility and crystallization of pedagogical practices. Dourado (2007) observes that excessively stable management processes tend to reproduce consolidated administrative routines, reducing openness to new perspectives and innovative experiences.

In addition, the institutional dependence on specific leaders can weaken the collective autonomy of the school, shifting the focus from democratic management to a personalistic logic. In this context, alternation does not represent instability, but a healthy mechanism for the circulation of ideas and institutional strengthening.

5.3 SCHOOL MANAGEMENT AND QUALITY OF EDUCATION

Several studies indicate that pedagogical leadership exerts a significant influence on learning indicators and the school climate. Luck (2006) emphasizes that effective school management articulates strategic planning, pedagogical monitoring and mobilization of the teaching team. However, the quality of management does not result exclusively from the prolonged permanence of the manager, but from the combination of continuing education, transparent accountability and collegiate participation.

The Federal Constitution (BRASIL, 1988) and the LDB (BRASIL, 1996) establish that democratic management must articulate autonomy and responsibility. Dourado (2007) highlights that accountability should be associated with clear and transparent indicators, avoiding discretionary practices.

Without objective criteria made explicit in the evaluation process, periodic evaluation can take on political rather than technical contours. Tragtenberg (2005, p. 91) observes that administrative structures that concentrate decision-making power tend to reproduce hierarchical relations of domination. Applied to the school context, this reflection indicates that monitoring mechanisms need to be institutionalized in a participatory way, ensuring contradictory and transparency.

Therefore, the quality of school management depends less on individual continuity and more on the consolidation of institutional training practices, objective technical evaluation and collegiate participation.

5.4 PARTICIPATION, LINKS AND LOCAL POLITICAL CULTURE

Democratic management must also be analyzed in the light of local political culture. In municipal networks, especially in contexts of community proximity, managers build affective

bonds, care networks and political articulations that influence school dynamics. Bourdieu (1998) calls symbolic capital the social recognition that legitimizes certain positions of authority.

In schools where principals stay for long periods, the accumulation of symbolic capital can impact consultation with the school community, even when the procedure is formally equitable. Gadotti (2009, p. 71) states that "the democratic school is built with the community", but this construction occurs within historical power relations.

Souza (2009) warns that school democracy is not neutral; It develops in contexts marked by symbolic and political disputes. Thus, community participation must be understood not only as a procedural mechanism, but as a field of interaction crossed by historical ties and interests.

Recognizing this dimension is fundamental to understand that democratic management is not automatically carried out by the existence of public consultation, but requires structural conditions that ensure equitable competition and effective alternation.

6 CONCLUSION

The analysis of Public Notice No. 001/2025 – SEDEC/JP reveals an institutional design that, in formal terms, incorporates central dimensions provided for in the Brazilian legal system for the effectiveness of the democratic management of public education. By articulating objective test, curriculum analysis, training course and consultation with the school community, the selection process dialogues with article 206, item VI, of the Federal Constitution (Brasil, 1988), with arts. 14 and 15 of Law No. 9,394/1996 (Brazil, 1996) and Goal 19 of the National Education Plan (Brazil, 2014), which associate democratic management with technical criteria of merit and performance, as well as community participation. From this point of view, the model analyzed meets the formal requirements of institutionalization of participation and professionalization of the management function.

However, the substantive analysis of the normative arrangement evidences relevant tensions. First, structural asymmetries favorable to the directors in office are identified, who do not fully submit to the same classification requirements imposed on new candidates. This differentiation compromises procedural isonomy, a basic principle of public administration (Brasil, 1988), and weakens institutional alternation. As Souza (2009, p. 133) argues, democratic management requires "equality of conditions of participation and real possibility of alternation in the exercise of power". The absence of this material equality tends to convert the selection process into a mechanism for confirming already consolidated leaderships.

Secondly, the provision for periodic evaluation without explicit details of objective indicators, measurable goals and a specific appellate body raises concerns about legal certainty and the autonomy of the manager. Dourado (2007) warns that accountability must be accompanied by transparency and social control, otherwise it will become an instrument of vertical control. Tragtenberg (2005, p. 91) reinforces this concern by stating that centralized administrative structures tend to reproduce "hierarchical relations of domination" when not submitted to institutional mechanisms of shared control. The lack of clearly defined objective parameters can shift the evaluation from the technical field to the political field, compromising pedagogical stability.

In addition, the reduced deadlines of the schedule and the lack of explicit limitation of successive renewals are factors that can restrict the renewal of leaderships. Paro (2010) argues that the democratization of school management presupposes effective circulation of power and not mere procedural formalization. The prolonged permanence of managers, especially in municipal contexts marked by community proximity, can produce a concentration of symbolic capital, in the terms of Bourdieu (1998), consolidating almost permanent leaderships and weakening institutional alternation.

In this way, the model is close to formal democratic management, as it incorporates public consultation and technical qualification criteria. However, it has limits with regard to substantive democratization. The distinction between formal democracy and substantive democracy is relevant in this context. The first refers to the existence of institutionalized participatory procedures; the second implies effective redistribution of decision-making power and the creation of structural conditions of equity. According to Paro (2010), the democratization of the school requires a transformation of internal relations of authority, not just the regulation of participatory stages.

7 RECOMMENDATIONS

In light of the weaknesses identified, it is initially recommended to standardize the evaluation stages for all candidates, ensuring procedural equality and strengthening the constitutional principle of equality. The equalization of the requirements would contribute to greater legitimacy of the process and expansion of democratic competition.

Secondly, it proposes the public and transparent definition of objective performance indicators, based on measurable pedagogical, administrative and financial criteria, articulated with the school's political-pedagogical project. Dourado (2007) emphasizes that institutional evaluation must be formative, participatory and guided by clear goals.

It is also recommended the creation of a specific appellate body for cases of dismissal, ensuring an adversarial and ample defense, in line with the principles of due administrative process. Such a measure would strengthen institutional autonomy and reduce the risk of political interference.

The limitation of successive reappointments is a relevant measure to promote alternation of leaderships and democratic circulation of power. Comparative experience in state and municipal networks shows that mandates with limited possibility of reappointment favor pedagogical renewal and institutional strengthening.

It is also suggested to extend the deadlines for the preparation and preparation of management plans, ensuring objective conditions for the participation of candidates and promoting qualified debate within the school communities.

Finally, it is recommended the mandatory inclusion of continuing education for all managers, regardless of the previous condition, reinforcing the professionalization of the management function. Luck (2006) argues that effective educational leadership depends on permanent updating and development of strategic competencies.

8 STUDY CONTRIBUTIONS

This study contributes to the academic debate by deepening the distinction between formal democracy and substantive democracy in school management, showing that the mere institutionalization of public consultation and technical criteria does not guarantee effective redistribution of decision-making power. By critically analyzing the municipal normative design, the research highlights the tensions between technical merit and community participation, illuminating the challenges of school governance in federative contexts.

In addition, it offers subsidies for the improvement of municipal regulations for the selection of managers, by proposing measures that strengthen isonomy, transparency and institutional alternation. Finally, it broadens the theoretical reflection on educational governance by articulating contributions from Paro (2010), Dourado (2007), Souza (2009), Luck (2006), Tragtenberg (2005) and Bourdieu (1998), contributing to the understanding of democratic management as a field of institutional and symbolic disputes within the Brazilian public school.

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IMAGES AS A DIDACTIC RESOURCE

IMAGENS COMO RECURSO DIDÁTICO

IMÁGENES COMO RECURSO DIDÁCTICO



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ABSTRACT

This study addresses the use of digital images as a didactic resource in higher education, focusing on the Faculty of Accounting and Administration at the Autonomous University of Querétaro, San Juan del Río campus. Faculty data are analyzed, and a review of methodologies and results from related research is also conducted. The research is exploratory-descriptive in nature and is grounded in Mayer's cognitive theory of multimedia learning, as well as principles of visual design and media literacy. A tool based on Google Colab is proposed, which allows the extraction of color palettes from thematic images, the consideration of emotion-based color palettes, and the generation of new educational images through artificial intelligence. It can be concluded that the application of images—by extracting color palettes and incorporating emotions—enhances the semantic and emotional value of images, which can help improve students' cognitive attention skills, facilitate the emotional communication of content, and promote deeper image interpretation.

Keywords: Images. Didactic Resource. Education. Media Literacy. Color Palette.

RESUMO

O presente estudo trata do uso de imagens digitais como recurso didático no ensino superior, com foco na Faculdade de Contabilidade e Administração da Universidade Autônoma de Querétaro, campus San Juan del Río. São analisados dados da faculdade, bem como metodologias e resultados de pesquisas relacionadas. A pesquisa é de caráter exploratório-descriptivo e fundamenta-se na teoria cognitiva da aprendizagem multimídia de Mayer, além de princípios de design visual e alfabetização midiática. Propõe-se uma ferramenta baseada no Google Colab que permite extrair paletas de cores de imagens temáticas, considerar paletas de cores associadas a emoções e gerar novas imagens educativas por meio de inteligência artificial. Conclui-se que a aplicação de imagens, ao extrair paletas de cores e incorporar emoções, potencializa o valor semântico e emocional das imagens, o que pode contribuir para melhorar a capacidade cognitiva de atenção dos estudantes, facilitar a

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comunicação emocional dos conteúdos e promover uma leitura mais aprofundada das imagens.

Palavras-chave: Imagens. Recurso Didático. Educação. Alfabetização Midiática. Paleta de Cores.

RESUMEN

El presente estudio se refiere al uso de imágenes digitales como recurso didáctico en educación superior, enfocándose en la facultad de contaduría y administración de la Universidad Autónoma de Querétaro campus San Juan del Río, se analizan datos de la facultad y también se hace un análisis de metodologías y resultados de investigaciones relacionadas. La investigación es de tipo exploratorio-descriptiva y se fundamenta en la teoría cognitiva del aprendizaje multimedia de Mayer y en principios de diseño visual y alfabetización mediática. Se propone una herramienta basada en Google Colab que permite extraer paletas de colores de imágenes temáticas, considerar paletas de colores de emociones y generar nuevas imágenes educativas mediante inteligencia artificial. Se puede concluir que la aplicación de imágenes al extraer paletas de colores y proponer emociones, potencia el valor semántico y emocional de la imagen, lo cual puede ayudar a mejorar la habilidad cognitiva de la atención en el estudiante, facilitar el mensaje emocional de contenidos y crear una lectura más profunda en las imágenes.

Palabras clave: Imágenes. Recurso Didáctico. Educación. Alfabetización Mediática. Paleta de Color.

1 INTRODUCTION

In the context of higher education, particularly in the Faculty of Accounting and Administration, didactic resources such as reading, the creation of exercises with numbers, as well as the use of images are used. Although the latter to a lesser extent.

The use of digital images as a teaching resource has great potential and importance, as well as a great impact on communication. Even though the impact on visual and emotional communication is very important, this resource is still not used as necessary. This research proposes to explore several aspects, such as the color palette, the emotions that are transmitted, the license of use, its integration into learning objects through artificial intelligence tools and even ethical aspects.

Despite the ease of access to didactic technological resources in education, the use of digital images is still limited or misused. In the Faculty of Accounting and Administration, images are used in presentations, but not necessarily with a clear pedagogical intention or based on design principles, cognitive or emotional principles.

The digital image has great potential to activate and improve cognitive processes, however, in teaching practice the use of color palettes, the emotional charge or the ethical impact of these images are almost not taken into account.

In a digital environment with so much visual information, it is important that learners are able to improve their media literacy knowledge and skills and have better critical thinking in each visual message.

Currently there is a lot of visual manipulation and fake news, which promote issues of politics, education, economics, etc., which are often based on ideologies or objectives of interest to a certain sector of the population. If these skills are improved, manipulation can be mitigated and over time can help students better interpret these messages and also have more meaningful learning.

2 THEORETICAL FRAMEWORK

2.1 BACKGROUND AND DEFINITIONS

In recent years, digital images in educational environments have become very important in improving content comprehension and retention. Studies have shown that visual design influences learning, especially when elements such as color palettes, composition, and symbolism are used to convey emotions. This makes it easier to interpret, understand, and retain information. A review of different research is made, with their results, methodologies, concepts and everything related to the digital image in the educational context.

2.1.1 Types of images

There are different types of images today, as well as different categories according to their use or purpose. Mainly there are images for free use and images with a license for use, in the educational field images for free use are sufficient. As for the format of images, jpg and png images are the most recommended for this study.

2.1.2 Psychology and use of color

The perception of color is influenced by the context and geographical place where a group of people is located and this can vary according to the culture, history and traditions of each place. Colors can trigger memories, emotions, and associations related to the same place of origin (Sánchez G., 2024).

Sánchez quotes (Bestley & Noble, 2018, p. 37) "the intelligent selection of color palettes and color combinations can be employed to create a design that is aesthetically pleasing to the viewer." When thinking about visual communication, it's worth choosing a color palette that's suitable. For example, creating an advertisement or PowerPoint presentation for a class session at school.

2.1.3 Color in education

The use of color is very important, remember that there are great theories about the use of color, both pedagogical and psychological. We may not always take it into account, but it is also important to consider it in the educational field.

Some research has found that 80% of the information that is processed by the user on the internet comes from sight, on the other hand, the excessive use of color can cause visual fatigue, the balance has to be found for the use of color (Canté, 2017). Canté quotes Embry (1984), "color accelerates learning from 55% to 78%".

2.1.4 Equity in didactic images

It is also necessary to carefully choose the images that are going to be used as a teaching resource, promoting diversity and inclusion.

2.1.5 Manipulative and non-manipulative teaching resources

A manipulative didactic material is that element used by teachers as a resource for learning based on obtaining knowledge through interaction with it, they are physical objects such as blocks or puzzles (Ruiz, 2019). Interactivity is very important, nowadays students have stopped being passive and tend to interact and manipulate didactic material. Non-

manipulative teaching resources are passive or abstract resources, such as texts, videos, audios or software. Various studies have shown positive effects when using manipulative and non-manipulative teaching resources (Reinoso, Córdova, Chillan, Méndez, & Bernal, 2024)

2.1.6 The Imaging Cognitive Tool

Visual organization is one of the best study techniques, the use of concept maps, diagrams, comparative charts and mind maps helps to structure the information and facilitates the review López, *et al.* (2018). This can be used in a face-to-face session, remotely or even in material such as homework and class complement.

One of the main cognitive skills we use when learning is attention. "Perceiving, memorizing and learning are actions that need attention" (Boujon & Quaireau, 2004). Many static or interactive resources such as various web-based applications or video games allow interaction and we can improve attention. A very famous website that helps improve cognitive skills and specifically attention.

2.1.7. Emotions in education according to the psychology of color

Choosing the right images is important in a teaching resource, but the color palette is also important. For example, in the design of a PowerPoint presentation or the main colors of a mind map. López, *et al.* (2018), state that emotions intensify the activity of neural networks and strengthen synaptic connections, which facilitates learning. Neurobiology shows that learning is better when content has emotional components.

If the wrong emotion is communicated, it can affect student performance, emotions such as anxiety, fear, or anger can sabotage attention span and affect working memory (Lopez, *et al.* 2018).

2.1.8 Data privacy

Platforms may use images of students or something else that may be part of an ethical and legal issue. Normally any institution manages several policies and some of them include a policy on their main website where personal data and images are secured, even so, it can be communicated to students.

Nissenbaum (2009) mentions the importance of contextualizing information and the need to establish guidelines on informed consent in educational settings. These precautions ensure that the use of images does not infringe on the integrity or rights of the participants.

2.1.9 Machine Vision

What is computer vision? "It is a scientific discipline made up of a set of techniques that allow the capture, processing, and analysis of images" (Domínguez, 2022).

2.1.10 Google colab

Google colab is a web-based tool that can help us to do statistical analysis, as well as practices based on artificial intelligence and artificial vision. This web-based application allows you to work with code instructions in Python, upload files in different data formats to manipulate them and without the need to use our computer resources, you can make calculations or obtain the results of various statistical tests. On the other hand, it also allows you to create artificial vision applications that in this case can analyze images and even generate new ones, by connecting to the "stable diffusion" library.

One of the main features is that cloud servers are used and the use of resources and response time depends on that. In comparison, if you use other applications such as "R studio", you would be using your own equipment and resources that usually increases the response time.

2.1.11 Media literacy

The existence of multimedia devices in our daily lives is undeniable, the younger generations have a special interest in new media and new ways of approaching information. (Gutierrez, Tyner, & Austin, 2012)

Fedorov (2011), refers to the definition of UNESCO documents, which refers to all types of media, texts and graphics, sounds, images of all kinds and through any technology. Contemporary media literacy can be defined according to Gutierrez, Tyner, & Austin, (2012) as:

The process of development of the personality influenced by the media and that occurs based on the material produced by them, which aims to modulate the culture of interaction with the media, the development of creative and communicative skills, critical thinking, the perception, interpretation, analysis and evaluation of media material and the teaching of different forms of personal expression with the use of media technology. Given the importance of media such as television, video games or the Internet in the informal education of children and young people, it would be unthinkable for schools to remain oblivious to the influence of the media.

There are formal and informal means of information and many of these are difficult to filter, at some point they reach a receiver. It is about understanding how the media works, how they influence society and how they can be used critically and responsibly.

2.1.12 The Science of Learning: Determining How Multimedia Learning Works

This article by Mayer (2009) reviews 15 principles of multimedia instructional design that are based on more than 200 experimental studies in the theory of text and graphic learning.

The author explains that learning is more effective when words and images go together in some teaching material, rather than separately. It has a theory based on 3 assumptions:

1. The dual-channel assumption: The human brain processes information through two separate cognitive channels. One is for visual and pictorial information, while the other is for auditory and verbal information. This means that graphics, animations, and on-screen text are processed differently than spoken narration or sounds.
2. The Limited Capacity Assumption: These cognitive channels have a limited ability to process information at a certain time. If too much information is presented at once, the student could experience cognitive overload, which would not allow them to be effective in learning.
3. The active processing assumption: Students must actively participate in cognitive activities rather than be passive, in order to construct new knowledge. These activities include:
 - Select: Pay attention to the most relevant words and images.
 - Organize: Mentally structure the selected words and images in verbal and pictorial models that are coherent.
 - Integrate: Connect these new models to each other and to the student's pre-existing knowledge in long-term memory.

Mayer (2009) clarifies that the use of visual elements in the PEA facilitates the construction of meanings.

Images not only fulfill a decorative objective, but also have a cognitive objective, favoring critical thinking.

The author also mentions that it is based on the CTML (Cognitive Theory of Multimedia Learning). Instructional material designers have developed principles to minimize irrelevant cognitive load, manage essential processing, and thus encourage generative processing.

Within these principles there are some very important ones such as:

The use of arrows, symbols, or headings to direct students' attention, the use of storytelling with images to take advantage of both communication channels, presenting the images with their description at the same time, breaking down long lessons into smaller parts, introducing concepts and keywords before the main lesson to reduce cognitive load, use a conversational tone that gives the feeling of social interaction.

2.1.13 Functions of the digital image in education: a methodological proposal for the writing and reading of the digital image on instructional screens

This research by Azzato (2011) is based on Richard Mayer's cognitive theory of multimedia learning, which proposes that humans learn best when words and images are combined, respecting certain design principles such as: multimedia (combining text and image to improve learning and that they are also synchronized), avoiding irrelevant elements and visual overload, Spoken narration is better than written text, and low-achieving students benefit more from good multimedia design.

In this study, a quasi-experimental design was made with control and post-test groups to pedagogy students of the University of Barcelona, creating 3 e-books with logic content, each with different characteristics, Lm (multimedia book):

- Lm1: with significant multimedia markings (following Mayer's principles).
- Lm2: with abstract multimedia markups (they do not follow the principles).
- Lm3: No media markups (text only).

In the results, there were actually no statistically significant differences in comprehension between the three groups, although abstract Lm2 was the least understood, while Lm1 did not have a clear advantage over Lm3. The students rated the books positively for their use and interactivity.

Assessment instruments were also created, such as prior knowledge about digital imagery, perception of the usefulness of the image in education, and willingness to apply the methodology in other contexts.

In this research, not all the hypotheses such as the advantages of Lm1 over Lm3 could be confirmed, but the importance and power of digital imaging as an educational tool is highlighted.

2.1.14 Effects of Adding Illustrations to Texts on Students' Science Achievement: A Meta-Analysis

This article by Lei, Chen, Chiu, Fang, & Ding, (2025), presents a meta-analysis of 63 studies conducted over five decades, with data from 7,621 students to evaluate the use of illustrations in scientific texts and how it influences students' academic performance.

The teaching material is diverse and a good part is of the textual type, which actually works quite well, especially for a person who has a better understanding of texts. Although there is also a lot of material that could need an illustration; teachers can improve science learning by carefully selecting appropriate illustrations to accompany texts (Lei, Chen, Chiu, Fang, & Ding, 2025).

Main findings found in the article:

1. Adding illustrations improves performance in science: The average effect was positive ($g = 0.232$), indicating that students learn better when illustrations are included in the text.
2. Factors that increase the positive effect:
 - Countries with higher national income.
 - Cultures that accept risk and have short-term orientation.
 - Students of higher grades.
 - Organizational illustrations (such as flowcharts or pictorials).
 - Black and white illustrations.
 - Texts that explain causes and effects or make comparisons.
 - Assessments that measure understanding and knowledge transfer.
3. Factors that do not influence: The means of evaluation (paper vs. computer) does not affect the result.

The authors recommend that teachers carefully select the illustrations that accompany texts, as they can facilitate learning, reduce cognitive load and improve students' memory.

2.1.15 Fake news: an opportunity for media literacy

The article by Fernández (2017) has as one of the central themes fake news, which is not a new phenomenon, but it does change the information landscape and represent a current social problem. Some social media platforms have become the main source of information and these have influenced policy issues. Facebook and Google have been criticized for allowing the spread of fake news, although they have already begun implementing measures to combat it.

Platforms have emerged in more than 50 countries to verify the veracity of this news, highlighting the importance of teaching citizens and especially young people to critically evaluate this information. Many of these fake news have the format of digital images and transmit emotions in addition to the false information itself.

3 METHODOLOGY

An exploratory-descriptive research was carried out and was based on Mayer's cognitive theory of multimedia learning and on principles of visual design and media literacy. A tool based on Google Colab is proposed that allows extracting color palettes from thematic images, considering color palettes of emotions and generating new educational images using artificial intelligence.

In the first part of the research, a questionnaire was applied to students of the Faculty of Accounting and Administration of the Autonomous University of Querétaro.

Type of research: Exploratory – descriptive.

Population and sample: According to the UAQ planning department (UAQ, 2024), the bachelor's degree in Public Accounting has a total of 287 students, in an age range mainly from 20 to 24 years old. The sample size is 164, with a confidence level of 95%.

Table 1

Students of the Bachelor's Degree in Public Accountant

Semester	Age Range					Total
	19-	20-24	25-29	30-34	35+	
1	41	5				46
2	9	9				18
3	27	19	5			51
4	1	14		1		16
5	2	33	1		1	37
6		12	1			13
7		33	3			36
8		21	1			22
9		35	11	2		48
Total	80	181	22	3	1	287

Source: UAQ-2024 Planning Department

3.1 FCA STUDENT QUESTIONNAIRE

A questionnaire was applied to students in the Public Accountant career in the Faculty of Accounting and Administration and these are some of the results obtained:

Figure 1

Do you remember any subject you learned in college?



Source: Questionnaire question no. 1

Figure 2

In the topics that you have remembered from the previous questions, were images included?

En los temas que hayas recordado de las preguntas anteriores ¿Se incluyeron imágenes?

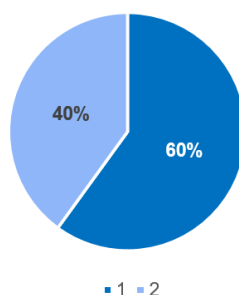
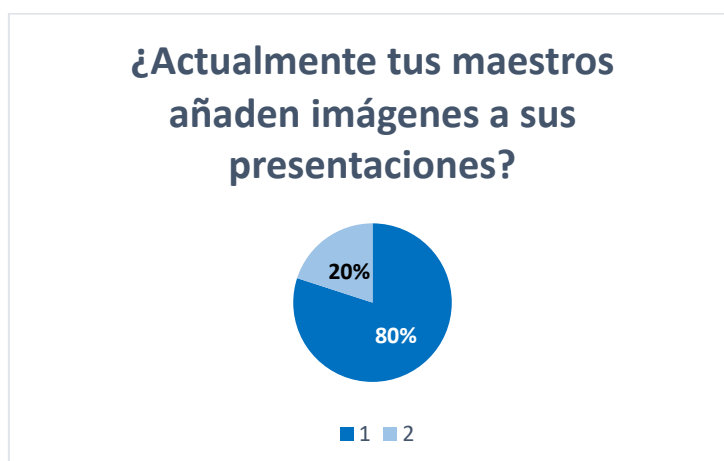


Figure 3

Do your teachers currently add images to their presentations?

**Figure 4**

Do you think you tend to remember a subject better when there are images?



In question 1, several possible answers were raised, while in questions 2, 3 and 4, the answer options were 1) Yes, 2) No.

4 RESULTS AND DISCUSSIONS

4.1 RESULTS OF APPLIED SURVEYS

According to the group of students from the Faculty of Accounting and Administration who formed the sample of this study, it was noted that images are actually used in presentations (PowerPoint), being one of the most used teaching resources. The students themselves consider that the use of images helps them to better remember a topic, however, the results show that it is not significant and this may be due to the profile of the students surveyed, but it may also be related to the fact that the teacher does not make use of the appropriate images that generate a notable impact on the students. Mayer (2009) states that

students achieve deeper learning when information is presented through images and words simultaneously, rather than just using words.

On the other hand, there are manipulative (physical) and non-manipulative (abstract) didactic resources, the latter being the ones to which the images referred to above belong. The quasi-experimental study by Reinoso et al (2024), suggests that manipulative resources have a significant positive impact at least on basic education students, this study is also based on the learning of mathematics. It might probably be good to combine them for the faculty of accounting and administration because of their nature in the use of numbers.

In question number 4, where they are asked if they tend to remember a topic better when images are used, the highest answer was NO, and surely this is due to the profile of students who are Accounting students and work much more with numbers

Following mainly the methodological proposal of Azzato (2011), where the author considers the digital image as an instructional message with educational intention, an application was developed in Google Colab that allows extracting color palettes from images (related to a theme) and reusing them in learning objects. This tool seeks to reinforce the visual and emotional coherence of the content, aligning with Mayer's (2001) principles of multimedia cognitive design.

The digital image, as Azzato proposes, must be read and written with functional criteria. This application proposes a form of visual writing based on color, where each palette communicates specific emotions in which it is possible to add new palettes of emotions manually. These can be used to reinforce concepts, motivate the student or facilitate understanding. The above, of course, taking care of the ethical aspect.

An application prototype with the following functionalities is proposed:

- Automatic image analysis using artificial vision techniques.
- Extracting color palettes from the same images
- Propose new color palettes, allowing you to select an emotion to convey
- Create new images based on all of the above

Here is the source code:

4.2 PROPOSAL FOR A PROTOTYPE OF IMAGE ANALYSIS

4.2.1 Part 1: Generating a Color Palette from a Group of Images

Figure 5

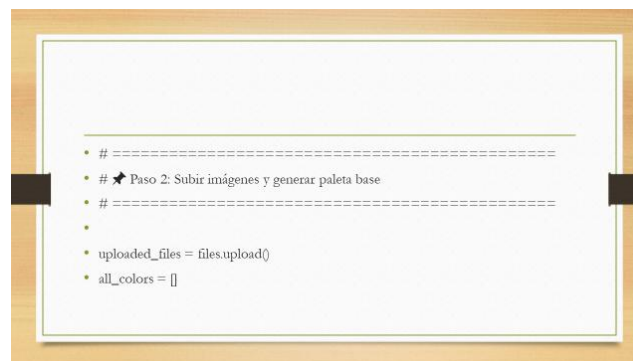
Generating a Color Palette from a Group of Images



Source: The authors.

Figure 6

Step 2 in Color Palette Generation

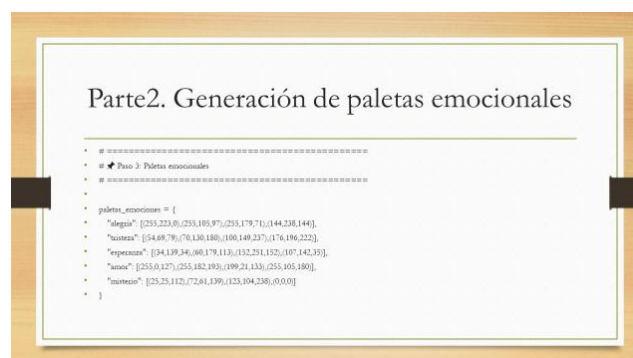


Source: The authors.

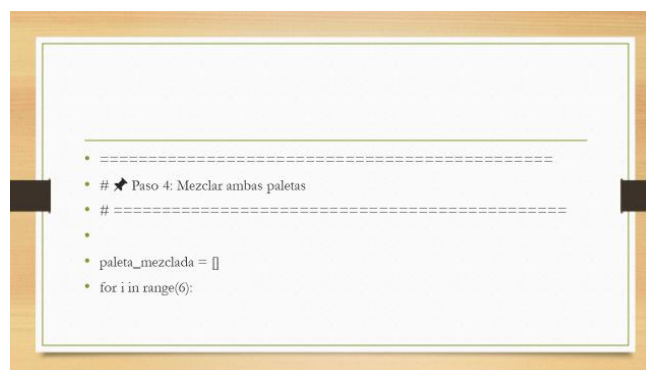
4.1.2 Part2. Generation of emotional palettes

Figure 7

Generation of emotional palettes

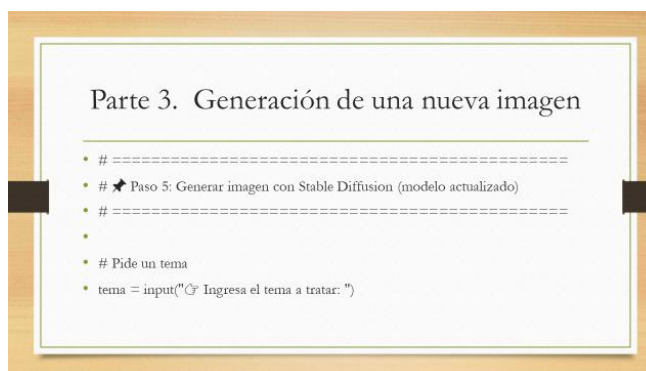


Source: The authors.

Figure 8*Mixing Both Paddles*

Source: The authors.

4.1.3 Part 3. Generating a new image

Figure 9*Generating a New Image*

Source: The authors.

5 CONCLUSION

The use of didactic material with images improves learning unless the student may have a greater sensory, auditory or kinesthetic inclination. Even so, it is proposed to use text and images at the same time, as proposed in other research. The didactic resource of the image analysis application that is proposed is manipulative, the student and the teachers will be able to interact.

On the teacher's side, these types of resources could be more difficult to prepare, but they are the most effective. Adding characteristics based on color theory also allows you to transmit some emotion in students and you will be able to get very complete learning instruments or objects.

On the other hand, several methods can also be combined, such as a WebQuest in which students are asked to send an image related to the topic to be studied and analyze these images to create other images based on those provided.

It is of utmost importance that the teacher carefully chooses the images to be used Lei, Chen (2025). The same is proposed within the procedure to create new images and color palettes.

When digital images are integrated into learning objects, apart from improving the experience, it also helps to strengthen media literacy.

The part of the prototype for analysing images that extracts colour palettes and proposes new colour palettes to convey an emotional impact, opens up the possibility of creating materials that go beyond informing, if it is proposed that learning objects can be created that transmit an emotion, but also that educate in the criticism of the visual part.

Teach students to identify how visuals can be used to manipulate emotions and create misinformation.

If we talk about teachers now, we could mention that it is important to be aware when designing educational images and contribute to forming citizens who are more critical and resistant to media manipulation. A culture of critical thinking can be fostered in the digital world.

The digital image not only accompanies the text, it also activates cognitive processes that in turn allow for more effective and meaningful learning.

The application of image analysis, by extracting color palettes and proposing emotions, enhances the semantic and emotional value of the image. This can help improve the cognitive ability of attention in the student, facilitate the emotional message of content and create a deeper reading in the images.

Work is currently being done on the application of the questionnaire to the other bachelor's degrees taught in the Faculty, Bachelor's Degree in Administration and Bachelor's Degree in Business and International Trade, in order to make a comparative table of the answers and thus obtain new results, considering new student profiles.

The software that is proposed for the generation of color palettes in the images, is of own elaboration (in the images presented, only the first part of each step is present), it is currently in the process of registration with indautor and would be made available to teachers to provide them with course presentations with images based on the generation of color palettes. It has currently been used by the research group and the students to whom it is taught.

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WHAT CAN SCHOOLS DO TODAY IN BRAZIL, IN THE CONTEXT OF EXTERNAL ASSESSMENTS?

O QUE PODE A ESCOLA HOJE, NO BRASIL, NO CONTEXTO DAS AVALIAÇÕES EXTERNAS?

¿QUÉ PUEDEN HACER HOY LAS ESCUELAS EN BRASIL, EN EL CONTEXTO DE LAS EVALUACIONES EXTERNAS?



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ABSTRACT

The question that titles this article is quite pertinent: What can schools in Brazil do today, within the context of external evaluations? Without aiming to exhaust the multiple possibilities for interpretation that this question offers and invites, this article seeks to discuss external evaluation and its relationship to everyday school processes, highlighting the Basic Education Development Index (Ideb) calculated from data on school flow obtained through the School Census and average performance in the Basic Education Assessment System (Saeb). Through a systematic literature review, it is possible to understand the (im)possibilities of Brazilian schools within an oppressive, segregating, meritocratic context that places blame/accountability primarily on teachers and students. Under this neoliberal aegis, Brazilian public education is regulated by the State, being subordinated to market logic, leading us to reflect, from a critical-questioning perspective, on what the school can do amidst this scenario of annihilation of its potential and charms.

Keywords: External Evaluation. School. IDEB (Basic Education Development Index). Accountability.

RESUMO

É propícia a pergunta que dá o título a este artigo: O que pode a escola hoje, no Brasil, no contexto das avaliações externas? Para tanto, sem o objetivo de esgotar as múltiplas possibilidades de escrita que a pergunta nos possibilita e convida, o presente artigo busca discutir a avaliação externa e suas relações com os processos escolares cotidianos, destacando o Índice de Desenvolvimento da Educação Básica (Ideb) calculado a partir dos dados sobre o fluxo escolar obtidos por meio do Censo Escolar e das médias de desempenho no Sistema de Avaliação da Educação Básica (Saeb). No exercício de uma revisão sistemática da literatura, é possível compreender as (im)possibilidades das escolas brasileiras em um contexto opressor, segregador, meritocrático e de culpabilização/responsabilização (*accountability*), principalmente do professor e do aluno.

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Nesta égide neoliberal, a educação pública brasileira é regulada pelo Estado, sendo subordinada à lógica do mercado, fazendo-nos refletir, a partir de um pensamento crítico-contestador, o que pode a escola em meio a este cenário de aniquilamento de suas potencialidades e encantamentos.

Palavras-chave: Avaliação Externa. Escola. IDEB (Índice de Desenvolvimento da Educação Básica). Accountability.

RESUMEN

La pregunta que da título a este artículo es muy pertinente: ¿Qué pueden hacer hoy las escuelas en Brasil, en el contexto de las evaluaciones externas? Sin pretender agotar las múltiples interpretaciones que esta pregunta ofrece e invita, este artículo busca analizar la evaluación externa y su relación con los procesos escolares cotidianos, destacando el Índice de Desarrollo de la Educación Básica (IDEB), calculado a partir de datos sobre el flujo escolar obtenidos mediante el Censo Escolar y el desempeño promedio en el Sistema de Evaluación de la Educación Básica (SAEB). A través de una revisión sistemática de la literatura, es posible comprender las (im)posibilidades de las escuelas brasileñas dentro de un contexto meritocrático, opresivo y segregacionista que responsabiliza principalmente a docentes y estudiantes. Bajo este marco neoliberal, la educación pública brasileña está regulada por el Estado, subordinada a la lógica del mercado, lo que nos lleva a reflexionar, desde una perspectiva crítico-cuestionadora, sobre qué puede hacer la escuela en medio de este escenario de aniquilación de su potencial y atractivo.

Palabras clave: Evaluación Externa. Escuela. IDEB (Índice de Desarrollo de la Educación Básica). Rendición de Cuentas.

1 INTRODUCTION

All knowledge [...] must contain a minimum of nonsense, like the old patterns of carpet or ornamental friezes, where one can always discover, at some point, an insignificant deviation from its normal course. In other words: the decisive thing is not the pursuit of knowledge in knowledge, but the leap that takes place in each one of them.

Walter Benjamin

Discussing what the School can do today, in Brazil, in the context of external evaluations, implies rethinking the figure, the role and the understanding of what is the knowledge historically constructed and transmitted within Brazilian schools. In the fragment that opens this introduction, written by the critic of modernity, the philosopher Walter Benjamin, knowledge has its perfection and standardization questioned, enabling the reader to believe in other truths, in the successes arising from deviations, from what seems to be insignificant, but which demonstrates an important ability to show us what the school can do today in a context of ready-made truths and not constructed of a single right answer, as if everything inside and outside it were homogeneous, despising the diversity that makes this privileged environment a space of potentialities and enchantments.

Thus, thinking about singularity and not standardization, it is possible to conceive the school as a space of creation, where the unprecedented shows us a living place, in which evaluation needs to be thought and problematized in a context of annihilation, in which the ranking, the comparison between different cities and states, the identification of better and worse, it has become something common in a country that makes its Basic Education Evaluation System (SAEB) through large-scale external evaluations, a one-way street that does not fit Brazil in its diversity, in which few walk/cross and that ends up creating the Basic Education Development Index (Ideb) that contributes nothing to the construction of public policies for Education, so that the barriers of inequality that prevent the access and permanence of thousands of students are overcome, creating mechanisms for the democratization of teaching, inclusion and, above all, that builds an evaluation capable of thinking with/in the school, not crucifying it and taxing it as a producer of insufficient teaching and learning.

Current public education policies conceive external evaluations as the main instrument of control by the State, using an outdated discourse that it is through them that teaching and learning practices can be improved. How? It will not be through copies, boring training exercises, based on a certain pattern of question and answer, fragmented and far from the reality of the students that we will have an expansion of the School's potential, on the contrary, we will be further reducing it and reinforcing an incompetent public school discourse. Here,

the one who fails in reality is the State, reinforcing a historical inequality and failing to promote the long-awaited quality education.

From agreements based on the agendas of international agencies, such as the World Bank, in a more categorical way from the 90's onwards, Brazil has been incorporating the model of *accountability*, of managerial logic, fostering Decrees such as, for example, No. 6,094/2007, which creates the Plan of Goals Commitment All for Education that defines the Ideb, configuring an evaluating and controlling State, through external evaluations that it is up to us to contest/inquire: What can the School do today, in Brazil, in the context of external evaluations?

2 THE BASIC EDUCATION DEVELOPMENT INDEX (Ideb): A RANKING AT THE SERVICE OF WHOM?

Based on the studies of Azevedo (2001), it is possible to identify since the 30s the possibility of a systematic evaluation of Brazilian education. However, according to the author, and through other studies – such as that of Coelho (2008), it was only at the end of the 1980s that an evaluation system on a national scale began to be developed, and its first application dates back to 1990. Therefore, from that year to the present date of writing this article, the Basic Education Evaluation System (SAEB) evaluates all Basic Education in the country, with Early Childhood Education being included as of 2019.

On December 20, 1996, Law No. 9394/96 was approved, which regulates the Guidelines and Bases of National Education (BRASIL, 1996). The text of the Law had as rapporteur Senator Darcy Ribeiro, who used the SAEB as the main unified mechanism for evaluating Brazilian education, serving as a kind of compass for the formulation of educational policies in the country. In line with the Law, in 1997 the reference matrices and, later, the descriptors, in which students from all over Brazil had to present minimum competencies to certain contents, were incorporated into the SAEB.

In the context described above, taken from a neoliberal perspective, it is important to consider that we have a wave of transnational regulation (BARROSO, 2006) based on a discourse created by international organizations, such as the World Bank, the Organization for Economic Cooperation and Development (OECD) and the United Nations Educational, Scientific and Cultural Organization (UNESCO). which ends up importing ideas/policies from different countries considered non-peripheral.

In this vein, in 2005, we created the National Assessment of School Performance (Anresc) – the Prova Brasil – with the objective of assessing the knowledge of students from all over Brazil in the subjects of Portuguese language and mathematics. To this end, the

SAEB was expanded and further reinforced at the national level, so much so that in 2007 Decree No. 6,094 was instituted, which deals with the implementation of the Plan of Goals Commitment All for Education, aiming at the social mobilization of families, school communities, the Union, the States, Municipalities and the Federal District for the improvement of the quality of basic education (BRASIL, 2007).

In its article 3, Decree No. 6,094 regulates the Ideb, namely:

Art. 3 The quality of basic education will be objectively measured based on the IDEB, calculated and periodically disclosed by INEP, based on data on school performance, combined with student performance, contained in the school census and the Basic Education Evaluation System - SAEB, composed of the National Evaluation of Basic Education - ANEB and the National Evaluation of School Performance (Prova Brasil). Sole Paragraph. The IDEB will be the objective indicator for verifying the fulfillment of the goals set in the term of adhesion to the Commitment (BRASIL, 2007).

It can be inferred, from the text of the Decree, that the word "quality" is right at the beginning of the article that deals with the Ideb, encouraging the maintenance of the same discourse in Law 13.005/2014, which institutes the National Education Plan (PNE) in its twenty goals, with goal 7 being the reason for analysis of this article: "To foster the quality of basic education in all stages and modalities, with improvement of the school flow and learning in order to achieve the following national averages for the Ideb" (BRASIL, 2014).

In this neoliberal logic, what ended up being configured in Brazil was a culture of ranking throughout Brazil, further reinforcing the country's historical inequality, causing a policy of competition capable of placing schools from the same education system as adversaries, accentuating a fragile discourse about a better school and a worse school, as if they all had the same students and were located at the same address, disregarding essential sociocultural factors to understand the conditions of each institution and which public education policies are necessary for a more equitable, inclusive and democratic education. Regarding ranking, Araújo (2007, p.4) points out that:

[...] the IDEB is more of a regulatory instrument than a definer of criteria for a better application of the Union's resources in order to change educational indicators. The result of each municipality and each state will be (and is already being) used to rank the education networks, to intensify competition and to pressure, via public opinion, the achievement of better results. In other words, the function of the MEC assumed by the Lula government maintains the perverse logic in force during twelve years of FHC.

This is a managerialist idea, with the objective that Schools present results as in a company, exempting the State from responsibilities and blaming, in particular, teachers and students for the results obtained. Therefore, this idea of quality of administration has in large-

scale evaluation the necessary subsidy to exempt the State from its role, disregarding the School and its characteristics in the context in which it is inserted and the specificities of its students.

The IDEB ends up being configured as an indicator at the service of the market guided by international organizations that aim to maintain the power of some over the exploitation of labor and the reproduction of the living conditions of others – the working class, understood as subaltern and necessary to the care of emerging neoliberal policies.

Regarding the Ideb and its configuration in the Brazilian public education scenario, Parente (2012, p.74) highlights:

What is imposed today in Brazilian public schools is the need to present results of efficiency and effectiveness at all costs (Taylorist model), rewarding the schools that present the best results, generating a climate of competitiveness among them. [...] In the same way that privatization strained relations in the school environment and between the spheres of public power, managerialism imposes a culture of competitiveness, represented by a power relationship and by statistical indicators that propose to measure the quality of education through evaluation processes [IDEB, Prova Brasil, ENEM].

In an attempt to answer the question that opens this section – Basic Education Development Index (Ideb): A ranking at the service of whom? – it is possible to consider that this managerialist model, in which the school must be accountable for its work, is in fact not at the service of an education that aims at the democratization of teaching and the construction of social justice.

Disregarding other forms of evaluation that take into account the teaching and learning process, as well as the development of each student, in an individualized way, this ranking model reinforces stigmas of school failure based on a shallow discourse devoid of knowledge about school spaces, summarizing evaluation in a duality between those who get it right (know?) and those who make mistakes (don't know?). Here, the question marks purposely composed the "know" and the "don't know", in order to problematize the extent to which an objective test is able to provide information that expresses whether the students have learned or not. Considering the complexity that involves the daily life of the School and everything that is predictable and unpredictable, from the class that spends months without a teacher to the student prevented from going to school due to the police operation in his or her community and/or the lack of infrastructure in the school environment is, at least and categorically, It is impossible for us to evaluate all students on the same parameter, the same line, which does not account for deviations that are not insignificant, but which affirm the school as a living place, of possibilities and enchantments.

The results of the Ideb, in the logic of ranking, are an end in themselves, not allowing other possible paths of policies committed, in fact, to the different students who form the identities of thousands of schools and who are not considered in the large-scale evaluation proposed in the country. Thus,

[...] Making the result the starting point for a process of accountability of the school via city halls leads us to explain the difference based on the liberal meritocratic perspective: merit of the principal who is well organized; merit of children who are hardworking; merit of the teachers who are applied; merit of the mayor who should be reelected, etc. But what about the living conditions of students and teachers? What about inadequate government policies? And what is left of a public service that the elites, in order to get elected, made a hanger for generalized employment, as long as they could without rules for hiring or firing? What about the permanent removal of teachers and specialists at any time, jumping from school to school? What about the hourly teachers who are divided between several schools? What can be said about the students who inhabit the growing favelas without minimum conditions for survival and much less to create an environment conducive to study? Not to mention the number of students in the classroom. (FREITAS, 2007, p. 971-972)

With Freitas (2007), it is possible to further intend what the results presented by Ideb can represent beyond the ranking and accountability of the school, denouncing the meritocratic perspective that feeds inequality and presents a lethargic State in the promotion of public policies committed to schools and their potential. The IDEB ends up being subsidized, in general terms, by a logic based on productivity, effectiveness and *accountability*, at the service of a managerialist practice that exclusively favors the market, represented by the oppressors.

3 WHAT CAN THE SCHOOL DO?

In the context of external evaluations, what can the school today, in Brazil, do between mistakes and successes?

Among more mistakes than successes, of course! In a direct answer to the question that opens this subsection, it is possible to identify an education policy that already begins by disregarding Brazil itself and all its diversity, because the idea brought, which began in the 1990s and was strengthened in the first decade of the twenty-first century, in force until the present day, despises, or rather, presents a total lack of knowledge of the problem that is chronic – social inequality – which does not allow even in the long term to be realized a standardized evaluation at the national level and, above all, to work on the data obtained as they have always been worked wrongly.

The saturated order of the Ideb, calculated by means of two variables, the school flow and the performance in the Prova Brasil, on a vertical scale from zero to ten, does not account

for the educational needs of the country and does not allow us to know our own education. There are errors that are not in schools, but in those that formulate and direct the country's educational policies. Evaluating is always necessary – it is important to emphasize this, but the way in which it is evaluated must be widely discussed. On the other hand, we experience the practice that, in the words of Afonso (2001), is of an "Evaluator State", based on the aegis of comparison, ranking, competition. In the errors presented here, we have the evaluations:

external, carried out by entities external to the institution, and are exogenous, decided outside the institution (as opposed to internal and endogenous evaluations); they are summative, not formative; they are focused on results, and not on pedagogical processes or on the social effectiveness of educational policies; are mostly carried out ex-post and aimed at stimulating the competitiveness of higher education institutions that make up the educational quasi-market (OLIVEIRA; YANNOULAS, 2013, p. 76).

The citation promotes the exposure of a series of errors promoted by the SAEB, as this same system disregards the process that involves teaching and learning, focusing its attention exclusively on the result. Thus, evaluating the quality of education through Ideb does not give us the diagnosis we need to think about public policies to improve Brazilian public education. The Ideb as an end only serves to create an unfair ranking devoid of truths, far from reality, based on merely quantitative, cold data.

In the errors made by an incomprehensible evaluation system, summarizing education and promoting the status of comparison, ranking, *accountability*, between error and success is, at the very least, contradictory. There is a contempt for the stories that make up the school and that makes it a place of possibilities. Undoubtedly, there is a story that history does not tell, since it is not important to neoliberal interests that exempt the State from its role/accountability.

