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The challenges for training in the modality of teaching young people and adults: In evidence the perception of teachers in Belo Horizonte

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Leila Vaz da Silva¹

ABSTRACT

This research aimed to identify the challenges for the completion of the formative process of students enrolled in the Education Program for young people and adults, considering the perception of teachers in schools in Belo Horizonte. For the theoretical foundation of the study, the processes that seek to legitimize the core and evolution of Youth and Adult Education (EJA) in Brazil were exposed, as well as to present the historical trajectory of this teaching modality, with reference to the works of Haddad (2,000); DI Pierro; Joia, Ribeiro, (2,001); the legal frameworks made available by the MEC (2003); in addition to the characterization of the profile of these students based on data from the Basic Education Census (2,020). The methodological strategy adopted as to nature, applied research with a quantitative approach, being classified as descriptive, with a case study technique. The results indicate that EJA students are workers who study and that the main challenges to conclude the training process consist of reconciling work and study; tiredness; adaptation to the heterogeneity of the classes; the structure of the rooms; and focus arising from other concerns. The study may contribute to the development of educational policy strategies focused on reducing dropout in this modality of education.

Keywords: Youth and Adult Education 1, EJA 2, Learning 3.

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INTRODUCTION

The literacy process adopted for young people and adults goes beyond the focus of understanding symbolologies, involving the entire procedure of identity and social insertion, considering the inclusion of issues that involve discrimination and social inequalities. For Soares (2001), the history of Youth and Adult Education (EJA) in Brazil is installed in a context that encompasses its devaluation and indifference, and that coexists with other initiatives and the materialization