Established by Ordinance number 931, on March 21, 2005, the SAEB, as already mentioned, was initially formed by two basic reference matrices, namely: the National Assessment of Basic Education (ANEB) and the National Assessment of School Performance (ANRESC). Both are based on a quality discourse that lacks a deeper understanding of the data collected by the School Census. In 2013, Brazil began to have the National Literacy Assessment (ANA), aimed at students in the 3rd year of Elementary School I segment, evaluating them in Portuguese language and mathematics, the last of which was in 2016. However, what interests us to problematize, in a more forceful way, is the "fruit generated by the SAEB" (SOUZA; ASUNÇÃO, 2011), which is the Ideb – an indicator that has been establishing labels for all Brazilian public schools, producing external pressures to annihilate the potentialities and enchantments that are inherent to the condition of school

institutions. The State ends up exercising its coercive power and the external evaluations with their results end up having no positive impact on the pedagogical organization of the schools. In this regard, Blasis, Falsarella and Alavarse (2013, p. 39) point out that,

It is important to recognize that external evaluation does not end with the disclosure of test results and indicators. It continues as it involves society, schools, communities and public authorities in the debates about these results and, from there, paving the way both to densify and dialogue with the internal evaluations carried out within the scope of the schools (of the pedagogical project and the educational action), and within the scope of the departments of education (of the guidelines of the educational policy).

However, what is observed in Brazil is exactly the opposite of what the authors above bring. In the current context, the school, in a relationship of subordination with the current evaluation policies of the State, ends up being reduced in its potentiality, except for the exceptions, in few places in Brazil, of those who refuse to take the Prova Brasil. Thus, Vianna (2005, p. 6) points out:

Evaluation is not a value in itself and should not be restricted to a simple rite of educational bureaucracy; needs to be integrated into the process of transformation of teaching/learning and thus actively contribute to the process of transformation of students.

This transformation of students is linked to the transformation of teaching, of the school, which goes against the productivism imposed by the hegemonic model of evaluation. Grades serve to include and exclude people, as Garcia (2001) pointed out, so many of us have already witnessed – as students or teachers – students who were left behind because of tenths in the grade, after all "[...] deep down it is she who decides her life" (VASCONCELLOS, 2008, p. 18). Ideb reinforces this tradition and encourages this culture even more. Luckesi (2001) calls this the pedagogy of the exam, characterized by the lack of commitment to the teaching process and, especially, to the students' learning. In this regard, Esteban (2001) brings an important analysis of what ended up becoming school evaluation itself. According to the author:

School evaluation, which maintains the logic of the exam, can be understood as one of the gentlest, less bodily violent and visually less perceptible methods of maintaining discipline; one of the instruments capable of acting with intensity and amplitude on the subject in its entirety. It has the sense of disciplining not only the body, but also the thought, the will, the dispositions (ESTEBAN, 2001, p. 105).

The school's potentiality is prevented from being experienced, because the pedagogical relationship it establishes with its students is purely disciplinary, both in body and in thought. At school, this model ends up being more camouflaged, perhaps less visible because it does not gain media like large-scale evaluation. The relationship established is one of reward or punishment, of reinforcement illustrated in the table of outstanding students of the two months or in the medal placed by the teacher on the chest of the "best student" in the class. Luckesi (2014, p. 17) draws our attention by making a kind of warning when he says that this model of evaluation internally practiced in our schools does not contribute to the change of paradigms imposed by large-scale evaluations, on the contrary, it only reinforces, works in favor of it. According to the author, these forms of evaluations [...] do not help us to realize the dream, the hope and the desire for democratization of education. On the contrary, they camouflage reality so that we can see their limited processes and results." As in a company, we end up valuing only the final product, that is, the grade (the number) that the student gives us.

In view of all this, it is worth returning to the question that gives the title to this subsection: What can the School do?

This model of external evaluation as a public policy, functioning as a mechanism for regulating educational policies and, especially, daily pedagogical practices, has made us doubt what the school can do, mainly because it traditionally ends up incorporating the oppressive, segregating, meritocratic and accountability model) imposed at the national level through external evaluations, which ends up harming it on a primary basis.

What is up to the school, then?

To understand, first of all, that "no content is learned by the person without being modeled by the affections, by the meaning that the learning of the content in question has for the subject who learns" (PRANDINI, 2004, p. 44). Thus, it is not through memorization and repetition that we will show what the school can do. The excerpt from the song *Estudo Errado*, by Gabriel – o Pensador, makes a scathing criticism of this model of grading system: "Mom, I got a ten on the test! I did well, I got a hundred and I want to see who fails me / I memorized every lesson / I didn't make a mistake [...] Almost everything I learned, tomorrow I already forgot / I memorized, copied, memorized, but I didn't understand". In addition to evaluation, criticism is also related to the education system, in line with what Luckesi (2005, p. 19) says: "the practice of the exam, due to operating with the pass/fail resources, necessarily leads to the policy of failure, which has manifested itself as the most consistent alibi for school failure".

It is up to the school, then, in the context of the evaluation promoted by it and its teachers, to change paradigms and philosophical conceptions that it reinforces and practices

in its daily life. Esteban (2001) addresses the issue of evaluation as an investigative practice, as opposed to the exclusionary model of external and internal evaluations. In this sense, in defense of a formative evaluation, Hoffmann (1993) highlights that "evaluation is a permanent reflection on reality, and accompaniment, step by step, of the student, in his trajectory of knowledge construction". Thus, without the objective of promoting a pre-established response or even moving towards a conclusion that delimits right or wrong, it is possible to think of alternatives for the democratization of education, providing processes for a more inclusive evaluation, as Esteban (2001) and Hoffmann (1993) point out. In this context of what the school can do, it is necessary and coherent to develop an evaluation of learning as a loving act as "the one who welcomes the situation, in its truth (as it is)" (LUCKESI, 2005).

4 FINAL CONSIDERATIONS

It is inaccurate to say what the school can do today, in Brazil, in the context of external evaluations. The question that gives the title to this article implies a change in thinking in all those involved with education and who believe in the power and enchantment that it is capable of producing. The *accountability model*, imposed through external evaluations, reduces the role of the school into a mere executor of technical activities based on productivity criteria, producing an indicator that is far from being something reliable in the Brazilian educational reality, such as the Ideb. In order for the school itself to deconstruct the fallacy of the discourse that external evaluations serve to measure the quality of education, it is necessary that evaluation policies be replaced by the recognition of the existence of differences in daily school life.

Thus, rankings are of no use, except to propagate a vision of homogenization based on positivist ideals that consolidate public education policies that end up accentuating social inequality in Brazil, as well as producing school failure through student failure/exclusion. Therefore, contemplating the complexity that involves the training space that is the school may not be the point of arrival, but certainly the starting point, promoting a necessary reflection based on dialogue and the democratization of evaluation processes inside and outside the institution.

In conclusion, but without the objective of accounting for the discussion started here and establishing ready-made answers, it is important to realize that the idea of the questions that permeate the writing of this article works as a kind of tapestry, in which other threads form so many other carpets with deviations of colors and shapes. In this intent, many other questions arise that are part of this article, and it is part of its own methodological selection to choose one that would continue the movement initiated here: What other paths could we

follow against what external evaluation imposes on us? I understand that, "for this, neither threat nor punishment is necessary, but rather welcoming and loving confrontation" (LUCKESI, 2001, p. 33).

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THE METHODOLOGY OF PROBLEMATIZATION IN THE RESCUE OF TRADITIONAL GAMES: EXPERIENCE REPORT OF PHYSICAL EDUCATION CLASSES FOR ELEMENTARY SCHOOL STUDENTS

A METODOLOGIA DA PROBLEMATIZAÇÃO NO RESGATE DAS BRINCADEIRAS TRADICIONAIS: RELATO DE EXPERIÊNCIA DAS AULAS DE EDUCAÇÃO FÍSICA PARA ALUNOS DO ENSINO FUNDAMENTAL

LA METODOLOGÍA DE LA PROBLEMATIZACIÓN EN EL RESCATE DE LOS JUEGOS TRADICIONALES: INFORME DE EXPERIENCIA DE LAS CLASES DE EDUCACIÓN FÍSICA PARA ESTUDIANTES DE PRIMARIA



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ABSTRACT

This study is linked to the Master's Graduate Program in Physical Education in the National Network (PROEF), São Paulo State University (UNESP), Faculty of Science and Technology (FCT), Presidente Prudente Campus. The objective is to make an experience report based on the description of the interventions carried out between October and December 2025, with 35 students from the 4th year of elementary school, in a public school in the municipality of Campo Grande (MS). Using the Methodology of Problematization of the Arco de Megueres and starting from the Freirean perspective, the interventions started from problems about popular games, their origins and their generational interpretations. It was possible to conclude that the occurrence of moments in which families experience the ludic culture and pass it on to their children, generate significant knowledge. However, due to many factors, families have attributed the function of this experience to schools. In turn, many schools make it impossible for Ludic Cultures to happen, due to the fact that, among other reasons, there is an appreciation of some contents, to the detriment of others. The methodology of problematizing the Magueres arch shows us that it is possible to think of active methodologies capable of involving students in a process of critical autonomy in physical education classes. Therefore, there is a possibility that popular games will resurface as a playful culture within schools, making what was once common in our streets, may reappear in the corners and charms of schools.

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Keywords: Arco de Meguerez. Children's Play Cultures. Problematization Methodology. Popular Games. Early Years of Elementary School.

RESUMO

Este estudo está vinculado ao Programa de Pós-graduação de Mestrado em Educação Física em Rede Nacional (PROEF), da Universidade Estadual Paulista (UNESP), Faculdade de ciências e Tecnologia (FCT), Campus de Presidente Prudente. O objetivo é fazer um relato de experiência a partir da descrição das intervenções realizada entre outubro e dezembro de 2025, com 35 alunos dos 4º anos do ensino fundamental, em uma escola pública no município de Campo Grande (MS). Utilizando-se da Metodologia da Problematização do Arco de Meguerez e partindo da perspectiva freiriana, as intervenções partiram de problemáticas sobre as brincadeiras populares, suas origens e suas interpretações geracionais. Foi possível concluir que, a ocorrência de momentos em que as famílias vivenciam a cultura lúdica e as passam aos filhos, geram conhecimentos significativos. No entanto, devido a muitos fatores, as famílias têm atribuído a função dessa vivência às escolas. Por sua vez, muitas escolas impossibilitam com que as Culturas Lúdicas aconteçam, pelo fato de, entre outros motivos, ocorrer uma valorização de alguns conteúdos, em detrimento de outros. A metodologia da problematização do arco de Maguerez nos mostra que é possível pensarmos em metodologias ativas capazes de envolver os estudantes em um processo de autonomia crítica nas aulas de educação física. Sendo assim, há uma possibilidade de que as brincadeiras populares ressurgam enquanto cultura lúdica dentro das escolas, fazendo com que outrora era comum em nossas ruas, possa ressurgir nos cantos e encantos das escolas.

Palavras-chave: Arco de Meguerez. Culturas Lúdicas Infantis. Metodologia da Problematização. Brincadeiras Populares. Anos Iniciais do Ensino Fundamental.

RESUMEN

Este estudio está vinculado al Programa de Máster de Posgrado en Educación Física en la Red Nacional (PROEF), Universidad Estatal de São Paulo (UNESP), Facultad de Ciencias y Tecnología (FCT), Campus Presidente Prudente. El objetivo es elaborar un informe de experiencia basado en la descripción de las intervenciones realizadas entre octubre y diciembre de 2025, con 35 alumnos de 4º curso de primaria, en un colegio público del municipio de Campo Grande (MS). Utilizando la Metodología de Problematización del Arco de Meguerez y partiendo de la perspectiva freireana, las intervenciones partieron de problemas sobre los juegos populares, sus orígenes y sus interpretaciones generacionales. Se pudo concluir que la ocurrencia de momentos en los que las familias experimentan la cultura lúdica y la transmiten a sus hijos genera un conocimiento significativo. Sin embargo, debido a muchos factores, las familias han atribuido la función de esta experiencia a las escuelas. A su vez, muchas escuelas hacen imposible que existan las culturas lúdicas, debido a que, entre otras razones, se aprecia ciertos contenidos, en detrimento de otros. La metodología de problematización del arco de Maguerez nos muestra que es posible pensar en metodologías activas capaces de involucrar a los estudiantes en un proceso de autonomía crítica en las clases de educación física. Por lo tanto, existe la posibilidad de que los juegos populares resurjan como una cultura lúdica dentro de las escuelas, haciendo que lo que antes era común en nuestras calles reaparezca en las esquinas y los encantos de las escuelas.

Palabras clave: Arco de Meguerez. Culturas de Juego Infantil. Metodología de Problematización. Juegos Populares. Primeros Años de Primaria.

1 INTRODUCTION

School Physical Education aims to transmit historically accumulated knowledge about human movement and its relations with the environment in which it lives. In this sense, it was decided to call this accumulated knowledge from the 1990s onwards as Body Culture of Movement (Coletivo de autores, 1992). From this perspective, school Physical Education has the responsibility of enabling students to access and critically appropriate this cultural heritage (Bracht, 1999; Betti, 1994; 2005). Thus, the objective of this article was to describe the application of the Methodology of Problematization with the Arch of Maguerez (MPAM) as a pedagogical possibility to develop the investigative capacity of students and promote the appreciation of popular games as manifestations of body culture.

The experience report that we propose seeks to show the use of MPAM as an active methodology in the construction of more autonomous students with decision-making capacity. According to Andretta (2020), the environment conducive to traditional games is less and less on offer due to a smaller space devoid of interactions in our current society, and in this sense, the school becomes a stronghold for the transmission of this accumulated knowledge.

Andretta (2020) also mentions that, in addition to the departure of parents from the labor market, urban violence, the decrease in interactions between peers and adults, the current situation of the federal government's educational policies corroborates the emergence of another context: the enrollment of children in full-time schools, which has been materialized in many observed realities.

As an example, we can mention the state of Mato Grosso do Sul, which recorded a significant increase in enrollment in schools that offer full-time education: from 62% in 2014, after a large drop between the years 2018 and 2020 (which offered between 29% and 30% of enrollments in this modality), it offered 45% in 2022 and 2024, 71% of enrollment in full-time education. This last percentage is above the expected goal of 65% within the state of Mato Grosso do Sul (Mato Grosso do Sul, 2025) and also above the goal of the National Education Plan 2024-2034 (Brasil, 2025), which provides for 55% of enrollments offered in this modality.

Thus, through the expansion of the offer of full-time education, the intention of rescuing traditional games and games as a tool for the study of invasion sports is justified, since the school can be considered a privileged place for this context to be consolidated.

2 CHILDHOOD AND PLAY IN PHYSICAL EDUCATION: WHY THINK ABOUT METHODOLOGIES FOR CHILDREN?

The consolidation of modern Physical Education is directly related to the transformations that occurred in the way of understanding childhood and the body throughout the eighteenth and nineteenth centuries. After the process of moralization and control of playful practices, body movement began to be valued not only as a form of discipline, but also as a fundamental element for physical development. the health and integral education of children (Azevedo; Lima, 2020).

According to Ariès (1981), from the eighteenth century onwards, the concern with the physical conditions of childhood intensified, especially with regard to strengthening the body and preventing diseases. In this context, the importance of activities involving movement began to be recognized, since children showed a preference for bodily practices. This perception contributed to the appreciation of the so-called exercise games, considered beneficial to growth and physical balance.

This movement occurred at a time marked by the advancement of medical and hygienist thinking, which began to defend the need for regular body practices as a way to promote health, physical vigor, and discipline. Progressively, exercises and games ceased to be just spontaneous manifestations of childhood and began to be organized, systematized and incorporated into the school routine (Ariès, 1981).

In this process, the body assumed centrality in the modern educational project. Physical Education arises, linked to a logic that articulates physical development, behavioral control and moral formation. Body movement is now allowed and encouraged, as long as it is guided, supervised and appropriate to the pedagogical objectives of the school. However, this valorization of the body in movement did not eliminate the logic of control that historically marked the civilizing process of childhood. As Azevedo (2016) points out, many school practices are still guided by a conception of normalization of behaviors, in which children are adjusted to previously defined models.

In this sense, "thinking of the child as an 'ideal' and not a 'real' being is part of our routine, whether at school, when we try to standardize him through concepts in which everyone needs to fit" (Azevedo, 2016, p. 79). In addition, the school space continues to produce forms of body regulation that limit spontaneity and body expression. The author points out that the control of movement is often manifested through the demand for immobility and silence, configuring what she calls "silence of the body", understood as "an institutionalized strategy to impose immobility and other types of deprivation on children" (Azevedo, 2016, p. 177).

This perspective shows that modern Physical Education is constituted in the midst of a permanent tension: at the same time that it recognizes the importance of movement for child development, it is also inserted in an educational system that historically values discipline, order and control of bodies. In this sense, modern Physical Education cannot be understood only as a result of the valorization of physical activity, but as part of a historical process that organized childhood and defined ways to control, guide and give meaning to movement in the school context.

The articulation between the historical analyses of Ariès (1981) and the reflections of Azevedo (2016; 2022) allows us to understand that bodily movement, when incorporated into the school, occupies an ambiguous place, being simultaneously recognized as necessary for development and subjected to norms that guide, limit, and discipline its expression.

This process, initially observed in the European context, is also manifested in a particular way in other historical scenarios. In the Brazilian case, the construction of childhood occurred in a context marked by colonization and social inequality. Since the colonial period, education has been linked to missionary action and the transmission of values considered necessary for the organization of life in society. With the advancement of the schooling process, this logic began to guide practices that prioritize discipline, the organization of behaviors, and the control of the child's body (Azevedo, 2022).

Even with the changes that have occurred in education over time, many of these traits can still be perceived in the daily life of schools. This shows up especially in the way children's movement, play, and body expressions are organized, allowed, or in some cases, restricted. In the Brazilian context, the organization of school Physical Education has also been built from different legal frameworks that express changes in the conceptions of education and human formation (Azevedo, 2022).

The Federal Constitution of 1988 represented an advance by establishing education as a right for all and oriented towards the full development of the person (Brasil, 1988). Subsequently, the Law of Guidelines and Bases of National Education, Law No. 9,394/1996 (Brasil, 1996) consolidated Physical Education as a curricular component of Basic Education, integrating it into the school's pedagogical project and reaffirming its contribution to the integral formation of students.

In the 1990s, the publication of the National Curriculum Parameters (PCNs) as a quality reference for the curriculum in Basic Education, brought more specific guidelines to the area, organizing teaching from the perspective of the body culture of movement and recognizing games, games, sports, dances, fights and gymnastics as school contents (Brasil, 1997). For many years, the PCNs constituted the main curricular reference for the

organization of pedagogical practices in Physical Education and, although this document did not have the normative status of Law, it has a historical importance when we think of a curricular organization for Brazilian Basic Education, especially for school Physical Education.

More recently, the ratification of the National Common Curricular Base (BNCC) in 2017 (Brasil, 2017), established the rights of learning and development for Basic Education, reaffirming Physical Education as an area responsible for working with body culture and organizing the contents into thematic units, including games and play. As it is a recent document, its implementation has still required moments of study, discussion and reorganization of pedagogical practices. In everyday school life, this means reviewing plans, rethinking objectives, and looking for ways to bring the BNCC guidelines closer to the reality of classes.

Although it is an important curriculum document, the BNCC (Brazil, 2017) is not exempt from criticism and, even when citing its importance, it is necessary to make some reservations here. Some controversies involving its construction by, for the most part, economic institutions that had no direct relationship with Education, is one of the issues that can be cited as an example. Other issues, such as the competency-based approach, the disregard for areas of knowledge when prioritizing some content and contributing to the reduction of others can also be listed (Azevedo, 2026).

Among other words, there is a generalized pressure on teachers and children so that the neoliberal economic logic, materialized by the incessant search for goals, the platformization of teaching and the increasingly bureaucratic teaching activities, is consolidated early in schools, especially public ones. In this context, the space for playing and playing is practically nil, since the market logic prioritizes only the time-profit relationship, demonstrated by the curtailment of Children's Playful Cultures since Early Childhood Education (Azevedo, 2026, p. 59).

The author also makes other observations: the education proposed by the BNCC is shallow, simplistic, aims at the formation of cheap work for the labor market and promotes a technicist education, in addition to not valuing Physical Education, since "this same logic tends to secondary issues related to play, which can be perceived by the very place attributed to this area within the BNCC: an area "annexed" to the others" (Azevedo, 2026, p.61).

Despite all these criticisms, the BNCC is what is in place and, let us continue fighting so that, in the near future, we can participate in a more collective and democratic construction of a possible new version of the BNCC – this is what we defend here in this work: that the BNCC can soon be reformulated by those who are present in the school routine.

Thus, it is observed that the moments of play in this document cannot be limited only to leisure. In them, children build relationships, negotiate rules, resolve conflicts, explore space and experiment with different forms of participation. This reality dialogues directly with the daily life of Physical Education classes in the early years, in which play often needs to compete for space with school routines, content and expectations. Recognizing the value of these experiences becomes fundamental for pedagogical practice to consider the child in his or her own way of learning and expressing himself, because:

(...) New skills can be acquired and improved by the child while playing, including many skills that will serve, as this process evolves, for the acquisition of knowledge in the classroom. For example, when proposing the variation of a certain game such as 'zerinho', in which children try to jump rope by sequencing the jumps in which the proposal is to increase the number of them, it is concerned, at first, with fulfilling this purpose, executing the action not only in the motor field, but anticipating its action in the mental field (Azevedo, 2016, p. 108).

These situations show that playing involves planning, anticipation, decision-making and the construction of strategies, reinforcing its potential as a significant learning experience. Understanding this historical trajectory makes it possible to look more critically at the place that play occupies today in school. The challenge is to ensure conditions for children to play, explore and express themselves through their bodies. Although recent legal documents, such as the Federal Constitution of 1988, the Statute of the Child and Adolescent (Law No. 8,069/1990), the Law of Guidelines and Bases of National Education (Law No. 9,394/1996) and the National Common Curricular Base (Brasil, 2017) recognize play as a right and as an expression of body culture, they still persist in school daily life, tensions between the valorization of playfulness and the institutional organization of time, space and children's behaviors.

In this sense, the analysis proposed by Ariès (1981) at the beginning of this topic, allows us to understand that the place of play in education is the result of historical and social transformations. Initially shared by the entire community, the games were progressively abandoned by adults from the upper classes, coming to be associated with childhood and the popular classes. Later, under the influence of new pedagogical and medical knowledge, these practices were incorporated into the school system and transformed into educational instruments. This historical path shows that playing is not just something natural to childhood, but a socially constructed cultural practice, which expresses values, ways of educating and ways of understanding children's development.

For Physical Education, this understanding is fundamental, as it allows us to recognize that its bases are related to broad social processes that involved the moralization, schooling

and scientificization of human movement. This historical look helps to understand that, at school, playing does not always appear as a free experience, being frequently reorganized to meet routines, contents and pedagogical expectations.

This issue is even more evident when observed in the context of the early years of Elementary School, especially in the first year, a stage marked by the transition between Early Childhood Education and formal schooling. At this moment, the child arrives at school bringing a culture of movement and play built in different social spaces, but starts to live with an organization of time, space, and activities that often reduces the opportunities for playful experiences (Azevedo, 2022).

Thus, when discussing the historical trajectory of games and play, it is possible to understand the tensions, permanences and possibilities related to the use of play in Physical Education classes in the early years. Investigating this reality seeks to bring academic production closer to the concrete situations experienced in daily school life, contributing to the construction of practices that are more sensitive to children's experiences.

3 THE METHODOLOGY OF PROBLEMATIZATION WITH MEGUERES' ARC

When thinking about a problem-solving education, we resort to the concept of Freire's praxis (Freitas; Freitas, 2022; Ângelo, 2006), described as critical reflection and action that transforms reality and that are appropriate in the school physical education curriculum. We refer to the problematization of man's action on the world, which for Freire (1996) implies a critical action to transform it, and which requires reflection and action on the environment. Thus, this conception of education is contrary to what Freire (1987) calls Banking Education - an education in which students and teachers are seen as deposits of content that should not be questioned, but rather absorbed passively.

Considering, then, the conception of problematization from the Freirean perspective, this work chose to use the MPAM described by Liziero (2024): as a methodological possibility. Liziero (2024) emphasizes that MPAM is part of the list of active methodologies, with principles such as the student as the center of learning, autonomy, reflection, problematizing reality, teamwork, innovation, and the teacher as mediator/facilitator/activator (Diesel; Baldez; Martins, 2017, apud Liziero, 2024).

Developed by Professor Neusi Berbel at the State University of Londrina/PR, the problematizing content was initially thought of in the areas of health (Berbel, 1998, p. 140) and was later applied in Basic Education (Liziero, 2023; 2024; Ventura, 2023). The Methodology of Problematization, as a methodology of teaching, study and work, can be used

whenever opportune, in situations where the themes are related to life in society (Berbel, 1998, p. 142.)

Thus, MPAM (Berbel, 1998; 2011; 2012) sought to break with traditional pedagogy and develop a renewing pedagogical method, capable of increasing responsibility and commitment to learning, forming autonomous students, builders of knowledge, holders of experiences and capable of reflecting on reality throughout the learning process.

It is focused on the realization of the greater purpose, which is to prepare the student/human being to become aware of his world and act intentionally to transform it, always for the better, to a world and a society that allow a more dignified life for man himself (Berbel, 1998, p. 144).

The intention of this study is to make an experience report based on the description of the interventions carried out between October and December 2025, with students in the 4th year of elementary school, in a public school in the municipality of Campo Grande, MS. The interventions are part of a research composed of 35 students aged 9 to 11 years⁵, belonging to two classrooms of the 4th year of elementary school, as part of a research of the Professional Master's Degree in Physical Education in National Network (PROEF), of the São Paulo State University (UNESP), Faculty of Science and Technology (FCT), Presidente Prudente campus.

4 METHODOLOGY: THE STAGES OF THE ARC DE MAGUEREZ

When thinking about children from 9 to 11 years old, we chose to adapt the problematization described by Berbel (2011) with the "practical" action inserted in the application of reality and the student as a producer of the reality to be researched. We decided to use the version described by Bordenave and Pereira (1982, apud Berbel, 2011) from the perspective of the teacher as the developer of the problem to be researched. Based on these assumptions, the following problem was raised: how can the games of our parents and grandparents help us to modify our physical education classes?

It is important to highlight that the content studied in the two months in which the intervention was carried out was aligned with the BNCC (Brasil, 2017) and the Curricular Reference of Campo Grande, MS (Campo Grande, 2019), whose thematic unit studied is "games and play" and "invasion sports".

⁵ The research was approved by the Research Ethics Committee (CEP) of the São Paulo State University (UNESP), Faculty of Science and Technology (FCT), Presidente Prudente Campus, whose CAAE is: 91528225.3.0000.5402; Opinion number: 7,932,588.

(CG. EF35EF01.s) To experience and enjoy popular games and games from Brazil and the world, including those of indigenous and African origin, and to recreate them, valuing the importance of this historical-cultural heritage.

(CG. EF35EF05.s). Experiment and enjoy different types of field and club, net/wall and invasion sports, identifying their common elements and creating basic individual and collective strategies for their execution, valuing collective work and protagonism.

(CG. EF35EF18.n) Experience playful activities and variations of field, club, net, wall and invasion sports. MS (Campo Grande, 2019, p. 68-69)

Following the steps of the arch described by Liziero (2024, p. 40), we started with the first phase of the arch, the *observation of reality*, proposing an active listening activity in which students chose a question about games and games they knew. Liziero (2024) tells us that *observation of reality* is the identification of issues to be studied and the moment of acquisition of information and identification of a problem. Thus, the students collected the necessary information to broaden the discussion on the problem raised.

In the second phase of the arc, the *survey of the key points*, we list the situations that most caught our attention during the mobilizing class: how can games help invasion sports? How do old games help us build new games?

In view of this scenario, the students were asked to take home an investigative questionnaire and in this we asked the family members to answer two questions: What games marked their childhood? Could you share with us how to play? (Rules, formats and variations) and; What games did you teach your child to play? Please make the description of the game. Thus, an activity was proposed for the students to investigate their families and make a survey of the games and games known by their relatives.

In the next class, 13 questionnaires were answered again and from these we began our investigations. Sequentially, we move on to what Liziero (2024) and Berbel (2011) describe as the third stage of the arc, *theorizing*, in which the scientific knowledge produced historically, by different means, is sought to provide subsidies and answers to the questions raised previously in the mobilizing class and with the key points. This stage will raise different possibilities of solutions and it was at this moment that the production of the pedagogical material telling the story of the origin of games and games in a way adapted to the reality of our students took place. Here, we show what according to Huizinga (2000) can be interpreted as the culture prior to the human being, and, in the case of this work, a culture of playing, since at the same time the game assumes the social contour given to it.

Although with other assumptions, but in similar ways, Kishimoto (2003) mentions that playing reflects the relationships we have at home, on the street, at school and in our social environment. In this sense, the meaning of the games is constructed from the experiences lived by the children in their social contexts.

Having formulated these theories that will support the pedagogical work, we move on to the hypothesis phase to solve our problem: how can the games of our parents and grandparents help us to modify our physical education classes? Based on Günther (2003), we used the basis of understanding of human behavior defended by this author to lead this stage:

There are three main ways to understand human behavior in the context of the empirical social sciences: (1) observe behavior that occurs naturally in the real realm; (2) create artificial situations and observe behavior in the face of tasks defined for these situations; (3) ask people about what they do (did) and think (thought). (Günther, 2003. p. 1)

Thus, we asked the family members how they played and what games they played. Thus, we list all the games described by the family members and apply them in our classes.

Table 1

Childhood games reported by families and transmission to their children

Responder	Games that marked childhood	Play taught to children / description
1	Elastic skipping; bets; Tag	Not informed
2	Play circuit (motor circuit); linesman; Burnt	Not informed
3	Tic-tac-toe; bets; tag; tug of war; sack race; volleyball; Football	Not informed
4	Bets; hide and seek; Jump rope	Not informed
5	Pass the ring	Not informed
6	Burning	Stop – a game in which participants choose categories (e.g., name, city, fruit) and must fill them in with words starting with a drawn letter.
7	Bets; linesman; lady; stop; burning; shuttlecock	Checkers and Stop – board and word games that stimulate reasoning and strategy.
8	Bets; Jump rope	Not informed
9	Volleyball; jumping elastic; hopscotch	Not informed
10	Jump rope	Not informed
11	Football; Tag	Not informed
12	Roller cart; soccer; playing with clay; scrap cart	He did not teach his son to play
13	Witch of colors; ring pass; American glue	He taught all the games mentioned

Source: Questionnaire applied by the authors to the students' families (2025).

Sarmiento (2002) describes childhood cultures as those that live from the coming and going of children's representations of the world, and these in interaction with the representations of adults. Thus, the answers show the presence of several traditional games in the families' memories, especially bets, tag, jump rope and dodgeball, which appeared in

more than one report. However, it is observed that for most adults there is no transmission of these representations to the new generations. It is also noticed that only 2 of these families transmitted games to the children.

Thus, we ended Maguerez's arc with the phase of *application of reality*, in which the students carried out interventions through a transformative action, subsidized by the previous stages of the arc (Berbel, 1999). We experienced the games, recreated and rethought, in our conversation circles, the various forms that those games could take in our physical education class. We understand the application of some games in the teaching of invasion sports, such as the flag game, as well as the variety of popular games and games (hopscotch, elastic jumps and others.)

For Sarmiento (2007), "the various planes are intercepted by the cultures of childhood, that is, by the modes of appropriation and symbolic production of children, generated in the interaction of peers and in adult-child representations" (Sarmiento, 2007, p. 27). Therefore, the interaction with the production of adults and the transmission provided by the method and the school environment (transmission between peers and adults) expanded the perception of learning invasion sports, as well as traditional games.

5 CONCLUSION

Family experiences are rich and diverse, but families are failing to transmit this knowledge to their children, attributing to the school the responsibility of transmitting this playful culture. At another point, Azevedo (2017) describes that the school can stimulate or prevent playful cultures, and that teacher mediation is important to value them.

In this way, the present article evidenced the use of the methodology of problematization with Maguerez's arc as an active methodology for the construction of student researchers, capable of intervening critically in the conversation circles and at the same time instrumentalizing the students with scientific theories about games and play, evidencing the role of the school as a driving force of the intergenerational ludic culture.

We remember that schools today have an important social status: the privileged *locus* for Children's Playful Cultures to happen. Based on what has been exposed in this work, it can be seen that children have stayed much longer in this institution, such as the aforementioned full-time education schools and, in fact, Brazil has been moving for some decades for this expansion to take place.

In this sense, even with a period of decline in enrollment in full-time education schools, especially in previous governments (2018-2022), full-time education is currently undergoing an important change in relation to the financial investments made in recent decades.

However, it is necessary to reflect on the objective that should be a priority in integral education: the expansion of the cultural, scientific and pedagogical repertoire of education as a whole.

Regarding the recognition of the school of integral education, we make a caveat: it cannot be seen as "a place for students to stay while their parents work", since this view represents only a welfare look. Integral education should not be associated with a kind of "page" for Brazilian students, but it should be recognized as a right and as an opportunity to have access to content that, routinely, many would not have access to. In addition, respect for the teacher's knowledge and recognition as an education professional demonstrated not only by a decent salary, but also through their social, cultural and scientific action, can be a differential when we are talking about comprehensive education.

Last but not least, the Methodology of Problematization of the Arch of Maguerez shows us that it is possible to think of active methodologies capable of involving students in a process of critical autonomy in physical education classes. Therefore, there is a possibility that popular games will resurface as a playful culture within schools, making what was once common in our streets, may reappear in the corners and charms of schools.

It is in this way that we can promote the emergence of a playful childhood that is capable of playing, reproducing games already known in other ways, remembering games from our childhood times and, who knows, inserting more time for body movement and less time for screens. But, this subject is a conversation for another work to be published.

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AN EXPERIMENTAL APPROACH TO TEACHING GAUSS'S LAW IN INITIAL PHYSICS TEACHER EDUCATION

UMA ABORDAGEM EXPERIMENTAL PARA O ENSINO DA LEI DE GAUSS NA FORMAÇÃO INICIAL DE PROFESSORES DE FÍSICA

UN ENFOQUE EXPERIMENTAL PARA LA ENSEÑANZA DE LA LEY DE GAUSS EN LA FORMACIÓN INICIAL DE PROFESORES DE FÍSICA



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ABSTRACT

This study presents an experimental approach to teaching Gauss's Law in undergraduate physics education. The proposal is based on a research-oriented didactic model that integrates experimentation, language, and knowledge construction. The methodology consisted of designing and implementing a sequence of activities using conductive paper to simulate a coaxial cable system, allowing the analysis of electric field and electric flux. The results showed that 70% of the students achieved a satisfactory level of conceptual understanding, indicating the effectiveness of the experimental approach in learning electromagnetism. It is concluded that the integration of theory and experimentation significantly contributes to the conceptual understanding of Gauss's Law.

Keywords: Gauss's Law. Physics Education. Experimental Learning. Electric Field. Electromagnetism.

RESUMO

Este estudo apresenta uma proposta de ensino da Lei de Gauss baseada em uma abordagem experimental aplicada a estudantes da Licenciatura em Física. O trabalho fundamenta-se em um modelo didático orientado à pesquisa, que integra experimentação, linguagem e construção do conhecimento. A metodologia consistiu na elaboração e implementação de uma sequência de atividades experimentais utilizando papel condutor, simulando um sistema análogo a um cabo coaxial, o que possibilitou a análise do campo elétrico e do fluxo elétrico. Os resultados indicaram que 70% dos estudantes alcançaram compreensão satisfatória dos conceitos envolvidos, evidenciando a eficácia da abordagem experimental no processo de aprendizagem em eletromagnetismo. Conclui-se que a integração entre experiência e teoria contribui significativamente para a construção conceitual da Lei de Gauss.

Palavras-chave: Lei de Gauss. Ensino de Física. Experimentação. Campo Elétrico. Eletromagnetismo.

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RESUMEN

Este estudio presenta una propuesta de enseñanza de la Ley de Gauss basada en un enfoque experimental aplicado a estudiantes de la Licenciatura en Física. El trabajo se fundamenta en un modelo didáctico orientado a la investigación, que integra la experimentación, el lenguaje y la construcción del conocimiento. La metodología consistió en la elaboración e implementación de una secuencia de actividades experimentales utilizando papel conductor, simulando un sistema análogo a un cable coaxial, lo que permitió el análisis del campo eléctrico y del flujo eléctrico. Los resultados indicaron que el 70% de los estudiantes alcanzó una comprensión satisfactoria de los conceptos involucrados, evidenciando la eficacia del enfoque experimental en el proceso de aprendizaje del electromagnetismo. Se concluye que la integración entre la experiencia y la teoría contribuye significativamente a la construcción conceptual de la Ley de Gauss.

Palabras clave: Ley de Gauss. Enseñanza de la Física. Experimentación. Campo Eléctrico. Electromagnetismo.

1 INTRODUCTION

This article presents a study on the teaching of Gauss's Law from an experimental approach, with the objective of favoring the construction of concepts by students of the third semester of the Physics Degree at the Federal Institute of Brasília.

The literature review showed a scarcity of studies that address the experimental dimension of Gauss's Law. In this sense, it is relevant to propose a contribution that values experimentation, considering the close relationship between experience, language and knowledge (Arcá et al., 1990).

In this work, we propose an investigation that has experimentation as a basis for the construction of knowledge. The proposal consists of approaching Gauss's Law through a process that highlights the need to understand electromagnetic phenomena, articulating theory and practice.

For the development of the proposal, a research-oriented didactic model was adopted, in which students are encouraged to investigate problems in a similar way to scientific practice. It is noteworthy that scientific activity does not follow a rigid method, but has widely accepted characteristics, such as its social character, the role of divergent thinking and the rejection of an empiricist view based exclusively on isolated data (UNESCO, 2005).

The proposed learning sequence includes the presentation of open problem situations, the performance of qualitative analyses, the development of experimental strategies and the collective discussion of the results. In this way, it seeks to favor the construction of scientific knowledge through the active participation of students.

Based on these considerations, the learning sequence was elaborated and implemented with the objective of analyzing its contribution to the understanding of Gauss's Law, based on learning indicators defined for this purpose.

2 FORMULATION OF THE PROBLEM

One of the objectives of the Federal Institute of Brasília is the development of alternative models for the training of teachers in experimental sciences. In this context, the importance of proposals that consider experimental activity as a fundamental element in the construction of knowledge is highlighted.

Thus, this work proposes the development of an alternative approach to the teaching of Gauss's Law, based on experimentation, allowing students to understand this law both from experience and theory.

To support this proposal, the cognitive process model presented by Arcá, Guidoni and Mazalli (1990) is adopted, which establishes an inseparable relationship between language,

experience and knowledge. These three elements are considered equally important and interdependent, and there is no hierarchy between them.

However, in many teaching situations, students are presented only with the equations of Gauss's Law, without a clear connection to the experience that underlies these concepts. This approach can make it difficult to build meaningful understanding, as it disregards the relationship between language, experience, and knowledge.

Therefore, this research seeks to contribute to students to build their own ideas about Gauss's Law, through a sequence of experimental activities that stimulate reflection on the need for this law in the study of electromagnetic phenomena.

As a starting point, it is considered that students already have previous knowledge about Coulomb's Law, which allows them to problematize questions such as: what are the limitations of this law? In what situations can it be applied? How to describe electric fields in continuous load distributions?

In this context, it is understood that the difficulty in understanding Gauss's Law is related, to a large extent, to the way it is introduced in teaching, generally detached from its experimental basis.

2.1 RESEARCH QUESTION

In view of the above, the following research question is formulated:

How to present Gauss's Law to undergraduate students in Physics through a process that highlights its necessity in the study of electromagnetic phenomena?

3 RESEARCH PROBLEM AND THEORETICAL FOUNDATION

Many university students have difficulties in solving problems related to electromagnetism, even after being exposed to similar content in the classroom. Studies indicate that students who have taken courses such as Electromagnetism I and II often do not develop an adequate understanding of field theory, unaware of its scope and limitations.

A possible explanation for this difficulty lies in the way the contents are presented. In many cases, physical laws are introduced in a predominantly operational way, without in-depth reflection on their meanings and without an explicit connection to the experience that gives rise to them. In addition, a relationship is rarely established between theoretical concepts and the measuring instruments used in practice.

Specifically in the case of Gauss's Law, it is observed that its teaching is often decontextualized. Often, it is presented only as an equation for calculating the electric field, without exploring the experimental basis on which its formulation is based. In general,

teaching begins with Coulomb's Law, applicable to point loads and static fields, which can limit students' understanding of the need for a more general approach, such as that provided by Gauss's Law.

In this context, the students' difficulty in understanding Gauss's Law is largely related to the absence of experiences that allow them to construct meaning for the concepts involved. Thus, students are often exposed to equations without fully understanding their physical interpretation.

In view of this, it is necessary to rethink the way this law is taught, incorporating approaches that integrate theory and experimentation.

From a theoretical point of view, this work is based on the conception that scientific knowledge is constructed from the interaction between language, experience and knowledge (Arcá, Guidoni & Mazalli, 1990). These three elements are interdependent and essential for understanding physical phenomena.

In addition, studies show that students arrive in the classroom with previous conceptions that influence their interpretations of the phenomena (Driver, 1987), reinforcing the importance of teaching strategies that promote active participation and the construction of hypotheses.

In this sense, experimentation plays a fundamental role, as it allows the student to relate theoretical concepts to real situations. As highlighted by Duschl (1997), the teaching of science must contemplate both the context of justification and the context of discovery, the latter being essential for the development of scientific thinking.

Thus, the present work proposes an experimental approach as a strategy to favor the understanding of Gauss's Law, considering that the integration between theory and experience is essential for the construction of knowledge in Physics.

3.1 SPECIFIC OBJECTIVES

- Design a didactic experiment that enables students to understand phenomena whose analysis involves Gauss's Law;
- Develop and implement a sequence of activities that integrates conceptual and procedural aspects;
- Analyze learning outcomes based on indicators defined for this purpose.

4 METHODOLOGY

The present research is characterized as descriptive, with a qualitative approach, with the objective of analyzing the processes of conceptual construction of students in the

understanding of Gauss's Law. This type of research is widely used in the educational area, as it allows the observation and interpretation of phenomena related to the cognitive development of students (Cohen & Manion, 1989).

The study was carried out with students of the Physics Degree course at the Federal Institute of Brasília, in the context of the discipline of Electromagnetism. The methodological proposal was based on the application of an investigation-oriented didactic sequence, in which students were led to explore physical concepts through experimentation.

4.1 EXPERIMENT DESCRIPTION

For the development of the proposal, a didactic experiment called *coaxial cable was used*, adapted from Ludwigsen (2006). The experiment consists of a conductive paper containing two concentric circular electrodes, which allow simulating the distribution of the electric field in a system analogous to a coaxial cable.

From this configuration, students were able to investigate concepts such as electric field, electric potential, and electric flow, establishing relationships between experimental measurements and theoretical models.

4.2 MATERIALS USED

- Digital multimeter
- Voltage supply (0–10 V)
- Alligator-alligator cables
- Styrofoam sheet (35 × 25 × 1.5 cm)
- Conductive paper with concentric electrodes (disc and ring)
- Metal pins for electrical connection

4.3 TRIAL ASSEMBLY

The conductive paper was fixed on the Styrofoam base. Then, metal pins were inserted into the central and external electrodes, ensuring electrical contact. These pins were connected to the voltage source by means of cables, establishing a potential difference between the electrodes.

4.4 SEQUENCE OF EXPERIMENTAL ACTIVITIES

The didactic sequence was organized into three main moments, called interventions.

4.4.1 Intervention 1 – Measurements of electric potential

In this stage, the students used the multimeter as a voltmeter to measure the potential difference between points on the conducting paper.

Measurements were performed at different radial positions (e.g., $r = 4$ cm, 6 cm, and 7 cm), allowing the ratio between the potential difference and the distance between the measured points to be calculated. These values were recorded in a table and analyzed by the students.

The objective of this activity was to lead students to identify the physical meaning of the ratio between potential difference and distance, associating it with the electric field.

Next, a tension meter with a fixed distance between tips (1 cm) was used, allowing direct measurements in units of V/cm. The students were instructed to compare the results obtained by different methods, establishing relationships between the measured values.

4.4.2 Intervention 2 – Direction of the electric field

In this stage, the students investigated the direction of the electric field through measurements at different points around the electrodes.

Keeping one of the tips of the instrument fixed, the other was moved around the system, allowing variations in measurements to be observed. The results were recorded and represented by vectors, indicating the direction of the electric field.

The objective was to promote the understanding of the orientation of the electric field and its relationship with the distribution of loads in the system.

4.4.3 Intervention 3 – Electrical flow

In the final stage, the students were led to relate the experiment to a three-dimensional model, considering the extension of the cylinder-shaped electrodes.

From this analogy, the characteristics of a Gaussian surface suitable for the calculation of electric flow were discussed. This activity aimed to introduce the concept of flow and its relationship with Gauss's Law.

4.5 DATA COLLECTION AND ANALYSIS

Data were collected through measurements made by students and answers to the questions proposed throughout the didactic sequence.

The analysis was conducted based on learning indicators, allowing to assess the level of conceptual understanding of the students in relation to the concepts of electric field, electric potential and electric flow.

5 RESULTS AND DISCUSSION

The analysis of the results aimed to identify the conceptual construction of the students throughout the learning sequence about Gauss's Law. For this, learning indicators specifically designed to evaluate the scope of the proposal were used, and these indicators were applied in a transversal way to the activities developed.

In order to systematize the analysis, three performance levels were defined, associated with the following categories:

- **Category A:** satisfactory understanding of the concept
- **Category B:** average understanding of the concept
- **Category C:** low understanding of the concept

This classification was adopted with the objective of facilitating the interpretation of the data and evaluating the effectiveness of the learning sequence, without the intention of reducing the complexity of the students' cognitive processes.

5.1 ANALYSIS OF PREVIOUS IDEAS

The learning sequence began with the following question: *"How to determine the direction of the electric field generated by two concentric electrodes?"*

The students answered that, although there is a theoretical and mathematical relationship to determine the direction of the electric field, they had no experience with its experimental determination.

This result evidences the absence of a previous experimental approach, reinforcing the need for the proposal developed in this work.

5.2 ANALYSIS OF INTERVENTION 1

In this step, the learning indicator related to the understanding that the voltage meter allows determining the electric field through the relationship between potential difference and distance was used.

Multimeter Usage

The students performed potential difference measurements at different positions and calculated the ratio between voltage and distance. When asked about the physical meaning of this relationship, they answered that it was a measurement associated with tension per unit length.

This answer was classified in Category A, as it demonstrates adequate understanding of the relationship between electric potential and electric field.

Usage of Tension Meter

In the next step, the students used a device that allows them to directly measure values in V/cm. When asked about the physical meaning of these measurements, they presented partially correct answers, indicating an understanding that is still developing.

This answer was classified in Category B, as it presents a conceptual approximation, although without total clarity.

When asked about the relationship between the data obtained from the different tables, the students presented answers that did not explicitly establish this connection, and were classified in Category C.

5.3 ANALYSIS OF INTERVENTION 2

In this stage, the students took measurements at different points in the system, with the objective of analyzing the direction of the electric field.

When asked about the measured physical quantity, the students recognized its relationship with the electric field, being classified in **Category B**.

Regarding the meaning of the negative sign in the measurements, the students correctly identified its relationship with the direction of the electric field, being classified in **Category A**.

In addition, by representing the results by means of arrows indicating the direction of the electric field, they demonstrated adequate understanding of the phenomenon, being classified again in **Category A**.

5.4 ANALYSIS OF THE CONCEPT OF ELECTRIC FLOW

In the final stage, the students analyzed the relationship between the experiment and a coaxial cable model.

By identifying the similarities between the configurations and by correctly describing an adequate Gaussian surface (cylindrical), they demonstrated a satisfactory understanding of the concept of electric flow, being classified in **Category A**.

5.5 GENERAL ANALYSIS OF THE RESULTS

The global analysis of the data was carried out based on the distribution of the answers in the defined categories.

The results indicated:

- **70%** of responses in Category A
- **12%** in Category B

- **18%** in Category C

These data show that most students achieved a satisfactory understanding of the concepts involved, indicating the effectiveness of the proposed experimental approach.

The results suggest that the learning sequence contributed significantly to the conceptual construction of the students, especially with regard to the understanding of the electric field, electric flow and Gauss's Law.

6 CONCLUSION

The results obtained in this study show that the proposed experimental approach contributed significantly to the conceptual construction of the students in relation to Gauss's Law. The implementation of the learning sequence enabled students to establish relationships between theoretical concepts and their experimental basis, overcoming difficulties previously identified in the teaching of electromagnetism.

It was observed that, initially, the students had limitations in the understanding of fundamental concepts, such as electric field, electric potential and their forms of measurement. However, after carrying out the experimental activities, it was possible to identify advances in the understanding of these concepts, especially in the recognition of the relationship between potential difference and electric field, as well as in the interpretation of the field direction.

In addition, the results indicate that most students achieved satisfactory levels of comprehension, as evidenced by the predominance of answers classified in category A. This result reinforces the effectiveness of the didactic sequence and highlights the role of experimentation as a central element in the meaningful learning of abstract concepts.

Thus, it is concluded that the integration between theory and experimentation constitutes an effective pedagogical strategy for the teaching of Gauss's Law, contributing to the formation of more critical Physics teachers capable of establishing connections between theoretical models and physical phenomena.

Finally, it is highlighted that the proposal presented can serve as a reference for the development of pedagogical practices in the teaching of electromagnetism, encouraging the adoption of investigative and experimental approaches in the teaching of Physics.

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CHALLENGES IN THE DEVELOPMENT OF HUMAN CAPITAL IN ANGOLA

DESAFIOS DE DESENVOLVIMENTO DO CAPITAL HUMANO EM ANGOLA

DESAFÍOS DEL DESARROLLO DEL CAPITAL HUMANO EN ANGOLA



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ABSTRACT

This study aimed to analyze the challenges and prospects of human capital in Angola, considering its relationship with education, the labor market, and public policies. It was a descriptive-exploratory research with a mixed-methods approach, combining quantitative and qualitative analyses. Data were collected through a structured digital questionnaire administered to a sample of 264 participants. The results revealed a highly educated profile but one marked by difficulties in labor insertion and career progression, associated with the absence of effective employment policies, nepotism, and job scarcity. Furthermore, a low organizational appreciation of human capital was observed. Despite the predominantly critical perception, respondents identified priority areas such as quality basic education, technical and vocational training, and technological innovation. Accordingly, six practical and strategic recommendations were developed to strengthen human capital. The study concludes that reinforcing human capital in Angola requires consistent public policies, closer education–labor market integration, and professional valorization strategies, which are essential for sustainable development.

Keywords: Human Capital. Employability. Public Policies. Education and Training. Sustainable Development.

RESUMO

O presente estudo teve como objetivo analisar os desafios e perspectivas do capital humano em Angola, considerando a sua relação com a educação, o mercado de trabalho e as políticas públicas. Trata-se de uma investigação de carácter descritivo-exploratório, com abordagem mista, que combinou análise quantitativa e qualitativa. A recolha de dados foi realizada por meio de um questionário digital estruturado, aplicado a uma amostra de 264 participantes. Os resultados revelaram um perfil altamente escolarizado, mas marcado por dificuldades de inserção e progressão profissional, associadas à ausência de políticas de emprego eficazes, ao nepotismo e à escassez de vagas. Além disso, constatou-se baixa valorização do capital humano nas organizações. Apesar da percepção predominantemente crítica, os inquiridos identificaram áreas prioritárias, como educação básica de qualidade, formação técnico-profissional e inovação tecnológica. É por isto que foram elaboradas seis recomendações Práticas e estratégicas para o fortalecimento do capital humano. conclui-se que o fortalecimento do capital humano em Angola exige políticas públicas consistentes,

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integração ensino–mercado e estratégias de valorização profissional, fundamentais para o desenvolvimento sustentável.

Palavras-chave: Capital Humano. Empregabilidade. Políticas Públicas. Educação e Formação. Desenvolvimento Sustentável.

RESUMEN

El presente estudio tuvo como objetivo analizar los desafíos y perspectivas del capital humano en Angola, considerando su relación con la educación, el mercado laboral y las políticas públicas. Se trata de una investigación de carácter descriptivo-exploratorio, con un enfoque mixto, que combinó análisis cuantitativo y cualitativo. La recolección de datos se realizó mediante un cuestionario digital estructurado, aplicado a una muestra de 264 participantes. Los resultados mostraron un perfil altamente escolarizado, pero con dificultades de inserción y progresión profesional, asociadas a la ausencia de políticas de empleo eficaces, al nepotismo y a la escasez de vacantes. Asimismo, se constató una baja valorización del capital humano en las organizaciones. A pesar de la percepción predominantemente crítica, los encuestados identificaron áreas prioritarias como la educación básica de calidad, la formación técnico-profesional y la innovación tecnológica. Por ello se elaboraron seis recomendaciones prácticas y estratégicas para el fortalecimiento del capital humano. Se concluye que dicho fortalecimiento en Angola exige políticas públicas consistentes, integración educación–mercado y estrategias de valorización profesional, fundamentales para el desarrollo sostenible.

Palabras clave: Capital Humano. Empleabilidad. Políticas Públicas. Educación y Formación. Desarrollo Sostenible.

1 INTRODUCTION

Human capital is one of the central pillars of economic growth and sustainable social development. Since the classic contributions of Schultz (1961) and Becker (1964), the economic literature recognizes that investments in education, health and professional qualification increase productivity, stimulate innovation and sustain long-term growth. Contemporary approaches reinforce that the effects of human capital depend not only on the volume of investments, but also on their quality, equity in access and the articulation between training systems, the labor market and institutions.

In African countries, the debate on human capital is particularly relevant due to the coexistence of high demographic potential with structural weaknesses in education, health and employment systems. These limitations make it difficult to convert human potential into effective gains in productivity and social inclusion, requiring integrated public policies oriented towards sustainable development.

In Angola, a country rich in natural resources, but historically dependent on the extractive sector and marked by persistent socioeconomic inequalities, the development of human capital is a strategic imperative. According to the United Nations Development Program report (2022), the country has human development levels below the regional average, reflecting weaknesses in education, health, and income. In addition, data from the World Bank (2023) show challenges in the labour market, namely high youth unemployment, informality and low job quality.

Recognizing these constraints, the Angolan State approved the National Human Capital Development Plan 2023–2037, aimed at strengthening the qualification of the population and aligning training and production needs. However, challenges remain related to the quality of training, employability, talent retention and institutional effectiveness. In this context, this article critically analyzes the development of human capital in Angola, identifying central obstacles and discussing strategic paths for more inclusive and sustainable growth.

1.1 RESEARCH PROBLEM

What are the main challenges limiting the development of human capital in Angola and how can they be overcome to ensure sustainable and competitive growth?

1.2 OBJECTIVES

1.2.1 General Objective:

To analyze the challenges of human capital development in Angola, identifying limiting factors to propose strategies to overcome them.

1.2.2 Specific Objectives:

- To examine the historical, social and economic factors that influence the formation and valorization of human capital in Angola;
- Identify gaps in education, health and employability policies;
- To assess the integration between higher education, vocational training and the labour market;
- Propose practical and strategic recommendations for the improvement of human capital in the country.

2 THEORETICAL FOUNDATION.

2.1 CONCEPT OF HUMAN CAPITAL

2.1.1 Human Capital

Human capital plays a central role in contemporary economic theory and strategic management, and is widely recognized as a critical determinant of productivity, innovation and organizational competitiveness.

The classical theory of human capital establishes that investments in education, vocational training and health are fundamental mechanisms of capital accumulation, with direct and indirect impacts on economic growth. Schultz (1961) introduced a paradigmatic shift by conceptualizing human capital as capital embodied in people, arguing that the quality of the workforce represents a key factor in explaining disparities in economic growth between countries.

Becker (1964) deepened this theoretical framework by developing formal models that show the economic returns of investments in human capital, both at the individual and organizational levels. According to Chiavenato (2020), human capital should be understood not only as the sum of technical qualifications, but as a strategic set that encompasses people's knowledge, skills, creativity, attitudes, and innovative potential.

In addition, authors such as Marr (2019) underline the importance of human capital in the digital age, in which artificial intelligence and automation intensify the valorization of creative, analytical and relational skills. In this sense, human capital is not only a factor of production, but a strategic differential that ensures sustainable competitive advantage.

2.1.2 Structuring Dimensions

Recent literature identifies several structuring dimensions of human capital, Table 1 presents an essence of them:

Table 1

Structuring Dimensions of Human Capital

Dimension	Description	References
Education and knowledge	They are considered the central core of human capital, as they condition the capacity for continuous learning and adaptation to change.	Hanushek & Woessmann (2020)
Health and well-being	They determine the availability and productivity of workers, and are fundamental for maintaining active and resilient human capital.	Bloom, Kuhn, & Prettnner (2022)
Technical and socio-emotional skills	The combination of <i>hard and soft skills</i> is now considered essential for employability and organizational innovation.	Almeida & Araújo (2021)
Capacity for innovation and continuous learning	The <i>lifelong learning</i> paradigm reinforces the idea that human capital must be constantly updated to respond to social and technological transformations.	Candy <i>et al.</i> (2019)

Source: Authors.

Thus, human capital can be understood as a strategic asset that transcends the productivist logic, constituting itself as the foundation of human, organizational and socio-economic development. Its valorization implies consistent investments in education, health, continuous training and inclusion policies, in addition to the recognition that people's creative and innovative capacity is an essential resource to face the challenges of the 21st century.

2.2 TRAINING AND DEVELOPMENT

Training and development are structuring dimensions of human capital, assuming a strategic role in the qualification, updating and mobilization of individual skills in increasingly complex and competitive organizational contexts. In the current socio-economic scenario, marked by rapid technological and organizational transformations, these practices go beyond an operational logic and assert themselves as central mechanisms for value creation and organizational sustainability.

Within the framework of human capital theory, training and development are understood as strategic investments with measurable economic and organizational returns. Schultz (1961) argues that investment in continuing education and training increases the productive capacity of individuals and is a determining factor of economic growth. In a complementary way, Becker (1964) demonstrates that professional qualification increases the marginal productivity of labor and income, reinforcing the role of human capital as a central element of organizational efficiency and competitiveness.

In the field of strategic people management, Chiavenato (2020) analytically distinguishes between training and development, associating the first with the improvement of immediate performance and the second with the construction of medium and long-term capabilities. This perspective is deepened by Ulrich (2013), when he argues that human resources management should act as a strategic partner of the business, with training and development being essential instruments for building organizational capabilities that sustain competitive advantage.

Samba (2016) stresses that training and human capital development are pillars of organizational strengthening and sustainable economic development. The author argues that systematic investments in professional training simultaneously contribute to increased productivity, worker appreciation and institutional consolidation, especially in economies in the process of structuring.

2.2.1 Development: Evolutionary and Strategic Dimension

Development differs from training in that it assumes a medium and long-term orientation, focused on the expansion of human potentialities and the preparation of individuals for more complex and uncertain organizational contexts. While training tends to focus on specific competencies, development involves skills such as strategic thinking, leadership, and decision-making in changing environments.

Authors of organizational psychology and behavior, such as Stephen Robbins and Timothy Judge (2019), conceptualize development as a continuous process of professional and personal growth, essential for individual and organizational adaptability. From this perspective, development reinforces not only individual performance, but also the organizational capacity to respond to strategic challenges.

2.2.2 Integrated Approaches and Recent Evidence

Recent literature converges on the understanding that training and development should be conceived in an integrated way, as complementary axes of the strategic management of human capital. Empirical studies show that continuous training favors technological adaptation and operational efficiency, while development sustains leadership, innovation and organizational learning.

Samba (2016) defends integrated human capital policies that articulate technical qualification, career progression and professional development, underlining their role in institutional strengthening and sustainable economic development. Thus, the effectiveness

of training and development depends on its articulation with organizational policies and with contemporary work challenges.

2.3 EDUCATION, HEALTH AND EMPLOYABILITY POLICIES

Public policies on education, health and employability are structural determinants of human capital development, while influencing economic productivity and social well-being. These policies create the necessary conditions for individuals to acquire skills, maintain productive capacities and integrate sustainably into the labour market.

2.3.1 Education

Within the framework of the theory of human capital, education is understood as a structuring investment that expands the productive capacities of individuals and generates sustainable economic and social returns. Becker (1993) deepens the analysis by demonstrating that the accumulation of human capital explains persistent differences in income, productivity and growth between economies.

Contemporary literature reinforces that the impact of education on economic growth depends, above all, on the quality of learning, and not only on the quantitative expansion of schooling. Hanushek and Woessmann (2020) show that strong cognitive skills exert a decisive influence on aggregate productivity and international competitiveness. This perspective converges with the endogenous development approach, according to which education strengthens local capacities for innovation, technological diffusion and productive diversification (Romer, 1990).

2.3.2 Health

Health represents one of the fundamental pillars of human capital, directly influencing the learning capacity, labor productivity and economic participation of individuals throughout the life cycle. Grossman (1972) conceptualizes health as a stock of capital that can be expanded by investments in medical care, nutrition, and adequate sanitary conditions, generating returns in the form of higher productivity and future income.

From the perspective of endogenous development, health plays a strategic role in strengthening the productive capacities of populations and reducing structural inequalities that compromise inclusive economic growth. International evidence shows that integrated investments in health, education, and nutrition enhance substantial gains in productivity and social well-being (Bank, 2023).

2.3.3 Employability

In the field of labour economics, employability is defined as the ability of individuals to obtain, keep and move between jobs in a constantly changing labour market. This concept goes beyond formal qualification, incorporating transferable skills, continuous learning and technological adaptability as essential elements of sustainable labour insertion (Marr, 2019).

2.4 HIGHER EDUCATION AND THE LABOUR MARKET

Higher education occupies a strategic position in the development of advanced human capital, functioning as a central mechanism for the production, dissemination and application of knowledge. Within the framework of the theory of human capital, higher education is understood as a long-term investment that enhances individual productivity, innovative capacity and sustained economic growth. Becker (1964) demonstrated that the returns associated with higher education are manifested throughout the professional life cycle, in the form of higher incomes, better employability and greater occupational mobility.

More recent approaches broaden this perspective by emphasizing that the impact of higher education does not depend only on access to or duration of training, but above all on its quality, relevance and alignment with the needs of the labour market. Hanushek and Woessmann (2020) argue that higher education systems oriented towards the development of cognitive and applied skills tend to generate greater effects on the productivity and competitiveness of economies.

In this sense, higher education assumes a role that transcends mere academic certification, starting to act as an active agent in the formation of technical, analytical and socio-emotional skills, essential for the insertion and permanence of individuals in labor markets characterized by high volatility and technological demand. The effectiveness of higher education as a tool for the development of human capital thus depends on its ability to adapt to contemporary economic and organisational transformations.

2.4.1 University-Market Articulation Models

The international literature shows that the articulation between higher education institutions and the labor market is a critical factor to maximize the returns on investment in human capital. Models based on university-company partnerships, internship programs, applied research and knowledge transfer have been widely recognized as effective mechanisms to reduce the gap between academic training and skills demanded by the productive sector.

From this perspective, the *triple helix* model that integrates university, industry and government stands out as a relevant analytical framework to understand the role of higher education in innovation and economic development. Studies indicate that higher education systems strongly integrated with the productive fabric tend to have higher levels of innovation, employability of graduates and economic dynamism (Marr, 2019). In this way, the articulation between higher education and the labor market emerges as a strategic axis of human capital development. The absence of this articulation tends to limit the positive impacts of higher education, reinforcing the need for integrated policies and collaborative governance among the main institutional actors.

2.4.2 Contemporary Challenges

The effectiveness of higher education as an instrument for the development of human capital depends on the alignment of curricula with emerging areas, as well as on the development of technical and socio-emotional skills. The interdependence between higher education and the labour market requires dynamic approaches geared towards quality, relevance and lifelong learning.

2.5 HUMAN CAPITAL POLICY

Human capital policy can be defined as the systematic set of principles, strategies and institutional instruments aimed at the development, enhancement and efficient use of human capacities, with a view to promoting sustainable economic growth, social equity and institutional strengthening. This policy is based on the assumption that individuals are not only factors of production, but strategic assets whose development conditions long-term economic and social performance (Schultz, 1961; Becker, 1964).

From a theoretical point of view, human capital policy is based on three major complementary approaches:

1. Classical theory of human capital, which holds that investments in education, health, and training increase individual productivity and income throughout the life cycle (Schultz, 1961; Becker, 1964);
2. Endogenous development approach, according to which human capital drives innovation, technological diffusion and productive diversification (Romer, 1990);
3. Institutional and labor economics, which emphasizes the role of institutions, employment policies, and the articulation between training and the labor market in the conversion of human capital into effective growth (Barro & Lee, 2015).

2.5.1 Structuring components of human capital policies

The literature identifies interdependent components that should guide effective human capital policies, particularly in emerging contexts:

1. **Education and professional qualification:** Education is the core of human capital policy. Empirical evidence shows that the quality of learning has a greater impact than the number of years of schooling on productivity and economic growth (Hanushek & Woessmann, 2020). The challenge lies in improving the quality of teaching, teacher training and curricular alignment with the labor market.
2. **Health and well-being:** Health directly influences learning capacity, work productivity and economic participation. Investments in public health, nutrition, and sanitation increase the return on educational investments (Bloom et al., 2022). Poor countries face problems of regional asymmetries in access to health services, negatively affecting the accumulation of human capital.
3. **Talent management and development:** Strategic talent management involves continuous training, lifelong learning, and the development of transferable skills. According to Noe (2017), these practices are essential to reduce the mismatch between skills supply and labor demand.
4. **Appreciation and incentives:** Fair remuneration policies, career progression, and recognition of merit increase motivation and talent retention, with positive impacts on productivity (Chiavenato, 2020).
5. **Multisectoral integration:** The articulation between government, private sector and educational institutions is essential to align training and the labor market, maximizing the social returns on investment in human capital (Carneiro & Heckman, 2003).

2.6 ENHANCEMENT OF HUMAN CAPITAL

The valorization of human capital refers to the set of policies and practices aimed at recognizing, stimulating and enhancing the skills and talents of individuals, creating conditions for their full productive and social use. This concept transcends the strictly economic logic of investment in training, incorporating dimensions such as motivation, well-being, career development and quality of the work environment (Chiavenato, 2020; Marr, 2019).

The valorization of human capital can be analyzed from three main dimensions:

1. Organizational dimension, associated with motivation, recognition and alignment between individual and institutional objectives;
2. Social dimension, related to equity, inclusion and decent working conditions;

3. Strategic dimension, linked to innovation, talent retention and sustainability.

4.

2.7 SOCIO-ECONOMIC SITUATION AND HUMAN CAPITAL DEVELOPMENT

The socio-economic situation is a transversal and determining factor in the development of human capital, since living conditions, economic structure and access to basic services condition the opportunities for training, valorization and productive integration of individuals (Sen, 1999; Piketty, 2020).

2.7.1 Human development indicators

The Human Development Index (HDI) synthesizes three fundamental dimensions: education, health and income. Countries with high HDI levels tend to have a greater capacity to transform economic growth into social well-being (UNDP, 2022).

In the case of Angola, despite the progress made in recent decades, structural challenges persist associated with:

1. Regional inequalities in access to education and health;
2. Limitations in the quality of social services;
3. Vulnerability of specific population groups.

These constraints reduce the effectiveness of human capital policies and undermine inclusive development.

2.7.2 Economic structure, employment and informality

The productive structure directly influences the quality of employment and the absorption of human capital. Diversified economies generate more skilled and stable jobs, while economies dependent on a few sectors face greater job insecurity (Bloom et al., 2016).

In Angola, three main constraints stand out:

1. Strong dependence on the oil sector;
2. High labor informality;
3. Low creation of skilled jobs outside the extractive sector.

These factors limit the conversion of investment in human capital into sustained economic growth (ILO, 2021).

2.7.3 Social inequality and multidimensional poverty

Income inequality and multidimensional poverty are structural barriers to human capital development. Piketty (2020) demonstrates that high levels of inequality restrict social mobility and access to quality education.

Multidimensional poverty includes:

1. Limited access to sanitation and clean water;
2. Inadequate housing conditions;
3. Food insecurity;
4. Poor access to health services (UNICEF, 2021).

These dimensions directly affect the population's learning capacity, health, and productivity.

2.8 HUMAN CAPITAL DEVELOPMENT AND ECONOMIC GROWTH

The relationship between human capital and economic growth is one of the most robust consensuses in the economic literature. Investments in education, health and professional training increase productivity and generate positive externalities for the economy (Becker, 1993; OECD, 2021).

However, the literature stresses that the impact of human capital on economic growth depends on complementary factors, such as:

1. Quality of institutions;
2. Efficiency of public policies;
3. Absorption capacity of the labor market (Barro & Lee, 2015; Pelinescu, 2015).

2.9 THE ANGOLAN CASE

The development of human capital in Angola has made significant institutional progress, although it remains conditioned by structural challenges that limit the conversion of these investments into sustainable gains in productivity and social well-being. The main strategic framework in this area is the National Human Capital Development Plan 2023–2037, approved by Presidential Decree No. 122/24, which guides the expansion of education, the strengthening of technical and vocational training, and the improvement of the articulation between the training system and the labor market (Government of Angola, 2024).

The plan defines medium and long-term goals aimed at increasing the qualification of the population, providing for the reinforcement of public investment in human capital compared to the levels observed in the early 2020s. Among the priorities are the expansion

of the training of primary education teachers, the growth in the number of graduates in higher and technical-vocational education and the consolidation of institutional mechanisms for the regulation of qualifications and competences (MAPTSS, 2024). These guidelines reflect the recognition of human capital as a central element of economic diversification and sustainable growth.

Despite this strategic framework, significant constraints to policy implementation persist. Regional inequalities in access to education and training remain widespread, especially between urban and rural areas, as a result of infrastructure constraints, shortages of skilled human resources and indirect costs of schooling that penalise lower-income households. In addition, there is a mismatch between the training offered and the needs of the production system, evidenced by situations of underemployment and unemployment among graduates, which compromises the efficiency of investments made in human capital.

Another structural challenge refers to the retention of qualified staff. Empirical evidence indicates that the brain drain of professionals with high levels of training is associated with the limited supply of postgraduate courses, restrictions on professional progression, uncompetitive salary conditions, and weaknesses in quality of life, configuring a relevant loss of strategic skills for national development (Samba dos Santos, 2025).

In summary, Angola has a consistent strategic framework for the development of human capital. However, the transformation of this potential into an effective driver of sustainable development requires overcoming challenges related to territorial equity, the quality and relevance of training, the articulation with the labor market and the retention of talent, as well as the strengthening of information, monitoring and evaluation systems of public policies.

3 METHODOLOGY

The present research adopts a mixed approach, combining qualitative and quantitative methods in a complementary way.

3.1 TYPE OF STUDY

The study assumes a descriptive-exploratory character. It is descriptive because it seeks to map and characterize the main challenges that limit the development of human capital in Angola, and exploratory because it aims to identify variables and relationships that are still little analyzed in the national context.

3.2 POPULATION AND SAMPLE

The **target population** comprises three strategic groups:

1. Workers in the public and private sectors;
2. University students;
3. Professionals linked to training and training.

The sample will be 261 participants, selected through *purposive sampling*, with the aim of ensuring diversity in terms of age, gender, academic background and area of expertise.

3.3 COLLECTION PROCEDURES

The data collected through the questionnaire structured in five sections (Sociodemographic Profile, Education and Training, Labor Market and Employability, Public Policies and Development, Perspectives and Recommendations), containing a total of 18 questions of an open and closed nature, were treated differently according to their typology.

The application of the questionnaire took place in digital format, through the *Google Forms platform*, which facilitated the collection, systematization and export of data for statistical and qualitative analysis.

4 ANALYSIS AND DISCUSSION OF THE RESULTS

In this section, the results of the questionnaire applied to 264 participants are presented and interpreted, articulating them with the literature and the problem investigated. The discussion is organized into five thematic blocks: sociodemographic profile, education and training, labor market and employability, public policies and development, and future perspectives in order to highlight trends, divergences and implications for understanding the challenges of human capital in Angola.

4.1 SOCIODEMOGRAPHIC PROFILE OF THE PARTICIPANTS

Sociodemographic characterization is essential to understand the perceptions and experiences of respondents, as variables such as age, gender and education directly influence the challenges of labor insertion and valorization of human capital. According to Babbie (2021), this analysis allows the identification of patterns and correlations between personal attributes and opinions expressed in the survey.

4.1.1 Age

With regard to age, the age distribution of the participants can be seen in Table 1:

Table 2

Distribution of participants by age group

Age group	Frequency	Percentage
Under 20 years old	5	1,9 %
20–29 years old	77	29,2 %
30–39 years old	106	40,2 %
40–49 years old	52	19,7 %
50 years or older	24	9,1 %
Total	264	100 %

Source: Authors.

The data show that most participants are between 30 and 39 years old (40.2%), followed by the 20–29 age group (29.2%), characterizing a young-adult sample in the phase of professional insertion and consolidation. Only 1.9% are under 20 years old, showing low participation of adolescents, while 9.1% are 50 years old or older, representing the most experienced group.

These results corroborate the ILO (2021), which identifies young adults as the segment facing the greatest employability pressure in Africa. This age composition allows relevant analyses on employability, continuous training and future prospects, as it realistically reflects the challenges of human capital in Angola.

4.1.2 Gender

Gender, in turn, is a central variable, since men and women experience opportunities differently to access employment, training and career progression. Table 3 characterizes this distribution among the participants.

Table 3

Distribution of participants by gender

Gender	Frequency	Percentage
Male	190	72,0 %
Women	74	28,0 %
Other	0	0,0 %
Total	264	100 %

Source: Authors.

The analysis reveals a male predominance among the respondents (72%), while women represent 28%, and there were no records in the "Other" category. This distribution reflects the masculinization typical of the engineering and industrial sector, as well as possible barriers to women's access to training and employment. Although there is a female presence, gender inequality remains evident, and should be considered in the analysis of employability

and in recommendations for inclusion and equity policies in the development of human capital in Angola.

4.1.3 Educational level

As for education, this is a key variable to assess the quality of human capital, given that academic training is directly linked to employability and the development of skills. Table 4 presents the data referring to this indicator.

Table 4

Distribution of participants by level of education

Education level	Frequency	Percentage
Primary education	0	0,0 %
Secondary education	0	0,0 %
Technical/vocational high school	17	6,4 %
Higher education (Bachelor's degree)	168	63,6 %
Master's Degree	59	22,3 %
PhD	20	7,2 %
Total	264	100 %

Source: Authors.

The results reveal a highly qualified profile, with more than 93% of the respondents having higher education: bachelor's degree (63.6%), master's degree (22.3%) and doctorate (7.2%). This finding dialogues with Hanushek and Woessmann (2020), who point out the mismatch between high levels of formal education and low market adequacy in developing countries. The lack of participants with only primary or secondary education shows a highly educated sample, possibly related to the nature of the sectors represented and the profile of those who responded to the survey.

Despite the high qualification, challenges of employability and alignment between training and market demands persist, which reinforces the need for policies that bring higher education closer to the demands of the Angolan productive fabric.

4.1.4 Current employment status

In turn, the working conditions of the participants are a direct indicator of their insertion in the labour market and allow us to capture the diversity of experiences that shape perceptions about the development of human capital. As ILO (2021) underlines, this heterogeneity reflects both structural employment dynamics and the constraints and opportunities of each context. The following table summarizes these results.

Table 5

Current employment status of participants

Professional status	Frequency	Percentage
Employee (public sector)	80	30,3 %
Employee (private sector)	119	45,1 %
Intern	11	4,2 %
Unemployed	42	15,9 %
Entrepreneur/Self-employed	48	18,2 %
Total	264	100 %

Source: Authors.

The results indicate a predominance of respondents employed in the private sector (45.1%), followed by the public sector (30.3%). This formal employment framework is complemented by a significant participation of entrepreneurs/self-employed (18.2%), evidencing the relevance of self-employment in contexts of fragility of the formal market. At the same time, 15.9% are unemployed, revealing difficulties in absorbing the qualified workforce, while 4.2% are interns, reflecting labor insertion processes among the youngest.

This configuration points to a dual reality: although there is a concentration in formal employment, a significant portion faces unemployment or resorts to entrepreneurship, simultaneously revealing the dynamism and vulnerability of the Angolan labor market, characterized by segmentation and stability challenges. This highlights both the dynamism and vulnerability of the Angolan labor market, marked by segmentation and stability challenges.

4.2 EDUCATION AND TRAINING

4.2.1 Perception of the quality of the education system

The perception of the quality of the education system is a central element in assessing Angola's ability to form competitive human capital. In this section you can learn about the perceptions of the respondents regarding this theme. Such is the case of table 6 which contains the answers obtained from the question regarding the quality of the Angolan education system.

Table 6

Evaluation of the quality of the Angolan education system

Category	Frequency	Percentage
Very good	0	0,0 %
Good	29	11,0 %
Regular	126	47,7 %
Weak	88	33,3 %
Very weak	21	8,0 %
Total	264	100 %

Source: Authors.

The results reveal that no participant considers the education system "very good" and only 11% classify it as "good". The majority evaluate it as "regular" (47.7%) or "weak" (33.3%), while 8% perceive it as "very weak". This critical perception confirms the UNDP reports (2022), which point to persistent weaknesses in the quality of education in African countries, especially in the alignment between curricula and market demands.

Despite the expansion of schooling in Angola, evidenced in the profile of the respondents, quality continues to be seen negatively, indicating a mismatch between quantity and quality in the formation of human capital. This finding converges with the World Bank (2023), which identifies the mismatch between education and the market as a central barrier to development in Africa. Table 7 illustrates this reality in the Angolan context based on the perceptions of the participants.

4.2.2 Adequacy between education and the labour market

Table 7

Assessment of the adequacy between education and the labour market (scale 1–5)

Level of suitability	Frequency	Percentage
1 – Not at all suitable	37	14,0 %
2 – Not very suitable	95	36,0 %
3 – Partially adequate	106	40,2 %
4 – Suitable	22	8,3 %
5 – Very suitable	4	1,5 %
Total	264	100

Source: Authors.

The data reveal that the vast majority of respondents evaluate the adequacy of teaching as low to median: 50% of the participants scored 1 (Not at all adequate) or 2 (Somewhat adequate). Another 40.2% consider it partially adequate. Only 9.8% perceive teaching as adequate or very adequate.

Thus, the results show that the expansion of education in Angola has not been accompanied by an effective adaptation to the needs of the labor market, reinforcing the need for curricular reforms, strengthening of technical-vocational education and greater articulation between universities, technical institutes and the productive sector.

Identifying the factors that hinder access to quality training is also essential to understand the obstacles to human capital development, the following table 8 contains the findings on these types of factors that the respondents determined.

4.2.3 Difficulties in accessing quality training

Table 8

Greater difficulties in accessing quality training. (multiple answers – choose up to 3 options)

Category	Frequency	Percentage
High costs	153	58,0 %
Precarious infrastructure	144	54,5 %
Lack of qualified teachers	55	20,8 %*
Geographical distance / Accessibility	146	55,3 %
Outdated curriculum	103	39,0 %
Other (open-ended responses, 1 each)	-	4 %

Source: Authors.

The main barriers pointed out focus on four critical dimensions:

- High costs (58%): it shows the limitation of access for economic reasons, consistent with the theory of Becker (1993), which understands education as an investment conditioned to the financial capacity of individuals and families.
- Precarious infrastructure (54.5%) and distance/accessibility (55.3%): reveal structural difficulties in physical and logistical access.
- Outdated curriculum (39%): indicates content flaws that hinder training aligned with market needs.
- Other factors (open-ended responses): range from lack of internships and excessive theorism to corruption and mismanagement of the education budget, pointing to problems of governance and policy implementation, also highlighted by UNDP (2021).

In general, the data confirm that the barriers to access to quality training in Angola are not only economic, but also structural and institutional, involving the quality of teachers, curriculum updating and the political management of the sector.

4.2.4 Technical and vocational training

Attendance at technical and professional training is very important, as it reflects on the updating and strengthening of human capital skills. Table 9 below collects the answers obtained with the application of this questionnaire regarding the participation of the in professional technical training in the last 5 years of the research.

Table 9

Participation in technical-professional training in the last 5 years

Reply	Frequency	Percentage
Yes	180	68,0 %

No	75	28,0 %
Others*	9	4,0 %
Total	264	100 %

Source: Authors.

The results show that more than two-thirds of the respondents (68%) have participated in some technical training in the last five years, revealing a high demand for complementary qualification. This data contrasts with the low rates of adequacy of formal education to the market (Graph 6), suggesting that individuals resort to additional training to fill gaps.

The areas mentioned in "Others" show a strong practical and vocational orientation, linked to management, accounting, oil and mining, safety and quality, leadership, etc. On the other hand, the fact that almost a third (28%) did not have access to these trainings raises concerns in line with UNDP (2021): the lack of opportunities for continuous training perpetuates inequalities and compromises the competitiveness of part of the workforce.

4.3 LABOUR MARKET AND EMPLOYABILITY

The articulation between educational institutions and the labor market is pointed out as one of the most critical elements to ensure that academic training results in skills effectively valued by companies. And knowing what Angolan professionals think about it in Angola is vitally important. Table 10 below presents the perceptions of the elements surveyed regarding the integration between education and the labour market.

4.3.1 Integration between education and the labour market

Table 10

Perception of the integration between education and the labor market in Angola

Category	Frequency	Percentage
Yes	9	3,4 %
Partially	135	51,1 %
No	120	45,5 %
Total	264	100 %

Source: Authors.

The data indicate that only 3.4% of the respondents perceive an effective integration between education and the market, while 51.1% recognize it only partially and 45.5% affirm the lack of this articulation. In Angola, this means that, despite the expansion of schooling, curricula remain far from the demands of the market, reinforcing the criticisms already pointed out in Table 6.

The low perception of full integration highlights the absence of solid policies for the articulation between education and work, which are fundamental to boost human capital and increase employability. In this sense, the identification of barriers to labor insertion becomes crucial. As the ILO (2021) highlights, structural unemployment, institutional failures, and social inequalities are recurrent obstacles to the inclusion of young people and adults in developing countries.

4.3.2 Integration into the labour market

Table 11

Main obstacles to insertion in the labor market

Obstacle	Frequency	Percentage
Lack of experience	113	42,0 %
Shortage of vacancies	166	62,9 %
Nepotism/cronyism	174	65,9 %
Inadequate training	41	15,5 %
Lack of effective employment policies	194	73,5 %
Other (open-ended responses)	5	–

Source: Authors.

Others (open-ended responses):

- Lack of opportunities
- Insufficient support from universities in the search for jobs
- "All of the above"
- Vacancies that are too specific
- Scarcity of opportunities for new talent

The results point out as the main obstacles to employability the absence of effective employment policies (73.5%), nepotism/cronyism (65.9%) and the scarcity of vacancies (62.9%). These structural and institutional factors show that unemployment in Angola goes beyond individual qualifications, reflecting failures in public policies and hiring practices.

Lack of experience (42%) is an additional obstacle, especially in a market marked by a high youth presence, while inadequate training (15.5%), although less mentioned, is related to the mismatch already identified between education and the market.

In summary, employability in Angola is multifaceted, combining structural (shortage of vacancies), institutional (nepotism and fragility of policies) and individual (lack of experience) factors. Thus, the strengthening of human capital requires not only greater qualification, but also active public policies, transparent labor governance, and incentives to the private sector to absorb qualified labor.

4.3.3 Valuing human capital in Angolan organizations

The valorization of human capital in organizations expresses the degree to which workers perceive recognition, opportunities and return for the investments made in education and experience. For Becker (1993), individual productivity only generates collective benefit when institutions offer conditions for the effective use of human capital. Table 12 presents the perceptions of the respondents about this process in the Angolan context.

Table 12

Level of human capital enhancement in Angolan organizations (scale 1–5)

Level of appreciation	Frequency	Percentage
1 – Nothing valued	43	16,3 %
2 – Little valued	99	37,5 %
3 – Partially valued	110	41,7 %
4 – Valued	10	3,8 %
5 – Highly valued	2	0,8 %
Total	264	100 %

Source: Authors.

The data reveal a mostly negative or moderate perception:

- 53.8% of the participants say that human capital is not at all or little valued (categories 1 and 2).
- 41.7% consider that it is only partially valued.
- Only 4.6% evaluate it positively (levels 4 and 5).

This panorama suggests that, despite the increasing investment in education identified in the sample (Table 4), workers do not perceive a proportional return in terms of recognition, appreciation and use in organizations.

This result dialogues with the reports of the UNDP (2021), ILO (2021) and the contributions of Sambas (2025), which emphasize that, in many African countries, the scarce appreciation of human capital contributes to demotivation, talent drain and low retention of qualified staff.

4.3.4 Opportunities for professional advancement in Angola

The results on the perception of professional progression opportunities in Angola (table 13) are presented below, which is fundamental to assess the potential for retention and motivation of human capital.

Table 13

Professional advancement opportunities in Angola

Category	Frequency	Percentage
Many	5	1,9 %
Moderate	76	28,8 %
Few	148	56,1 %
Almost non-existent	35	13,3 %
Total	264	100 %

Source: Authors.

The results indicate a negative perception of career progression in Angola: more than two-thirds of respondents consider opportunities few or non-existent, while only a minority evaluate them as significant. This picture confirms the low valuation of human capital already pointed out in Table 12, evidencing a restrictive organizational environment, with limited internal mobility. In the light of Becker (1993), the absence of progression compromises the expected returns of education and experience, favoring demotivation and talent drain.

4.4 PUBLIC POLICIES AND DEVELOPMENT

4.4.1 Effectiveness of government policies for human capital development

The effectiveness of public policies is a determining factor for the valorization and strengthening of human capital, as already analyzed in the epigraph related to the theme in the theoretical foundation of this research. Knowing the opinions of the sample tested (Table 14.) is very useful because it will allow us to understand how efficient Angolan public policies regarding human capital can be.

Table 14

Evaluation of the effectiveness of government policies for the development of human capital

Category	Frequency	Percentage
Very effective	0	0,0 %
Effective	20	7,6 %
Not very effective	192	72,7 %
Ineffective	52	19,7 %
Total	264	100 %

Source: Authors.

The results show a largely negative assessment:

- No participant considered the policies to be very effective.
- Only 7.6% consider them effective.
- The overwhelming majority (72.7%) classify the policies as ineffective, and another 19.7% even consider them ineffective.

This critical perception confirms the diagnosis of international organizations: in Angola, human capital policies suffer from discontinuity, low budget execution, lack of supervision and deficiencies in implementation.

Thus, the results suggest that advances in schooling and training (Tables 4, 6 and 7) are not being sustained by robust public policies, which compromises the transformation of this potential into effective economic and social development.

4.4.2 Priority areas in public policies to strengthen human capital

The definition of priorities in public policies is essential to direct strategic investments. countries that prioritize basic education, health, health at all levels and technical-professional training; they can build solid foundations for the sustainable growth of human capital. The following are the areas identified in this case by the respondents in Table 15.

Table 15

Areas that should be a priority in public policies

Area	Frequency	Percentage
Quality basic education	207	78,4 %
Technical and professional training	168	63,6 %
Higher education and scientific research	121	45,8 %
Health and well-being	130	49,2 %
Innovation and technology	90	34,1 %
Employability and entrepreneurship	111	42,0 %
Opportunities for new ones (open-ended response)	1	0,4 %

Source: Authors.

The results point to quality basic education (78.4%) and technical-professional training (63.6%) as priority areas, followed by health and well-being (49.2%) and higher education and research (45.8%), evidencing an integrated view of human development.

Emerging areas such as employability/entrepreneurship (42%) and innovation and technology (34.1%) reinforce the need for economic diversification and digital adaptation. In line with the UNDP (2021), the data reveal that strengthening human capital requires multidimensional policies, ranging from the educational base to labor and technological insertion.

4.4.3 Impact of factors on human capital development in Angola

Respondents' perception of the factors that most affect human capital development is a key data point for understanding priorities and weaknesses in the national context, and the following table (Table 16) contains them.

Table 16*Assessment of the impact of factors on human capital development (scale 1–5)*

Factor	1	2	3	4	5	Total
Quality of education	57	101	51	21	34	264
Quality of the health system	95	78	47	16	28	264
Technical and professional training	59	89	56	36	24	264
Employment policies	106	71	41	28	18	264
Access to technology and innovation	100	69	47	19	29	264

Legend: 1 = very low impact; 5 = very high impact.

Source: Authors.

Analysis of the results

1. Quality of education: More than 60% of respondents gave values between 1 and 2 (low impact), but 34 participants (12.9%) highlighted very high impact (5). This polarization suggests disbelief in the effectiveness of the current system, but also recognition of its transformative potential if it were strengthened, consistent with the recurrent criticisms of the adequacy of teaching (Table 7).
2. Health system: The highest percentages are concentrated in grades 1 and 2 (65.5%), revealing that the population perceives major limitations in the sector, in line with the UNDP diagnoses (2021) on weaknesses in the Angolan health system.
3. Technical-professional training: Although 56 (21.2%) gave a score of 3, low valuation still predominates (1 and 2 add up to 56.0%). This reinforces the idea that, despite the demand (Table 9), the technical training system is perceived as ineffective or insufficient to generate a real impact on human capital.
4. Employment policies: The most poorly evaluated factor 177 respondents (67.1%) gave grades 1 or 2, revealing disbelief in the capacity of public policies to generate opportunities. This confirms the finding in Box 11 about the lack of effective policies as the main obstacle to employability.
5. Access to technology and innovation: 63.9% gave grades of 1 or 2, confirming that the population perceives great technological backwardness as a critical barrier to development. Only 29 (11%) see this factor as having a very high impact, showing that innovation is not yet perceived as a structuring lever.

In general, the data show that respondents perceive all the factors evaluated as having a low current impact on the development of human capital, not because of irrelevance, but due to their fragile implementation in Angola.

4.5 PERSPECTIVES AND RECOMMENDATIONS

4.5.1 Major current challenges for human capital development in Angola

The open responses presented show a strong convergence around some main axes. Table 17 summarizes the participants' perceptions of the challenges in thematic categories:

Table 17

Main challenges for human capital development in Angola (open responses)

Thematic Category	Examples of representative responses	Interpretative synthesis
Education and training	"Low quality of education and inability to prepare the population for the labor market"; Expansion and qualification of the educational system, lack of teachers, infrastructure and integration with market demands", Scarcity of opportunities for professional internships".	Education is seen as the biggest obstacle, highlighting weaknesses from the base to higher and technical-professional education, as well as the absence of practice and continuous training.
Public policies and governance	"The biggest challenge is the government's policies"; "Nepotism is injustice"; "Corruption that has taken deep root in almost all sectors"; "Lack of a clear strategy for the implementation of public policies"	Respondents point to inconsistent policies, clientelism and corruption as critical obstacles to strengthening human capital.
Valuing and retaining talent	"Lack of appreciation of the national workforce"; "Brain drain"; "Companies and institutions do not create conditions for training and talent retention"; "Expatriate staff is valued to the detriment of the local staff"	The responses denounce weak meritocracy, devaluation of national staff and difficulties in retaining qualified professionals.
Health, well-being and socio-economic conditions	"Lack of quality education and health"; "Child malnutrition combined with poor educational quality"; "Well-being (quality of life)"; "High cost of living, with an impact on access to education and health"	Social well-being is considered the basis of human capital, with emphasis on limitations in the health system, nutrition, and living conditions.
Innovation, technology and adapting to the future of work	"Unequal access between education and technology"; "Automation and artificial intelligence"; "Adaptation to new technologies"; "Lack of innovation and incentive to scientific research"	The digital transition and innovation are perceived as insufficient, increasing the risk of Angola being left on the sidelines of global changes in the labor market.

Source: Authors.

The perceptions of the respondents reveal that the biggest challenge for human capital in Angola is not only in initial training, but in a set of structural factors: a fragile educational system, inconsistent public policies, institutional practices that limit meritocracy, devaluation of national talents, precariousness in health and insufficient adoption of technologies.

Overall, the respondents reinforce the need for a national pact for human capital, in which government, the private sector and civil society are articulated around clear priorities: quality basic education, technical and professional training, employability policies, health and technological innovation.

4.5.2 Strategic measures for the enhancement of human capital

The analysis and discussion of the results obtained in the question asked about what measures the respondents could propose is summarized in Table 18.

Table 18

Proposals for strategic measures for the enhancement of human capital

Thematic Category	Examples of representative responses	Interpretative synthesis
Quality education and training	(a) Investing in basic education, research and higher education; (b) Commitment to technical-professional and continuous training; (c) More schools, more teacher training and capacity building centres; (d) Curriculum review aligned with the market.	Education is seen as the central axis: it requires curricular reforms, expansion of the school network, teacher appreciation and greater integration with the labor market.
Continuous training and innovation	(a) Permanent training of cadres; (b) Creation of corporate academies; (c) training in digital and technological skills; (d) reskilling and lifelong learning programmes.	There is a strong emphasis on continuous learning, with a focus on digital skills, innovation and adaptation to changes in the world of work.
Valorization, remuneration and working conditions	(a) Better wages and social benefits"; (b) Merit-based career paths; (c) Employee recognition and reward; (d) First appreciation of people: health and psychological well-being in the company.	Worker recognition, through fair remuneration, professional progression and decent conditions, is pointed out as a key to talent retention.
Public policies and governance	(a) the political will expressed by the investment; (b) Combat nepotism and corruption" (c) Strict supervision of compliance with labour law; (d) Transparency in the application of public resources.	The responses highlight the need for consistent, fair and inspected public policies, combating clientelist practices and promoting social equity.
Teaching-business integration	(a) Partnerships between universities and companies"; (b) national traineeship and first job programmes; (c) targeted integration between training and the market; (d) Companies should collaborate in the definition of resumes.	The articulation between educational institutions and the productive sector is perceived as strategic to align trained skills with the real needs of the market.
Health, well-being and quality of life	(a) Investment in health and well-being; (b) Supporting housing and transport; (c) work-life balance programmes; (d) Affordable basic food basket.	Human capital development is also associated with improved social and economic well-being, going beyond education and employment.
Inclusion, meritocracy and talent retention	(a) To give merit to those who really deserve it"; (b) Greater appreciation of the national framework compared to the expatriate; (c) Talent retention policies; (d) Incentives for the inclusion of youth and women.	Meritocracy, gender equity and prioritizing national talent are seen as essential conditions for creating fair opportunities and reducing brain drain.
Innovation, technology and entrepreneurship	(a) Invest in innovation and <i>startups</i> ; (b) Policies to encourage entrepreneurship; (c) Introduce digital skills from an early age; (d) Technological innovation integrated into training.	The answers point to the need to diversify the economy and modernize technology, strengthening entrepreneurship and adapting to Industry 4.0.

Source: Authors.

The answers reinforce that the valorization of human capital in Angola requires a pact between government and companies, where the State guarantees solid, transparent and inclusive public policies, while the private sector invests in training, meritocracy and innovation. Quality education, decent working conditions, teaching-business partnerships and the fight against corruption appear as the structuring pillars.

4.5.3 Future prospects for human capital in Angola

To conclude this study, respondents were asked to project their perceptions (Table 19) about the future of human capital in Angola over the next ten years. This question is particularly relevant because it allows us to understand not only the evaluation of the present, but also the expectations and concerns about human development in the medium and long term.

Table 19

Insight into the future of human capital in Angola (next 10 years)

Answer Option	Frequency	Percentage
Very promising	7	2,7 %
Promising	83	31,4 %
Uncertain	120	45,5 %
Not very promising	48	18,2 %
Negative	6	2,3 %
Total	264	100 %

Source: Authors.

Most respondents face the future of human capital in Angola with uncertainty (45.5%) or pessimism (20.5%), while only 34.1% perceive it as promising or very promising. This scenario reveals a cautious view, marked by distrust in public policies and current structural conditions. However, the presence of an optimistic minority suggests that, with strategic investments and appropriate policies, human capital can become an engine of sustainable economic and social development in the country.

4.6 SYNTHESIS OF THE ANALYSIS AND DISCUSSION OF THE RESULTS

The results show that Angola has a young and increasingly educated human potential, but faces serious structural limitations. The quality and adequacy of education remain fragile, making it difficult to integrate with the labor market, marked by scarcity of opportunities, nepotism practices and low valuation of professionals.

Public policies are seen as ineffective, reinforcing the need for deep reforms in education, health, innovation and employment. Respondents point to clear paths: investment

in continuous training, salary enhancement, meritocracy and education-business partnerships.

As for the future, an uncertain view prevails, although there is moderate confidence in the possibility of advances, as long as the government, companies and society act in an articulated manner. In summary, Angola is faced with a decision point: to maintain the current weaknesses or to transform its human capital into the engine of sustainable development.

4.7 PRACTICAL AND STRATEGIC RECOMMENDATIONS

Based on the results obtained and the reviewed literature, six practical and strategic recommendations are identified that can contribute to the strengthening of human capital in Angola:

- 1. Reinforcement of basic education and technical-professional training.** The results revealed the perception that basic education and vocational training are priority areas. Systematic investment in improving pedagogical quality, updating curricula and expanding the technical training network is recommended, ensuring that citizens acquire essential skills for labour market integration.
- 2. Higher education-labour market integration.** The disconnect between curricula and market demands was identified as one of the main weaknesses. It is recommended the creation of university-company cooperation programs, professional internships and applied research projects, in order to bring academic training closer to productive and technological needs.
- 3. Implementation of effective and transparent employment policies.** The high perception of nepotism and the absence of effective employment management mechanisms are structural barriers. It is recommended the development of public policies that ensure transparency in the recruitment and promotion processes, based on objective criteria of merit and performance.
- 4. Valuing human capital in organizations.** The survey showed that workers perceive low recognition and few opportunities for career progression. It is recommended to implement structured career plans, recognition policies and incentives for talent retention, promoting internal mobility and professional motivation.
- 5. Promotion of entrepreneurship and technological innovation.** Faced with the fragility of the formal market, entrepreneurship and innovation emerge as strategic alternatives. It is recommended to create support programs for entrepreneurs, business incubators, lines of financing and tax incentives, aiming at economic diversification and sustainable job creation.

6. Strengthening institutional governance and international cooperation. The results pointed to limitations in institutional coordination and in the effectiveness of human development policies. It is recommended to strengthen interministerial articulation, improve labor inspection mechanisms and intensify international cooperation, in order to favor the transfer of knowledge and the adoption of good practices.

5 CONCLUSIONS

The present study analyzed the challenges of human capital development in Angola, focusing on education, the labor market and public policies, with the aim of identifying limiting factors and proposing strategies to overcome them. Based on a descriptive-exploratory investigation, with a mixed approach, supported by a questionnaire applied to 264 participants, it was possible to articulate empirical evidence with the theoretical foundation of human capital.

The results confirm the theoretical assumptions of Schultz (1961) and Becker (1964), according to which education and qualification are central investments for development, but demonstrate that, in Angola, high schooling does not automatically translate into employability, professional progression or talent enhancement. The predominant perception of respondents reveals weaknesses in the quality of education, a strong mismatch between training and labour market demands and structural limitations in the employment system.

Among the main obstacles identified are the absence of effective employment policies, the scarcity of vacancies, the perception of nepotism and the low valuation of human capital in organizations, expressed in insufficient recognition and reduced opportunities for professional progression. These factors indicate that the challenges of human capital in Angola are simultaneously formative, institutional and organizational, requiring responses that go beyond isolated interventions in the education system.

With regard to public policies, the mostly negative evaluation of their effectiveness contrasts with the clarity of the priorities pointed out by the participants, namely quality basic education, technical and vocational training, health and well-being, as well as employability, innovation and entrepreneurship. The future outlook reveals a scenario of uncertainty, reflecting distrust in the ability to effectively implement existing policies, but also recognition of the transformative potential of human capital if appropriate strategies are adopted.

It is concluded that the development of human capital in Angola depends on an integrated and multidimensional approach, which articulates consistent public policies, effective integration between education and the labor market, strengthening meritocracy and

organizational strategies for professional valorization. The recommendations made in this study offer practical contributions to this process, reinforcing the idea that only with effective institutions, transparent policies and continuous investment in people will it be possible to transform human capital into an engine of sustainable, competitive and socially inclusive economic growth.

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SOCIOECONOMIC DETERMINANTS OF ESSAY WRITING PERFORMANCE: A DESCRIPTIVE STUDY BASED ON MICRODATA FROM THE 2022 ENEM EXAM

DETERMINANTES SOCIOECONÔMICOS DO DESEMPENHO EM REDAÇÃO: UM ESTUDO DESCRITIVO A PARTIR DOS MICRODADOS DO ENEM 2022

DETERMINANTES SOCIOECONÓMICOS DEL DESEMPEÑO EN LA REDACCIÓN DE ENSAYOS: UN ESTUDIO DESCRIPTIVO BASADO EN MICRODATOS DEL EXAMEN ENEM DE 2022



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ABSTRACT

This study conducts a descriptive and interpretative statistical analysis of the 2022 ENEM microdata from a sociological perspective to investigate how structural disparities influence proficiency in the essay exam. Based on a sample of 3,517 participants, the research examines categorical variables such as family income, school type, and household technological resources. The results reveal profound educational stratification, where access to computers and the internet at home correlates with progressive and significant increases in mean and median scores. This highlights what authors such as Rubim, Mantovani, and Alavarse (2025) classify as the expressive impact of combining devices and connectivity on proficiency. The analysis of family income demonstrates that academic performance is strongly determined by socioeconomic background, showing a trend toward higher scores as income increases, which stabilizes only at higher income levels. Furthermore, the study discusses geographical and school inequalities, pointing out the underrepresentation of rural students and the superiority of scores in private and federal public institutions compared to state and municipal networks, as corroborated by Correia and Pintos-Payeras (2025). Under the lens of Jessé Souza (2017), the text reflects on the roots of Brazilian backwardness and the perpetuation of inequalities in access to higher education. It concludes that ENEM has established itself as a fundamental tool for university access, becoming even more effective

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through the implementation of public policies for digital inclusion and the strengthening of basic education. Such actions are essential to increase equity in the examination and ensure that admission to higher education is an accessible reality for all students.

Keywords: Educational Inequalities. ENEM 2022. Essay. Microdata. Digital Inclusion.

RESUMO

Este estudo realiza uma análise estatística descritiva e interpretativa dos microdados do ENEM 2022, sob uma perspectiva sociológica, para investigar como as disparidades estruturais influenciam a proficiência na prova de redação. A partir de uma amostra de 3.517 inscritos, a pesquisa examina variáveis categóricas como renda familiar, tipo de escola e aporte tecnológico domiciliar. Os resultados revelam uma profunda estratificação educacional, onde o acesso a computadores e internet no domicílio correlaciona-se a aumentos progressivos e significativos nas notas médias e medianas, evidenciando o que autores como Rubim, Mantovani e Alavarse (2025) classificam como o impacto expressivo da combinação de dispositivos e conectividade na proficiência. A análise da renda familiar demonstra que o desempenho acadêmico é fortemente determinado pelo background socioeconômico, apresentando uma tendência de notas mais altas conforme a renda aumenta, estabilizando-se apenas em patamares superiores. Além disso, o trabalho discute as desigualdades geográficas e escolares, apontando a sub-representação de estudantes rurais e a superioridade das notas em instituições privadas e públicas federais em comparação às redes estaduais e municipais, conforme corroborado por Correia e Pintos-Payeras (2025). Sob a lente de Jessé Souza (2017), o texto reflete sobre as raízes do atraso brasileiro e a perpetuação de desigualdades no acesso ao ensino superior. Conclui-se que o ENEM se consolida como uma ferramenta fundamental de acesso à universidade, tornando-se ainda mais eficaz mediante a implementação de políticas públicas de inclusão digital e fortalecimento do ensino básico. Tais ações são essenciais para ampliar a equidade no certame e garantir que o ingresso ao ensino superior seja uma realidade acessível a todos os estudantes.

Palavras-chave: Desigualdades Educacionais. ENEM 2022. Redação. Microdados. Inclusão Digital.

RESUMEN

Este estudio realiza un análisis estadístico descriptivo e interpretativo de los microdatos del ENEM 2022, desde una perspectiva sociológica, con el fin de investigar cómo las disparidades estructurales influyen en la competencia en la prueba de redacción. A partir de una muestra de 3.517 inscritos, la investigación examina variables categóricas como ingreso familiar, tipo de escuela y acceso a tecnología en el hogar. Los resultados revelan una profunda estratificación educativa, en la que el acceso a computadoras e internet en el hogar se correlaciona con aumentos progresivos y significativos en las puntuaciones medias y medianas, evidenciando lo que autores como Rubim, Mantovani y Alavarse (2025) califican como el impacto expresivo de la combinación de dispositivos y conectividad en la competencia. El análisis del ingreso familiar demuestra que el desempeño académico está fuertemente determinado por el contexto socioeconómico, presentando una tendencia de mayores puntuaciones a medida que aumenta el ingreso, estabilizándose solo en niveles superiores. Además, el trabajo discute las desigualdades geográficas y escolares, señalando la subrepresentación de estudiantes rurales y el mejor desempeño de instituciones privadas y públicas federales en comparación con las redes estatales y municipales, como lo corroboran Correia y Pintos-Payeras (2025). Desde la perspectiva de Jessé Souza (2017),

el texto reflexiona sobre las raíces del atraso brasileño y la perpetuación de las desigualdades en el acceso a la educación superior. Se concluye que el ENEM se consolida como una herramienta fundamental de acceso a la universidad, volviéndose aún más eficaz con la implementación de políticas públicas de inclusión digital y el fortalecimiento de la educación básica. Estas acciones son esenciales para ampliar la equidad en el examen y garantizar que el acceso a la educación superior sea una realidad para todos los estudiantes.

Palabras clave: Desigualdades Educativas. ENEM 2022. Redacción. Microdatos. Inclusión Digital.

1 INTRODUCTION

The National High School Exam (ENEM) is a standardized test applied throughout Brazil since 1998. It was created with the objective of evaluating the performance of basic education graduates and from 2009 onwards it began to be used as a selection for access to universities, including changing its methodology (INEP, 2026).

Every year, the National Institute for Educational Studies and Research Anísio Teixeira (INEP) organizes and applies the exam, which is currently the main mechanism for access to public universities through the Unified Selection System (Sisu), which uses ENEM scores, as well as to access the University for All Program (ProUni) to attend higher education in private institutions. INEP also collects data from citizens who take the tests and makes available the database of data collected since 1998, the last being made available in relation to the year 2024.

Enem microdata are the lowest level of disaggregation of data collected through the exam (INEP, 2026). They meet the demand for specific information by making available the tests, templates, information about the items, the grades and the questionnaire answered by those enrolled in Enem. In addition to the grades of the areas evaluated and information about the test items, the microdata include the answers to the demoFigureic and socioeconomic questionnaire of those enrolled in ENEM.

Several researches and studies are carried out from the microdata made available by INEP with different objectives and perspectives of analysis of different variables. We highlight works carried out through the analysis of socioeconomic variables, mainly income and access to technology, which demonstrate the relevance of such variables for the performance of students in ENEM.

In this work, we started from the assumption of the existence of educational inequalities caused by various demoFigureic factors and socioeconomic differences, proposing as an objective to analyze categorical variables related to school (type and location), access to technology at home (computer and internet) and family income, relating them to the exam writing scores. The focus of the investigation lies in the analysis of categorical variables, type and location of the school, access to technology (computer and internet) and family income, and their direct correlation with the scores of the writing test.

It is worth mentioning that, although the universe of ENEM enrollees reaches the mark of millions of candidates annually, this article is based on a sample of 3,517 enrollees extracted from ENEM 2022 microdata. This delimitation is justified by the fact that this work is the result of an academic exercise proposed within the scope of the Master's Degree in Public Policy Evaluation, specifically in the discipline of Quantitative and Qualitative Methods

and Analysis II. Therefore, the findings presented here derive from this exercise of data treatment and analysis, serving as an empirical investigation that, although delimited, seeks to reflect real patterns of inequality observed in the official examination.

To support the interpretation of the data, the text is articulated with the contemporary literature on inequality and cultural capital. The contributions of Correia and Pintos-Payeras (2025) on the impact of family background, the research of Rubim, Mantovani and Alavarse (2025) on the digital divide and the sociological reflections of Jessé Souza (2017) on the structural roots of Brazilian inequality stand out.

The analysis is structured in four complementary statistical axes, organized into the following sections: Interpretation of frequency tables: outlining the sociodemographic profile and technological gaps of the sample; Visual analysis by Figureic resources: using histograms and Box-Plots to visualize the distribution of the notes; Measures of central tendency: examining means, modes, and medians to identify patterns of proficiency between different groups; Dispersion measures: assessing the variability and consistency of academic performance as a function of school location.

2 DESCRIPTIVE AND INTERPRETATIVE ANALYSIS OF ENEM 2022 MICRODATA: INFLUENCE OF VARIABLES ON THE PERFORMANCE OF THE WRITING TEST

This chapter is dedicated to the empirical and descriptive investigation of the ENEM 2022 microdata, and as previously mentioned, based on a sample of 3,517 enrollees. The central objective of this section is to scrutinize the genesis of Brazilian educational inequalities, examining how categorical variables — specifically the type and location of the school unit, the technological contribution at home (access to computers and the internet) and the stratification of family income — exert influence on the proficiency of students, with a focus on the writing test.

To ensure methodological rigor and analytical clarity, the presentation of the results is structured in four complementary axes, namely: the exegesis of the frequency tables, which outline the sociodemographic profile of the sample; visual analysis through Figureic resources and histograms; the examination of measures of central tendency and the evaluation of measures of dispersion.

This approach allows us to articulate the statistical findings processed in the Jamovi tool with the contemporary literature on family background and cultural capital, providing an in-depth discussion on the determinants of academic performance in the national scenario.

2.1 INTERPRETATION OF THE FREQUENCY TABLES

The interpretation of the attendance tables, generated through the Jamovi program, from the microdata of the 2022 National High School Exam, are important tools for quantitative analysis, since it allows us to identify how different groups are distributed in variables relevant to the exercise proposed here, whether they are the type of school and its location, use of computers, internet, income or type of school. Thus, through these tables, it is possible to understand the social composition of the participants and evidence patterns of inequality, making it possible to visualize asymmetries that often remain hidden in purely descriptive analyses or those centered on averages only.

Thus, the initial descriptive analysis allows us to draw a diagnosis of the structural disparities that permeate the public enrolled in the exam. It can be said that the data reveal a scenario of socioeconomic heterogeneity and significant technological gaps.

2.1.1 *Type of school and location of the school*

The number of people enrolled in ENEM 2022 reached the mark of 3,396,632 (three million, three hundred and ninety-six thousand, six hundred and thirty-two) people (INEP, 2022). In this work, we will use the sample of 3,517 people from the microdata released by INEP.

The behavior of the sample in the distribution by type of school (public and private) shows that most students attend **public schools** (31.8%), while only **7.8% study in private schools**. However, there are some limitations in its precision, as can be seen in Table 1, as there is a high rate of "no response" (60.4%). This high fraction (60.4%) of "did not answer" reduces the accuracy of the inferences, but does not cancel the trend of predominance of the public network. In any case, we choose not to deepen the analysis in relation to this variable in the following sections, and future studies are suggested to understand the high rate of non-respondents to this important information.

It is noteworthy that in an econometric study with microdata from ENEM 2023, Correia and Pintos-Payeras (2025) point out that students from state and municipal public schools perform lower than the general average and other components of the ENEM test when compared to the result of the averages of students from private schools, the exception is federal public schools, in which the average grades of all the components of the test were higher than those of private schools.

In terms of location, 96.9% of students are in urban areas, while only 3.1% are in rural areas. This disproportion reflects the centralization of vacancies in urban areas and indicates that students from rural areas face greater difficulties in commuting with problems related to

distance to school, and infrastructure with fewer educational resources in their area, lack of Internet access and low socioeconomic conditions. The fact that students from rural areas are not considered in the data is indicative that non-urban communities are underrepresented by the microdata made available by ENEM and that the challenges of these students are rarely addressed in educational research.

This asymmetry corroborates the literature that points to the severe challenges of infrastructure and connectivity in remote regions, factors that operate as barriers to entry into higher education.

Table 1

Table of attendances in relation to school type and location.

TP_ESCOLA Frequencies

TP_ESCOLA (Type of High School)	Counters	% of Total	Cumulative %
1 – Didn't answer	2124	60.4%	60.4%
2 – Public	1120	31.8%	92.2%
3 – Private	273	7.8%	100.0%

TP_LOCALIZACAO_ESC Frequencies

TP_LOCALIZACAO_ESC (School Location)	Counters	% of Total	Cumulative %
1 – Urban	985	96.9%	96.9%
2 – Rural	32	3.1%	100.0%

Source: Prepared by the authors through the Jamovi tool from the ENEM 2022 database.

2.1.2 Computers

Data on question Q024 (existence of a computer at home) indicate that 41.1% of ENEM 2022 students do not have a computer at home; and 39.8% have only one. Only 19.2% have two or more, as divided in the answers presented in Table 2. However, the discrepancy observed is alarming, as access to the network carried out exclusively via mobile devices (cell phones) limits engagement in complex pedagogical activities and the development of robust digital skills. As Rubim *et al.* (2025), the combination of internet and computer is the factor that effectively enhances proficiency, while the isolated use of cell phones can act only as an entertainment tool, keeping the student at a competitive disadvantage.

Table 2

Table of frequencies in relation to the existence of a computer in the home

Frequencies of Q024

Q024 (Is there a computer at your residence?)	Counters	% of Total	Cumulative %
A – No	1444	41.1%	41.1%
B – Yes, a	1399	39.8%	80.8%
C – Yes, two	422	12.0%	92.8%
D – Yes, three	165	4.7%	97.5%
E – Yes, four or more	87	2.5%	100.0%

Source: Prepared by the authors through the Jamovi tool from the ENEM 2022 database.

Through these data, it is inferred that there is a high segregation in access to technology. Studies, as well as online work and participation in students' digital engagement, are significantly impacted by this gap, which can still create educational inequality. That's why it's crucial that all students have access to technology, at the very least.

2.1.3 Internet

Table vinculated to Question Q025 shows that 92.1% of ENEM 2022 students have internet at home, while 7.9% do not; but, although the internet is a well-known technology, at the same time, many students do not have the necessary access at home to use digital resources in the educational environment. The lack of internet at home makes it difficult to study, access online platforms, and develop digital skills.

Therefore, even with most students connected, the data show the need for public policies and school strategies that prioritize connectivity for all. Ensuring minimum access to the internet is essential to reduce inequalities, promote digital inclusion, and provide conditions for all students to take full advantage of the learning opportunities of the twenty-first century.

Table 3

Table of frequencies in relation to internet access in the residence.

Frequencies of Q025

Q025 (Do you have internet access at your residence?)	Counters	% of Total	Cumulative %
A – No	277	7.9%	7.9%
B – Yes	3240	92.1%	100.0%

Source: Prepared by the authors through the Jamovi tool from the ENEM 2022 database.

Researchers from the University of São Paulo (USP) analyzed a sample of 1.5 million low-income students who participated in ENEM between 2013 and 2023, demonstrating in the results that **having only internet at home has a positive, but modest, effect on students' proficiency in the exam**; on the other hand, **the combination of computer and**

internet proved to be relevant between the years 2015 and 2023, an increase of more than 23.4 points is estimated for students with access to the internet and computer compared to those without access to both technologies (Rubim; Mantovani; Alavarse, 2025).

The technological inequality suggested by the frequencies in relation to access to computers and the internet in the home justifies more detailed analyses of the relationship between computer/internet ownership and performance.

2.1.4 Income

Table 4, referring to question Q006, presents the family income distribution of ENEM 2022 students, revealing a great socioeconomic diversity. It is observed that most of the participants are concentrated in the lower and middle income brackets, while only a small portion corresponds to the highest brackets.

The distribution of Q006 (income ranges) shows concentration in ranges **B** (up to 1 minimum wage) and **C** (from 1 to 1.5 minimum wage at the time), which together add up to 42.5% of the sample. The highest ranges (K to Q, which correspond to more than R\$ 8,484.01 of per capita income) account for less than 10% of the cases.

Table 4

Table of frequencies in relation to family income with a central tendency in relation to the average ENEM score

Frequencies of Q006 with average trend scores for each income bracket

Q006 What is your family's monthly income? (Add your income to that of your family members.)	Counters	% of Total	Cumulative %	Average Essay Grade	Fashion of Essay Notes
A – No Income	182	5.2%	5.2%	531.65	0.00
B – Up to R\$ 1,212.00	916	26.0%	31.2%	559.21	0.00
C – From R\$ 1,212.01 to R\$ 1,818.00.	581	16.5%	47.7%	598.14	600.00
D – From R\$ 1,818.01 to R\$ 2,424.00.	380	10.8%	58.5%	624.74	620.00
E – From R\$ 2,424.01 to R\$ 3,030.00.	308	8.8%	67.3%	619.35	0.00
F – From R\$ 3,030.01 to R\$ 3,636.00.	172	4.9%	72.2%	653.14	580.00
G – From R\$ 3,636.01 to R\$ 4,848.00.	Continues			668.07	640.00
H – From R\$ 4,848.01 to R\$ 6,060.00.				686.12	580.00A
I – From R\$ 6,060.01 to R\$ 7,272.00.	107	3.0%	87.0%	714.77	580.00
J – From R\$ 7,272.01 to R\$ 8,484.00.	62	1.8%	88.8%	743.55	920.00
K – From R\$ 8,484.01 to	48	1.4%	90.1%	743.33	880.00

R\$ 9,696.00.					
L – From R\$ 9,696.01 to R\$ 10,908.00.	64	1.8%	92.0%	735.94	900.00
M – From R\$ 10,908.01 to R\$ 12,120.00.	60	1.7%	93.7%	756.00	720.00
N – From R\$ 12,120.01 to R\$ 14,544.00.	47	1.3%	95.0%	792.34	880.00
O – From R\$ 14,544.01 to R\$ 18,180.00.	50	1.4%	96.4%	744.00	940.00
P – From R\$ 18,180.01 to R\$ 24,240.00.	55	1.6%	98.0%	774.18	820.00
Q – Above R\$ 24,240.00.	71	2.0%	100.0%	763.94	800.00

Source: Prepared by the authors through the Jamovi tool from the ENEM 2022 database.

This distribution highlights economic inequalities that can directly affect access to educational resources, such as books, computers, quality internet, preparatory courses, and extracurricular activities. Students from lower-income families may face additional difficulties in keeping up with learning and preparing for competitive exams, while those from higher-income families have more opportunities for support and resources.

Therefore, the data highlight the need for public policies and school strategies that promote educational equity, ensuring that all students, regardless of family income, have minimum conditions of access to tools, technology, and learning opportunities.

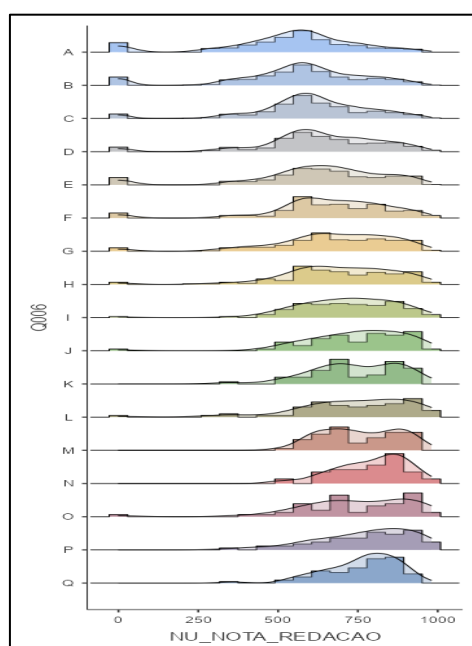
2.2 INTERPRETATION OF THE CHARTS

The attendance tables reflect the economic inequality in the country and point out that most of the candidates belong to low-income families. Recent econometric studies show that **family income, type of school, and parents' education** have significant effects on ENEM performance, especially in writing and mathematics grades (Correia and Pintos-Payeras, 2025).

Figure 1, with a histogram of the relationship between family income (Y axis - vertical) and the essay score (x-axis - horizontal) of the researched sample, contributes to visualize how the data regarding the essay scores are distributed in each category of the income variable (A to Q), which demonstrates a **progressive growth in relation to the peaks and concentration of scores as income increases, tending to stabilize and present a smaller variation from the "J" range (income from R\$ 7,272.01 to R\$ 8,484.00) to "Q" (above R\$ 24,240.00).**

Figure 1

Histogram of the relationship between family income and essay grade.



Source: Prepared by the authors through the Jamovi tool from the ENEM 2022 database.

When analyzing Figure 1 and table 4 together, a tendency to repeat higher scores can be perceived, with average scores above and repetition of scores (mode) above 700 from income range "I" and income range "J", respectively.

We can also see that there is a tendency for higher grades as income increases. For example, students in band "A" obtain an average of around **531.65 points**, while those in band "I" achieve an average of **714.77 points**, and group "Q" obtain an average of **763.94 points**. The medians follow this trend, suggesting that the increase in income is associated with better scores.

It is noteworthy, however, that from the "J" range, the essay scores do not maintain the positive variation that had been progressing from one range to the other, presenting random variations when analyzed only under the aspect of the income variable. For example, the highest repetition of the highest grades corresponds to 940 points and occurred in the "O" range, while the highest per capita income bracket "Q" obtained the highest repetition of grades at 800 points. In relation to the average of the essay scores, the range with the highest score was "N", which corresponded to 792.34 and the immediately highest income range, "O" had an average essay score of 744.00 points.

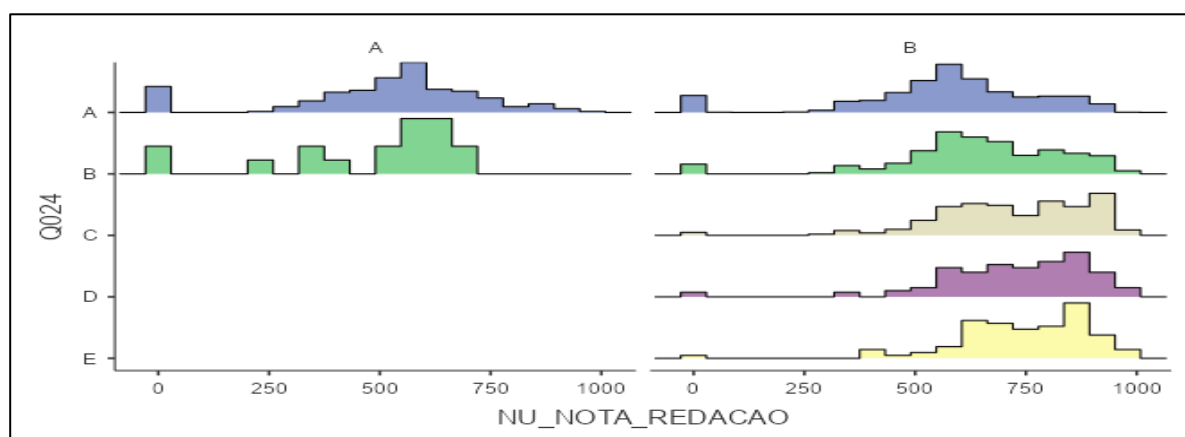
This analysis of the influence of income on ENEM performance and the observation that from a certain income range, does not influence by itself the continuity of the progression of higher grades, suggests that other variables besides income are important to elucidate and understand the results of students in the exam, such as parental education and access to

technology, as he studies by **Rubim; Mantovani; Alavarse (2025)**. In their research with **ENEM microdata from 2015 to 2023**, the authors demonstrate that the combination of computer and internet has a significant impact on proficiency, while the internet alone has a modest effect.

In the histogram of Figure 2 below, which crosses the data of Q024 (existence of computers in the home) on the Y axis (vertical) with the essay score on the X axis (horizontal), separated by group of those who do not have access to the internet (A) and those who have access (B), which appear at the top of the Figure. We can observe an escalation in the scores of the group of those who have access to the internet and as the number of computers at home increases.

Figure 2

Histogram of the relationship between the groups of access and non-access to the internet and the existence of computers in the residence and the writing grade

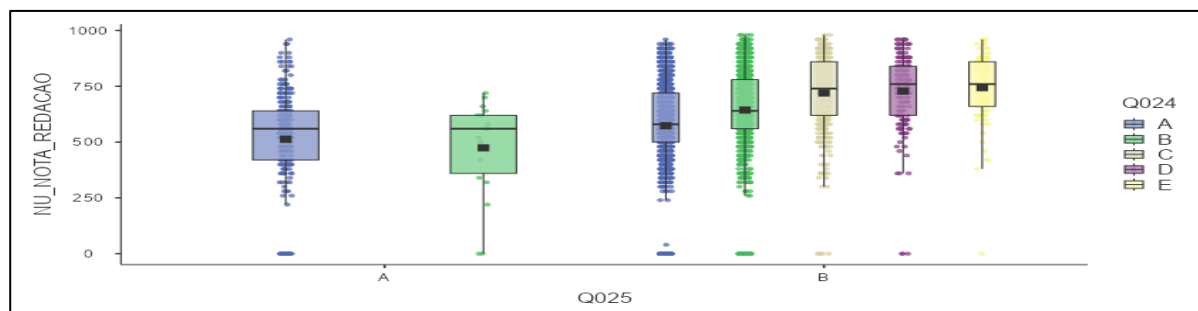


Source: Prepared by the authors through the Jamovi tool from the ENEM 2022 database.

It is noteworthy in relation to the group that does not have access to the internet, that the sample of this group only has two variables in relation to the existence of computers in the residence, either they do not have a computer ("A" x "A") or they have only one ("A" x "B"), with the average scores of those who have a computer, but do not have internet, being smaller than those who do not have a computer and do not have internet, being more evident in Figure 3 of the Box-Plot type, which is below:

Figure 3

Histogram of the relationship between the groups of access and non-access to the internet and the existence of computers in the residence and the essay grade.



Source: Prepared by the authors through the Jamovi tool from the ENEM 2022 database.

Figure 3 shows the highest medians and means (black line and square that appear within the colored rectangles, respectively) for those who have access to the internet and have a computer, making the best results of those who have internet and one more computer even more evident, compared to the results of the group that does not have internet.

2.3 INTERPRETATION OF MEASURES OF CENTRAL TENDENCY

The world is increasingly integrated into the technological environment, and education suffers, like any other dimension of human life, the influence of the increasing presence of technologies, whether in the classroom environment or outside it. Currently, the possibilities of using technological resources are wide and diversified and in the case of the National High School Exam, it can be stated, according to Ramos (2012, p. 5) that

Society is becoming more and more technological, including in education, which requires specialization of its sciences. In this context, a new format of education appears, in which chalk, blackboard and books are no longer the only instruments to teach that teachers have, thus needing to develop a set of didactic-pedagogical activities based on the technologies available in the classroom and those that students bring with them.

Given this requirement, access to technological resources must be part of the reality of our schools. In this regard, the microdata available by INEP allow us to understand, among other things, how access to the computer and internet by the public that takes the test interferes with its results. Thus, we chose to verify how or not owning the computer affects the exam's writing grade, as well as seeking to establish a relationship between having access to the internet at home and writing performance.

Before presenting the results, it should be clarified that the variables chosen to give substance to this analysis use the following denomination: code Q024, used for the following question: "Do you have a computer in your home?"; code Q025 for the following question:

"Do you have Internet access in your home?" and NU_NOTA_REDACAO for the Writing test score.

With this, the tables with the respective discussions and analysis follow, namely:

Table 5

Residence with computer and Grade of the writing test

Descriptive Statistics		
	Q024	NU_NOTA_REDACAO
N	A	1444
	B	1399
	C	422
	D	165
	E	87
Average	A	563
	B	642
	C	720
	D	729
	E	744
95% CI mean lower limit	A	552
	B	631
	C	704
	D	703
	E	711
95% CI upper limit mean	A	574
	B	652
	C	736
	D	755
	E	777
Median	A	580
	B	640
	C	740
	D	760
	E	760
Fashion	A	0.00
	B	580
	C	920
	D	880
	E	880

Note. The CI of the mean assumes that the sample distribution of the mean follows a distribution t with N-1 degrees of freedom

Source: Prepared by the authors through the Jamovi tool from the ENEM 2022 database.

The results obtained from the crossings between the variables "Q024" (computer use) and NU_NOTA_REDACAO allow a series of considerations. As for the essay score, the average undergoes a progressive growth as it advances from categories A (which has an average of 563) to E (with a score of 744), a fact that also occurs in the median. In fashion, there is an abrupt growth from category B (grade 580) to C (grade 920) and a slight drop to maintain the grade of 880 in categories D and E. There is also an advance in the medians, which go from 580 to 760 points.

With regard to fashion, there is a piece of data to be better analyzed, as the table indicates that candidates belonging to category A had a result of zero (0). At first glance, it can be said that the high number of zeros represents a large number of people who did not write the essay or made serious mistakes, such as escaping the topic or serious writing difficulties. With this, the table shows that in the most vulnerable groups there are extreme results, such as the zero presented in fashion. As for the most favored groups, there is a concentration of high grades, with a lower number of failed results and more consistent performance.

Now, this picture represents very clearly that educational inequality, demonstrated in the microdata in ENEM, is not only present in the differences in the averages obtained, but demonstrates the coexistence in the education of our country of those who experience bitter results of their performance because they belong to vulnerable groups of society and those who stand out for the excellence of the results, because they belong to the privileged layers of society.

The data presented so far demonstrate that the performance of ENEM participants is influenced by several factors, especially demographic and socioeconomic factors (Correia; Payeras, 2025). Thus, different authors reinforce how close the relationship between ENEM performance and access to different technological resources is. Rubim, Mantovani and Alavarse (2025) add directly to this when they state that "addressing digital inclusion as a priority implies ensuring that all students have essential resources, such as devices connected to the internet, allowing learning to extend beyond school and reach the home environment".

Table 6

Residence with Internet access and Grade of the writing test.

Descriptive Statistics		
	Q025	NU_NOTA_REDACAO
N	A	277
	B	3240
Omission	A	0
	B	0
Average	A	511
	B	635
95% CI mean lower limit	A	485
	B	628
95% CI upper limit mean	A	537
	B	642
Median	A	560
	B	640
Fashion	A	560
	B	580
Standard deviation	A	222

Descriptive Statistics

	Q025	NU_NOTA_REDACAO
	B	204
	A	49378
Variance	B	41430
	A	960
Breadth	B	980
	A	0
Minimum	B	0
	A	960
Maximum	B	980

Note. The CI of the mean assumes that the sample distribution of the mean follows a distribution t with N-1 degrees of freedom

Source: Prepared by the authors through the Jamovi tool from the ENEM 2022 database.

At first, it can be highlighted that internet access in homes exceeds by more than eleven times the number of homes without internet. In percentage terms, we have 7.9% of households without internet against 92.1%. As for the average, there was a significant difference of 124 points between the categories, with 511 points in category A, against 635 in category B. A situation that can be confirmed when we observe the median, where the participants without internet had 560 points while the others had 640 points, reinforcing the difference in the average. As for fashion, even with a difference of less than 20 points between the categories, the group with internet access continues to perform better.

Thus, there is no doubt that access to the internet works as a strong indicator of access to information, to different resources for study and to digital literacy practices. A picture that corroborates the view of authors, such as Moran (2015), when he states that digital culture, present in the use of computers and access to the internet, modifies the ways of learning and teaching, requiring new knowledge to deal with information and communication in the digital environment and through this knowledge, it is possible to envision a more egalitarian society.

Now, access to the internet is associated with better educational results and greater stability in the performance of writing tests, since the various indicators presented in tables 5 and 6 demonstrate that better performance among ENEM participants who have access to technological resources such as computers and internet access. On the other hand, according to Henares, Menezes-Filho, and Komatsu (2021), disadvantaged groups tend to have greater difficulty in preparing for ENEM, reflecting that socioeconomic disparities are visible not only in society, but also in education.

In this regard, Farias, Negreiros and Rocha (2024) state that to reduce inequalities, it is necessary to strengthen both support for families and the quality of the public education system, either by providing the necessary infrastructure for internet access in schools, as well as the creation of policies that favor the necessary means for internet access also in the homes of the neediest social groups.

2.4 INTERPRETATION OF DISPERSION MEASURES

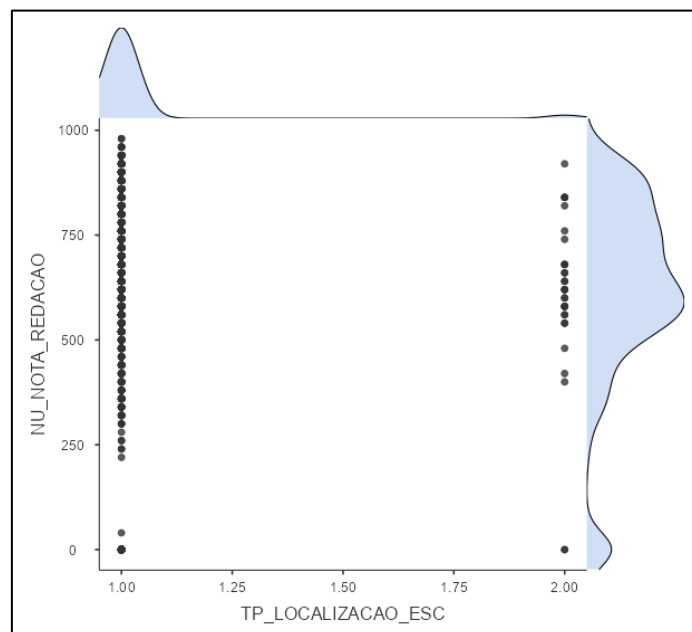
Applied since 1998, the National High School Exam (ENEM) was implemented to assess the learning of students in the last year of high school (3rd grade). In 2009, ENEM underwent a reform, reaching its current format with 45 questions from each area of knowledge (BRASIL, 2018) and an essay. This is the largest large-scale evaluation in Brazil, being used as a competition parameter for access to higher education vacancies in the main Brazilian universities.

Thus, from this last information we will briefly discuss how ENEM can be a tool for exclusion and perpetuation of inequalities in access to higher education within the Brazilian socio-historical context. This text aims to analyze the measures of dispersion in ENEM essay scores in the 2022 edition, comparing the average essay scores of students from schools located in the urban area with the average essay scores of students from schools located in the rural area.

The analysis of the essay score was selected for this study because it is the only essay test of the exam, thus excluding the scores of the objective tests. The essay test requires students to have interdisciplinary knowledge, sociocultural repertoire, argumentation skills and written production. Let's look at the following Figure.

Figure 4

Measures of dispersion of essay scores by Type of School Location



Source: Prepared by the authors through the Jamovi tool from the ENEM 2022 database.

When analyzing Figure 4, where 1.00 represents schools in the urban area and 2.00 represents schools in the rural area, we see that the average writing scores closest to 1000

(thousand) were from students from schools in the urban area. The Figure is divided into quartiles, as proposed by Barbetta (2012), also showing that schools in the urban area had greater variance in essay scores, while schools in the rural area had a higher concentration of essay scores between 500 and 750 points.

Now, is it not known to the government that rural students, including peasants, *caiçaras*, indigenous people, and quilombolas, face absurdly greater challenges than students in urban areas? Why, then, put them on the same "ruler" and offer the same conditions of access to university if they did not have the same educational conditions?

Studying the history of the formation of the Brazilian State, we see that historically the working class (especially the rural one) inherited the ills left by the traces of inequality in Brazil. Quoting Souza (2017), "the true root of Brazilian backwardness lies in the legacy of slavery" and in the way the ruling class was formed. (Souza, 2017).

From the classic perspective of Holanda (1978), the relationship of approximation between the State and society is the way to confront and repair inequalities (Holanda, 1978), so it is urgent that the government, through Public Policies, the Ministry of Education, Councils and Secretariats: 1. offer dignified conditions of education to rural populations; 2. respect the specificities of rural education regarding the forms of learning assessment; 3. Guarantee rural students the right to access university through the principles of equity, citizenship and social justice.

3 FINAL CONSIDERATIONS

The analyses carried out in this work infer that **socioeconomic inequalities and access to technology strongly influence the performance of students in ENEM**. The attendance tables showed that the majority of the sample is low-income and does not have a computer. The Figures and measures of central tendency showed that essay scores increase significantly with the possession of computers and, to a lesser extent, with access to the internet. Family income is determinant and has significance for the averages and medians of essay scores, rising as one advances in the income brackets until a stabilization from the per capita income above R\$ 7,272.01 at the time. The dispersion of essay scores is lower among students from schools located in urban areas, suggesting a state view of the specificities of schools located in rural areas.

These inferences converged with the recent literature, in which the studies pointed out demonstrate that the combination of computer and internet has a significant effect on proficiency, that the type of school and family income are crucial determinants of performance and that the digital divide deepens educational inequalities.

As a limitation of the work, we point out that social phenomena are complex and involve both structural aspects and subjective dimensions of reality. In this sense, Pougan (2015) suggests the articulation between qualitative and quantitative methods to expand the possibilities of analysis and interpretation of the investigated phenomena. Regarding the choice of research method, Creswell (2010) points out that when developing a research proposal that uses a quantitative, qualitative or mixed methods approach, it is essential to review the academic literature on the topic of interest, in order to verify its relevance to the investigation. In addition, this survey provides subsidies to the researcher to delimit the scope of the study, enabling a more precise reflection on the feasibility and relevance of the area chosen to carry out the research.

In this way, the relevance of future research in which statistical data are articulated, field research and theoretical references on social, cultural and digital capital is pointed out, discussing public policies for technological inclusion and support for public schools (especially state/municipal and rural) as ways to reduce the gap of opportunities.

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RACIAL LITERACY: THE BEAUTY OF DIVERSITIES – LEARNING TO BE AND TO COEXIST MUNICIPALITY OF BENEVIDES – PARÁ

LETRAMENTO RACIAL: A BELEZA DAS DIVERSIDADES – APRENDENDO A SER E A CONVIVER MUNICÍPIO DE BENEVIDES – PARÁ

ALFABETIZACIÓN RACIAL: LA BELLEZA DE LAS DIVERSIDADES – APRENDIENDO A SER Y A CONVIVIR MUNICIPIO DE BENEVIDES – PARÁ



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ABSTRACT

In a context where differences are often met with strangeness and prejudice, educating for ethnic-racial and cultural diversity becomes an extremely important topic for forming citizens capable of respecting and engaging in dialogue with people and the world. Learning to be and learning to coexist are two fundamental pillars of education; therefore, helping children recognize the beauty of their own identity allows them to expand their perspective beyond themselves and discover that others also have unique beauties. Considering the roots of racism and its sociocultural persistence is a way to seek paths that give new meaning to our history, where we can embrace and value the richness of knowledge and practices that have color and ancestry, thereby contributing to a more socially just and humane world. The project's general objective was to provide children with awareness of the beauty of diversities, considering the importance of each child in discovering their own identity, and, through self-recognition, expanding their perspective toward respectful coexistence with various racial diversities. The project was carried out in five stages. The process of strengthening each child's identity was developed through dialogue, listening, and support, and culminated in Afro-Brazilian music and dance, theater with storytelling, and a photo exhibition—a celebration with the participation of the school community, including education staff and the children's families.

Keywords: Racism. Childhood. Culture. History.

RESUMO

Diante de um contexto em que o diferente   considerado com estranheza e preconceito, educar para diversidades  tnico-raciais e culturais, torna-se uma tem tica de suma import ncia para formar cidad es capazes de respeitar e dialogar com as pessoas e com o mundo. Aprender a ser e aprender a conviver, s o dois pilares fundamentais da Educa  o, portanto, ajudar a crian a a reconhecer a beleza da sua identidade,   possibilitar que ela possa ampliar o olhar para fora de si e descobrir que o outro tamb m belezas particulares.

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Considerar as raízes do racismo e sua permanência sociocultural, é buscar caminhos para dar um novo sentido à nossa história, onde se possa acolher e considerar a riqueza dos saberes e fazeres que tem cor e ancestralidade, e desse modo, construir um mundo mais socialmente justo e mais humano. O Projeto teve como objetivo geral proporcionar para as crianças uma sensibilização para a beleza das diversidades considerando a importância de cada criança com a descoberta da sua própria identidade, e através do reconhecimento de si, ampliar o olhar para a convivência respeitosa com as diversas diversidades raciais. O Projeto teve a duração de 5 etapas. O percurso de fortalecimento da identidade com cada criança foi feito com diálogo, escuta e acolhimento, e culminou com músicas, danças afro-brasileira, teatro com contação de histórias, e exposição de fotos, uma celebração com a participação da comunidade escolar, como servidores da educação e as famílias das crianças.

Palavras-chave: Racismo. Infância. Cultura. História.

RESUMEN

En un contexto en el que la diferencia se percibe con extrañeza y prejuicio, educar para las diversidades étnico-raciales y culturales se convierte en un tema de suma importancia para formar ciudadanos capaces de respetar y dialogar con las personas y con el mundo. Aprender a ser y aprender a convivir son dos pilares fundamentales de la educación; por lo tanto, ayudar a los niños a reconocer la belleza de su propia identidad les permite ampliar su mirada más allá de sí mismos y descubrir que los demás también tienen bellezas particulares. Considerar las raíces del racismo y su permanencia sociocultural implica buscar caminos para dar un nuevo sentido a nuestra historia, en la que se pueda acoger y valorar la riqueza de los saberes y prácticas que tienen color y ancestralidad, contribuyendo así a un mundo más socialmente justo y humano. El objetivo general del proyecto fue sensibilizar a los niños sobre la belleza de las diversidades, considerando la importancia de cada niño en el descubrimiento de su propia identidad y, a través del reconocimiento de sí mismos, ampliar la mirada hacia la convivencia respetuosa con las diversas diversidades raciales. El proyecto tuvo una duración de cinco etapas. El proceso de fortalecimiento de la identidad de cada niño se desarrolló mediante el diálogo, la escucha y la acogida, y culminó con música y danza afrobrasileña, teatro con narración de cuentos y exposición de fotos, en una celebración con la participación de la comunidad escolar, incluyendo al personal educativo y a las familias de los niños.

Palabras clave: Racismo. Infancia. Cultura. Historia.

1 INTRODUCTION

The history of Brazil is deeply marked by the presence of the native peoples, who inhabited this territory long before the arrival of the European colonizers. With the Portuguese invasion, a process of exploitation and oppression was established based on deep social and racial inequalities, among which the enslavement of African men and women, violently removed from their territories, cultures and family ties, stands out. This past forged a social structure based on racism, the effects of which are still persistently present in our society. However, it is also from this reality that seeds of resistance, ancestry, culture, and collective strength emerge, fundamental elements in the construction of a fairer society.

In the municipality of Benevides, in the state of Pará, this memory of struggle and resistance is expressed in a unique way. On March 30, a local historical milestone is celebrated: the liberation of the first six enslaved people in the region, an episode prior to the signing of the Golden Law. This date, known as the History of March 30, is a potent symbol of emancipation and protagonism, which consolidated Benevides as the "Cradle of Freedom". The symbolic force of this narrative inspires pedagogical practices that value ethnic-racial diversity, equity, and social justice from the earliest years of childhood.

Based on this historical and social context, the project "Racial Literacy: The Beauty of Diversities – Learning to Be and to Live Together" was conceived, conceived and executed by the Benevides Training and Research Center. The initiative began on November 6, 2024, at CMEI Berço da Liberdade, reaching four institutions in the municipal Early Childhood Education network so far. In 2025, it will be expanded to all schools in this stage of education and, from 2026, it will also include Elementary School I.

2 GENERAL OBJECTIVE

Promote, through playful and accessible pedagogical practices, an awareness of children in Early Childhood Education for the appreciation of ethnic-racial diversity, enabling each student to recognize and strengthen their own identity, understand the richness of differences and develop attitudes of respect, empathy and coexistence. From the recognition of themselves and their ancestry, the project seeks to broaden the children's view of the other, stimulating the formation of conscious, ethical and socially committed subjects with the construction of a more just, plural and anti-racist society.

2.1 SPECIFIC OBJECTIVES

- a. Awaken, through storytelling, children's perception of ethnic-racial differences, promoting the appreciation of the plurality of colors, traits, cultures and ways of being present in Brazilian society;
- b. Encourage the recognition of their own identity, helping each child to perceive and value their personal characteristics such as skin color, hair, name and origin as important elements of their history and belonging;
- c. Retell and reinterpret the history of Benevides as the Cradle of Freedom, through storytelling activities, dramatizations and children's artistic productions, rescuing the local memory as a reference of resistance and inclusion;
- d. Promote cultural experiences through music, dances and games, which value Afro-Brazilian, indigenous, riverside and other cultural heritages, strengthening respect for differences and the pleasure of living with diversity.

3 DEVELOPMENT

In the face of a social context in which difference is often received with strangeness, prejudice and exclusion, educating for ethnic-racial and cultural diversities becomes a formative urgency. It is an essential path for the construction of citizens capable of respecting the other, dialoguing with plurality and living ethically in a multicultural society.

In the educational field, the principles of "learning to be" and "learning to live together" are fundamental pillars that guide the integral development of children. In this sense, promoting the recognition of the beauty of one's own identity is also opening space for the child's gaze to expand beyond oneself, allowing the encounter with the other in their uniqueness, history, ancestry and culture.

Considering the historical roots of racism and its permanence in Brazilian social and cultural structures is a necessary step to resignify our collective trajectory. This movement implies welcoming and valuing knowledge, practices and memories that have color, territory and ancestry, recognizing in them a richness that should be celebrated and integrated into the school routine.

By promoting an education that recognizes, respects and values diversity, not only a more inclusive school environment is built, but also a project for a more humane, plural and socially just society.

The project "Racial Literacy: The Beauty of Diversities – Learning to Be and to Live Together" was developed based on an integrated, affective and culturally referenced pedagogical proposal, based on the guidelines of Law 10.639/2003, on the National Common

Curricular Base (BNCC), on the Sustainable Development Goals (SDGs) of the 2030 Agenda and, above all, on sensitive listening to children and local socio-cultural realities.

Initially structured in five stages, the project underwent a methodological adaptation during its execution, opting for a more objective and effective organization, consisting of three central stages, with an average duration of 40 to 50 minutes per activity. This reorganization made the practice more accessible and applicable in different contexts of Early Childhood Education, including in municipal networks with more limited infrastructure, strengthening its replicable character.

- a. **Planning and Training of Educators:** The starting point of the methodology was the continuing education of teachers and pedagogical coordinators, promoted by the Training and Research Center of Benevides. This preparatory stage addressed the fundamentals of racial literacy, structural racism in childhood, childhood pedagogy, and anti-racist methodologies. Educators were encouraged to develop a sensitive look at children's identities and the cultural contexts of their communities.
- b. **Application of the Stages with the Children:** The activities with the students were planned to respect the time, interest and forms of expression of childhood. The methodology values playing, imagining, narrating and representing as ways to build knowledge and strengthen identity. The three main steps were:
 - **Stage 1 – Identity and Representativeness:** Storytelling with black, indigenous and traditional community characters, followed by activities such as self-portraits, creation of various dolls, body recognition games, conversation circles about name, family and skin color. The goal is to promote positive self-identification and respect for differences.
 - **Stage 2 – Local History and Child Protagonism:** The children were invited to learn about and retell, through theater, art and imagination, the story of March 30, the date that marks the liberation of the first enslaved people in the region. This experience enables the construction of a new narrative, in which children see themselves as an active part of the history of the municipality and the country.
 - **Stage 3 – Celebration of Cultural Diversity:** Experiences with Afro-Brazilian, indigenous and riverside music, dances, tales, clothing and games. Cultural fairs, singing circles and workshops were also held that integrated families and the school community, promoting mutual respect and a sense of collective belonging.
- c. **Participation of the School Community:** The methodological proposal contemplates the active participation of families and the community, recognizing the school space as a place of intergenerational exchanges and joint construction of knowledge. Workshops,

conversation circles and exhibitions with families expanded the scope of the project, transforming it into a community experience of valuing roots and collective memories.

- d. Registration, Evaluation and Sharing: All actions were recorded in portfolios, videos, photo albums, murals and pedagogical diaries. These materials serve as an evaluative instrument, process memory and model for replication. The municipality's technical team has also organized reports that can be used by other education departments interested in implementing the practice.

The methodology applied is simple, adaptable and low-cost, and can be reproduced in different educational contexts in Pará, especially in municipalities that wish to promote racial literacy in a playful, affective way and aligned with the local reality. The use of accessible materials (books, fabrics, dolls, music and stories), combined with the appreciation of the history and culture of the territory, makes the project versatile and powerful to be expanded in a network, inspiring other initiatives in the state and beyond.

4 FINAL CONSIDERATIONS

The application of the project "Racial Literacy: The Beauty of Diversities – Learning to Be and to Live Together" has generated significant and concrete results, both in the development of children and in the transformation of the school environment as a whole. Experience shows that, by including the debate on identity, ancestry and respect for diversity in a sensitive and playful way from an early age, it is possible to build a solid foundation for a more just, empathetic and plural coexistence.

The main results achieved are highlighted below:

- a. Strengthening Children's Identity: Children began to recognize and value their physical and cultural characteristics, such as skin color, hair, name, and family history. An increase in self-esteem, emotional security and a sense of belonging was observed among black, indigenous and riverside children, who began to see themselves as beautiful, capable and important within the school space.
- b. Reduction of Discriminatory Attitudes in Daily School Life: Teachers and pedagogical coordinators reported noticeable changes in interactions between students, with a decrease in derogatory comments and a greater willingness to dialogue, care and acceptance of differences. The project contributed to the construction of a healthier, more welcoming and affective school climate.
- c. Active Involvement of Families and the Community: The project also reached the children's families, who began to participate more actively in the school's activities, especially in conversation circles, cultural fairs and theatrical presentations. This

involvement favored the rescue of family memories, pride in the origins and the strengthening of the bonds between school and community.

- d. Awareness and Training of Educators: The continuing education promoted by the Benevides Training and Research Center has increased the awareness and preparation of educators in relation to anti-racist practices. Teachers reported feeling safer to address ethnic-racial issues in the classroom and more attentive to the cultural and affective aspects that involve the formation of identity in childhood.
- e. Increased Visibility of Local History: By retelling and dramatizing the History of March 30, a milestone in the liberation of the first enslaved people in Benevides, children and the school community began to value more the collective memory and the role of Benevides as the Cradle of Freedom. This strengthened the feeling of belonging to the territory and resignified local history as a symbol of resistance, pride and inspiration.
- f. Consolidation of a Replicable Pedagogical Practice: With the documentation of the stages, the use of accessible resources and efficient methodological adaptation, the project has consolidated itself as a viable proposal to be replicated in other municipalities in Pará, regardless of the size or structure of the education network. The results achieved in Benevides become a reference for the implementation of public policies for anti-racist education aimed at children.

The practice of racial literacy developed in Early Childhood Education in Benevides demonstrated measurable results that attest to its effectiveness both through qualitative (observations, reports and behaviors) and quantitative (participation, adherence and children's production) indicators. These results prove the positive impact of the project on identity formation, respectful coexistence and the appreciation of diversity.

1. Quantitative Indicators

The quantitative results of the project "Racial Literacy: The Beauty of Diversities – Learning to Be and to Live Together" show not only the active involvement of the school community, but also the effectiveness of the strategies adopted and their ability to generate real pedagogical changes. The following are the main indicators collected during implementation:

- a. Child Participation and Cultural Production:
 - 100% of the children in Early Childhood Education participated in the proposed activities, including conversation circles, storytelling, theater, games and cultural workshops.
 - More than 90% of the children produced authorial records related to the theme of the project, such as drawings, dramatizations, story rewritings, collages and artistic

presentations that addressed the appreciation of diversity, identity and respect for differences.

- In all the schools involved, at least one collective event was promoted per two months, with the joint participation of students, teachers and families, with the ethnic-racial and cultural theme as its central focus.

b. Training and Involvement of Educators:

- 100% of the Early Childhood Education teachers of the participating schools participated in the initial training and developed the activities with their classes.
- Educators reported a significant increase in repertoire, pedagogical security and sensitivity to work on racial issues with children, which demonstrates an important advance in continuing education and institutional commitment to equity.

c. Institutional Impact and Sustainability of the Practice:

- The project caused changes in the planning of the schools: the ethnic-racial theme was inserted as a structuring axis in the Pedagogical Action Plans (PAPs) of the school units for the following year.
- Schools began to institutionalize Black Consciousness Week as an annual event integrated into the school calendar, with expanded involvement of the entire school community and educational management.

These data reinforce that the practice, in addition to being pedagogically consistent, is evaluable and measurable and replicable, which qualifies it as an inspiring reference for other municipalities in the State of Pará that wish to implement racial literacy actions in Early Childhood Education with concrete results.

2. Potential for Replicability and Scalability of the Project

The project "Racial Literacy: The Beauty of Diversities – Learning to Be and to Live Together" has high potential for replicability and scalability, based on universal principles of humanizing education, on the appreciation of ethnic-racial identities from childhood and on accessible, sensitive and culturally referenced methodologies. Its pedagogical structure is flexible and can be applied in different educational contexts, respecting the singularities of each territory, which makes it a replicable experience in several municipalities in the State of Pará and in other regions of the country.

a. Replicability

The practice can be easily adapted and applied in other schools in the municipal, state or private network, both in Early Childhood Education and in the first years of Elementary School, with language adjustments and strategies according to the age

group. Its methodological simplicity and low operational cost favor reproduction in different educational realities, even in municipalities with fewer resources.

Among the main elements that can be replicated from the practice, the following stand out:

- Afro-Brazilian and indigenous storytelling, promoting active listening, imagination and cultural appreciation;
- Traditional games and music, which integrate playfulness and respect for differences;
- Art and body expression activities, such as painting, theater, dance and self-portraits, stimulating self-esteem and protagonism;
- Conversation and reading circles, which favor dialogue, empathy and plural coexistence.

Such actions dialogue directly with the National Common Curriculum Base (BNCC), with Law 10.639/03, which makes the teaching of Afro-Brazilian and African History and Culture mandatory, and with the Sustainable Development Goals (SDGs) of the 2030 Agenda, especially SDG 4 (Quality Education) and SDG 10 (Reduction of Inequalities).

b. Scalability

The project is also highly scalable, with the possibility of expansion to other educational and social dimensions, such as:

- Expansion to other age groups, with approaches adjusted to the level of cognitive and emotional development of students in Elementary School I and II;
- Direct involvement of families and communities, through workshops, conversation circles and cultural events that strengthen bonds and the appreciation of ancestral roots;
- Articulation with other municipal and state education networks, through institutional partnerships with education departments, universities and civil society organizations;
- Continuous training of teachers and school managers, through pedagogical workshops, seminars and production of training materials based on the experience of the municipality of Benevides.

The practice has the potential to integrate public educational policies aimed at racial equity, being incorporated into the Political-Pedagogical Projects (PPP) of schools, the Pedagogical Action Plans (PAPs) and the guidelines for continuing education of education professionals, as a structuring axis of an anti-racist, inclusive and plural school culture.

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THE USE OF DRAWINGS AS A LEARNING STRATEGY IN HEMATOLOGY CLASSES: THE CONSTRUCTION OF KNOWLEDGE BY THE STUDENT

O USO DE DESENHOS COMO ESTRATÉGIA DE APRENDIZAGEM NAS AULAS DE HEMATOLOGIA: A CONSTRUÇÃO DO SABER PELO DISCENTE

EL USO DE DIBUJOS COMO ESTRATEGIA DE APRENDIZAJE EN CLASES DE HEMATOLOGÍA: LA CONSTRUCCIÓN DEL CONOCIMIENTO POR PARTE DEL ESTUDIANTE



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ABSTRACT

The study of hematology is multifaceted, requiring students to have both theoretical knowledge and prior ability to visualize complex microscopic structures. This work evaluated the impact of a methodology, using drawings of leukocyte morphology along with their morphofunctional description, with students from the Pharmacy course. This is a descriptive study, with a qualitative and quantitative approach, developed with 40 students enrolled in the Basic Hematology course of the Pharmacy program. Initially, the teacher gave a theoretical-practical presentation on the main characteristics of leukocytes, using microscopic slides to introduce and contextualize the content. Then, the students were instructed to draw the visualized cells and describe them in terms of morphology and function. Subsequently, a microscopic quiz was conducted to identify cell types before and after the activity, allowing for a comparative analysis. Finally, a Google Forms evaluation questionnaire was applied. As a result, a significant level of participation in the proposed activity was observed, with 35 students (87.5%) taking part. Regarding the assessment of self-perception of knowledge, a substantial modification was observed in the parameters presented by the students after the strategy, with the consolidation of learning. Regarding the activity's contribution to academic life, 85.7% of participants stated that the methodology helped elucidate robust concepts associated with cells, and 59.5% reported that the proposal facilitated microscopic visualization. It was concluded that the leukocyte drawing activity was effective in strengthening learning and connecting the practical and theoretical aspects of the Basic Hematology discipline.

Keywords: Active Methodologies. Drawing. Learning.

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RESUMO

O estudo da disciplina hematologia é multifacetada, necessitando dos estudantes conhecimentos teóricos e habilidade prévia na capacidade de visualizar estruturas microscópicas complexas. O trabalho avaliou o impacto de uma metodologia, utilizando desenhos da morfologia dos leucócitos juntamente com sua descrição morfofuncional, com discentes do curso de Farmácia. Trata-se de um estudo descritivo, com abordagem quantitativa, desenvolvido com 40 estudantes, matriculados na disciplina de Hematologia Básica do curso de Farmácia. Inicialmente, o docente fez uma exposição teórico-prática sobre as principais características dos leucócitos, com o suporte de lâminas microscópicas, de modo a introduzir e contextualizar o conteúdo. Em seguida, os alunos foram instruídos a desenhar as células visualizadas e descrevê-las quanto a morfologia e função. Subsequentemente, realizou-se uma gincana microscópica, com o intuito de identificação dos tipos celulares antes e após à atividade, possibilitando uma análise comparativa. Por fim, aplicou-se um formulário avaliativo Google Forms. Como resultado observou-se uma adesão expressiva à atividade proposta, com a participação de 35 alunos (87,5%). Quanto à avaliação da autopercepção do conhecimento, observou-se uma modificação substancial nos parâmetros expostos pelos alunos após a estratégia, com a consolidação da aprendizagem. Quanto à contribuição da atividade na vida acadêmica, 85,7% dos participantes afirmaram que a metodologia auxiliou na elucidação de conceitos robustos associados às células e 59,5% relataram que a proposta facilitou a visualização microscópica. Concluiu-se, que a atividade de desenho dos leucócitos foi eficaz no fortalecimento do aprendizado e na conexão entre os aspectos prático e teórico da disciplina de Hematologia Básica.

Palavras-chave: Metodologias Ativas. Desenho. Aprendizagem.

RESUMEN

El estudio de la hematología es multifacético y requiere que los estudiantes posean tanto conocimientos teóricos como la capacidad previa de visualizar estructuras microscópicas complejas. Este trabajo evaluó el impacto de una metodología, utilizando dibujos de la morfología de los leucocitos junto con su descripción morfofuncional, con estudiantes del curso de Farmacia. Se trata de un estudio descriptivo, con un enfoque cualitativo y cuantitativo, desarrollado con 40 estudiantes matriculados en el curso de Hematología Básica del programa de Farmacia. Inicialmente, el profesor impartió una presentación teórico-práctica sobre las principales características de los leucocitos, utilizando preparaciones microscópicas para introducir y contextualizar el contenido. Posteriormente, se instruyó a los estudiantes para que dibujaran las células visualizadas y las describieran en términos de morfología y función. A continuación, se realizó un cuestionario microscópico para identificar los tipos de células antes y después de la actividad, lo que permitió un análisis comparativo. Finalmente, se aplicó un cuestionario de evaluación mediante Google Forms. Como resultado, se observó un nivel significativo de participación en la actividad propuesta, con 35 estudiantes (87,5%) participando. En cuanto a la autoevaluación del conocimiento, se observó una modificación sustancial en los parámetros presentados por los estudiantes tras la estrategia, con la consiguiente consolidación del aprendizaje. Respecto a la contribución de la actividad a la vida académica, el 85,7% de los participantes afirmó que la metodología ayudó a dilucidar conceptos fundamentales relacionados con las células, y el 59,5% indicó que la propuesta facilitó la visualización microscópica. Se concluyó que la actividad de dibujo de leucocitos fue eficaz para fortalecer el aprendizaje y conectar los aspectos prácticos y teóricos de la disciplina de Hematología Básica.

Palabras clave: Metodologías Activas. Dibujo. Aprendizaje.

1 INTRODUCTION

Hematology is a specialty of medicine that studies the morphological, biochemical, and functional aspects of blood components and the organs involved in the process of formation, proliferation, differentiation, and maturation of blood cells, as well as quantitative and qualitative cellular changes (Jiménez, 2017; Borelli, 2023). This specialty deals with the detailed study of the physiological mechanisms of the red series, composed of erythrocytes whose main function is to perform tissue oxygenation, consisting of leukocytes that participate in the body's defense, and platelets, which play an indispensable role in homeostasis and coagulation (Jiménez, 2017; Hoffbrand; Moss, 2018). In addition, Hematology is dedicated to the study of pathologies resulting from changes in blood elements, such as anemia, polyglobulia, hemostasis disorders, coagulopathies and neoplasms, including the prevention, diagnosis, evolution and treatment of these conditions (Melo; Silveira, 2019; Lima *et al.*, 2024).

The discipline of Hematology, in the undergraduate course in Pharmacy, serves to train the student for the future exercise of the profession in Clinical Analysis. This subject is taught with theoretical and practical classes and in the latter, there is the performance of several laboratory techniques, highlighting the blood count. The realization of this exam is the main focus of teaching and is characterized by being a relatively difficult procedure to be performed, because the students who are going to take this discipline have a very elementary notion about optical microscopy and need the constant support of the teacher and monitors to establish themselves in this area.

The correct performance and interpretation of the blood count requires an in-depth understanding of the morphology of blood cells, their modifications associated with various diseases, as well as knowledge of how to use the microscope appropriately as a practical tool for the visualization of cells in the blood smear (Failace, 2015; Silva; Ribeiro Neto; Santos, 2017). The morphological identification of white blood cells, for example, requires visual training, concentration, and attention to microscopic details, which can be initially challenging (Rodak *et al.*, 2020; Silva; Ribeiro Neto; Santos, 2017). Thus, during undergraduate studies in Pharmacy, many students face difficulties in transposing what they learn in theory to what they observe under the microscope. This fact may occur due to the resistance to playful and visual methods by many teachers, remaining in traditional teaching, which can create a distance between theory and practical reality (Lima *et al.*, 2019; Ferreira *et al.*, 2024; Marinho, 2025). In addition, there are factors intrinsic to the student, such as social and financial conditions, cognitive overload, lack of motivation and lack of interest, such individual attributes can lead to a stressful and inefficient scenario of the teaching-learning

process, reducing student engagement (Oliveira; Caggy, 2013; Freeman *et al.*, 2014; Salvatierra, 2019).

In this way, the "making of drawings by the students themselves" can be a pedagogical proposal that is inserted in the context of Active Methodologies, as it is characterized by the student's protagonism. Active Methodologies, which have been widely discussed and implemented in higher education, especially in the areas of health, are presented as teaching strategies that place the student at the center of the learning process, stimulating their active participation in the construction of knowledge (Ferreira *et al.*, 2024; Azevedo *et al.*, 2025; Rocha *et al.*, 2025; Rodrigues; Coutinho, 2025). In this format, the student ceases to be a passive listener of information and becomes a critical, creative, reflective, autonomous and independent subject about the contents studied, and this behavior is fundamental for their professional training (Cunha *et al.*, 2024; Ferreira *et al.*, 2024; Azevedo *et al.*, 2025; Pancotto; Rosenau, 2025; Rodrigues; Coutinho, 2025). In addition, studies show that active approaches promote greater interaction between students and content, greater knowledge retention, stimulation of long-term memory, and consequently better academic performance, when compared to traditional teaching methods, highlighting some of the benefits of adopting this model (Freeman *et al.*, 2014; Ferreira *et al.*, 2024; Oliveira *et al.*, 2024; Azevedo *et al.*, 2025).

Under this bias, the use of drawing stimulates the detailed observation, interpretation and creative and authorial reproduction of cellular structures, promoting visual reasoning and active learning, in which the student becomes the protagonist of his learning (Lima *et al.*, 2019). In addition, the act of drawing allows the visualization of concepts considered abstract for the student and promotes connections between the subjects studied (Pagliarini, 2016). Therefore, drawing should not be seen only as an artistic activity, but also as a way of learning that enhances the understanding of theory (Schwamborn *et al.*, 2010; Fiorella; Zhang, 2018). Thus, the use of illustrations is a potentially effective strategy, especially in disciplines that involve visual components, such as Hematology.

In this context, the present study aimed to evaluate the impact of the application of a methodology, using drawings of the morphology of leukocytes together with their morphofunctional description, carried out in order to solve the difficulties in microscopic visualization and to evaluate whether the learning was effective among the students of the Basic Hematology discipline of the Pharmacy course.

2 METHODOLOGY

This is a descriptive study, with a quantitative approach, developed with the aim of implementing and evaluating an active strategy in the teaching-learning process in Hematology. In this sense, we sought to use the drawing of blood cells, with emphasis on leukocytes, associated with the detailed description of their morphological and functional characteristics as a pedagogical tool for the fixation of contents and significant construction of knowledge. The methodology was structured in sequential stages and was applied in a class composed of 40 students from the 4th semester, regularly enrolled in the Basic Hematology discipline of the Pharmacy course. Initially, the professor responsible for the course made a theoretical-practical presentation on the main characteristics, classifications and functions of leukocytes, with the support of microscopic slides, in order to introduce and contextualize the content.

In the subsequent stage, the students were encouraged to produce schematic and illustrative images of the cells they had visualized, along with the description of the relevant morphological aspects, such as the size and color of the cell, cytoplasmic composition and nuclear shape, and also the physiological functions performed by each leukocyte. In addition, the students had the monitors of the discipline as an auxiliary element during the execution of the illustrations.

After completion, all students received a score, as an incentive to engagement, participation and commitment to the proposed activity. Then, as a complementary step, a practical gymkhana was carried out using microscopes, in which slides with leukocyte cells were added in order to analyze observation, microscopic interpretation and the ability to identify cell types before and after the activity, enabling a comparative analysis of its impact. Finally, an evaluation form was applied through the *Google Forms platform* in order to measure the perception of the students in relation to the adopted methodology, as well as its effectiveness in class learning.

Among the evaluative criteria contained in the form, the participants had to rate their ability to distinguish granulocytes and agranulocytes before and after the activity, using a Likert-type scale, composed of "very bad", "bad", "moderate", "good" and "excellent". Simultaneously, the students evaluated the activity of the drawing in terms of its efficacy for the association between the theoretical content and the cells seen in the blood distension, as well as its cooperation for the microscopic differentiation of leukocytes during the practical class and for the establishment of knowledge about these cells. Finally, the undergraduates selected those leukocytes that they had the greatest degree of difficulty in understanding morphofunctionally during exercise. This instrument allowed the collection of relevant data

on the acceptance of the method and its efficiency, enabling the analysis of its implementation in subsequent classes.

3 RESULTS AND DISCUSSION

3.1 PROFILE OF THE PARTICIPANTS

The adhesion of the students to the proposed activity was expressive, with the participation of 35 students, corresponding to 87.5% of the class formed by 40 students. This data shows a relevant level of engagement of academics, a considerable aspect when it comes to the implementation of active strategies in higher education. Strong participation can be understood as a strong indication of the acceptance of the pedagogical proposal, as well as its potential to arouse the interest of students in the content exposed, a factor that is essential for the efficiency of the teaching-learning process, making it less tedious.

3.2 EVOLUTION OF SELF-PERCEPTION OF KNOWLEDGE

Regarding the evaluation of the self-perception of knowledge, a substantial change was observed in the parameters exposed by the students before and after the methodology. Regarding granulocyte leukocytes (rod and segmented neutrophils, basophil and eosinophil), it was found that, prior to the illustrative exercise, 28 students (80%) classified their knowledge as ranging from very bad (8.6%), poor (37.1%) and moderate (34.3%). This initial data suggests a difficulty in assimilating the contents linked to this cell group, possibly associated with the complexity of understanding its morphological character, as well as the limitations presented in traditional teaching methods, commonly centered on the exposure of pictures from textbooks that differ from authentic visualization under the microscope, corroborating the obstacle of integrating theory and practice.

After applying the methodology, a significant inversion was observed in this panorama, with the same number of students, 28 students, corresponding to 80% of the total number of participants, categorizing their knowledge as good (54.3%) or excellent (25.7%). This change in the self-perception of comprehension demonstrates a strong indication that the didactic model adopted was effective in consolidating cell morphology.

At the same time, similar results were observed with regard to agranulocyte leukocytes (lymphocyte and monocyte). Prior to the activity, 23 students (65.7%) considered their understanding as very bad (8.6%), bad (17.1%) or moderate (40%), reinforcing, once again, the existence of gaps in initial learning. After the suggested intervention, there was an evolution in the level of security in the self-perception of knowledge, with 31 students (88.6%) evaluating it as good (48.6%) or excellent (40%). This significant increase reinforces the

effectiveness and demand of the technique used, indicating that initiatives that encourage the active participation of the student as a central agent in their intellectual and scientific construction process can add to the solidification and self-confidence in their learning.

The aforementioned results are in agreement with the literature studied, which showed that drawings executed by the students themselves favor the development of effective learning of the proposed content (Schwamborn *et al.*, 2010; Fiorella; Zhang, 2018; Cromley; Du; Dane, 2020; Navratil; Kühl, 2023).

The integral analysis of the data of the present study allows us to conclude that the pedagogical approach not only favored the improvement of the self-perception of knowledge, but also played a crucial role in the positive impact on the assimilation of the subjects, enhancing its conceptual and practical mastery, elements that are closely related to academic self-confidence. However, it is worth noting that self-perception, although significant, has a subjective bias since it can be influenced by personal factors such as motivation, interest and individual stimulus. Thus, its interpretation must be made in a critical and rational way, combined, when possible, with other evaluative criteria.

3.3 IMPACT ON THE INTEGRATION BETWEEN PRACTICE AND THEORY

Regarding the students' view of the contribution of the activity to their academic life, 30 participants (85.7%) stated that the methodology fulfilled its initial objective of assisting in the elucidation of robust concepts and functional details associated with the defense cells of the human body. This answer signals the relevance of tools that can overcome the traditional aspects of teaching blood cells and that emphasize the importance of integrating the function with its given morphology, especially white blood cells. Thus, the assimilation of this morphofunctional basis is essential and should be consolidated during graduation, enabling the training of professionals capable of detecting possible pathophysiological changes.

In addition, the students' perception regarding the reading of slides under the microscope after the developed strategy was evaluated, in which 22 students (59.5%) reported that the proposal facilitated the visualization of the cells in the blood distension under the aid of the microscope during the practical class in the laboratory. Although this percentage is comparatively lower than the others, it still includes the majority of participants, showing that this didactic method had repercussions on the improvement of the practical ability of microscopic observation.

Another factor that clarifies this quantitative finding is that the identification of blood cells in hematological slides requires not only theoretical knowledge, but also laboratory experience that is acquired through the development of specific visual skills obtained by

recurrent practice. In this sense, the activity reveals itself as an initial facilitator, contributing to the habituation with the cellular structures and the technical criteria for their correct identification.

From this perspective, the methodology was able to promote the integration between practice and theory, a fact that was validated by the students, of whom 24 (64.9%) agreed that the artistic and descriptive exercise served as an efficient instrument in establishing this connection. Therefore, pedagogical approaches that transcend the limit between concept and execution are essential to promote critical and reflective attitudes during the study, aiming at the application of scientific knowledge in real situations in the laboratory.

Corroborating the data found in the present research, there is a study carried out by Oliveira, Silva and Duarte (2019) with students of the Histology discipline of the Physiotherapy Course of a Public University, whose result showed that the drawing method based on the observation of histological slides, helped in the theoretical-practical development of the undergraduates.

3.4 DIFFICULTIES EXPERIENCED BY STUDENTS

Despite the positive results, the analysis of the data was not restricted to this aspect and evidenced the specific difficulties faced by the students. According to the evaluative form, the leukocytes that presented the highest level of difficulty in terms of morphological differentiation and identification under the microscope were eosinophils and monocytes, while in terms of functional characterization were basophils and eosinophils. These impasses can be justified by the intrinsic characteristics of these cells, such as the coloration of the granules, the low frequency in blood smears because they are few in the peripheral circulation, and the morphological similarity with other granulocytes, especially in the case of basophils, whose granules are profoundly dark, obscuring the visualization of their nucleus.

Thus, understanding the functions of these leukocytes can be more complex, since it involves immunological processes, such as allergic reactions and responses to the presence of parasites, which are not commonly addressed in depth in the initial semesters of training. In addition, during the elaboration of the activity, the monitors of the discipline played an essential role as mediators of learning, offering a follow-up of the classes and reinforcing the main criteria to be observed under the microscope and reproduced in the drawing. After applying the methodology, the monitors were also active in answering questions and mitigating, together with the students, these difficulties that were listed later.

From a critical point of view, the outcomes obtained demonstrate that the applied strategy has potential as a teaching tool, as reports in the literature show that the execution

of a drawing is associated with the stimulation of memory and perceptions, with a consequent increase in the capacity for observation and concentration (Ramos; Porfírio, 2011; Palheiro, 2020).

However, the results of the present study also highlighted the need for adjustments and complementations, especially with regard to the development of more refined practical skills, the approach to contents considered more complex, such as leukocyte functions, and the establishment of a greater number of evaluation criteria.

In summary, the investigation of the data suggests that the use of active pedagogical approaches, such as the combination of cell design and its morphofunctional description, can represent an interactive and strategic resource in the teaching of Hematology, enabling the improvement of skills crucial to the training of pharmaceutical professionals. Therefore, its implementation should be continuous, improved and integrated with other pedagogical schemes, in order to enhance its effects and explore its applicability in the study of other areas, such as Histology, Embryology and Anatomy, frequent disciplines in health courses.

4 FINAL CONSIDERATIONS

The design of white blood cells associated with their morphological and functional description demonstrated efficacy in strengthening learning and in the connection between the practical and theoretical aspects of the discipline of Basic Hematology. Therefore, the data obtained indicate that visual and active strategies can minimize common difficulties in cell identification, increase student engagement and favor a more solid and interactive learning. In addition, there has been an evolution in the visual understanding of leukocytes, indicating that the method has helped in the critical and detailed observation of their morphological characteristics, although there are still some difficulties in differentiating and identifying more complex cellular attributes.

In this way, illustration presents itself as an important and effective pedagogical tool in the learning process of blood cells, especially leukocytes, indicating the need for its progression and continuous application with the improvement of more objective evaluative criteria in order to maximize its effect in the academic context.

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THE TRAJECTORY OF SELF-EFFICACY IN MEDICAL EDUCATION: CHALLENGES AND PROSPECTS

A TRAJETÓRIA DA AUTOEFICÁCIA NA FORMAÇÃO MÉDICA: DESAFIOS E PERSPECTIVAS

LA TRAYECTORIA DE LA AUTOEFICACIA EN LA FORMACIÓN MÉDICA: DESAFÍOS Y PERSPECTIVAS



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ABSTRACT

This longitudinal study investigated the trajectory of perceived self-efficacy among medical students over a four-year undergraduate program, grounded in Albert Bandura's Social Cognitive Theory. Self-efficacy, understood as the belief in one's capacity to succeed in specific situations, is essential for academic performance, persistence, and adaptation. The research followed students from the basic science cycle through clinical internship, utilizing the Perceived Self-Efficacy Scale in Higher Education (EAPES), which assesses five dimensions: academic competence, learning regulation, social interaction, proactive actions,

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and academic management. The findings revealed a significant decline in overall self-efficacy from the beginning of the course through the mid-clinical cycle, followed by partial recovery during the internship year, though not returning to initial levels. The proactive actions dimension exhibited the most pronounced decline and least recovery, suggesting that students' confidence in taking initiative and acting independently is particularly vulnerable during medical training. Individual trajectories varied considerably, underscoring the influence of personal and contextual factors. These findings have substantial implications for medical education, indicating the necessity for targeted pedagogical interventions, particularly during critical transition periods between cycles. The study contributes to understanding how the escalating demands of medical training impact students' perceived competence.

Keywords: Self Efficacy. Medical Students. Longitudinal Study. Medical Education. Professional Training.

RESUMO

Este estudo longitudinal investigou a trajetória da autoeficácia percebida em estudantes de medicina ao longo de quatro anos de formação, fundamentando-se na Teoria Social Cognitiva de Albert Bandura. A autoeficácia, entendida como a crença na capacidade de sucesso em situações específicas, é essencial para o desempenho acadêmico, persistência e adaptação. A pesquisa acompanhou estudantes desde o ciclo básico até o internato, utilizando a Escala de Autoeficácia Percebida no Ensino Superior (EAPES), que avalia cinco dimensões: acadêmica, regulação da formação, interação social, ações proativas e gestão acadêmica. Os resultados revelaram um declínio significativo na autoeficácia geral do início do curso até a metade do ciclo clínico, seguido de recuperação parcial no internato, embora não retornando aos níveis iniciais. A dimensão de ações proativas apresentou o declínio mais pronunciado e menor recuperação, sugerindo que a confiança dos estudantes em tomar iniciativas e agir independentemente é particularmente vulnerável durante a formação médica. As trajetórias individuais variaram consideravelmente, evidenciando a influência de fatores pessoais e contextuais. Os achados têm implicações importantes para a educação médica, indicando a necessidade de intervenções pedagógicas direcionadas, especialmente durante períodos críticos de transição entre ciclos. O estudo contribui para compreender como as demandas crescentes da formação médica impactam a percepção de competência dos estudantes.

Palavras-chave: Autoeficácia. Estudantes de Medicina. Estudo Longitudinal. Educação Médica. Desenvolvimento Profissional.

RESUMEN

Este estudio longitudinal investigó la trayectoria de la autoeficacia percibida en estudiantes de medicina durante cuatro años de formación, fundamentándose en la Teoría Social Cognitiva de Albert Bandura. La autoeficacia, entendida como la creencia en la propia capacidad para alcanzar el éxito en situaciones específicas, es esencial para el desempeño académico, la persistencia y la adaptación. La investigación siguió a estudiantes desde el ciclo de ciencias básicas hasta el internado clínico, utilizando la Escala de Autoeficacia Percibida en la Educación Superior (EAPES), que evalúa cinco dimensiones: competencia académica, regulación del aprendizaje, interacción social, acciones proactivas y gestión académica. Los resultados revelaron un declive significativo en la autoeficacia general desde el inicio del curso hasta la mitad del ciclo clínico, seguido de una recuperación parcial durante el año de internado, aunque sin retornar a los niveles iniciales. La dimensión de acciones proactivas exhibió el declive más pronunciado y la menor recuperación, sugiriendo que la confianza de los estudiantes en tomar iniciativas y actuar de manera independiente es particularmente vulnerable durante la formación médica. Las trayectorias individuales variaron considerablemente, evidenciando la influencia de factores personales y

contextuales. Estos hallazgos tienen implicaciones sustanciales para la educación médica, indicando la necesidad de intervenciones pedagógicas dirigidas, particularmente durante períodos críticos de transición entre ciclos. El estudio contribuye a la comprensión de cómo las demandas crecientes de la formación médica impactan la competencia percibida de los estudiantes.

Palabras clave: Autoeficacia. Estudiantes de Medicina. Estudio Longitudinal. Educación Médica. Capacitación Profesional.

1 INTRODUCTION

The academic journey in medicine is widely recognized as challenging, demanding from students not only an extensive mastery of scientific knowledge and technical skills but also psychological robustness to confront the inherent pressures of training and future professional practice (Ten Cate et al., 2024). In this context, perceived self-efficacy emerges as a psychological construct of fundamental importance, directly influencing academic performance, persistence in the face of obstacles, and the capacity to adapt to new learning environments (Bandura, 1997). Self-efficacy, as defined by Albert Bandura, refers to an individual's belief in their own ability to organize and execute the actions required to produce specific outcomes. In other words, it is the conviction that one possesses the competencies to perform a task or achieve a particular goal. This belief is not merely a reflection of actual abilities but a powerful predictor of how individuals behave, the effort they invest, and the resilience they exhibit in the face of adversity (Bandura, 1986; Klassen & Klassen, 2018).

Medical education, with its complex and progressive curricular structure—transitioning from the basic sciences cycle to the clinical cycle and finally to the internship—imposes escalating demands on students. Each phase presents distinct challenges: the basic sciences cycle, with its intense theoretical load and the need to memorize vast content; the clinical cycle, which introduces patient contact and the practical application of knowledge, requiring clinical reasoning and interpersonal skills; and the internship, characterized by full immersion in the hospital environment, with significant responsibilities and the necessity for decision-making under pressure (Biswas et al., 2022). The transition between these phases can be a period of considerable stress and uncertainty, impacting students' perceptions of their own capabilities. Understanding how self-efficacy develops and evolves throughout this trajectory is crucial for identifying points of vulnerability and designing more effective pedagogical and psychological support interventions (Visoso, 2024; Costa Filho et al., 2022).

The literature has explored self-efficacy in various educational contexts, including medicine, but longitudinal studies tracking the same cohort of students over an extended period—capturing the nuances of changes in perceived self-efficacy across different training phases—remain relatively scarce (Zheng et al., 2020). Most research is cross-sectional, providing a snapshot of self-efficacy at a given moment but lacking the ability to trace fluctuations and the factors influencing them over time. The gap in the literature thus lies in the need for investigations that offer a more dynamic and process-oriented understanding of self-efficacy in medical education, particularly within a curriculum spanning several years and marked by significant transitions.

This chapter aims to address this gap by presenting the results of a longitudinal study that followed a cohort of medical students over four years, from the beginning of the course through to the internship. The study was conducted at a public university located in the interior of the state of São Paulo, from 2021 to 2025. The primary objective was to analyze the trajectory of perceived self-efficacy, identifying patterns of change and the factors associated with these fluctuations. We believe that the findings of this study can provide valuable insights for medical educators, educational policymakers, and the students themselves, contributing to the creation of learning environments that foster well-being and the development of more competent and confident professionals.

1.1 SOCIAL COGNITIVE THEORY AND SELF-EFFICACY

Social Cognitive Theory (SCT), developed by Albert Bandura, stands as one of the most influential theoretical frameworks for understanding human behavior, learning, and motivation (Bandura, 1986). At the core of SCT is the concept of human agency, which posits that individuals are not mere passive recipients of environmental stimuli but active agents who influence and are influenced by their environment, personal factors, and their own behavior in a triadic reciprocal causation process. Within this framework, perceived self-efficacy occupies a central position, regarded as the most important cognitive mechanism of human agency (Bandura, 1997).

Bandura (1997) contends that self-efficacy beliefs form the foundation of human agency, as they determine whether people will think optimistically or pessimistically, motivate themselves or become despondent, and how they will behave in challenging situations. Individuals with high self-efficacy tend to set higher goals, persist longer in the face of obstacles, recover more quickly from failures, and experience less stress and anxiety when confronting difficult tasks. In contrast, those with low self-efficacy may avoid challenging tasks, give up easily, and focus on their personal deficits, potentially leading to a vicious cycle of unsatisfactory performance and diminished confidence (Klassen & Klassen, 2018; Burr, 2019).

Thus, the relevance of SCT and the self-efficacy construct to medical education is undeniable. The training of a physician is a continuous process of acquiring new skills and knowledge, where the ability to learn, adapt, and persist is constantly tested (Ten Cate et al., 2024). Self-efficacy beliefs influence career choices, engagement with learning, resilience in the face of clinical challenges, and the capacity to manage uncertainty and the complexity of medical practice (Bandura, 2001). Therefore, understanding how these beliefs develop and

are sustained throughout medical school is essential for optimizing the educational process and training more prepared and confident professionals.

1.2 SELF-EFFICACY IN MEDICAL EDUCATION

Medical education provides fertile ground for applying the principles of Social Cognitive Theory, particularly with regard to self-efficacy. The curriculum's complexity, heavy workload, exposure to human suffering, and constant performance evaluation are factors that can significantly impact students' perceptions of their own capabilities (Jebram, 2024; Zheng et al., 2020). Self-efficacy among medical students extends beyond mere confidence in learning and memorizing content; it encompasses trust in clinical skills, communication, diagnostic reasoning, decision-making, and stress management.

Studies have demonstrated that self-efficacy is positively correlated with academic performance in medical students. Those with higher self-efficacy tend to engage more actively in the learning process, employ more effective study strategies, and persist in difficult tasks, which translates into better grades and greater success in examinations. Moreover, self-efficacy has been linked to important outcomes for future medical practice, such as specialty choices, professional satisfaction, and the ability to handle uncertainty and clinical complexity (Klassen & Klassen, 2018; Bandura, 1977).

However, the trajectory of self-efficacy throughout medical school is not linear. Some studies suggest that self-efficacy may decline during specific phases of training, particularly during transitions to the clinical cycle and internship, when students confront the realities of medical practice and perceive their own limitations (Li et al., 2023). This decline may be attributed to factors such as the discrepancy between expectations and reality, exposure to challenging clinical situations for which students feel unprepared, workload overload, and a lack of constructive feedback. Understanding these fluctuations is vital for developing support programs and pedagogical interventions. For instance, mentorship programs, realistic clinical simulations, constructive feedback, and supervised mastery experiences can bolster students' self-efficacy during critical training moments (Yong & Roberts, 2024). Identifying the specific dimensions of self-efficacy most vulnerable to declines can direct the focus of these interventions, rendering them more effective.

In summary, this chapter is justified by the need to deepen understanding of self-efficacy in medical education through a longitudinal methodology that captures the complexity of its trajectory. Its relevance lies in providing evidence to enhance pedagogical practices and student support, contributing to the training of more competent, resilient, and confident physicians capable of facing professional challenges with agency and self-efficacy.

2 METHODS

The present study is characterized as longitudinal, prospective, and quantitative, tracking a cohort of incoming medical students at a public university located in northwestern São Paulo in 2021. The initial sample comprised 80 students, with a final sample of 50 participants who completed all data collection waves.

2.1 INSTRUMENTS

Two instruments were employed for data collection:

- **Sociodemographic Questionnaire:** Collected basic participant information, such as age, sex, race, place of residence, location of elementary and secondary education, among other variables. Developed by the researchers.
- **Perceived Self-Efficacy Scale in Higher Education (PSEHE):** This scale, adapted and validated for the Brazilian context, assesses perceived self-efficacy across five specific dimensions of the university environment (Polydoro & Guerreiro-Casanova, 2010):
 - **Academic:** Beliefs regarding the capacity to perform study and learning tasks.
 - **Regulation of Training:** Beliefs regarding the capacity to manage one's own learning and development process.
 - **Social Interaction:** Beliefs regarding the capacity to relate to and interact with peers and professors.
 - **Proactive Actions:** Beliefs regarding the capacity to take initiatives and seek opportunities.
 - **Academic Management:** Beliefs regarding the capacity to organize and plan academic activities.

2.2 DATA COLLECTION

Data collection was conducted at four distinct time points, following students' progression through the medical program:

- **Time 1 (2021):** Beginning of the course (basic sciences cycle).
- **Time 2 (2022):** Second year of the course (onset of the clinical cycle).
- **Time 3 (2023):** Third year of the course (mid-clinical cycle).
- **Time 4 (2025):** Fifth year of the course (internship).

2.3 DATA ANALYSIS

Data were analyzed using descriptive and inferential statistics. To evaluate changes in perceived self-efficacy over time, repeated-measures Analysis of Variance (ANOVA) was employed, with a significance level of $p \leq 0.05$. Effect size was calculated using Cohen's d to indicate the magnitude of observed differences (Cohen, 1988).

3 RESULTS

The results of this longitudinal study offer a detailed perspective on the trajectory of perceived self-efficacy among medical students across four years of training. Data analysis enabled characterization of the sample, identification of evolutionary patterns in total self-efficacy and its dimensions, and observation of fluctuations at critical junctures in the medical curriculum. The presentation of findings is structured to emphasize the most salient aspects, including participant characterization, overall self-efficacy evolution, and an in-depth examination of dimensions, with particular emphasis on the "Proactive Actions" dimension.

3.1 SAMPLE CHARACTERIZATION

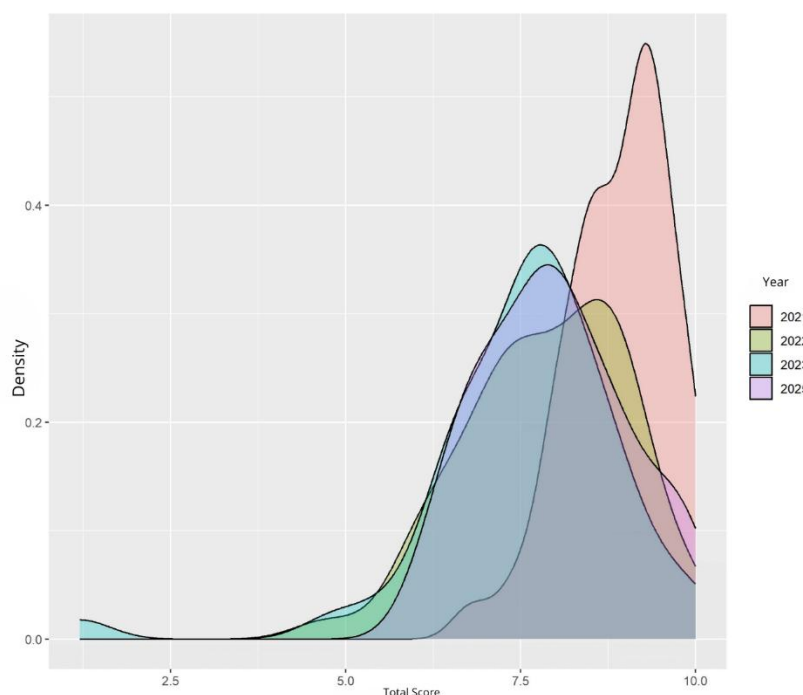
The study sample comprised 50 medical students tracked from the first year (2021) through the fifth year (2025) of the program. The sample exhibited a slight predominance of male students (**56%**). Most participants were young, with **76%** aged 18 to 20 years at course inception—a demographic profile typical of incoming medical students in Brazil. The predominance of students from private schools (**74%**) mirrors established patterns in access to medical higher education at select institutions (Figueiredo et al., 2022). These demographic features provide essential context for result interpretation, though the study's primary emphasis remains the individual longitudinal trajectory of self-efficacy.

3.2 EVOLUTION OF SELF-EFFICACY OVER TIME

Analysis of total perceived self-efficacy disclosed a significant pattern of change throughout the four-year follow-up period. **Figure 1** depicts the mean total self-efficacy scores at each data collection point.

Figure 1

Distribution of the Total Self-Efficacy Score among medical students at different stages of their undergraduate studies (Brazil, 2025)



Source: Research Data, 2025.

The Figure 1 clearly demonstrates a substantial decline in total perceived self-efficacy among students from 2021 (onset of the basic sciences cycle) to 2023 (mid-clinical cycle). The mean score, which was high at the course inception, diminished progressively as students progressed to more demanding phases of training. This decline was statistically significant ($p < 0.001$), indicating that students' perceptions of self-efficacy were considerably undermined during this period.

However, a partial recovery in self-efficacy was observed in 2025 (onset of the internship). Although self-efficacy increased relative to the nadir recorded in 2023, it did not revert to the initial 2021 levels. This recovery suggests that, as students adapt to the exigencies of the clinical cycle and prepare for the internship—or perhaps upon surmounting the most acute challenges of the clinical phase—they commence rebuilding their confidence, albeit incompletely. The disparity between 2023 and 2025 was also statistically significant ($p < 0.01$).

3.3 ANALYSIS BY DIMENSIONS

For a more nuanced understanding, the analysis was extended to the five dimensions of the PSEHE. All dimensions displayed a general pattern of decline followed by partial

recovery, akin to that observed in total self-efficacy. Nevertheless, the magnitude of both decline and recovery varied across dimensions. **Table 1** presents the mean scores for each dimension across the four years.

Table 1

Self-efficacy - scores by years.

Variable	2021 N = 50 ¹	2022 N = 50 ¹	2023 N = 50 ¹	2025 N = 50 ¹
Academic Self-Efficacy	8.92 ± 0.74	8.07 ± 1.25	7.81 ± 1.24	8.13 ± 0.95
Self-Efficacy in Learning Regulation	8.78 ± 0.87	7.71 ± 1.26	7.13 ± 1.84	8.02 ± 1.27
Self-Efficacy in Social Interaction	8.63 ± 0.92	7.76 ± 1.25	7.69 ± 1.47	8.31 ± 1.04
Self-Efficacy in Proactive Actions	8.87 ± 0.89	7.27 ± 1.49	6.81 ± 1.72	6.83 ± 1.71
Self-Efficacy in Academic Management	9.34 ± 0.67	8.55 ± 1.25	8.33 ± 1.50	8.54 ± 1.21
Total Score	8.90 ± 0.72	7.87 ± 1.14	7.56 ± 1.41	7.97 ± 1.03

¹Mean ± standard deviation

Source: Research Data, 2025.

Table 1 reveals that the "Proactive Actions" dimension exhibited the most pronounced decline from 2021 to 2023 and also demonstrated the least recovery in 2025, remaining significantly below initial levels. Whereas other dimensions, such as "Social Interaction", displayed a less marked decline and a more robust recovery, self-efficacy in "Proactive Actions" appears particularly vulnerable to the pressures of medical training.

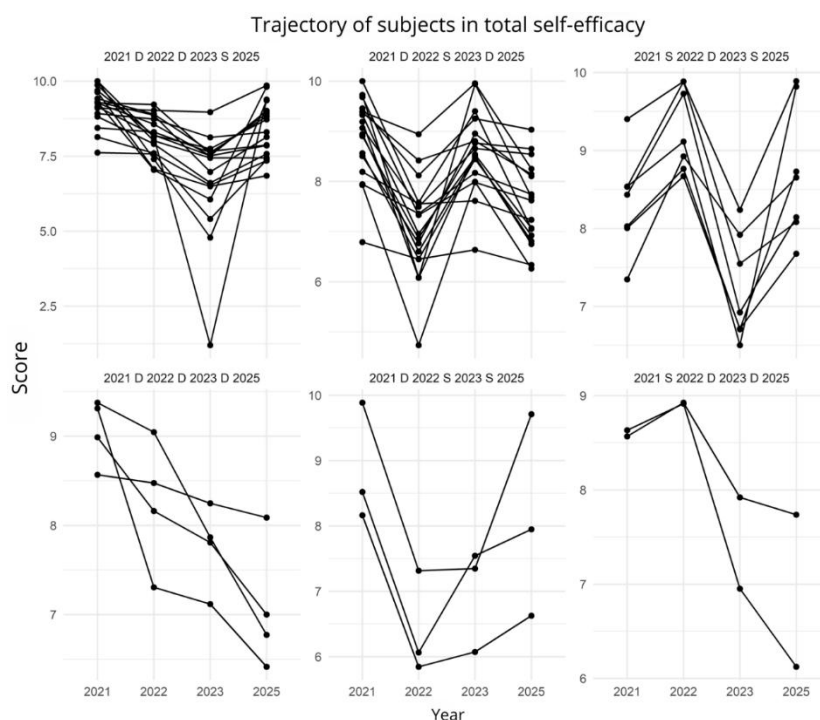
The decline in self-efficacy for "Proactive Actions" may be interpreted as a response to the escalating complexity and responsibility of clinical tasks. At the outset of the course, students may harbor an optimistic perception of their capacity for initiative-taking. However, upon confronting the realities of the clinical cycle—wherein decision-making bears direct implications for patient health and constant supervision prevails—confidence in independent proactive action may be profoundly undermined (Carlsson et al., 2023; Benett-Weston et al., 2024). The partial recovery in 2025 may reflect adaptation and the cultivation of greater autonomy during the internship, yet the persistence of lower levels relative to course inception constitutes a concerning finding.

3.4 INDIVIDUAL TRAJECTORIES

Although group means disclose clear trends, analysis of the individual trajectories of the 50 participants indicated considerable variability. Some students maintained relatively stable self-efficacy levels over time, whereas others experienced more drastic declines and slower or absent recoveries. **Figure 2** illustrates hypothetical examples of individual trajectories for total self-efficacy.

Figure 2

Individual trajectories of total self-efficacy scores in medical students throughout their undergraduate studies, indicating patterns of decrease (D), increase (S), or stability (I) in scores between 2021, 2022, 2023, and 2025 (Brazil, 2025)



Source: Research Data, 2025.

Figure 2, though illustrative, underscores the heterogeneity of individual experiences. This variability suggests that, while general trends exist, specific personal and contextual factors may modulate each student's self-efficacy trajectory. Factors such as coping strategies, social support networks, mentorship experiences, and personality traits may play a pivotal role in how individuals perceive and manage the challenges of medical training (Lajimi et al., 2025; Burr, 2019; Khawwaf et al., 2024). Identifying these individual factors and elucidating their interactions with curricular demands represent promising avenues for future research.

In summary, the results of this longitudinal study confirm a significant decline in perceived self-efficacy among medical students during the early and intermediate phases of the program, followed by partial recovery. The "Proactive Actions" dimension proved particularly vulnerable. These findings carry important implications for medical education, which will be explored in the discussion section.

4 DISCUSSION

The findings of this longitudinal study provide a profound understanding of the dynamics of perceived self-efficacy in medical students, revealing a pattern of substantial decline followed by partial recovery over four years of training. The identification of the "Proactive Actions" dimension as the most affected offers a crucial focal point for discussion and intervention development. This section interprets these results through the lens of Bandura's Social Cognitive Theory, explores implications for medical education, and addresses study limitations alongside future directions.

4.1 DECLINE IN SELF-EFFICACY: UNDERSTANDING THE PHENOMENON

The significant decline in perceived self-efficacy from 2021 to 2023—spanning the basic sciences cycle and the onset of the clinical cycle—resonates with extant literature on the rigors of medical training (Huamán-Tapia et al., 2023). At course inception (2021), students typically arrive with elevated expectations and inflated self-efficacy, often rooted in prior academic successes and an idealized view of the profession. This initial self-efficacy may be bolstered by mastery experiences in less demanding contexts and social persuasion (e.g., praise from family and teachers).

However, as students advance through the basic sciences cycle and, particularly, into the clinical cycle, they confront a more complex and demanding reality. The vast volume of information to assimilate, the intricacy of medical concepts, exposure to challenging clinical scenarios, and the imperative to develop practical skills under rigorous supervision can profoundly undermine their self-efficacy beliefs. Mastery experiences become harder to attain, and setbacks (e.g., examination errors, procedural difficulties, negative feedback) may be construed as evidence of incompetence, thereby eroding self-efficacy (Bandura, 1997).

The transition to the clinical cycle (2022–2023) is especially critical. It is during this phase that students begin applying theoretical knowledge to real patients, grappling with uncertainty, responsibility, and the integration of multifaceted knowledge domains and skills. The discrepancy between initial self-efficacy and the realities of clinical demands may precipitate a "reality shock," prompting a more realistic—and often diminished—reappraisal of their capabilities. Physiological and affective states, such as stress and anxiety prevalent in this phase, may also be misinterpreted as indicators of low competence, further contributing to self-efficacy diminution (Alabduljabbar et al., 2022; Salah, 2024).

The partial recovery observed in 2025, at the internship onset, suggests a process of adaptation and resilience. Following the nadir in 2023, students may have cultivated more effective coping strategies, accrued incremental mastery experiences, and received positive

feedback as their clinical skills matured. The internship, though intensive, affords greater opportunities for supervised practice and knowledge consolidation, potentially fortifying self-efficacy (Masoodi et al., 2022). Nevertheless, the failure to revert to 2021 levels indicates that the scars of prior challenges endure, rendering self-efficacy perceptions more realistic—and perhaps more cautious.

4.2 PROACTIVE ACTIONS DIMENSION: AN IN-DEPTH ANALYSIS

The finding that the "Proactive Actions" dimension endured the most pronounced decline and the least recovery is particularly noteworthy. Self-efficacy for proactive actions pertains to beliefs in one's capacity to take initiative, seek solutions, plan, and execute actions independently (Polydoro & Guerreiro-Casanova, 2010). In the medical context, this translates to a student's ability to identify problems, propose management plans, initiate procedures, or intervene in clinical situations without sole reliance on superior guidance.

At course outset, students may exhibit elevated self-efficacy for proactive actions, premised on prior autonomy in academic settings. However, medical culture—especially in early clinical phases—is often hierarchical and supervision-centric. Students are instructed to adhere to protocols, seek permission, and consult superiors before significant initiatives. This structure, while essential for patient safety and supervised learning, may inadvertently erode students' self-efficacy regarding proactive agency (Carlsson et al., 2023; Bennett-W et al., 2024).

Exposure to complex clinical scenarios, where decision-making demands knowledge and experience beyond students' current purview, may reinforce perceptions of inefficacy in proactive action. Fear of errors, their potential consequences, and perpetual scrutiny may foster a passive, dependent stance, diminishing confidence in personal agency.

The limited recovery of self-efficacy for "Proactive Actions" in 2025, even during the internship, raises concern. Although the internship confers greater autonomy, persistent supervisory culture and case complexity may continue inhibiting full proactive self-efficacy expression. This implies a need to rebalance necessary supervision with fostering student agency and initiative. Cultivating responsible, safe proactivity is vital for training competent, autonomous physicians.

4.3 IMPLICATIONS FOR MEDICAL EDUCATION

The results of this study hold significant implications for medical education and student well-being.

1. **Identification of Critical Junctures:** The study highlights 2022 and 2023 (transition and mid-clinical cycle) as periods of heightened self-efficacy vulnerability. Medical institutions must prioritize these phases with targeted support programs.
2. **Focused Interventions:** The vulnerability of the **"Proactive Actions"** dimension underscores the need for pedagogical strategies actively promoting initiative and autonomy under safe supervision, such as high-fidelity simulations, academic leagues, and student organizations.
3. **Mentorship and Coaching:** Mentorship programs encouraging progressive responsibility assumption and reflective action, with constructive feedback.
4. **Progressive Mastery Opportunities:** Curricular structuring to provide incrementally complex mastery experiences, enabling confidence building.
5. **Constructive Feedback Culture:** Fostering feedback that is formative rather than merely evaluative, emphasizing development and self-efficacy enhancement.
6. **Curricular Development:** Revising curricula to integrate self-efficacy-building opportunities, particularly proactivity, via research projects, student leadership, and independent case discussions.
7. **Psychological Support:** Psychological monitoring and stress management programs to help students reframe failures as learning opportunities rather than incompetence indicators.

4.4 LIMITATIONS AND FUTURE DIRECTIONS

Although robust in its longitudinal design, this study has limitations. The sample of 50 participants, while suitable for a cohort study, derives from a single institution, potentially restricting generalizability to other medical schools with divergent curricula or cultures. Convenience sampling may introduce bias.

Another limitation is reliance on a self-report instrument (PSEHE), susceptible to response biases such as social desirability. Despite validation, perceived self-efficacy may not fully align with actual competencies.

Future research should encompass multicenter studies incorporating objective performance measures and self-efficacy assessments, in-depth analyses of modulating factors (e.g., personality, social support), and intervention trials with pre- and post-testing.

5 CONCLUSION

This study demonstrates that perceived self-efficacy among FAMERP medical students declines substantially during undergraduate training, particularly in the basic and clinical cycles. Although partial recovery occurs during the internship, initial levels are not

regained. Among assessed dimensions, **Proactive Actions** exhibited the sharpest decline, while **Social Interaction** proved more stable; individual trajectories varied considerably.

Scientifically, the research contributes meaningfully by longitudinally tracking students, offering an underexplored perspective on self-efficacy in medical training. Findings affirm self-efficacy as dynamic and responsive to stage-specific experiences. Moreover, the study validates the PSEHE's utility in capturing these shifts within the Brazilian context.

Practically, results indicate a need for targeted psychosocial and pedagogical support, especially during vulnerability peaks. Strategies bolstering resilience, proactivity, and burnout prevention can enhance student well-being and academic performance, fostering more confident, prepared professionals. Future investigations should employ mixed methods, incorporate mental health and academic performance factors, and extend to diverse contexts and postgraduate phases.

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PSYCHOMETRIC VALIDATION OF THE BRAZILIAN VERSION OF THE ATTITUDES TO PATIENT SAFETY QUESTIONNAIRE (APSQ-III) AMONG HEALTH STUDENTS

VALIDAÇÃO PSICOMÉTRICA DA VERSÃO BRASILEIRA DO QUESTIONÁRIO DE ATITUDES EM RELAÇÃO À SEGURANÇA DO PACIENTE (APSQ-III) ENTRE ESTUDANTES DA ÁREA DA SAÚDE

VALIDACIÓN PSICOMÉTRICA DE LA VERSIÓN BRASILEÑA DEL CUESTIONARIO DE ACTITUDES HACIA LA SEGURIDAD DEL PACIENTE (APSQ-III) ENTRE ESTUDIANTES DE LA SALUD



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ABSTRACT

This chapter details the cross-cultural adaptation and psychometric validation of the Attitudes to Patient Safety Questionnaire III (APSQ-III) for Brazilian Portuguese, aiming to assess the attitudes of health area students regarding patient safety. Driven by the growing importance of patient safety in education, the study sought to provide a reliable tool to identify training gaps and support pedagogical interventions. The methodology employed a quantitative, descriptive, and cross-sectional study involving 292 first-year Medicine, Nursing, and Psychology students from a Brazilian public university. The cross-cultural adaptation process

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followed rigorous guidelines, including multiple translations, back-translations, and evaluation by an expert committee, which resulted in high semantic, idiomatic, experiential, and cultural equivalence of the Brazilian version. A pre-test with 50 students allowed for minor adjustments to improve item clarity. In the validity analysis, a final model of 26 items and 9 factors of the APSQ-III showed a satisfactory fit to the data through confirmatory factor analysis (CFA). Factor loadings were mostly high, confirming the structure. However, the factors "Inevitability of error" (F4) and "Importance of patient safety in the curriculum" (F9) demonstrated low reliability, suggesting the need for future revisions of these constructs. Correlations between factors revealed significant associations, such as the strong link between team functioning and the valuing of safety in the curriculum, and the relationship between training and confidence in reporting errors. Comparison by sex indicated a statistically significant difference only in the "Confidence in reporting error" (F2) factor, with men showing slightly more confidence than women, albeit with a small effect size. In conclusion, the Brazilian version of the APSQ-III is a valid and reliable tool for most of its dimensions, useful for identifying strengths and weaknesses in training and for monitoring safety culture. Limitations include the convenience sample and the low reliability of two factors. Future research is recommended to diversify samples, revise less robust factors, and conduct longitudinal studies to monitor the evolution of students' attitudes.

Keywords: Patient Safety. Attitudes. Health Students. Health Education. Cross-Cultural Adaptation. Psychometric Validation. Attitudes to Patient Safety Questionnaire. Confirmatory Factor Analysis.

RESUMO

Este capítulo detalha a adaptação transcultural e a validação psicométrica do Attitudes to Patient Safety Questionnaire III (APSQ-III) para o português brasileiro, com o objetivo de avaliar as atitudes de estudantes da área da saúde em relação à segurança do paciente. Impulsionado pela crescente importância da segurança do paciente na educação, o estudo buscou fornecer um instrumento confiável para identificar lacunas na formação e apoiar intervenções pedagógicas. A metodologia empregou um estudo quantitativo, descritivo e transversal envolvendo 292 estudantes do primeiro ano de Medicina, Enfermagem e Psicologia de uma universidade pública brasileira. O processo de adaptação transcultural seguiu diretrizes rigorosas, incluindo múltiplas traduções, retrotraduções e avaliação por um comitê de especialistas, resultando em alta equivalência semântica, idiomática, experiential e cultural da versão brasileira. Um pré-teste com 50 estudantes permitiu ajustes menores para melhorar a clareza dos itens. Na análise de validade, um modelo final com 26 itens e 9 fatores do APSQ-III apresentou ajuste satisfatório aos dados por meio da análise fatorial confirmatória (AFC). As cargas fatoriais foram, em sua maioria, elevadas, confirmando a estrutura. Contudo, os fatores "Inevitabilidade do erro" (F4) e "Importância da segurança do paciente no currículo" (F9) apresentaram baixa confiabilidade, sugerindo a necessidade de revisões futuras desses construtos. As correlações entre fatores revelaram associações significativas, como a forte relação entre o funcionamento da equipe e a valorização da segurança no currículo, além da relação entre formação e confiança na notificação de erros. A comparação por sexo indicou diferença estatisticamente significativa apenas no fator "Confiança na notificação de erro" (F2), com homens apresentando ligeiramente mais confiança que mulheres, embora com pequeno tamanho de efeito. Em conclusão, a versão brasileira do APSQ-III é um instrumento válido e confiável para a maioria de suas dimensões, sendo útil para identificar pontos fortes e fragilidades na formação e para monitorar a cultura de segurança. Entre as limitações destacam-se a amostra por conveniência e a baixa confiabilidade de dois fatores. Recomenda-se que pesquisas futuras diversifiquem as amostras, revisem fatores menos robustos e realizem estudos longitudinais para acompanhar a evolução das atitudes dos estudantes.

Palavras-chave: Segurança do Paciente. Atitudes. Estudantes da Área da Saúde. Educação em Saúde. Adaptação Transcultural. Validação Psicométrica. Attitudes to Patient Safety Questionnaire. Análise Fatorial Confirmatória.

RESUMEN

Este capítulo detalla la adaptación transcultural y la validación psicométrica del Attitudes to Patient Safety Questionnaire III (APSQ-III) para el portugués brasileño, con el objetivo de evaluar las actitudes de los estudiantes del área de la salud en relación con la seguridad del paciente. Impulsado por la creciente importancia de la seguridad del paciente en la educación, el estudio buscó proporcionar un instrumento confiable para identificar brechas en la formación y apoyar intervenciones pedagógicas. La metodología empleó un estudio cuantitativo, descriptivo y transversal con la participación de 292 estudiantes de primer año de Medicina, Enfermería y Psicología de una universidad pública brasileña. El proceso de adaptación transcultural siguió directrices rigurosas, incluyendo múltiples traducciones, retrotraducciones y evaluación por un comité de expertos, lo que resultó en una alta equivalencia semántica, idiomática, experiencial y cultural de la versión brasileña. Un pretest con 50 estudiantes permitió realizar ajustes menores para mejorar la claridad de los ítems. En el análisis de validez, un modelo final con 26 ítems y 9 factores del APSQ-III mostró un ajuste satisfactorio a los datos mediante el análisis factorial confirmatorio (AFC). Las cargas factoriales fueron en su mayoría elevadas, confirmando la estructura. Sin embargo, los factores “Inevitabilidad del error” (F4) e “Importancia de la seguridad del paciente en el currículo” (F9) mostraron baja fiabilidad, lo que sugiere la necesidad de futuras revisiones de estos constructos. Las correlaciones entre factores revelaron asociaciones significativas, como la fuerte relación entre el funcionamiento del equipo y la valoración de la seguridad en el currículo, así como la relación entre la formación y la confianza en la notificación de errores. La comparación por sexo indicó una diferencia estadísticamente significativa únicamente en el factor “Confianza en la notificación de errores” (F2), con los hombres mostrando ligeramente más confianza que las mujeres, aunque con un tamaño de efecto pequeño. En conclusión, la versión brasileña del APSQ-III es una herramienta válida y confiable para la mayoría de sus dimensiones, útil para identificar fortalezas y debilidades en la formación y para monitorear la cultura de seguridad. Entre las limitaciones se destacan la muestra por conveniencia y la baja fiabilidad de dos factores. Se recomienda que futuras investigaciones diversifiquen las muestras, revisen los factores menos robustos y realicen estudios longitudinales para monitorear la evolución de las actitudes de los estudiantes.

Palabras clave: Seguridad del Paciente. Actitudes. Estudiantes de la Salud. Educación en Salud. Adaptação Transcultural. Validación Psicométrica. Attitudes to Patient Safety Questionnaire. Análisis Factorial Confirmatorio.

1 INTRODUCTION

Patient safety emerges as an unavoidable pillar in modern clinical practice and, consequently, in health education. Globally, concern with preventing adverse events and promoting safe care has driven significant transformations in undergraduate curricula, aiming to cultivate a safety culture from the initial stages of professional training. The ability to identify, analyze, and mitigate risks, as well as to effectively communicate errors, are essential competencies for future health professionals, given the inherent complexity of health systems and the potential impact on patients' lives.

In this context, the assessment of health students' knowledge and attitudes regarding patient safety becomes a strategic tool. This evaluation not only allows for the identification of training gaps but also directs pedagogical efforts towards the continuous improvement of educational approaches. Such monitoring is crucial to ensure that graduates of health courses are capable of integrating patient safety principles into their future clinical practices, contributing to the construction of safer and more effective care environments (Bohomol & Freitas, 2016).

One of the most widely recognized and internationally used instruments to measure attitudes towards patient safety is the Attitudes to Patient Safety Questionnaire (APSQ). Over the years, the APSQ has undergone several revisions, culminating in the most recent version, the APSQ-III. This version, composed of 26 items distributed across nine factors, has demonstrated applicability in different cultural contexts, such as the United Kingdom, Australia, and Saudi Arabia (Carruthers et al., 2009; Almaramhy et al., 2011; Alser et al., 2020). However, the mere existence of an instrument validated in one context does not guarantee its universal suitability. For its use in a new culture, it is imperative that the instrument undergoes a rigorous process of cross-cultural adaptation and psychometric validation, ensuring that its structure, items, and properties faithfully reflect the construct it proposes to measure in the new population (Sousa & Rojjanasrirat, 2011).

The process of cross-cultural adaptation goes beyond literal translation. It demands an in-depth analysis of linguistic, conceptual, and cultural nuances, so that the instrument maintains its validity and is understandable to the target audience (Epstein et al., 2015). Subsequent psychometric validation is vital to verify properties such as reliability and validity, ensuring the robustness of the instrument for research and practical application in the new population (Perneger et al., 2014).

In Brazil, patient safety has gained considerable prominence in recent decades. The implementation of public policies, such as the National Patient Safety Policy (PNSP) in 2013, solidified an institutional framework for promoting quality and safety in health care (Ministério

da Saúde, 2013). Furthermore, there is a growing movement and clear guidelines for the inclusion of patient safety as a cross-cutting and integrating theme in health course curricula, as recommended by regulatory bodies and professional associations (Conselho Nacional de Educação, 2018).

In this context of increasing valorization of patient safety in professional training and practice, the need for validated and culturally adapted instruments for the Brazilian scenario becomes urgent. The availability of a Brazilian version of the APSQ-III would allow for a robust assessment of the attitudes and knowledge of first-year health students, providing valuable subsidies for improving patient safety education and monitoring attitudinal changes throughout their academic and professional trajectories. Previous studies already highlight the importance of integrated and longitudinal approaches in patient safety education, with the use of active methodologies and opportunities for practical application (Nora et al., 2022; Sherwood & Barnsteiner, 2022).

Thus, this chapter seeks to present a study that aimed at the cross-cultural adaptation and psychometric validation of the APSQ-III for the Portuguese language and Brazilian culture. By doing so, we contribute to the advancement of patient safety research in the country, enabling international comparisons and offering a reliable tool for attitudinal assessment, essential for the development of professionals who are more aware and committed to the quality and safety of health care.

1.1 PATIENT SAFETY CONTEXT AND HEALTH EDUCATION

Patient safety is not a new concept, but its formalization and systematic integration into health systems and education are phenomena of recent decades. Historically, medicine and nursing were often focused on disease treatment and intervention, with less explicit emphasis on preventing iatrogenic harm. The report "To Err Is Human: Building a Safer Health System," published by the Institute of Medicine (IOM) in the United States in 1999, was a watershed moment, revealing the magnitude of medical errors and the thousands of annual deaths associated with them (Kohn et al., 1999). This report catalyzed a global movement for awareness and action in patient safety, transforming it into a public health priority.

In Brazil, this international trend was accompanied by the development of policies and programs. The creation of the National Patient Safety Policy (PNSP) in 2013, through Ordinance No. 529 of the Ministry of Health, institutionalized concern with patient safety, establishing guidelines and encouraging the creation of Patient Safety Units (NSP) in

hospitals (Ministério da Saúde, 2013). These initiatives demonstrate a formal recognition of the need for safer systems and processes, and not just more vigilant professionals.

Health education, in turn, is a fundamental vector for the dissemination and internalization of these principles. It is not enough to have policies; it is necessary to train professionals who understand them and incorporate them into their daily lives. The inclusion of patient safety as a theme in undergraduate curricula, as recommended by the National Education Council for courses such as Medicine (Conselho Nacional de Educação, 2018), reflects the understanding that attitudes and behaviors related to safety are shaped early on. Training should transcend the mere transfer of technical knowledge, encompassing the development of communication skills, teamwork, critical thinking for risk identification, and a proactive stance in the pursuit of safety.

Assessing students' attitudes regarding patient safety is, therefore, an indicator of the effectiveness of these educational strategies. Understanding how future professionals perceive error, responsibility, communication, and the patient's role in safety is crucial for adjusting teaching programs. If, for example, students perceive error as a sign of incompetence, this can inhibit reporting and learning from incidents, perpetuating a cycle of silence and insecurity (Kiesewetter et al., 2014).

1.2 RATIONALE FOR ADAPTING THE APSQ-III

The need to adapt and validate the APSQ-III in the Brazilian context is multifaceted and crucial for the advancement of research and practice in the field of patient safety. The justifications for this endeavor are based on several foundations:

Differences in Health Education: There are significant variations in pedagogical approaches to patient safety among different countries and, even within Brazil, among various institutions. Nursing, medicine, and psychology curricula may differ in course design, content covered, timing of safety topics introduction, assessment processes, and expected outcomes. An instrument developed in a distinct educational context may not adequately capture the attitudes of Brazilian students unless it is adapted to their realities (Bohomol & Freitas, 2016).

Challenges in Curricular Integration: Despite the recognized importance of patient safety, its effective integration into undergraduate health curricula still faces challenges. Often, the topic is addressed fragmentally or superficially. A validated instrument allows for quantitative verification of the impact of formal and informal curricula on the training of undergraduates regarding patient safety precepts, identifying areas where education can be more effective.

Methodological Validity and Reliability: For any measurement instrument to be used in a new cultural and linguistic context, it is fundamental that it undergoes a rigorous process of cross-cultural adaptation and psychometric validation. Literal translation is insufficient; it is necessary to ensure semantic, idiomatic, cultural, and conceptual equivalence. This ensures that the instrument measures the same construct in the target population, producing valid and reliable results. The absence of a psychometrically robust instrument can lead to erroneous conclusions about student attitudes.

International Comparability: The validation of a Brazilian version of the APSQ-III allows Brazilian researchers to compare their findings with studies conducted in other countries that also use the instrument. This comparability is essential for identifying global gaps, best educational practices, and contributing to the international body of knowledge on patient safety in education.

Subsidies for Educational Interventions: The availability of a validated instrument provides a solid basis for the design, implementation, and evaluation of educational interventions. By identifying specific attitudes that need improvement (e.g., confidence in reporting errors, perception of error inevitability), educators can develop more targeted and effective teaching strategies.

Longitudinal Monitoring: A reliable instrument allows for monitoring changes in student attitudes throughout their training. This is vital to understand how exposure to different curriculum phases and clinical experiences affects the perception of patient safety, enabling real-time adjustments in teaching programs.

In summary, the validation of the APSQ-III for Brazilian Portuguese is not merely a methodological issue but a strategic necessity to strengthen health education and, consequently, the quality and safety of care provided to the Brazilian population.

1.3 RELEVANCE AND IMPACT OF THE STUDY

The realization of a study focused on the cross-cultural adaptation and validation of an instrument like the APSQ-III for the Brazilian context possesses intrinsic relevance and long-reaching impact, both in the academic sphere and in clinical practice.

Firstly, the study contributes directly to the quality and improvement of health education programs. In recent decades, there has been an exponential growth in the number of institutions training health professionals in Brazil, concomitantly with an increase in the number of graduates. Given this scenario, evaluating the effectiveness of these programs has become a priority (Pascali, 2010). This study offers concrete subsidies for institutions to identify gaps and implement improvements in patient safety teaching strategies. By

quantifying the training of undergraduates and the impact of the curriculum, it will be possible to refine approaches, pedagogical methods, and content, aligning theory with the practical needs of a safe care environment.

Additionally, the research reinforces the social responsibility of training institutions. Society places its trust in universities that the professionals trained there will be fully capable of meeting its needs. This implies not only technical excellence but also a deep understanding and commitment to patient safety. A validated instrument allows institutions to demonstrate and improve the quality of their educational programs in this vital aspect (Joseph et al., 2019).

The study has a direct impact on reducing health error rates. Patient safety during undergraduate studies is a predictor of safe behavior in professional practice. By instrumentalizing the assessment of attitudes and knowledge, the study helps train more conscious professionals, proactive in identifying and preventing errors. This ultimately translates into tangible benefits for patients, who will receive safer and higher-quality care.

The cross-cultural adaptation and validation of the APSQ-III also promote the advancement of patient safety research in Brazil. With a reliable and valid instrument, Brazilian researchers will have the ability to conduct more robust studies, comparing their findings with international literature and identifying particularities of the national context. This enriches the existing body of knowledge and drives the creation of new research lines focused on effective educational interventions and the promotion of a safety culture.

Finally, the validated tool supports the planning and implementation of more effective educational interventions. By identifying which dimensions of patient safety attitudes are most challenging or require more attention, educators can develop more targeted training programs. This can range from reforming disciplines and modules to introducing new active teaching-learning methodologies, such as clinical simulations, case studies, and discussions on ethical dilemmas related to error. Such interventions are crucial for fostering the training of professionals who not only possess technical knowledge but are also imbued with a proactive and empathetic safety culture.

In essence, this study transcends purely academic value, projecting itself as a facilitator of positive changes in health training and the quality of care provided to the population, consolidating patient safety as an intrinsic value of professional practice.

2 OBJECTIVES

The clarity of objectives is fundamental to guide any scientific research, and this study is no exception. In seeking to adapt and validate a complex psychometric instrument such as

the APSQ-III, the objectives were delineated to cover all necessary steps to ensure the robustness and applicability of the Brazilian version.

2.1 GENERAL OBJECTIVE (PRIMARY)

The primary objective of this study was:

To validate for Brazilian Portuguese the Attitudes to Patient Safety Questionnaire III (APSQ-III) data collection instrument.

This general objective encapsulates the essence of the research: to make the APSQ-III a reliable and culturally appropriate tool for use in the Brazilian scenario.

2.2 SPECIFIC OBJECTIVES (SECONDARY)

To achieve the general objective, the following specific objectives were established, detailing the methodological and analytical steps:

- a) To translate and culturally adapt the Attitudes to Patient Safety Questionnaire III (APSQ-III) instrument for Brazilian Portuguese, considering the specificities of the academic context of undergraduate nursing, psychology, and medicine students;

This objective addresses the initial and crucial phase of instrument adaptation, ensuring that it is not only linguistically translated but also adjusted to resonate with the particularities of Brazilian culture and educational environment, especially for nursing, psychology, and medicine courses.

- b) To evaluate the psychometric properties of the Brazilian version of the Attitudes to Patient Safety Questionnaire III (APSQ-III) instrument in medical, psychology, and nursing students, including:

- a) content validity;
- b) construct validity (exploratory and confirmatory factor analysis);
- c) internal consistency;
- d) test-retest reliability;

This objective details the statistical analyses necessary to ensure the quality of the instrument. Content validity ensures that the items are relevant and representative of the construct. Construct validity, through factor analysis, verifies whether the underlying conceptual structure of the instrument is maintained. Internal consistency evaluates the coherence of the items comprising each factor, while test-retest reliability verifies the stability of measures over time.

This objective aims to provide a detailed overview of the sample, including information such as age, sex, undergraduate course, course period, and other relevant data. This

characterization is important for contextualizing the results and identifying possible associations between student characteristics and their attitudes toward patient safety.

The achievement of these specific objectives allows for a systematic and rigorous approach to the validation of the APSQ-III, culminating in a robust tool capable of contributing significantly to the field of patient safety in Brazilian health education.

3 MATERIAL AND METHODS

The methodology adopted in this study was carefully planned to ensure the validity and reliability of the results of the cross-cultural adaptation and psychometric validation of the Attitudes to Patient Safety Questionnaire III (APSQ-III). The methodological design comprised several stages, from the study design and ethical considerations to data collection and analysis procedures.

3.1 STUDY DESIGN

This was a quantitative, descriptive, non-randomized, uncontrolled, prospective, and cross-sectional study.

Quantitative: The study focused on collecting and analyzing numerical data, using statistics to describe and infer relationships.

Descriptive: Its objective was to describe the characteristics of a population (health students) and the psychometric properties of the instrument.

Non-randomized and uncontrolled: Participant selection occurred by convenience, and there was no control group or experimental intervention.

Prospective: Data were collected after the study's conception, and not from past records.

Cross-sectional: Data collection was performed at a single point in time, providing a "snapshot" of students' attitudes.

This design is appropriate for instrument validation studies, which aim to assess the psychometric properties of a scale in a specific population at a given time.

3.2 ETHICAL ASPECTS

The research was conducted in strict compliance with the ethical principles governing research involving human beings in Brazil. The study obtained formal approval from the Research Ethics Committee (CEP) of the institution (Opinion 4,543,158, of 02/17/2021), as required by regulatory standards.

All participants were duly informed about the study objectives, the procedures involved, potential risks and benefits, confidentiality assurance, and the freedom to participate or withdraw at any time, without any prejudice. After this explanation, participants who agreed to participate signed an Informed Consent Form (ICF). This document ensured that participation was voluntary and informed, respecting the autonomy of the individuals involved. The collected information was treated anonymously and confidentially, guaranteeing the privacy of data and participants.

3.3 PARTICIPANTS

The study sample was one of convenience, consisting of first-year undergraduate health students, specifically in medicine, nursing, and psychology, from a Brazilian public university.

The sample size was determined based on recognized guidelines for psychometric instrument validation studies, which suggest a minimum of 10 participants per instrument item (Pascali, 2010). Considering that the final version of the APSQ-III to be validated has 26 items, the calculated minimum sample was 260 participants (26 items x 10 participants/item). To ensure a safety margin and greater representativeness, and also to compensate for an expected loss, a final sample size of 292 participants was chosen, which corresponds to a 20% increase over the calculated minimum.

Inclusion Criteria: Included students regularly enrolled in the selected courses who voluntarily agreed to participate in the study and were over 18 years old.

Exclusion Criteria: Students under 18 years old or those who did not consent to participate in the study were excluded. The online data collection platform was configured to prevent submission of incomplete responses or from participants who had not accepted the ICF, ensuring data integrity and compliance with ethical criteria. The sample was stratified by course and semester, seeking a balanced representation, with approximately 86.7 participants per course and 28.9 per year, although exact variations might occur during collection.

3.4 INSTRUMENTS

The central instrument of this study was the Attitudes to Patient Safety Questionnaire III (APSQ-III), originally developed by Carruthers et al. (2009). This version of the APSQ-III is composed of 26 items, organized into nine dimensions (factors). The dimensions and corresponding number of items are detailed in Table 1:

Table 1

Dimensions and number of items of the APSQ-III. FAMERP, São José do Rio Preto-SP, 2024

DIMENSION	NUMBER OF ITEMS
1. TEAM TRAINING	3
2. ERROR AND RESPONSIBILITY	3
3. CONFIDENCE	3
4. TRAINING AND SKILLS	3
5. ERROR REPORTING	3
6. ORGANIZATIONAL FACTORS	3
7. INDIVIDUAL FACTORS	3
8. PATIENT FACTORS	3
9. ERROR DISCLOSURE AND DISCUSSION	2
TOTAL	26

Source: Adapted from Menezes (2024).

The APSQ-III items are answered on a 5-point Likert scale, ranging from "strongly disagree" to "strongly agree." This scale allows participants to express their degree of agreement or disagreement with the statements, providing ordinal data for psychometric analysis.

In addition to the APSQ-III, a sociodemographic variables questionnaire, developed by the researchers themselves, was used. This questionnaire collected relevant information to characterize the sample, such as:

Age Sex Undergraduate course Course period Other pertinent data, including gender identity, sexual orientation, marital status, number of children, personal/family income, religion, previous schooling (elementary, secondary, higher education) and parents' education level, employment status, primary source of funds to cover study costs, and information about admission to FAMERP.

These variables were included based on previous studies that demonstrated their potential influence on students' attitudes towards patient safety (Alser et al., 2020; Almaramhy et al., 2011).

3.5 PROCEDURES

The methodological procedures were divided into two main phases: cross-cultural adaptation and psychometric validation, both executed rigorously to ensure the quality of the Brazilian version of the APSQ-III.

3.5.1 Phase 1: Cross-Cultural Adaptation

The cross-cultural adaptation process of the APSQ-III followed the widely recognized guidelines of Beaton et al. (2000) and Epstein et al. (2015), which advocate a series of steps to ensure equivalence between the original instrument and its adapted version.

Independent Translation: Three independent translations were performed by native Brazilian Portuguese speakers. This multiplicity of translations aims to capture different linguistic nuances and avoid bias from a single translator. The initial translations showed semantic equivalence of 92%, 95%, and 94% with the original instrument.

Synthesis of Translations: Based on the three translations, the study researchers produced a synthesis version. This step is crucial for consolidating the best translation options and resolving any discrepancies. The synthesis version achieved 96% semantic equivalence with the original questionnaire.

Back-translation: The synthesis version was then submitted to three independent back-translations, performed by native English speakers who had no prior knowledge of the original questionnaire. This process serves as a check on the quality of the translation, ensuring that the meaning of the items was not altered in the transition to Portuguese. The back-translations showed 93%, 91%, and 94% semantic equivalence with the original version.

Expert Committee Evaluation: An expert committee was formed, consisting of 5 professors from health undergraduate courses and 3 specialists in cross-cultural instrument adaptation. This committee evaluated the proposed synthesis regarding four types of equivalence:

- **Semantic Equivalence:** Is the meaning of the words the same?
- **Idiomatic Equivalence:** Were expressions and slang well adapted?
- **Experiential Equivalence:** Is the experience portrayed in the items relevant to the local culture?
- **Cultural Equivalence:** Is the cultural context appropriate? The committee achieved a high level of consensus: 97% for semantic equivalence, 95% for idiomatic, 98% for experiential, and 96% for cultural, resulting in an average of 96.5% consensus for the pre-final version.

3.5.2 Phase 2: Pre-test and Psychometric Validation

After the completion of the cross-cultural adaptation phase, the pre-test stage followed, along with data collection for psychometric validation in the Brazilian context.

Pre-test: The pre-final version of the APSQ-III was applied to 50 second and third-year Nursing, Medicine, and Psychology students. After completing the questionnaire, these participants were interviewed to identify any comprehension problems, ambiguities, or suggestions for improving items and instructions.

Adjustments: Based on suggestions from pre-test participants, the expert committee made minor adjustments to the wording of three items. These specific modifications aimed to optimize the clarity and comprehension of the instrument without altering its conceptual meaning. After these adjustments, the final version of the APSQ-III was deemed suitable for the subsequent psychometric validation stage.

Data Collection for Validation: Data collection for the validation itself was carried out with the 292 participants from the convenience sample, excluding students who participated in the pre-test to avoid any bias.

Collection Method: Collection was performed using an online form, utilizing the Google Forms platform. This modality allowed for wide dissemination and efficient data collection.

Invitation: Students were invited to participate in the study via institutional email and through the social media of the courses, ensuring significant reach of the target population.

Form Content: The online form contained an initial section with detailed information about the study objectives and the Informed Consent Form (ICF). Only after explicit agreement with the ICF did the participant gain access to the sociodemographic questionnaire and, subsequently, to the adapted version of the APSQ-III.

Complete Filling: The Google Forms configuration ensured that responses could only be submitted after all items were fully completed, minimizing missing data and ensuring data completeness for subsequent analyses.

These systematic procedures were crucial to ensure that the Brazilian version of the APSQ-III was not only linguistically accurate but also culturally relevant and psychometrically robust for the Brazilian health student population.

3.6 DATA ANALYSIS

Data analysis for this study was undertaken with a high degree of methodological rigor, using advanced statistical techniques appropriate for the validation of psychometric instruments with ordinal data. The objective was to evaluate the validity and reliability properties of the APSQ-III adapted for the Brazilian context.

3.6.1 Confirmatory Factor Analysis (CFA)

The factorial structure of the APSQ-III was evaluated using Confirmatory Factor Analysis (CFA). This technique is used to verify whether observed data fit a pre-specified theoretical model (in this case, the 9-factor structure of the APSQ-III).

Polychoric Correlation Matrix: Given the ordinal nature of the data (5-point Likert scale), a polychoric correlation matrix was used. This matrix is more appropriate than the Pearson correlation matrix for ordinal data, as it estimates the underlying correlations between latent variables that give rise to the ordinal items.

WLSMV Estimation Method: The estimation method employed was the Weighted Least Squares Mean and Variance Adjusted (WLSMV). This is a robust estimator considered ideal for factor analysis with ordinal data and non-normal distributions (DiStefano et al., 2018). This procedure aligns with recent instrument validation studies, which recommend similar approaches to ensure the accuracy of results (Green et al., 2016; Stefanek et al., 2023).

Software and Packages: Confirmatory factor analyses were performed using the lavaan 0.6-8 package of the R Statistical language (version 4.3.2) (Rosseel, 2012; R Core Team, 2016).

3.6.2 Model Fit Criteria

The fit of CFA models was evaluated using a set of three widely recognized indices in psychometric literature. Table 2 presents the fit criteria used to determine model acceptability:

Table 2

Fit criteria for confirmatory factor analysis models. FAMERP, São José do Rio Preto-SP, 2024

INDEX	ACCEPTABLE FIT CRITERION
RMSEA	< 0.08 (CI not reaching 0.10)
CFI	≥ 0.90
TLI	≥ 0.90

Source: Adapted from Menezes (2024).

Root Mean Square Error of Approximation (RMSEA): Indicates how well the model fits the data, considering parsimony. Values below 0.08 are generally acceptable, and a confidence interval that does not reach 0.10 is preferable (Brown, 2006; Kline, 2023).

Comparative Fit Index (CFI): Compares the fit of the proposed model with a null model (where all variables are uncorrelated). Values of 0.90 or higher are considered indicative of a good fit (Cangur & Ercan, 2015).

Tucker-Lewis Index (TLI): Similar to CFI, it is also a comparative fit index, with values above 0.90 being acceptable (Lai & Green, 2016).

3.6.3 Reliability Analysis

For models that showed acceptable fit in the CFA, the following reliability indices were calculated for the latent variables:

Cronbach's Alpha: A classic indicator of internal consistency.

McDonald's Omega: Considered a more robust reliability estimator than Cronbach's Alpha, especially for ordinal data or when the assumption of tau-equivalence is not met (Viladrich et al., 2024; Zhang & Yuan, 2016).

Composite Reliability: Evaluates the proportion of variance in a construct that is explained by its observed items. A latent variable was considered reliable if it presented a minimum value of 0.60 in McDonald's omega or composite reliability (Hair et al., 2019).

Software and Packages: Reliability indices were calculated using the semTools package (Jorgensen et al., 2019).

3.6.4 Comparison Between Groups (Invariance Analysis)

Comparison between groups, especially between sexes, was ideally planned to be performed using invariance analysis (Putnick & Bornstein, 2016). This analysis unfolds in three stages:

Configural Invariance: Verifies whether the factorial structure (number of factors and which items load on each factor) remains consistent across groups.

Metric Invariance: Investigates whether the factor loadings (the strength of the relationship between items and their respective factors) are equivalent across groups.

Scalar Invariance: Evaluates the equivalence of item intercepts or thresholds between groups, indicating whether participants from different groups with the same latent score tend to respond to items in the same way.

However, due to material limitations (missing responses for at least one of the response categories for one of the groups), a complete verification of measurement invariance was not possible. Therefore, scalar invariance between sexes was assumed as a premise, a common practice in many studies in the health and education fields, although without direct empirical support in this case.

Factor Scores: For comparison, factor scores estimated by the tenBerge method, which preserves correlations between factors, were used (Grice, 2001; DiStefano et al., 2019; Logan et al., 2022). The tenBerge factor score is a refined score, using standardized information to create standardized scores, ranging from approximately -3.0 to +3.0. These values were then normalized to a scale of 1 to 7, compatible with the instrument's original

Likert scale. Although more appropriate than raw scores (summation), the use of factor scores is still not widespread (DiStefano et al., 2019; Logan et al., 2022).

Comparison Tests: Before comparing score differences between sexes, the normality of the distribution of factor scores was checked using the Shapiro-Wilk test (p -value > 0.05 as an indicator of normality).

If the assumption of normal distribution was not rejected, Student's t -test would be used.

Otherwise (which was the case), the Mann-Whitney test was used to compare medians between groups.

Effect Sizes: To complement the statistical analyses, effect sizes were calculated using the ggstatsplot package (Patil, 2021), providing a measure of the magnitude of observed differences.

Graphical Analyses: Graphical analyses were performed with the ggplot2 package (Wickham, 2016) for visualization of results.

This robust set of analyses ensured a comprehensive evaluation of the psychometric properties of the APSQ-III in the Brazilian population, providing a solid basis for its conclusions.

4 RESULTS

The results of this study are presented in two main sections: the cross-cultural adaptation of the APSQ-III and the validity analysis, which includes confirmatory factor analysis and comparison between groups.

4.1 CROSS-CULTURAL ADAPTATION OF THE APSQ-III

The cross-cultural adaptation process, fundamental to ensuring the instrument's applicability in a new cultural context, was performed in two distinct phases, according to methodological guidelines.

4.1.1 Phase 1: Translations and Expert Committee

The first phase, focused on linguistic and conceptual equivalence, demonstrated a high degree of rigor. The three initial independent translations into Brazilian Portuguese showed semantic equivalence of 92%, 95%, and 94% with the original instrument. From these, the researchers synthesized a version, which achieved a semantic equivalence of 96%.

Subsequently, the three back-translations into English, performed by translators without prior knowledge of the original, obtained semantic equivalences of 93%, 91%, and 94% with the original version. These high indices attest to the fidelity of the translation and back-translation.

The evaluation by an expert committee, composed of 5 health area professors and 3 specialists in cross-cultural adaptation, was crucial to refine the pre-final version. The committee achieved notable consensuses: 97% for semantic equivalence, 95% for idiomatic, 98% for experiential, and 96% for cultural, resulting in an average of 96.5% consensus. This level of agreement is a strong indicator of the adapted version's suitability across multiple domains.

4.1.2 Phase 2: Pre-test

In the second phase, the pre-test was conducted with 50 Nursing, Medicine, and Psychology students. Participants responded to the pre-final version of the APSQ-III and were interviewed to identify clarity problems or suggestions for improvement.

Based on the valuable contributions of the pre-test participants, the expert committee made minor adjustments to the wording of three items. These specific modifications aimed to optimize the clarity and comprehension of the instrument without altering its conceptual meaning. After these adjustments, the final version of the APSQ-III was considered fully adequate for the subsequent psychometric validation stage.

4.2 VALIDITY ANALYSIS OF THE APSQ-III

The validity analysis was conducted using Confirmatory Factor Analysis (CFA), evaluating the fit of models with different item configurations.

4.2.1 Confirmatory Factor Analysis of the Attitudes to Patient Safety Questionnaire (APSQ) with 30 items

Initially, a model with 30 items, representing an earlier or broader configuration of the instrument, was tested. This model showed an acceptable fit to the data, with the following indices: $\chi^2 [369] = 653.262$, CFI = 0.983, TLI = 0.981, and RMSEA = 0.043 [95% CI: 0.037 – 0.048]. These values are within the acceptability criteria (Table 2), allowing the conclusion that the latent variables measured by this model were valid.

Table 3 details the factor loadings of the items in this 30-item model. It is important to note that some items exhibited behaviors that required attention.

Table 3

Distribution of Factor Loadings by APSQ Items, with 30 items. FAMERP, São José do Rio Preto-SP, 2024

FACTOR	ITEM	FL	INVERSE FL
F1	1. My training is preparing me to understand the causes of medical errors.	0.801	0.801
F1	2. I have a good understanding of patient safety issues as a result of my undergraduate training.	0.602	0.602
F1	3. My training is preparing me to prevent medical errors.	0.935	0.935
F2	4. I would feel comfortable reporting any errors I had made, no matter how serious the outcome was for the patient.	0.922	0.922
F2	5. I would feel comfortable reporting any errors others had made, no matter how serious the outcome was for the patient.	0.714	0.714
F2	6. I am confident that I could openly speak with my supervisor about an error I made if it resulted in potential or actual harm to my patient.	0.760	0.760
F2	7. I feel confident that I could report an error I made without feeling I would be blamed.	0.506	0.506
F3	8. Shorter shifts for medical healthcare professionals will reduce errors in healthcare.	0.792	0.792
F3	9. By not taking regular breaks during shifts, healthcare professionals are at greater risk of making errors in healthcare.	0.932	0.932
F3	10. The number of working hours for healthcare professionals increases the likelihood of making errors in healthcare.	0.893	0.893
F4	11. Even the most experienced and competent healthcare professionals make mistakes.	0.765	0.765
F4	12i. A true professional does not make mistakes or errors.	-	0.769
F4	13. Human error is inevitable.	0.291	0.291
F4	14. I don't think I will make mistakes once I am a qualified healthcare professional.	-	0.702
F5	15. Most errors in healthcare result from careless nurses.	0.547	0.547
F5	16i. If people paid more attention at work, errors in healthcare would be avoided.	0.652	0.652
F5	17i. Most errors in healthcare result from careless healthcare professionals.	0.793	0.793
F5	18i. Errors in healthcare are a sign of incompetence.	0.699	0.699
F6	19i. It is not necessary to report errors that do not result in adverse patient outcomes.	0.684	0.684
F6	20. Healthcare professionals have a responsibility to disclose errors to patients only if they result in harm to patients.	0.633	0.633
F6	21. All errors in healthcare should be reported.	-	0.933
F6	22. It is the responsibility of all healthcare professionals to formally report all healthcare errors that occur.	-	0.804
F7	23. Better multidisciplinary teamwork will reduce errors in healthcare.	0.845	0.845
F7	24. Teaching teamwork skills will reduce errors in healthcare.	0.964	0.964
F8	25. Patients have an important role in preventing errors in healthcare.	0.738	0.738
F8	26. Encouraging patients to be more involved in their care can help reduce the risk of errors occurring in healthcare.	0.942	0.942
F9	27. Teaching students about patient safety should be an important priority in the training of health area students.	0.737	0.737
F9	28i. Patient safety issues cannot be taught and can only be learned through clinical experience when qualified.	-	0.509
F9	29. Learning about patient safety issues before I qualify will allow me to become a more effective healthcare professional.	0.825	0.825
F9	30. Learning about patient safety issues is not as important as learning other more skill-based aspects of being a healthcare professional.	-	0.615

Source: Adapted from Menezes (2024).

Analysis of factor loadings (FL) in Table 3 revealed that, although items 12, 16, 17, 18, 19, and 28 were expected to be inverse items (i.e., scored opposite to the dimension), only items 12 and 28 behaved as such. Additionally, items 14, 21, 22, and 30 also exhibited inverse behavior. Four items (7, 13, 15, 28) showed low factor loadings, suggesting that their contribution to their respective factors was limited or that they did not fit well into the proposed structure.

Table 4 summarizes the factor loadings and reliability indices for this 30-item model.

Table 4

Summary of factor loadings and reliability indices of the APSQ, with 30 items. FAMERP, São José do Rio Preto-SP, 2024

FACTOR	N	MEAN	SD	MIN	MAX	CRONBACH'S ALPHA	MCDONALD'S OMEGA	COMPOSITE RELIABILITY
F1	3	0.779	0.167	0.602	0.935	0.770	0.810	0.619
F2	4	0.726	0.171	0.506	0.922	0.770	0.780	0.609
F3	3	0.872	0.072	0.792	0.932	0.830	0.850	0.763
F4	4	0.632	0.229	0.291	0.769	0.500	0.520	0.487
F5	4	0.673	0.102	0.547	0.793	0.720	0.740	0.528
F6	4	0.763	0.134	0.633	0.933	0.750	0.800	0.658
F7	2	0.905	0.084	0.845	0.964	0.800	0.830	0.754
F8	2	0.840	0.144	0.738	0.942	0.750	0.780	0.624
F9	4	0.672	0.138	0.509	0.825	0.520	0.590	0.529

Source: Adapted from Menezes (2024).

Note: N: Number of items per factor; SD: Standard Deviation; Min: minimum; Max: Maximum. Bold: Values below .60. F1: Received patient safety training; F2: Confidence in reporting error; F3: Working hours as a cause of error; F4: Inevitability of error; F5: Professional incompetence as a cause of error; F6: Responsibility for disclosure; F7: Team functioning; F8: Patient involvement in error reduction; F9: Importance of patient safety in the curriculum.

Table 4 highlights that, although many factors exhibited good reliability (values above 0.60 for McDonald's Omega or composite reliability), factors 4 ("Inevitability of error") and 9 ("Importance of patient safety in the curriculum") did not meet this reliability criterion. This finding indicated the need to refine the model, leading to the consideration of the original 26-item version of the APSQ-III.

4.2.2 Confirmatory Factor Analysis of the Attitudes to Patient Safety Questionnaire (APSQ) with 26 items

Based on observations from the 30-item model, a 26-item model (the original APSQ-III version) was tested, excluding the 4 items with low factor loadings or reliability issues: items 7, 13, 15, and 28. This model showed a superior and acceptable fit to the data: χ^2 [263] = 407.602, CFI = 0.990, TLI = 0.987, and RMSEA = 0.036 [95% CI: 0.029 – 0.043]. These indices indicate an excellent fit, confirming that the latent variables measured by this model are valid in the studied context.

In this final model, items 12, 21, and 28 were used inversely, as expected and adjusted for correct interpretation. Table 5 presents the factor loadings for this 26-item version.

Table 5

Distribution of Factor Loadings by APSQ Items, with 26 items. FAMERP, São José do Rio Preto-SP, 2024

FACTOR	ITEM	FL
F1	1. My training is preparing me to understand the causes of medical errors.	0.806
F1	2. I have a good understanding of patient safety issues as a result of my undergraduate training.	0.601
F1	3. My training is preparing me to prevent medical errors.	0.932
F2	4. I would feel comfortable reporting any errors I had made, no matter how serious the outcome was for the patient.	0.933
F2	5. I would feel comfortable reporting any errors others had made, no matter how serious the outcome was for the patient.	0.705
F2	6. I am confident that I could openly speak with my supervisor about an error I made if it resulted in potential or actual harm to my patient.	0.742
F3	8. Shorter shifts for medical healthcare professionals will reduce errors in healthcare.	0.785
F3	9. By not taking regular breaks during shifts, healthcare professionals are at greater risk of making errors in healthcare.	0.931
F3	10. The number of working hours for healthcare professionals increases the likelihood of making errors in healthcare.	0.895
F4	11. Even the most experienced and competent healthcare professionals make mistakes.	0.867
F4	12i. A true professional does not make mistakes or errors.	0.689
F4	13. Human error is inevitable.	0.231
F5	15. Most errors in healthcare result from careless nurses.	0.533
F5	16. If people paid more attention at work, errors in healthcare would be avoided.	0.670
F5	17. Most errors in healthcare result from careless healthcare professionals.	0.826
F5	18. Errors in healthcare are a sign of incompetence.	0.645
F6	19. It is not necessary to report errors that do not result in adverse patient outcomes.	0.743
F6	20. Healthcare professionals have a responsibility to disclose errors to patients only if they result in harm to patients.	0.688
F6	21i. All errors in healthcare should be reported.	0.852
F7	23. Better multidisciplinary teamwork will reduce errors in healthcare.	0.840
F7	24. Teaching teamwork skills will reduce errors in healthcare.	0.970
F8	25. Patients have an important role in preventing errors in healthcare.	0.747
F8	26. Encouraging patients to be more involved in their care can help reduce the risk of errors occurring in healthcare.	0.932
F9	27. Teaching students about patient safety should be an important priority in the training of health area students.	0.760
F9	28i. Patient safety issues cannot be taught and can only be learned through clinical experience when qualified.	0.451
F9	29. Learning about patient safety issues before I qualify will allow me to become a more effective healthcare professional.	0.819

Source: Adapted from Menezes (2024)

Note: F1: Received patient safety training; F2: Confidence in reporting error; F3: Working hours as a cause of error; F4: Inevitability of error; F5: Professional incompetence as a cause of error; F6: Responsibility for disclosure; F7: Team functioning; F8: Patient involvement in error reduction; F9: Importance of patient safety in the curriculum; FL: Factor Loading; i: inverted.

Table 5 shows that factor loadings were, on average, high, which is a good indication of the instrument's convergent validity. However, three items (13, 15, and 28) exhibited lower factor loadings, suggesting that, although the model converged well, these items may require additional adaptation or reformulation for the Brazilian sample.

Table 6 presents the summary of factor loadings and reliability indices for the 26-item model.

Table 6

Summary of factor loadings and reliability indices of the APSQ, with 26 items. FAMERP, São José do Rio Preto-SP, 2024

FACTOR	N	MEAN	SD	MIN	MAX	CRONBACH'S ALPHA	MCDONALD'S OMEGA	COMPOSITE RELIABILITY
F1	3	0.780	0.167	0.601	0.932	0.770	0.800	0.619
F2	3	0.793	0.122	0.705	0.933	0.790	0.820	0.636
F3	3	0.871	0.076	0.785	0.931	0.830	0.850	0.761
F4	3	0.596	0.328	0.231	0.867	0.310	0.330	0.382
F5	4	0.669	0.121	0.533	0.826	0.720	0.740	0.524
F6	3	0.761	0.083	0.688	0.852	0.700	0.740	0.582
F7	2	0.905	0.092	0.840	0.970	0.800	0.840	0.756
F8	2	0.840	0.131	0.747	0.932	0.750	0.780	0.621
F9	3	0.676	0.198	0.451	0.819	0.420	0.480	0.470

Source: Adapted from Menezes (2024)

Note: N: Number of items per factor; SD: Standard Deviation; Min: minimum; Max: Maximum. Bold: Values below .60. F1: Received patient safety training; F2: Confidence in reporting error; F3: Working hours as a cause of error; F4: Inevitability of error; F5: Professional incompetence as a cause of error; F6: Responsibility for disclosure; F7: Team functioning; F8: Patient involvement in error reduction; F9: Importance of patient safety in the curriculum.

Consistent with the 30-item model, Table 6 reveals that factors 4 ("Inevitability of error") and 9 ("Importance of patient safety in the curriculum") continued to show low reliability (values below 0.60 for McDonald's Omega or composite reliability). This is a critical point suggesting that, although the structural model is adequate, the internal consistency of these specific factors still requires attention or reformulation in future studies.

Table 7 presents the correlations between the latent variables estimated by the 9-factor, 26-item model, providing insights into the inter-relationships among different patient safety dimensions.

Table 7

Correlation between latent variables of the 9-factor, 26-item model. FAMERP, São José do Rio Preto-SP, 2024

	F1	F2	F3	F4	F5	F6	F7	F8	F9
F1	1.00								
F2	0.46	1.00							
F3	0.05	0.00	1.00						
F4	0.09	0.11	0.34	1.00					
F5	0.08	-0.03	0.02	-0.38	1.00				
F6	-0.06	-0.29	-0.18	-0.21	0.08	1.00			
F7	0.14	0.15	0.50	0.30	0.06	-0.26	1.00		
F8	0.27	0.12	0.20	0.13	-0.04	-0.01	0.36	1.00	
F9	0.26	0.23	0.41	0.38	0.03	-0.36	0.66	0.35	1.00

Source: Adapted from Menezes (2024)

Note: Bold: $p\text{-value} < .05$; F1: Received patient safety training; F2: Confidence in reporting error; F3: Working hours as a cause of error; F4: Inevitability of error; F5: Professional incompetence as a cause of error; F6: Responsibility for disclosure; F7: Team functioning; F8: Patient involvement in error reduction; F9: Importance of patient safety in the curriculum.

Table 7 shows that the majority of significant correlations between factors are of low to moderate magnitudes, following Cohen's (1988) criterion, where correlations between 0.10 and 0.29 are low and between 0.30 and 0.49 are moderate.

Strong Positive Correlations:

- **F7 (Team functioning) and F9 (Importance of patient safety in the curriculum):** With a correlation of 0.66, this is the strongest relationship, suggesting that a positive perception of teamwork is strongly associated with a greater valuing of patient safety in academic training.
- **F7 (Team functioning) and F3 (Working hours as a cause of error):** With a correlation of 0.50, this indicates that problems in team functioning may be related to the perception that long working hours contribute to errors.

Moderate Positive Correlations:

- **F1 (Received patient safety training) and F2 (Confidence in reporting error):** A correlation of 0.46, indicating that perceived effective patient safety training is positively related to confidence in reporting errors.
- **F3 (Working hours as a cause of error) and F9 (Importance of patient safety in the curriculum):** A correlation of 0.41.
- **F4 (Inevitability of error) and F9 (Importance of patient safety in the curriculum):** A correlation of 0.38.

Negative Correlations:

- **F6 (Responsibility for disclosure) and F2 (Confidence in reporting error):** A correlation of -0.29, suggesting that a greater perception of responsibility to disclose errors may be inversely associated with lower confidence in reporting them. This may indicate a dilemma or a perceived risk associated with reporting.
- **F6 (Responsibility for disclosure) and F9 (Importance of patient safety in the curriculum):** A correlation of -0.36.
- **F4 (Inevitability of error) and F5 (Professional incompetence as a cause of error):** A correlation of -0.38, suggesting that the belief in the inevitability of error may be associated with a lower perception of professional incompetence as a primary cause of errors.

Very Low or Absent Correlations:

- Some pairs of factors, such as F3 and F2 (0.00), showed correlations close to zero, indicating no significant linear relationship between these dimensions. This may mean that they operate relatively independently in the context of students' attitudes.

These findings are crucial for understanding the network of relationships between students' attitudes toward patient safety, providing insights into where educational interventions might be most effective and where more targeted approaches are needed.

4.3 COMPARISON OF THE APSQ-III BETWEEN GROUPS

The comparison of APSQ-III factor scores between sexes was performed using the Mann-Whitney test, as the data did not show a normal distribution. Table 8 presents the results of this analysis.

Table 8

Comparative analysis of APSQ-III factors by sex. FAMERP, São José do Rio Preto-SP, 2024

FACTOR	GROUP	N	MEDIAN [MIN, MAX]	W	P-VALUE	R-BISERIAL [95% CI]
F1	Female	281	5.20 [1.00; 6.84]	18531.00	0.23	-0.07 [-0.19; 0.05]
	Male	142	5.28 [1.69; 7.00]			
F2	Female	281	5.03 [1.00; 7.00]	17495.00	0.04	-0.12 [-0.24; -0.01]
	Male	142	5.17 [2.23; 6.82]			
F3	Female	281	5.98 [1.33; 7.00]	19317.00	0.59	-0.03 [-0.15; 0.08]
	Male	142	6.05 [1.37; 6.81]			
F4	Female	281	6.10 [3.00; 7.00]	18738.00	0.31	-0.06 [-0.18; 0.06]
	Male	142	6.12 [3.54; 6.68]			
F5	Female	281	3.25 [1.14; 6.66]	19595.00	0.76	-0.02 [-0.13; 0.10]
	Male	142	3.31 [1.00; 6.75]			
F6	Female	281	2.49 [1.00; 6.33]	20350.00	0.74	0.02 [-0.10; 0.14]
	Male	142	2.54 [1.05; 5.95]			
F7	Female	281	6.32 [2.50; 6.89]	18054.00	0.11	-0.10 [-0.21; 0.02]
	Male	142	6.35 [2.68; 7.00]			
F8	Female	281	5.38 [1.00; 6.84]	18721.00	0.30	-0.06 [-0.18; 0.05]
	Male	142	5.47 [1.85; 7.00]			
F9	Female	281	6.30 [1.25; 6.87]	18322.00	0.17	-0.08 [-0.20; 0.03]
	Male	142	6.38 [3.09; 7.00]			

Source: Adapted from Menezes (2024)

Note: min: Minimum; max: Maximum; N: Sample Size; F1: Received patient safety training; F2: Confidence in reporting error; F3: Working hours as a cause of error; F4: Inevitability of error; F5: Professional incompetence as a cause of error; F6: Responsibility for disclosure; F7: Team functioning; F8: Patient involvement in error reduction; F9: Importance of patient safety in the curriculum.

As observed in Table 8, a statistically significant difference was found only in factor F2: "Confidence in reporting error" ($p = 0.04$). Men presented a median of 5.17 [2.23; 6.82], while women had a median of 5.03 [1.00; 7.00]. This suggests that, in the studied sample, male students demonstrate greater confidence in reporting errors compared to female students.

However, the effect size (r -biserial) for this difference was -0.12 , indicating a small effect. This implies that, although the difference is statistically detectable, its magnitude is limited and may have little practical relevance in clinical or educational contexts.

For all other factors (F1, F3, F4, F5, F6, F7, F8, and F9), there were no statistically significant differences between sexes, with p -values ranging from 0.11 to 0.76 . The median scores for men and women in these factors were very close, and the effect sizes were equally very small, close to zero.

These results suggest that, in general, attitudes towards patient safety are quite similar between male and female students in this sample, with the singular exception of confidence in reporting errors, which is slightly higher in men. It is crucial to emphasize that the interpretation of statistical significance must be weighed against the effect size, especially in larger samples, where small differences can reach statistical significance without necessarily representing a substantial impact.

5 DISCUSSION

The cross-cultural adaptation and validation of the Attitudes to Patient Safety Questionnaire III (APSQ-III) for the Brazilian context represent a significant advance in the availability of robust tools for evaluating the attitudes of health students regarding patient safety. This study not only provides a validated version of the instrument but also offers important insights into the psychometric properties and perceptions of these future professionals in the national scenario.

The cross-cultural adaptation process, which involved independent translations, back-translations, synthesis, and evaluation by an expert committee, ensured excellent semantic, idiomatic, experiential, and cultural equivalence of the Brazilian version with the original instrument (Beaton et al., 2000; Epstein et al., 2015). The consensus expressed by the expert committee, along with the clarity and relevance perceived by pre-test participants, reinforces the suitability of the Brazilian version for the studied population. This systematic approach is crucial because cross-cultural adaptation goes far beyond mere linguistic translation, seeking to ensure that the instrument's concepts and language are understood and interpreted in the same way across different cultures (Sousa & Rojjanasrirat, 2011; Chen, 2008). Similar results have been observed in other instrument adaptation studies related to patient safety in Brazil and other countries (de Carvalho & Cassiani, 2012; Menezes et al., 2020; Alfaqawi et al., 2020).

Confirmatory Factor Analysis (CFA) was fundamental for evaluating the construct validity of the APSQ-III. Initially, the 30-item model, although showing an acceptable fit,

revealed weaknesses in terms of low factor loadings and inverse behavior of some items. This finding is not uncommon in adaptation studies, where cultural and educational particularities can influence how items are understood and responded to (Damásio & Borsa, 2017). Previous studies adapting the APSQ in countries like Saudi Arabia, Singapore, and Hong Kong also found the need for item adjustments for better suitability to their respective contexts (Alshahrani et al., 2021; Leung & Patil, 2010; Al-Sawalha et al., 2023).

The exclusion of four items and the reanalysis of the model with 26 items resulted in a satisfactory fit, corroborating the 9-factor structure of the original APSQ-III version. Factor loadings, mostly high, indicated good convergent validity. However, the persistence of low reliability in the factors "Inevitability of error" (F4) and "Importance of patient safety in the curriculum" (F9) in the final 26-item model is a point that deserves reflection. This fragility suggests that these constructs may be complex or that the items composing them do not entirely consistently capture the perceptions of Brazilian students. It is possible that the inevitability of error is viewed ambivalently or that the actual importance of patient safety in the curriculum is not yet fully consolidated or is perceived in diverse ways by students. These findings, although partially consistent with studies that found similar factorial structures of the APSQ (Al-Sawalha et al., 2023; Atwa et al., 2023), highlight the importance of cultural contextualization in the evaluation of psychometric instruments.

Correlations between latent factors provided valuable insights into the interrelationship of student attitudes. The strong positive correlation between "Team functioning" (F7) and "Importance of patient safety in the curriculum" (F9) underlines the interdependence between the perception of a collaborative work environment and the valuing of safety education. This reinforces the notion that a robust safety culture in practice depends on training that integrates these aspects. The positive correlation between "Patient safety training" (F1) and "Confidence in reporting error" (F2) suggests that good training increases self-confidence for reporting adverse events. On the other hand, the negative correlation between "Responsibility for disclosure" (F6) and "Confidence in reporting error" (F2) is intriguing. It could indicate that, although students recognize the responsibility to disclose errors, confidence in doing so may be lower, perhaps due to fear of punishment or stigmatization, a well-documented challenge in safety culture (Kiesewetter et al., 2014; Nabilou et al., 2015). These interrelationships highlight the complexity of attitudes and the need for educational approaches that consider multiple factors.

The comparison between groups by sex revealed a statistically significant difference only in the "Confidence in reporting error" (F2) factor, with men showing slightly greater confidence than women. Although this difference is statistically significant ($p < 0.05$), the

small effect size (r -biserial = -0.12) suggests that the practical relevance of this difference may be limited. Gender differences in risk perception, communication, and propensity to report errors have been explored in the literature (Kiesewetter et al., 2014), but the magnitude of the effect found here indicates that general attitudes towards patient safety are largely similar between sexes in this student sample.

The results of this study, therefore, reinforce the importance of an integrated approach to patient safety in health curricula. It is fundamental that education covers not only technical aspects but also the development of teamwork skills, effective error communication, and active patient involvement in their own care. Innovative teaching methods, such as simulations, case studies, and discussions about error, can be valuable for promoting interprofessional learning and developing essential competencies for safe practice (Nora et al., 2022; Sherwood & Barnsteiner, 2022). The Brazilian version of the APSQ-III emerges as a valuable tool for monitoring the impact of these interventions and for identifying areas that require greater attention.

5.1 SOCIODEMOGRAPHIC AND ACADEMIC CHARACTERIZATION OF PARTICIPANTS

The characterization of the sociodemographic and academic profile of the students who participated in this study provides an essential background for interpreting the validity and reliability results of the APSQ-III. This section describes the main characteristics of the sample, which consisted of 292 first-year students from Medicine, Nursing, and Psychology courses at a Brazilian public university.

The sample was composed of first-year students, meaning that their attitudes toward patient safety are largely a reflection of their pre-academic experiences, general knowledge, and the initial influence of the university environment. The inclusion of multiple health courses (Medicine, Nursing, and Psychology) allowed for capturing a diversity of perspectives and backgrounds that, although converging toward health, have distinct training and approaches.

Regarding sex distribution, the sample was predominantly female, reflecting the typical demographic composition of many health courses, especially nursing and psychology. This distribution is relevant for interpreting the observed differences in the "Confidence in reporting error" factor, where men showed slightly greater confidence, albeit with a small effect size. The more detailed analysis of sociodemographic variables, which included gender identity, sexual orientation, age, marital status, number of children, income, religion, previous schooling, and employment status, allowed for an in-depth understanding of the participants' profile.

For example, information about previous schooling (elementary and secondary education in public or private schools) can influence students' knowledge base and critical thinking skills, which in turn can impact their perception of patient safety. Employment status (working in the course-related area, in a different area, or not working) can expose students to different realities and pressures, shaping their attitudes even before a deep immersion in specific patient safety content during undergraduate studies. Personal or family income can be associated with different levels of access to information and educational resources, which may also play a role in initial attitudes toward complex topics such as safety.

Data on admission to FAMERP (vestibular option, such as broad competition or affirmative actions, and enrollment call) can indicate the socioeconomic and educational diversity of the sample. This heterogeneity, although challenging for some analyses, enriches the representativeness of the sample regarding the profile of Brazilian university health students.

The participants' age, distributed in ranges (e.g., 20 years, 21-30 years, 31-40 years, >40 years), allowed for analyzing whether maturity or previous life experience influenced how students perceived safety aspects. The diversity of age groups suggests that the study captured both students entering directly after high school and those pursuing a second degree or returning to studies after a period of work.

The detailed sociodemographic and academic characterization not only contextualizes the results of the psychometric validation of the APSQ-III but also serves as a basis for future research seeking to understand how these variables may interact with patient safety attitudes and, consequently, with the effectiveness of educational interventions. It underscores the complexity of the target audience and the importance of considering multiple factors when planning strategies for improving health education.

6 CONCLUSION

The cross-cultural adaptation and validation of the Attitudes to Patient Safety Questionnaire III (APSQ-III) for the Brazilian context were conducted with methodological rigor, culminating in the availability of a promising instrument for assessing the attitudes of health students regarding patient safety.

The cross-cultural adaptation process, which involved independent translations, back-translations, synthesis, and evaluation by an expert committee, ensured excellent semantic, idiomatic, experiential, and cultural equivalence of the Brazilian version with the original instrument. The pre-test confirmed that the adapted version is understandable and applicable

to the Brazilian academic context, with minor punctual adjustments further enhancing its clarity.

Confirmatory Factor Analysis (CFA) demonstrated that the final 26-item, 9-factor model of the Brazilian APSQ-III showed a satisfactory fit to the data. Factor loadings were, on average, high, indicating good construct validity. However, it is fundamental to highlight that the factors "Inevitability of error" (F4) and "Importance of patient safety in the curriculum" (F9) exhibited low reliability (McDonald's omega and composite reliability values below 0.60). This finding suggests that, although the factorial structure is confirmed, the internal consistency of these specific constructs may be weaker in the Brazilian context, warranting attention and possible reformulations in future investigations.

Correlations between factors revealed significant associations that corroborate the complexity of patient safety attitudes. The strong relationship between "Team functioning" and "Importance of patient safety in the curriculum" highlights the relevance of training that integrates dimensions of collaboration and safety culture. The correlations also pointed to potential challenges, such as the inverse relationship between "Responsibility for disclosure" and "Confidence in reporting error," which may indicate cultural or institutional barriers to reporting.

The comparison between groups by sex indicated a statistically significant difference only in the "Confidence in reporting error" (F2) factor, with men showing greater confidence than women. However, the small effect size (r -biserial = -0.12) suggests that this difference, although present, has limited magnitude and may not translate into a substantial practical impact. For other factors, patient safety attitudes were similar between genders in the studied sample.

In summary, this study provides a valid and reliable instrument (with reservations for factors F4 and F9) to assess the attitudes of health students regarding patient safety in Brazil. The Brazilian APSQ-III can be a valuable tool for:

- Identifying specific gaps in academic training.
- Supporting the development and implementation of more targeted and effective educational interventions.
- Monitoring changes in students' attitudes over time and in response to teaching programs.
- Contributing to the promotion of a proactive safety culture in health services, from initial training.

The results reinforce the imperative that health curricula comprehensively address patient safety, with special emphasis on developing teamwork skills, open communication

about errors, and active patient engagement. By doing so, we train professionals who are more conscious and committed to quality and safety in care, benefiting society as a whole.

7 LIMITATIONS

This study, although robust in its methodology of cross-cultural adaptation and psychometric validation, presents some inherent limitations in its design and execution that deserve consideration in the interpretation of results and in the planning of future research.

Convenience Sample and Generalization: The use of a convenience sample, composed of students from a single Brazilian public higher education institution, restricts the generalization of the results. Students' attitudes and perceptions can vary significantly among different institutions (public and private), geographic regions, and socioeconomic profiles. Thus, the findings may not be fully representative of all health students in Brazil.

Cross-sectional Design: The cross-sectional nature of the study, with data collection at a single point in time, prevents causal inferences. It is not possible to determine whether the observed attitudes are directly influenced by specific curriculum aspects or by previous experiences. Furthermore, it does not allow for evaluating the temporal stability of the instrument (test-retest reliability, although foreseen in the specific objectives, was not reported in the presented results, indicating a limitation in its execution).

Low Reliability of Specific Factors: The identification of low reliability (McDonald's Omega and composite reliability below 0.60) in the factors "Inevitability of error" (F4) and "Importance of patient safety in the curriculum" (F9) represents a significant limitation. Although the overall fit of the 26-item model was satisfactory, the fragility of these factors compromises confidence in the specific measures of these constructs. This suggests that the current version of the items may not ideally capture these concepts for the Brazilian population, requiring revision or recontextualization.

Assumption of Scalar Invariance: The material impossibility of verifying measurement invariance between sexes (due to missing responses in some categories) led to the assumption of scalar invariance. This was a pragmatic decision, but it introduces an assumption without empirical confirmation, which may influence the validity of comparisons between groups. In an ideal scenario, invariance should be rigorously tested.

Nature of Attitude Measurement: Self-report instruments, such as Likert-scale questionnaires, are susceptible to response biases, such as social desirability. Participants may tend to provide answers they consider more socially acceptable or "correct" rather than their genuine attitudes, especially on sensitive topics like errors and responsibility.

Challenges in Cultural Adaptation of Inverse Items: The need to reverse the scoring of several items (beyond those initially planned) and the low factor loading of some of them (items 13, 15, and 28) indicate that the understanding and structure of these items may be particularly challenging in the Brazilian cultural context. The formulation of inverse items can sometimes generate ambiguity or be interpreted in ways distinct from the original intention.

These limitations do not invalidate the obtained results but contextualize the applicability of the instrument and guide future research directions, aiming to improve the Brazilian version of the APSQ-III.

8 RECOMMENDATIONS FOR FUTURE RESEARCH

Based on the findings and limitations of this study on the adaptation and validation of the APSQ-III for the Brazilian context, several recommendations can be formulated for future research. These suggestions aim to deepen the understanding of patient safety attitudes among health students and improve the instrument.

Expand and Diversify the Sample: Future studies should seek to replicate this work with larger and more diversified samples, encompassing multiple higher education institutions (public and private) in different geographical regions of Brazil. This would increase the generalizability of the results and allow for a more robust analysis of possible regional or institutional differences in students' attitudes.

Revision and Improvement of Factors with Low Reliability: The factors "Inevitability of error" (F4) and "Importance of patient safety in the curriculum" (F9), which showed low reliability, demand in-depth investigation. Researchers could conduct qualitative studies (such as focus groups or cognitive interviews) to understand how Brazilian students interpret the items in these factors. Based on these insights, items can be reformulated, added, or removed to increase their clarity and internal consistency, seeking a better representation of the constructs in the cultural context.

Longitudinal Studies: The implementation of longitudinal studies is crucial to evaluate the temporal stability of student attitudes and how they evolve throughout their academic training and initial clinical experiences. Such a design would allow investigating the impact of specific curricular interventions and of exposure to practice environments on modifying attitudes toward patient safety.

Investigation of Measurement Invariance: It is fundamental that future studies conduct a rigorous analysis of measurement invariance between different groups (e.g., sex,

course, academic period, institution type) to ensure that comparisons are valid. The inability to do so in this study suggests a methodological gap to be filled.

Convergent and Discriminant Validity with Other Constructs: Future research could explore the convergent and discriminant validity of the Brazilian APSQ-III, correlating it with other instruments that measure related constructs (such as empathy, resilience, stress perception, organizational culture) or theoretically distinct constructs. This would enrich the validity framework of the instrument.

Association with Clinical or Behavioral Outcomes: Although challenging, it would be valuable to investigate the relationship between attitudes measured by the APSQ-III and more objective outcomes, such as the participation in patient safety training, the notification of adverse events in clinical practice (when applicable), or the observation of safe behaviors in simulated environments.

Exploration of Interdisciplinary Differences: The inclusion of medicine, nursing, and psychology students opens doors for more in-depth investigations into differences and similarities in patient safety attitudes among different health professions. Understanding these nuances can support the creation of more effective interprofessional education programs.

Contextualization of Sociodemographic Variables: Deepen the analysis of the influence of sociodemographic and academic variables (such as income, parental education, previous work experiences) on patient safety attitudes. This can reveal groups with specific educational needs or factors protective/of risk for the development of a safety culture.

Integration with Mixed Methods: The combination of quantitative and qualitative methods could provide a richer understanding of student attitudes. Semi-structured interviews or focus groups could explore in depth the reasons behind certain attitudes or the perceived barriers to safe practice, complementing questionnaire data.

Applications in Educational Interventions: Use the validated version of the APSQ-III as an impact assessment tool for educational interventions (for example, courses, simulations, workshops) focused on patient safety. This would allow demonstrating the effectiveness of different pedagogical approaches in modifying student attitudes.

By following these recommendations, the Brazilian academic community will not only be able to strengthen the APSQ-III tool but also contribute more substantially to the training of engaged and competent health professionals in promoting patient safety.

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LITERARY PODCAST IN HIGH SCHOOL: YOUTH EMPOWERMENT, ORALITY, AND CRITICAL LITERACY IN AN AMAZONIAN PUBLIC SCHOOL

PODCAST LITERÁRIO NO ENSINO MÉDIO: PROTAGONISMO JUVENIL, ORALIDADE E LETRAMENTO CRÍTICO EM ESCOLA PÚBLICA AMAZÔNICA

PODCAST LITERARIO EN LA ESCUELA SECUNDARIA: EMPODERAMIENTO JUVENIL, ORALIDAD Y ALFABETIZACIÓN CRÍTICA EN UNA ESCUELA PÚBLICA AMAZÓNICA



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ABSTRACT

This article, funded by Fapeam (Amazonas Research Support Foundation), presents a didactic proposal using literary podcasts in Literature classes, aiming to contribute to active learning methodologies, stimulating a love of reading and critical analysis of literary works, promoting student interaction, creativity, and youth empowerment. The methodology adopted in this study is characterized as action research of an exploratory and interventional nature, with a mixed-methods approach. The investigative procedures were structured in stages, encompassing diagnostic, intervention, and evaluation phases. Data collection instruments included participant observation, field diary, and questionnaires (before and after the project). The project was based on the theoretical considerations of authors who address the importance of incorporating active methodologies that involve students in the pursuit of knowledge. Analyzing the findings, it was possible to note greater interest in discussions about the supplementary reading materials read and recorded during Literature classes. Thus, the data suggest that, despite the context of socio-educational vulnerability in the Amazon region, methodologies such as this corroborate the transformative potential of podcasts as a pedagogical mediator by fostering the integrated development of oral expression, critical argumentation, and student authorship.

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Keywords: Podcasts. Literature. Active Methodologies. Critical Argumentation. Youth Empowerment.

RESUMO

O presente artigo, financiado pela Fapeam (Fundação de Amparo à Pesquisa do Amazonas), apresenta uma proposta didática com a realização de podcasts literários nas aulas de Literatura tendo o objetivo de contribuir com propostas de metodologias ativas, estimulando o gosto pela leitura e análise crítica de obras literárias, promovendo a interação dos estudantes, a criatividade e o protagonismo juvenil. A metodologia adotada neste estudo caracteriza-se como uma pesquisa-ação de natureza exploratória e interventiva, o delineamento assume um enfoque misto. Os procedimentos investigativos foram estruturados em etapas, abrangendo fases de diagnóstico, intervenção e avaliação. Dentre os instrumentos de coleta de dados têm-se: observação participante, diário de campo, questionários (pré e pós desenvolvimento do projeto). O projeto baseou-se nas considerações teóricas de autores que abordam a importância da inserção de metodologias ativas que envolvam os discentes na busca por conhecimento. Analisando os “achados”, foi possível notar maior interesse nas discussões acerca dos paradidáticos lidos e gravados durante as aulas de Literatura. Destarte, os dados sugerem que, apesar do contexto de vulnerabilidade socioeducacional na região amazônica, metodologias como essa corroboram o potencial transformador do podcast como mediador pedagógico ao fomentar o desenvolvimento integrado da expressão oral, da argumentação crítica e da autoria discente.

Palavras-chave: Podcasts. Literatura. Metodologias Ativas. Argumentação Crítica. Protagonismo Juvenil.

RESUMEN

Este artículo, financiado por Fapeam (Fundación de Apoyo a la Investigación de la Amazonía), presenta una propuesta didáctica que utiliza podcasts literarios en clases de Literatura, con el objetivo de contribuir a metodologías de aprendizaje activo, estimulando el amor por la lectura y el análisis crítico de obras literarias, promoviendo la interacción estudiantil, la creatividad y el empoderamiento juvenil. La metodología adoptada en este estudio se caracteriza por ser una investigación-acción de carácter exploratorio e intervencionista, con un enfoque de métodos mixtos. Los procedimientos de investigación se estructuraron en etapas, abarcando fases de diagnóstico, intervención y evaluación. Los instrumentos de recolección de datos incluyeron observación participante, diario de campo y cuestionarios (antes y después del proyecto). El proyecto se basó en las consideraciones teóricas de autores que abordan la importancia de incorporar metodologías activas que involucren a los estudiantes en la búsqueda del conocimiento. Analizando los hallazgos, se observó un mayor interés en las discusiones sobre los materiales de lectura complementarios leídos y grabados durante las clases de Literatura. Así, los datos sugieren que, a pesar del contexto de vulnerabilidad socioeducativa en la región amazónica, metodologías como esta corroboran el potencial transformador de los podcasts como mediador pedagógico, al fomentar el desarrollo integral de la expresión oral, la argumentación crítica y la autoría estudiantil.

Palabras clave: Podcasts. Literatura. Metodologías Activas. Argumentación Crítica. Empoderamiento Juvenil.

1 INTRODUCTION

The acceleration of technological advances in recent decades constitutes one of the central vectors of contemporary globalization, reconfiguring not only economic and social relations, but also educational processes (Belloni, 2005). Even if it is not realized, the world and global context is digital. In view of this, the school should not be neutral to this reality, it is essential that the educational institution be the mediator between all messages, discourses and information until the critical, conscious and emancipatory knowledge of the student.

The teaching and learning process mediated by technology should have as its primary function to promote the formation of individuals capable of thinking critically and freely, appropriating, mainly, what the new digital technologies offer, since the young student has made use of these new resources intensely, however, with the sole purpose of entertainment and communicative relationship.

Such appropriation, however, offers significant pedagogical potential when mediated intentionally, allowing the conciliation between the technological domain of youth and the development of essential skills for citizenship education. The National Common Curricular Base (BNCC, 2018) explicitly recognizes orality as the structuring axis of the Portuguese language curricular component, defining it as language practices that encompass oral interactions with or without face-to-face contact — such as debates, interviews, seminars, and recorded productions — with the aim of fostering active listening, critical argumentation, and social participation (Brasil, 2018, p. 78-79).

This dynamic is in line with the propositions of Coll (2010), for whom ICTs expand educational processes beyond the walls of the school, promoting multiple literacy and the ethical-reflective exercise of citizenship. In this sense, the school assumes the role of integrator of Information and Communication Technologies (ICT), compensating for social and regional inequalities resulting from asymmetric access to these resources, as argued by Belloni (2005, p. 45-47), when he states that the educational institution must act to mitigate disparities generated by the digital divide.

This article reports the results of a research project funded by FAPEAM, entitled *Literary Podcast*: analysis and discussion of literary works as stimuli for the facilitation of the learning process in Literature classes, developed in a State Public Education School, located in the municipality of Itacoatiara/AM, in a context of socioeconomic and community vulnerability.

With the objective of contributing with proposals for active methodologies stimulating the taste for reading and critical analysis of literary works from the recording of *podcasts*, promoting student interaction, creativity and youth protagonism in high school. To this end,

initially, it aimed to identify factors that have contributed to the students' lack of interest in reading paradidactic books, then, it was proposed to encourage the reading of literary works through the recording of *podcasts* in Literature classes to develop the critical, participatory and protagonist sense of students in order to minimize the lack of interest in reading the requested paradidactic books. Finally, records were made, through reports, about the progress of the students who participated in the recording with analysis and discussions about the works read.

The initiative sought to overcome difficulties observed in students, such as shyness in oral presentations, low dialogic participation and limited capacity for critical positioning, through the intentional integration of the *podcast* as a pedagogical mediator. Thus, it is proposed not only to document the empirical impacts of the intervention, but to contribute to the debate on how digital technologies can be critically appropriated in basic education, fostering more autonomous, reflective and engaged subjects in the transformation of their local realities. Given this panorama, the *podcast* emerges as a particularly promising media tool for the promotion of orality in an educational environment, especially in the context of socio-educational vulnerability in the Amazon region.

2 THEORETICAL FOUNDATION

If Freire's premise alerts us to the anteriority of the reading of the world, Applied Linguistics, through the contributions of Ângela Kleiman, instrumentalizes this discussion by situating reading and writing as social practices inseparable from the contexts of power and identity. In environments marked by social vulnerability, such as the school scenario of Itacoatiara/AM, the analysis of the reading difficulties of high school students requires, initially, a break with the traditional view that blames the individual for the failure to appropriate the cultured norm.

Kleiman (1995) proposes the concept of literacy as the state or condition of those who not only know how to read and write, but cultivate and exercise the social practices that use writing. The author argues that the school often operates under the aegis of an autonomous model of literacy, treating reading as a neutral technique, disconnected from the cultural experiences of students. "Literacy is, therefore, a set of social practices that use writing, as a symbolic system and as a technology, in specific contexts, for specific objectives." (KLEIMAN, 1995, p. 19).

For the student in a situation of vulnerability, the distance between the language taught (standard, Eurocentric, bookish) and the language lived (orality, local dialects, digital language) creates a barrier to access. Kleiman invites us to observe that these students are

not "illiterate" or "empty"; They actively participate in other spheres of literacy — often mediated by digital technologies — that are made invisible by the formal curriculum.

In this sense, the author defends the teaching of reading through literacy projects that function as an agency for social transformation. Reading, in Kleiman's perspective, is an act of meaning-making that should empower the subject to navigate through the different spheres of society. For high school graduates, reading competence should not only aim at passing large-scale exams, but also at the ability to interact critically with the multiple texts that circulate in the information society.

The introduction of Digital Information and Communication Technologies (DICT) in this context, as investigated in this research, is supported by Kleiman's view of the plasticity of literacy practices. If the school wishes to train critical readers, it needs, in the words of the author, to act as a literacy agency, hybridizing the vernacular knowledge of students with the prestigious knowledge, without annulling the Amazonian cultural identity that constitutes them. Therefore, overcoming the difficulties of reading and writing is not a process of "fixing" the student, but of adjusting the pedagogical lens to recognize and expand the literacies he already has, using technology not as an end, but as a bridge for the appropriation of the legitimized literate culture.

Orality, as a founding language practice of human interaction, transcends its merely communicative dimension to become a structuring axis of citizenship education, integral literacy and preparation for selection processes for admission to higher education. The National Common Curricular Base (BNCC, 2018) positions it as a specific competence of the Portuguese Language component in High School, emphasizing the production, active listening, and critical analysis of oral texts in different fields of activity — especially artistic-literary and journalistic-media — with emphasis on autonomy, argumentative fluency, and reflective criticality (Brasil, 2018, p. 87 and 503-510). In High School, the student is called to participate with greater analytical density in complex communicative situations, taking a leading role in practices that go beyond the school environment and connect directly to the demands of entrance exams, where the critical interpretation of literary works is essential for performance in discursive questions and essays.

This normative orientation dialogues with classic contributions by Marcuschi (2013), who defends the systematic teaching of orality as an autonomous object, and Antunes (2016), who advocates for the valorization of oral genres in multimodal contexts, overcoming the traditional hierarchy between oral and written. In the context of information and communication technologies (ICT), the *literary podcast* emerges as a pedagogical tool particularly apt to enhance these practices.

Created a little over a decade ago, the virtual *podcast genre* emerged from the combination of *pod*, *iPod* (Apple's mp3 player) and *broadcast* (transmission), to refer to audio recordings, made available in programs on the *internet*, being used for the first time in 2004, in *The Guardian newspaper*, by the English journalist Ben Hammersley (JAIN; HASHMI, 2013). This genre is a media for transmitting content in audio format, just like radio, however, unlike the latter, the *podcast* is available so that listeners can access it whenever they want, pausing, coming back and listening as many times as necessary. This media is transmitted via *Really Simple Syndication*, which translates to "really simple transmission", allowing the listener to receive updates on the programs they want to hear. Such media can be accessed through *websites* that make podcasts available, but the most common is that they are listened to on *smartphones* through applications or digital audio *streaming* platforms, such as *Spotify, Castbox, Google Podcast, Apple Podcast*, etc. (HASAN; HOON, 2013)

A new space for sociability, for the organization of information, knowledge and education. Therefore, the technological resources that enable access to the internet need to be inserted in educational practice, in order to offer students possibilities of access to content in different formats and appropriate to the needs of students, so that the educator can promote the teaching of content simultaneously with individual and social training for the use of technology in an ethical and civic way.

This perspective dialogues with the critical education defended by Kleiman (2020) and Bagno (1999), who emphasize literacy as an anti-discriminatory social practice, integrating orality, multiliteracies, and digital culture to overcome linguistic prejudices and promote equity in access to the knowledge required in selection processes.

In the increasingly digital global and global context, the school cannot remain neutral: it must act as a critical mediator between discourses, information and knowledge, promoting a conscious and emancipatory education. the tools available on the internet, such as the *Podcast*, can be used as a didactic resource that enables quick access to multimedia content, without limitations in terms of time and space and which are composed of languages that favor the access of the student with disabilities to the content and resources made available. In this sense, Almeida and Moran (2005, p. 63) state that: The use of the internet at school is a requirement of *cyberculture*, that is, of the new communicational-cultural environment that emerges with the worldwide interconnection of computers in strong expansion at the beginning of the twenty-first century.

Thus, the production of *literary podcasts* about literary works develops critical thinking, oral argumentation, and interest in pleasurable and analytical reading. The teacher transcends the mere transmission of content, becoming a facilitator of processes that meet

individual, social and human needs, articulating digital technologies with school literary knowledge to prepare critical readers who are able to face the challenges of the selection processes for admission to higher education.

3 METHODOLOGY

The methodology adopted in this study is characterized as an exploratory and interventional action research, with emphasis on pedagogical transformation through the integration of the *podcast* as a tool for the development of orality and youth protagonism in the teaching of Literature. As elucidated by Thiollent (2011), action research is a collaborative and dialogical modality, anchored in Freire's praxis, which aims at the emancipation of the subjects involved through the collective identification of problems, the implementation of interventional actions and the cyclical evaluation of results, with the aim of generating applicable and transformative knowledge.

Action research, as outlined by Thiollent (2011), constitutes a participatory approach that intertwines objectives of scientific knowledge and practical action, involving researchers, educators and subjects of the problem-situation (in this case, students and scholarship holders) in the identification, analysis and intervention on real issues of the educational context. In this sense, action research is justified by the need to confront the reading demotivation observed among high school students, through the implementation of a pedagogical practice - the recording of *podcasts* - that provides argumentative power and, consequently, promotes meaning to the act of reading, thus stimulating this practice inherent to intellectual/human development.

The study was conducted in the second semester of 2024 in a Public School located in Itacoatiara/AM, involving high school students, selected by convenience and availability, with inclusion criteria based on active enrollment and informed consent. From a population of 120 high school students, 35 were withdrawn to participate in the research. The sample reflects the socioeconomic and cultural diversity typical of peripheral Amazonian contexts, characterized by limited access to educational technological resources. Ethical considerations were strictly observed, with institutional approval by the Research Ethics Committee (REC) of the linked institution, ensuring anonymity, confidentiality, and the right to voluntary withdrawal, in accordance with CNS Resolution No. 510/2016.

The investigative procedures were structured in stages, according to the action research model, covering diagnosis, intervention and evaluation phases. Initially, the factors that have contributed to the lack of interest of high school students in reading the requested paradidactic books were identified, this identification phase was done through participant

observation with notes in the field diary, followed by a questionnaire containing seven questions applied to the students, which revealed the reading demotivation as a central problem. Then, the intervention was applied to the problem found with the incentive to read the works requested during the two months - or even in the entrance exams - through the recording of *podcasts* in Literature classes to develop the critical, participatory and protagonist sense of high school students and, as a verification/evaluation of the developed project, a second questionnaire was made to serve as a comparison to the first in order to verify the evolution in the interest in reading books, in relation to overcoming (or not) shyness, about the engagement of students in oral and critical activities, for example. That said, the progress records of the students who participated in the recording of the *podcasts* were also made.

In addition, the design takes a mixed approach, integrating qualitative and quantitative procedures in a single study for greater interpretative detail. Tashakkori and Creswell (2007) define mixed research as the collection, analysis, and integration of qualitative and quantitative data, allowing inferences that transcend the limitations of each isolated approach. Here, the quantitative aspects emerge from the analysis of measurable indicators (such as frequency of participation, levels of engagement, and content production), while the qualitative aspects derive from participant observation, oral reports, and interpretative analyses of student productions. This mixed integration favors the understanding of the impact of the intervention on the development of orality and the critical appropriation of literary works, in line with the recommendations of Creswell and the Clark Plan (2017) for sequential or convergent designs in educational contexts.

The research begins with an exploratory bibliographic phase, as recommended by Gil (2007), who classifies the bibliographic research as a fundamental stage for the systematic survey of theoretical and empirical sources, aiming to subsidize the formulation of the problem and the conceptual delimitation. After the initial meeting at the Vital de Mendonça State School — in which schedules, responsibilities and the term of ethical commitment were defined — the theoretical foundation was carried out with the active participation of the selected scholarship holders, under the mediation of the advisor. This stage involved collective reading, discussion of pertinent texts and preparation of files, notes and systematic records, promoting the critical appropriation of the framework and the collective construction of knowledge (Gil, 2007).

The sampling was intentional and non-probabilistic, composed of high school students, selected for convenience and availability in the school context. This choice is justified by the interventional nature of action research, in which the sample prioritizes situational

representativeness and the direct involvement of participants in the transformation of practice (Thiollent, 2011).

The data collection instruments were diversified to capture multiple dimensions of the experience: participant observation and field diary: They recorded interactions, enthusiasm, responsibility and use of school spaces (library, classroom), allowing qualitative analysis of the engagement process (Yin, 2015). A questionnaire was developed at the beginning of the project in order to identify factors that have contributed to the lack of interest of high school students in reading the requested books, also about shyness/difficulty in making presentations in the classroom, about the confidence they had (and if they had) in orality, about the frequency of participation in discussions with debates raised during expository and dialogued classes, about the ability to argue and in relation to the interest in literary reading. The semi-structured questionnaire consisted of seven questions, answered via *Google Forms*, with *Likert* scales to measure the answers presented.

In possession of the possible cause of the lack of interest in carrying out the requested readings, the proposal was presented to the students about reading in order to record *podcasts* in Literature classes to develop the critical, participatory and protagonist sense of high school students. Thus, the students organized themselves into groups to carry out the readings, according to the selection of books made, and then the recording of podcasts with critical analyses about the readings performed. This activity of reading, recording, editing and sharing the material produced with the other high school classes was carried out during the three months following the beginning of the project developed in the school mentioned here. The records of the practical classes were made in reports to identify the progress of the students who participated in the research.

It is noteworthy that the oral records and informal conversations began with reports on the use of *podcasts* in Literature classes, capturing initial perceptions and spontaneous narratives of the students. Therefore, there were, through the developed project, multimodal productions of the participants, which included paradidactic readings in PDF format via cell phone, formation of groups for oral rehearsals, presentation scripts, video/podcast recordings and collaborative editions. These productions served as primary data to evaluate the development of orality, critical argumentation and protagonism, aligning with the concept of reflective portfolio in educational action research.

In addition, it was possible to carry out the content analysis of the productions that involved examination of the students' contributions regarding thematic relevance, historical contextualization, literary analysis and oral expression, with triangulation between observations and self-evaluations. As for the intervention, it adopted a multifaceted (or

multidimensional) approach, incorporating complementary dimensions: detailed literary analysis of the paradidactic works, historical-cultural contextualization, interviews/recorded orality, critical debates and collaborative production of audiovisual content.

The qualitative analysis of the textual productions, participant observation records, field diaries and semi-structured interviews was conducted according to Bardin's (2011) content analysis technique, in its thematic modality, in sequential stages: (I) The first stage carried out was the collective reading of literary texts via mobile devices, using the *smartphone* itself of students. (II) Next, groups were formed for planning and oral rehearsals, in order to prepare the scripts that would be recorded in the *podcasts*. (III) In the third stage, recordings and content editions were made, with emphasis on the importance of the work, authorship, relevant themes and acquisition of critical knowledge, in order to provide students with the opportunity to play a leading role in the process of critical analysis of the selected works. The high level of enthusiasm, responsibility, and participation observed reinforces the emancipatory potential of action research when mediated by accessible technologies (Thiollent, 2011; Gil, 2007).

This methodological configuration, by combining participatory action research, mixed focus and multifaceted approach, ensures scientific rigor combined with practical relevance, contributing to the advancement of the use of podcasts as a pedagogical strategy in the promotion of literary orality and student protagonism in Brazilian school contexts.

4 RESULTS AND DISCUSSIONS

The first part of this study was aimed at probing and observation in literature classes and the acceptance (or refusal) that was seen in the student from whom the reading was requested. The students also reported lack of motivation in relation to mandatory readings because they considered them to have no legitimate meaning, that is, as they said "*reading simply because it is mandatory reading, recommended in the selection processes or in the school's internal evaluations*".

That said, it is important to analyze the emancipatory proposition defended by the great thinker Paulo Freire in relation to the act of reading. In the seminal work "*The importance of the act of reading*" (1989), Freire establishes a fundamental ontological proposition for critical pedagogy: "The reading of the world precedes the reading of the word". This assertion, far from being a mere poetic aphorism, contains a theoretical density that reorients the social function of the public school. Freire (1989) argues that the subject, before having contact with syntax or normative morphology, is already an active interpreter of his

surroundings. The "world" to which the author refers is the universe of sensory, affective, social and political experiences that constitute the individual.

"The reading of the world precedes the reading of the word, so the subsequent reading of the latter cannot dispense with the continuity of the reading of the former. Language and reality are dynamically linked." (FREIRE, 1989, p. 11). Thus, the didactic proposal presented here unites the reading activity with digital technology, considering that all the work of reading, recording, editing and presenting the videos is done on the smartphones of the young students. Thus, the dialogue that takes place between the word and the word-world is related to the reality present in the twenty-first century.

In the context of students in vulnerable situations, this "reading of the world" is often crossed by experiences of exclusion, resistance and survival strategies. Ignoring this previous repertoire — what Freire would classify as a practice of "banking education" — is an act of symbolic violence. When the school imposes the "reading of the word" (the formal curriculum) without connecting it to the "reading of the world" (the student's reality), a cognitive and affective gap is produced that invariably results in school failure.

Regarding the application of the questionnaires, the results - evidenced by the collected data - are positive and statistically observable in the development of oral, critical and reading skills of the 35 subjects enrolled in the research. The initial diagnostic questionnaire revealed a profile of low oral resourcefulness and limited engagement with literature: approximately 70% of the respondents reported significant difficulties in expressing critical opinions about literary works in the classroom, with a predominance of shyness, low participation in debates and little motivation to read paradidactics. This initial configuration is in line with Belloni's (2005) analysis of the social and regional inequalities that affect equitable access to communicative and cultural practices in contexts of vulnerability.

After the implementation of weekly workshops for the production of literary podcasts — which involved technical training, shared reading of paradidactic works, preparation of analytical scripts, recordings of reviews, interpretive debates and simulated interviews on literary themes — the post-intervention data showed substantive evolution. The comparative tables (Before and After) illustrated below show an average increase of 45% in self-perception of confidence in orality, critical argumentation and interest in reading, with greater commitment and ability in analytical positions on the works studied.

Table 1

Comparison of students' self-perception regarding oral, critical and reading skills before and after the intervention with literary podcasts (n=35)

Competence	Before the intervention (%)	After the intervention (%)	Absolute change (%)
Confidence in orality	30	75	+45
Participation in discussions	35	80	+45
Critical argumentation skills	40	80	+40
Interest in literary reading	40	85	+45

Source: Questionnaires applied by the authors (2024). Prepared by the authors.

Table 1, by recording progress of 45 percentage points in confidence in orality and participation in discussions, validates Marcuschi's (2013) thesis that orality should be treated as an object of autonomous and systematic teaching, and not as a subsidiary competence to writing. The gain of 40 points in the capacity for critical argumentation directly reflects the mobilization of specific competencies in the area of Languages and their Technologies of the BNCC (Brasil, 2018, p. 504-510), especially EM13LGG201 (critical analysis of discourses in different languages) and EM13LGG301 (collaborative production with the exercise of protagonism and authorship). These results also dialogue with the perspective of Antunes (2016), who defends the overcoming of the traditional hierarchy between oral and written through multimodal genres, such as podcast, which integrates voice, script, sound editing and digital circulation.

As can be seen, specifically, the students engaged in the productions positioned themselves as active producers of literary content, fostering intergenerational and intragroup dialogues based on the works read. This practice is in line with Primo's (2005) conception of *podcasting* as an interactive media process that promotes flexibility, socialization of knowledge and collaborative construction of meanings. The dissemination of the episodes to the school community expanded the reach, encouraging greater interest in reading paradidactics and the realization of awareness campaigns about the importance of literature in critical education.

Table 2

Evolution in interest in literature, overcoming shyness and engagement in oral and critical activities (before vs. after)

Indicator	Before the intervention (%)	After the intervention (%)	Absolute change (%)
Reduction of shyness in oral activities	35	72	+37
Interest in recording literary podcasts	40	78	+38
Motivation to read paradidactics	72	82	+10
Participation in literary debates	32	75	+43

Source: Questionnaires applied by the authors (2024). Prepared by the authors.

Table 2 highlights the increase of 43 percentage points in participation in literary debates and 38 points in interest in recording *podcasts*, which shows the transformation of the student from passive receiver to active producer of literary meanings. This displacement is in line with the notion of youth protagonism developed by Costa (2006) and Rabin & Bacich (2018), in which young people exercise reflective authorship and social intervention in their contexts. The modest variation of +10 points in motivation to read paradidactics suggests that the greatest impact occurs in oral and collaborative practices, but that reading itself gains indirect traction through dialogical mediation and the pleasure associated with authorial production — a phenomenon that Kleiman (2020) associates with critical literacy as an anti-discriminatory and emancipatory social practice.

The quantitative data summarized in Tables 1 and 2 show significant average gains — ranging between 37 and 45 percentage points — in the core dimensions of argumentative orality, interpretative criticality and reader engagement, empirically corroborating the central hypothesis of the project: the collaborative production of literary podcasts constitutes a mediating pedagogical device capable of reconfiguring integral literacy in the 2nd year of High School, especially in contexts of socio-educational vulnerability in the Amazon region.

This elevation is not limited to a mere instrumental improvement in oral expression, but reveals a process of epistemic and ontological empowerment of the subjects, in line with Vygotsky's (2001/1934) historical-cultural theory, according to which dialogical and multimodal interactions — here materialized in the elaboration of analytical scripts, in the recording of interpretative debates and in the collective editing of episodes about works such as *Olhos d'água* (Conceição Evaristo), *The hour of the star* (Clarice Lispector), *Vidas Secas* (Graciliano Ramos) or *Casa Velha* (Machado de Assis) — they function as superior psychological tools that expand the zone of proximal development of students. The internalization of these mediated practices promotes the transition from the interpsychological plane (collective debate) to the intrapsychological plane (autonomy in

critical argumentation and reflective reading), configuring the podcast as a cultural artifact that enhances the active appropriation of literary knowledge.

From a methodological point of view, the observed gains reinforce the power of active methodologies mediated by ICT in High School, as defended by Bacich & Moran (2018), especially in contexts of digital and educational inequality. However, the persistence of a minority with lower initial engagement (about 20-25%, inferred from pre-intervention data) points to the need for differentiated strategies that consider psychosocial factors, varied learning paces, and barriers to access to connectivity — a recurrent structural challenge in the Amazon, as evidenced by the ICT Education Survey (NIC.br, 2025) and the School Census (INEP, 2025).

In summary, the tables not only document measurable advances, but attest to the capacity of the *literary podcast* to operate as a cultural mediator that articulates critical orality, literary literacy, and preparation for the selection processes for admission to higher education. The results position the intervention as a relevant contribution to the contemporary debate on inclusive pedagogical innovation, multiliteracies and the formation of critical readers and protagonists in Brazilian public education.

5 CONCLUSION

The data indicate, therefore, that, in the case of a project developed in a public school, located in the Amazon region with its economic and social limitations, developing the work in the classroom making use of active methodologies, such as the *podcast*, has been a great stimulus for the participation of young students in the readings and discussions that this methodology provides. The results obtained in the project corroborate the transformative potential of the *podcast* as a pedagogical mediator, by fostering the integrated development of oral expression, critical argumentation and student authorship in contexts of socio-educational vulnerability.

The intervention demonstrated that the collaborative production of audio episodes, anchored in the reading, analysis and debate of paradidactic literary works — often required in selection processes for admission to higher education — contributes to overcoming initial barriers of shyness and low participation, in line with the guidelines of the National Common Curricular Base (BNCC, 2018), which position orality as the structuring axis of literary literacy and youth protagonism as an essential competence for the formation of critical readers and reflective citizens (Brasil, 2018, p. 59-87 and 503-510; competencies EM13LGG201, EM13LGG301 and EM13LGG601).

Notwithstanding the advances observed — such as greater engagement in literary discussions, improvement in interpretative argumentation, and increased interest in the analytical reading of canonical and contemporary texts — contextual limitations have emerged that demand critical reflection. The main difficulty was related to unstable connectivity: although the school has a Wi-Fi network, the infrastructure does not support simultaneous access by teachers and students, resulting in frequent interruptions during bibliographic research, consultation of critical abstracts or audio edits.

This obstacle reflects a persistent structural challenge in Brazilian public schools, especially in the North/Amazon region, where, according to recent data from the School Census (2023-2025) and the ICT Education Survey (2024-2025), adequate connectivity for pedagogical purposes varies significantly, with national advances for about 96% of connected schools, but persistent regional inequalities (e.g., only 63-64% in Amazonian contexts in recent years, with even more restricted effective use for learning) (NIC.br, 2024-2025; Inep/MEC, 2025; National Strategy for Connected Schools).

In addition, a minority of students manifested distraction with digital devices during activities such as reading PDF works or consulting online critical analyses, requiring more intensive mediation from the teacher to stay focused on the proposed task. This phenomenon highlights the need for continuing education in critical digital literacy, capable of transforming the recreational use of technology into an instrument of intentional and pleasurable learning, especially for young digital natives who demand approaches that integrate ICT with the pleasure of literary reading (Kleiman, 2020; Moran, 2015; Belloni, 2005).

Despite these restrictions, the contemporary global context is unequivocally technological, demanding that education actively incorporate ICT to promote meaningful, pleasurable learning that is aligned with educational and social training/development demands. The teacher emerges as the main agent in this mediation, guiding young people to appropriate technologies for the sake of critical knowledge — as in the production of *podcasts* that debate recurring literary themes in texts (social inequalities, identity, gender, colonialism) — instead of succumbing to passive or distracting use (Bacich & Moran, 2018). Projects such as the one reported here, by positioning the student as a protagonist in the analysis and oral discussion of literary works, strengthen active participation in Literature classes, fostering communicative, reflective and collaborative skills aligned with the BNCC and preparation for selection processes for admission to higher education.

Based on the findings and the limitations identified, the following recommendations are proposed for the replicability and expansion of similar initiatives: firstly, investment in digital infrastructure, it is necessary to prioritize public policies and institutional partnerships

(via the National Strategy for Connected Schools – ENEC) to universalize high-speed and stable connectivity in public schools, with continuous measurement of internet quality (Connected Education Meter of the MEC/NIC.br) and focus on Amazon and peripheral regions (MEC, 2025; NIC.br, 2024-2025). In addition, the continuing education of teachers is essential. It is therefore necessary to implement training programs in digital literacy, active methodologies mediated by ICT and pedagogical use of the literary *podcast*.

Another relevant factor as a recommendation is systematic curricular integration. Include the production of *literary podcasts* as a regular practice in the lesson plans of Literature and Portuguese Language, aligning it with the axes of orality, multiliteracies, literary literacy and citizenship of the BNCC, with formative evaluation of student productions and focus on works of entrance exams (Brasil, 2018). Expansion and longitudinal monitoring are also recommended. Conduct longitudinal studies to assess long-term impacts on literary criticality, argumentative orality, and interest in reading, as well as replicate the project in other schools with larger samples, incorporating data triangulation and partnerships with universities for greater scientific rigor (Thiollent, 2011).

These actions, if implemented in an articulated way between school, education network and public policies, can enhance the literary *podcast* as an emancipatory tool, contributing to a more inclusive, reflective education aligned with the realities of contemporary youth, especially in preparation for the challenges of university entrance exams and in the formation of critical readers and protagonists of knowledge.

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PLAYFULNESS AS MOTIVATION IN MATHEMATICS CLASSES
A LUDICIDADE COMO MOTIVAÇÃO NAS AULAS DE MATEMÁTICA
EL JUEGO COMO MOTIVACIÓN EN LAS CLASES DE MATEMÁTICAS



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ABSTRACT

The purpose of this work was to present the geoboard teaching material, showing its contributions to mathematics education, in an attempt to make the material more known and used in the classroom, since it is of great importance in the construction of knowledge, helping to break down the barriers of traditional teaching. As well as the dissemination of mosaics, it provides some examples of activities that can be explored on the geoboard and geometric grids. After a prior mathematical foundation on the recognition of the plane with regular and irregular polygons; moving on to the art of creating mosaic patterns, in the field of geometry, the main focus concerns planar tessellations, using geometric grids and the geoboard as pedagogical resources. In Elementary School, it is the responsibility of both the Art and Mathematics teachers to develop the geometric-spatial skills of the students.

Keywords: Geoboards. Geometric Grids. Mathematics.

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RESUMO

O propósito deste trabalho foi expor o material didático geoplanos, mostrando as suas contribuições para o ensino de matemática, na tentativa que o material passe a ser mais conhecido e usado em sala de aula, visto que, é de grande importância na construção do conhecimento ajudando a quebrar as barreiras do ensino tradicional. Assim como a divulgação do mosaico, traz alguns exemplos de atividades que podem ser exploradas no geoplano e malhas geométricas. Após um embasamento matemático prévio sobre o reconhecimento do plano com polígonos regulares e irregulares; partindo para a arte de criar padrões em mosaico, no campo da geometria na qual o foco principal concerne às pavimentações planas, utilizando como recurso pedagógico as malhas geometrias e o geoplano. No Ensino Fundamental cabe tanto ao professor de Artes quanto ao de Matemática desenvolver as habilidades geométrico-espaciais dos alunos.

Palavras-chave: Geoplanos. Malhas Geométricas. Matemática.

RESUMEN

El propósito de este trabajo fue presentar el material didáctico del geoplano, mostrando sus contribuciones a la enseñanza de las matemáticas, con el fin de difundir su uso en el aula, dada su gran importancia en la construcción del conocimiento y su contribución a la superación de las barreras de la enseñanza tradicional. Además de la difusión de mosaicos, se ofrecen ejemplos de actividades que pueden explorarse en el geoplano y las cuadrículas geométricas. Tras una base matemática previa sobre el reconocimiento del plano con polígonos regulares e irregulares, y pasando al arte de crear patrones de mosaico, en el campo de la geometría, el enfoque principal se centra en las teselaciones planas, utilizando cuadrículas geométricas y el geoplano como recursos pedagógicos. En la educación primaria, es responsabilidad tanto del profesorado de Arte como del de Matemáticas desarrollar las habilidades geométrico-espaciales del alumnado.

Palabras clave: Geoplanos. Cuadrículas Geométricas. Matemáticas.

1 INTRODUCTION

Analyzing the history of mathematics, we can say that the teaching of mathematics today is not very motivating, because it is associated with the practices of reproduction of mathematical procedures, which has not been attracting the clientele, since most students do not feel interested in classes.

Observing these aspects, I realized the need to innovate the learning process in relation to methodologies that seek students' commitment, offering a more dynamic and playful way to learn mathematical knowledge. In this aspect, it is worth mentioning that "no one educates anyone, no one educates himself, men educate themselves, medialized by the world". (FREIRE, 2006, p. 68).

Teaching mathematics is to develop logical reasoning and stimulate creativity and the ability to solve problems in a pleasurable way. Playful activities (games and play) should be experienced by students and educators, since they are indispensable ingredients in the relationship of the teaching-learning process, as well as a possibility for affectivity, self-knowledge, autonomy, cooperation, imagination and creativity to grow, allowing the student to learn through the pleasure of wanting to do and build.

Among the educational problems nowadays, we highlight the difficulties that the student encounters in learning mathematics. Thus, D'Ambrósio (1972) argues that it should be worked in a simple and attractive way, where the student can get involved, and although much research has contributed to the advancement of mathematics education, much still needs to be done.

2 THEORETICAL FRAMEWORK

Mathematics in the 1960s and 1970s was seen as a privileged access route for scientific and technological thinking and teaching began to have excessive concerns with abstractions internal to Mathematics itself, more focused on theory than on practice, exaggerating formalism, axiomatics. But, by bringing school mathematics closer to pure mathematical science, this pedagogical reform did not consider a basic point: what was proposed was out of the reach of students, especially those in elementary school.

With the ebb of this movement, problem solving became the focus of Mathematics teaching in the 80s and new directions were given to curricular discussions, which began to deal with the understanding of the relevance of social, anthropological and linguistic aspects in the learning of Mathematics.

According to works such as the PCN's (Brasil, 1997) and Onuchic (1999), the potentiality of mathematical knowledge should be explored in the broadest possible way in

elementary school, and thus lead the student, among other objectives, to understand and transform the world around him; solve problem situations, knowing how to validate strategies and results; develop forms of reasoning; to establish connections between mathematical themes and other areas.

By inserting play in elementary school, there is a move away from the traditionalist view that reserves the child a role of spectator ready to absorb knowledge that aims to prepare him for the role that will be charged in the following years at school to place him at the center of educational actions, in the role of an active subject capable of reflecting, by their own means, the social and cultural context in which they live.

Nowadays, the educator's ability to motivate students in the process of knowledge construction makes all the difference, the educator's active participation and his ability to transform traditional classes into sessions that arouse the student's interest and motivate him to learn is a legitimate means through which the teacher can achieve his pedagogical goals. The educator has to know how to transform his classes into work-game. (ALMEIDA, 1994, p. 68).

It is observed that playfulness is a liberating practice that removes the ties imposed by traditional education and places the child in conditions of interaction with the world around him, and with which he communicates through the act of playing that represents the child's way of assimilating and reconstructing, in a permanent and dynamic way, the reality around them.

It is worth highlighting the work of Moura (2000) entitled "The serious search in the game: of the ludic in mathematics", which leads us to a reflection on the role of the game as a cultural element that integrates the formation of concepts. The child learns and develops his cognitive structures by dealing with the game of rules that is impregnated with learning and allows the understanding of socially transmitted knowledge, subsidizing the child with new elements to appropriate the available knowledge. Piaget (1907, p. 392) points out that "[...] the interaction of subject and object is such [...] that it becomes impossible to conceive of one of the terms without the other. In other words, intelligence is the construction of relationships and not just identification [...]".

According to Macedo (2008, p. 85) "Piaget's great contribution was to study logical-mathematical reasoning, which is fundamental in school, and can be taught depending on the child's knowledge structure". Therefore, the environment and the situations that the teacher creates are fundamental for the development of logical-mathematical knowledge.

For Vygotsky (1993), concepts can be 'spontaneous' – they arise from the daily life prior to school, without a systematic organization, without awareness of their formation, and

'scientific' – those that come from formal instruction, from the natural, social and exact sciences and require awareness of action, that is, reflective awareness.

The pedagogical proposal based on concrete mathematical activities is the means through which we can achieve positive results, from the point of view of education. By proposing an educational line based on the valorization of practical activities, it appreciates the student as a subject in the process of knowledge construction, and understands action as a form of interaction between the child and the surrounding environment, through which the child can modify it according to his own experiences.

Some research carried out based on the difficulties of the students, in relation to the teaching-learning process of numbers, shows that there is only progress in learning when intervention is made with playful activities, working on the reality that students live in the classroom.

Playfulness represents a dimension in the process of knowledge elaborated by children. By using play, education recognizes the child as a subject capable of interpreting reality in his own way, considering the authenticity of his experiences in the social environment.

From birth, the child is in contact with the social environment and draws his experiences from it, but it is through play that he understands the environment around him and reconstructs the experiences acquired, forming a network of information about reality (WAJESKOP, 2001, p.21)

The teaching-learning of Mathematics should take into account the aspects of the relationship between school and society, emphasizing the use of the student's previous knowledge as a tool for the improvement of their learning and their reality. Mathematics can become pleasurable if there are no repressive and memorized practices. These practices lead to the withdrawal of students and reinforce the ingrained stigmas that learning Mathematics is difficult.

The acquisition of mathematical knowledge implies, therefore, a question of citizenship, at the same time that it reveals itself as a form of social inclusion, by enabling the creative capacity and positioning in the world in which we are inserted. In this way, the mastery of mathematics broadens our horizons, providing us, above all, with access to information and the production of knowledge.

We know that most students have difficulty mainly in geometry, as it requires greater concentration and a certain logical reasoning to understand abstract situations. Perhaps this difficulty is due to the materials that are used to work geometry with students, usually these

materials are books and notebooks, but this difficulty can be overcome with the help of concrete materials to work with geometry, as is the case with the Geoplane.

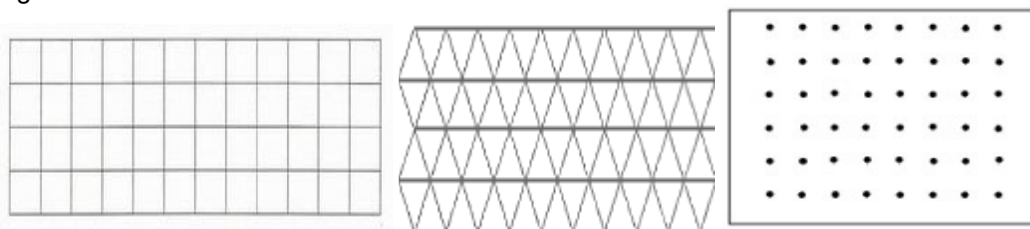
The geoplane will constitute a fundamental point of reference for those who are interested in the fascinating problem of paving the Euclidean plane linked to the teaching of mathematics, at the most variable levels, by bringing out the mathematics hidden in the mosaic patterns.

3 LEARNING GEOMETRY

Geometric meshes are resources used in mathematics that enable the student to introduce geometric concepts more easily, in order to lead him to an explicit understanding of the teaching of geometry.

Meshes are elements used in the development of activities, and can be squared, dotted, triangular or others, as can be seen below:

Figure 1



Source: Ochi et al (1992, p. 13)

Some types of meshes, preferably checkered ones, will be used as resources for the intuitive introduction of geometric concepts, aiming at a later understanding of these concepts and providing a significant learning of Geometry. Activities related to sequences, symmetries, congruences, similarities, area, perimeter and spatial visualization will be developed.

The geoplane is a very important pedagogical material for the teaching of mathematics, as it provides students with possibilities for a broad hypothetical development, allowing constructions and problem solving, since this student will have immediate contact with the relationships of geometry with measures and magnitudes, numbers and operations.

The use of the geoplane is directly related to the shapes of the meshes, whether they are squared, triangular, circular, etc.; From these, it will be possible to name which shape of the geoplane. It enables the exploration of activities that develop skills related to space exploration; visual discrimination; the construction of the notions of area and perimeter; comparison of areas and perimeters; to the understanding of the idea of fraction; the construction of irrational numbers; to the understanding of symmetry, reflection, rotation and translation.

According to Sabbatiello (1967) "the Geoplane is a mathematical model that allows us to translate or suggest mathematical ideas." It is a fact that the so-called concrete materials are interesting alternatives for students to formulate hypotheses, exchange ideas, make discoveries, that is, enrich the learning moment.

It is worth considering that the following are pedagogical resources: the geometric grid and the geoplane; As a learning tool, it is a resource of extreme interest to educators, since its importance is linked to the development of the student.

For all that has already been said, we propose the geoplane (board) with a focus on the teaching of geometry, highlighting symmetry and plane figures, in a dynamic and relaxed way, arousing interest in the student, curiosity about mathematical knowledge.

In this way, it is worth noting that the geoplane is a simple and easily accessible material that can be made with a natural wooden board or painted whose measurements will vary according to the desired shape that would serve as a base, medium nails preferably without the head or wooden pins, suitable for working with children and colored alloys or strings with which we can attach them to the nails by drawing and forming geometric figures on the geoplane. The distance between one nail and another, both vertically and horizontally, has to be the same, so there is a need to use a ruler or millimeter paper, in addition, we must consider a measurement not so large that it cannot be represented on the board, nor so small that it cannot be visualized, it is more indicated that the measurements are expressed by natural numbers.

With regard to the contents, it serves to work on the construction of polygons with sticks, the construction of Polyminos, the construction of segments of parallel lines, orthogonal, straight and non-straight lines, in addition to working on the game: "What is the piece?" and "What is the piece not?", and still with some challenges we can work on potentiation and can also make a contextualization with geography we can work on directions (North, South, East, West) and can be worked on in elementary II.

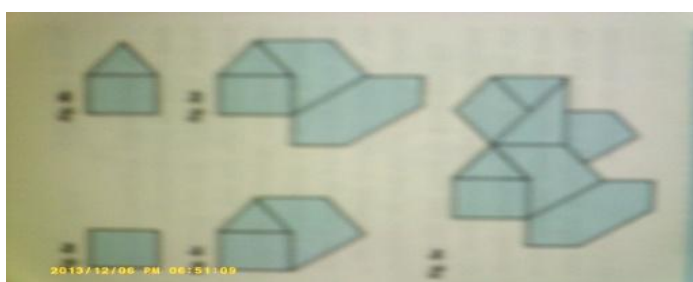
In addition to also encouraging students to learn by playing, it also works with recycling; Geometric Solids is used to work proportionalities, segments, plane and spatial figures, angles can be worked on in elementary school where it makes the student learn by playing.

4 PAVING THE PLAN

According to Barbosa (1993) the concept of paving the plane is "a set of polygons is a paving of the plane if, it is only if, the set of polygons covers the plane without intersections". Therefore, each time we add a new polygon, side by side, we form a new frontier by expanding the previous one; So we say that a partial paving of the plan was done.

The paving of the plane can occur with regular polygons (squares, regular triangles, regular hexagons) and irregular polygons (rhombuses, rectangles, trapezoids, quadrilaterals, hexagons, pentagons). Let's look at some examples of how mosaics can be obtained from simple pieces:

Figure 2

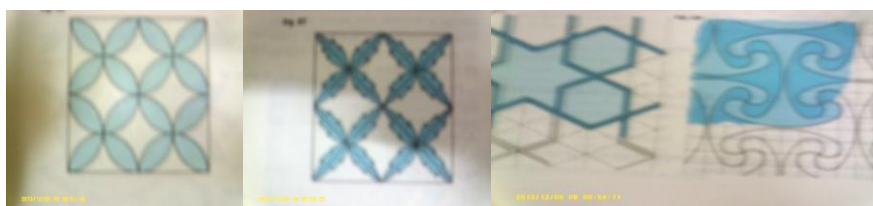


Source: Van de Walle (2009, p. 455)

Mosaics have been known since ancient times. They were present in the Assyrian, Babylonian, Persian, Egyptian, Greek, Chinese and other civilizations. Many mosaics found on floors, ceilings and wall panels, temples or palaces, in their constructions, the walls presented various patterns of symmetry never related to living beings, due to religious precepts. They attest to the intimate relationship between certain patterns and the art of decoration.

The built-in set of stones (painted or not) with which figures or designs named mosaic are formed. As conceptualized by Mini Aurélio (2001): Inlays of colored stones, arranged in such a way that they present designs. The mosaic can be constructed from squares, regular hexagons, equilateral triangles and with combined. Some examples of mosaic below:

Figure 3



Source: Van de Walle (2009, p. 451)

The teacher must be concerned with seeking to create greater interaction, through oral and written texts, with his students. There can be no value fair that determines the discourse of one superior and better than that of the other and the teacher knows this, or at least, should know and apply it in his daily practices in the classroom. According to Kishimoto (1996), using the game in education is the same as maximizing the teaching-learning conditions, through the playful properties of pleasure, the capacity for initiation, active and motivating action.

The use of the game values the exploration and construction of knowledge by the child to the extent that he is internally motivated to practice the action, however, the achievement of the pedagogical objectives requires a selection and offer of external stimuli, as well as a system of concepts generated in non-game situations, in addition to the establishment of criteria for the selection of toys appropriate to the intended objectives.

5 FINAL CONSIDERATIONS

Mathematics, despite being present in our daily lives, is often seen in a way that is totally dissociated from reality and the language we speak. By relating some studies on learning problems in general, it shows the current trend of rescuing the pleasure of learning with creativity and communication, supported by the great merit of the PCN, which, with a post-constructivist theoretical foundation, seek to reconcile cognitive and affective-relational aspects, showing the need to understand that intelligence develops in interaction, in the organization of the world in which we live.

The use of geometric meshes and geoplanes as mediating techniques for school learning is a conception of education that recognizes in play the advantage of aggregating contents and stimuli for learning in the same activity or object.

To provide students with situations where they can develop through games and play their intellectual capacities that will serve as support for learning characterized by autonomy and the possibility of generating action alternatives that can meet the situational needs that arise in the social environment

The abandonment of the teaching of geometry in school is noticeable, especially by the teacher who focuses on operations and calculations; leaving aside the development of students' reasoning and spatial perception. Since the beginning, geometric knowledge has already been used to solve problems and needs. Allowing to pave the way for the evolution of the current geometry.

The school, as an agency par excellence for the production of knowledge, plays a role of fundamental importance in the process of acquisition of mathematical knowledge, by

developing it in a systematized way, attributing meaning to the learning of mathematics, through the interactions established in the school context.

The reflections undertaken about the teaching-learning process of mathematics reveal the multifaceted character of the school, in general, not having awakened in the student the taste and pleasure for geometry. The child, when he starts his school life, shows a lot of interest and expectation, but little by little he loses enthusiasm.

There are still traditional schools that only pay attention to reproducing ready-made and finished mathematical knowledge, without even providing something really meaningful to the student. It is of great value for the school and the teacher to instigate their students to build new knowledge, focused on their socio-cultural relations.

It was observed that the students made great progress in learning language. The fact that they presented different levels of knowledge contributed to a good performance of the activities, as those with greater knowledge in a way helped those who presented greater difficulties.

We also reintegrate numbers and texts as part of the routine, presenting in writing activities containing lists and memorized texts with a proposal for reflection on the writing system. We recommend the use of numbers problematizing and contextualizing with the students' reality.

It was noticed that the long and formal activities left the students unmotivated, when they were placed as active and participative subjects in the elaboration of the activities, they were enthusiastic in wanting to complete, socialize and interact during the tasks.

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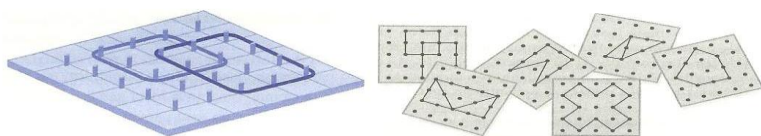
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ANNEX

ACTIVITY 1

Copy the shapes shown on the following cards into the geoplane:

Figure 4

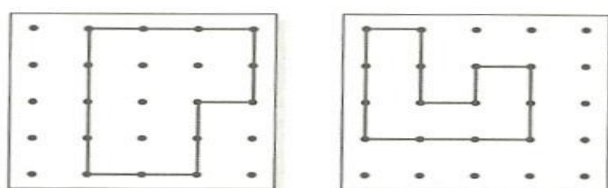


Source: Van de Walle (2009, p. 449)

ACTIVITY 2

Copy the shapes of the cards into a grid or geoplane and compose, cut, or divide them into smaller congruent shapes.

Figure 5



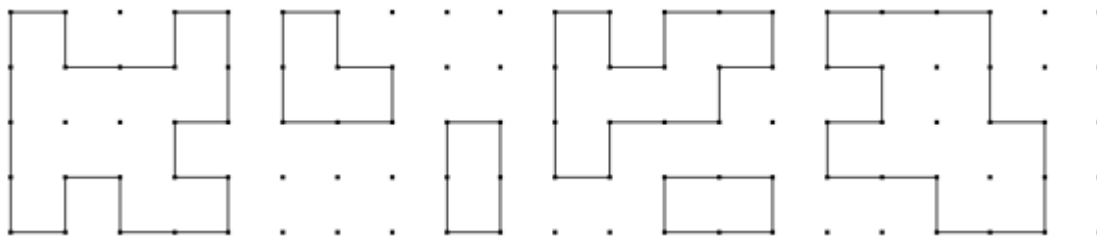
Source: Van de Walle (2009, p. 450)

- 1-What is the greater or lesser number of triangles that fill figure 1?
- 2-Fill figure 2 with three rectangles.

ACTIVITIES 3

1. Let's reproduce the figures below on the Geoplane and calculate the area and perimeter?

Figure 6



Source: Van de Walle (2009, p. 450)

2. Construct on the geoplane all possible figures formed by four congruent right triangles, joined by the legs and the hypotenuse. We can build more than 10 different figures.

TEACHER APPRECIATION IN DISPUTE: TRAINING, CAREER, AND NEOLIBERAL RATIONALITY

VALORIZAÇÃO DOCENTE EM DISPUTA: FORMAÇÃO, CARREIRA E RACIONALIDADE NEOLIBERAL

LA VALORACIÓN DEL PROFESORADO EN ENTREDICHO: FORMACIÓN, CARRERA PROFESIONAL Y RACIONALIDAD NEOLIBERAL



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ABSTRACT

This article analyzes the valorization of teacher education as a field of dispute between different educational projects, taking as its empirical reference the career plan of the Municipal Education Network of Niterói (RJ), based on the dissertation by Yamaguchi (2024). It is grounded on the assumption that teacher valorization is a historical, political, and contradictory construction, shaped by tensions between the conception of education as a social right and its increasing subordination to neoliberal rationality (Laval, 2004; Freitas, 2018). Methodologically, this is a qualitative study of a documentary and analytical nature, based on the interpretation of legal and normative documents, as well as data produced in the aforementioned dissertation (Minayo, 2007; Yamaguchi, 2024). The theoretical framework draws on critical scholars who understand teacher education as a socially situated and historically constructed process (Saviani, 2013; Freitas, 2007). The results indicate that, although there are institutional advances in the valorization of teacher education, these are reconfigured by mechanisms of regulation and control that challenge their emancipatory potential, particularly in contexts influenced by managerial and neoliberal logics (Laval, 2004). It is concluded that teacher valorization constitutes a field of dispute in which antagonistic educational projects coexist.

Keywords: Teacher Valorization. Teacher Education. Teaching Career. Educational Policies. Neoliberalism.

RESUMO

O presente artigo analisa a valorização da formação docente como um campo de disputa entre distintos projetos educacionais, tomando como referência empírica o plano de carreira da Rede Municipal de Educação de Niterói (RJ), à luz da dissertação de Yamaguchi (2024). Parte-se do pressuposto de que a valorização docente constitui uma construção histórica, política e contraditória, atravessada por tensões entre a concepção da educação como direito social e sua crescente subordinação à racionalidade neoliberal (LAVAL, 2004;

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FREITAS, 2018). Metodologicamente, trata-se de uma pesquisa qualitativa de natureza documental e analítica, fundamentada na interpretação de dispositivos legais e normativos, bem como nos dados produzidos na referida dissertação (MINAYO, 2007; YAMAGUCHI, 2024). O referencial teórico apoia-se em autores do campo crítico que compreendem a formação docente como processo social e historicamente situado (SAVIANI, 2013; FREITAS, 2007). Os resultados indicam que, embora existam avanços institucionais na valorização da formação docente, estes são reconfigurados por mecanismos de regulação e controle que tensionam seu potencial emancipatório, especialmente em contextos marcados por lógicas gerenciais e neoliberais (LAVAL, 2004). Conclui-se que a valorização docente se configura como um campo de disputa no qual coexistem projetos educacionais antagônicos.

Palavras-chave: Valorização Docente. Formação de Professores. Carreira Docente. Políticas Educacionais. Neoliberalismo.

RESUMEN

This article analyzes the valuation of teacher training as a field of dispute between different educational projects, taking as an empirical reference the career plan of the Municipal Education Network of Niterói (RJ), in light of Yamaguchi's dissertation (2024). It starts from the premise that the valuation of teachers constitutes a historical, political, and contradictory construction, traversed by tensions between the conception of education as a social right and its increasing subordination to neoliberal rationality (LAVAL, 2004; FREITAS, 2018). Methodologically, this is a qualitative research of a documentary and analytical nature, based on the interpretation of legal and normative provisions, as well as on the data produced in the aforementioned dissertation (MINAYO, 2007; YAMAGUCHI, 2024). The theoretical framework is based on authors from the critical field who understand teacher training as a social and historically situated process (SAVIANI, 2013; FREITAS, 2007). The results indicate that, although there are institutional advances in valuing teacher training, these are reconfigured by regulatory and control mechanisms that strain their emancipatory potential, especially in contexts marked by managerial and neoliberal logics (LAVAL, 2004). It is concluded that teacher valuation is configured as a field of dispute in which antagonistic educational projects coexist.

Keywords: Teacher Valuation. Teacher Training. Teaching Career. Educational Policies. Neoliberalism.

1 INTRODUCTION

Teacher valorization occupies a central place in Brazilian educational policies, being repeatedly affirmed in legal frameworks and national guidelines as a condition for guaranteeing the right to education (BRASIL, 1996). However, far from constituting a consensual concept, this notion is configured as a field crossed by theoretical, political, and economic disputes, in which different projects of society and education confront each other (FREITAS, 2018).

In this context, teacher training assumes a strategic role, and is often presented as a structuring axis of professional valorization. However, its centrality does not imply uniformity of meanings. On the contrary, education is appropriated by different rationalities, sometimes understood as a critical and collective process, sometimes reduced to an instrument of adaptation to market demands (LAVAL, 2004).

Despite the relevance of the theme, there is a gap in the literature regarding the analysis of the concrete mediations through which these disputes materialize in local educational policies. It is in this sense that this article proposes to examine the valorization of teacher training as a field of dispute, taking as a reference the career plan of the Municipal Education Network of Niterói, in the light of the data produced in Yamaguchi's dissertation (2024).

Thus, it seeks to understand how this process of teacher valorization, particularly with regard to training, is tensioned by different educational projects, evidencing the contradictions that cross its materialization in public policies.

2 EDUCATION, TRAINING AND NEOLIBERAL RATIONALITY

The understanding of teacher valorization in the contemporary scenario requires its insertion in the broader context of reconfiguration of educational policies under the influence of neoliberal rationality. As Laval (2004) argues, education has been progressively redefined based on the logic of human capital, in which the school is conceived as a space for the production of skills aimed at employability and competitiveness.

In this process, this teacher training undergoes significant displacements in its direction. On the one hand, a perspective is consolidated that reduces it to a set of technical and instrumental skills, guided by performance indicators and results (FREITAS, 2007). On the other hand, its critical, historical and social dimension, essential to understanding the role of education in human formation, is weakened (SAVIANI, 2013).

The educational reforms implemented in recent decades in Brazil deepen this movement, especially with the centrality attributed to the National Common Curricular Base

(BRASIL, 2017), which reinforces the pedagogy of competencies and curriculum standardization (FREITAS, 2018).

In addition, there is an expansion of continuing education models based on training and certifications, often disconnected from collective processes of teacher reflection (FREITAS, 2007). Such dynamics contribute to the individual accountability of teachers, shifting the focus from structural working conditions to their own performance (LAVAL, 2004).

3 THE VALORIZATION OF TEACHERS IN NITERÓI

The analysis of the career plan of the Municipal Education Network of Niterói reveals important advances with regard to the valorization of teacher training, especially by establishing the title as a criterion for functional progression, in line with the Brazilian educational legislation (BRASIL, 1996).

The Positions, Career and Wages Plan instituted by Law No. 2,866/2013 represents a relevant milestone in expanding incentives for initial and continuing education, associating the title with salary progression (NITERÓI, 2013).

However, the analysis shows that these advances are crossed by mediations that reconfigure the meaning of teacher valorization. As Yamaguchi (2024) points out, subsequent changes introduced conditions to the recognition of the title, such as the requirement to comply with the probationary stage.

This change transforms valorization into a regulated process, dependent on institutional criteria, which evidences the presence of control mechanisms over the teaching career (FREITAS, 2018).

In addition, the valorization of teacher training is directly related to budgetary issues, since the incentive to obtain degrees implies an increase in personnel expenses (YAMAGUCHI, 2024), inserting educational policy in a logic of fiscal management that tensions the expansion of rights (LAVAL, 2004).

4 TEACHER VALUATION AS A FIELD OF DISPUTE

This process is configured, in the context of contemporary educational policies, as a field of dispute in which different rationalities and education projects are confronted (FREITAS, 2018). Far from constituting a homogeneous or linear politics, its materialization occurs through tensions that express broader structural contradictions in society.

On the one hand, the conception of education as a social right is inscribed, which understands the valorization of teachers as an inseparable dimension of an educational project committed to critical training, the democratization of knowledge and the guarantee of

decent working conditions (ANFOPE, 2018). From this perspective, ~~teacher training~~ is not reduced to a technical requirement, but is constituted as a continuous, collective and historically situated process, articulated with the pedagogical practice and the social function of the school.

On the other hand, there is a growing incorporation of principles associated with neoliberal rationality, which reconfigure the meaning of teacher valorization by introducing mechanisms of regulation, evaluation and control (LAVAL, 2004). In this context, this training process is progressively instrumentalized, assuming a functional character, guided by competencies, performance and productivity, which contributes to the individualization of professional trajectories and to the accountability of teachers for educational results (FREITAS, 2007).

The analysis of the career plan in Niterói concretely evidences this tension. As pointed out by Yamaguchi (2024), although there is institutional recognition of the importance of teacher training, materialized in progression by degree, such recognition is crossed by constraints that regulate its access and effectiveness. The requirement to comply with the probationary period, for example, shifts professional recognition from an immediate right to a conditioned achievement, mediated by institutional criteria.

This dynamic reveals that the process of valorization, at the same time that it is affirmed as a principle in educational policies, is also the object of disputes that redefine its meanings and scope. Thus, what is at stake is not only the expansion of rights, but the very definition of what is meant by professional recognition, evidencing the coexistence of antagonistic educational projects within public policies.

5 FINAL CONSIDERATIONS

The analysis developed in this article allows us to affirm that this process, in the context of the Municipal Education Network of Niterói, cannot be understood in a homogeneous or linear way, but as an expression of a field of disputes crossed by different rationalities (FREITAS, 2018).

The results show that, although there is significant institutional progress, especially with regard to the recognition of training as a criterion for career progression, such advances are stressed by regulatory mechanisms that condition its effectiveness. This process reveals the presence of a rationality that, at the same time that it incorporates the language of valorization, reconfigures its meanings, bringing it closer to a logic of individual control and accountability (LAVAL, 2004).

In this scenario, training assumes an ambiguous role. If, on the one hand, it remains a central element in the construction of professional valorization, on the other hand, it is progressively captured by devices that subordinate it to performance and productivity criteria, which weakens its critical and collective dimension (FREITAS, 2007). Such a movement tensions the understanding of education as a right and brings it closer to a logic of individual investment.

In view of this, the need for public policies that include the valorization of teachers in their structural dimension is reaffirmed, articulating training, career, working conditions and social recognition of the profession (SAVIANI, 2013 and ANFOPE, 2018). More than expanding certification or progression mechanisms, it is about building policies that strengthen the collective character of teaching and that resist the trends of individualization and instrumentalization present in the contemporary scenario.

Finally, this study contributes to the debate by showing that professional recognition is not limited to its normative formulation, and it is essential to analyze the concrete mediations that cross its implementation. In this sense, understanding these policies as a field of dispute allows us to broaden our view of it, highlighting its contradictions and limits, but also its possibilities of resistance and transformation.

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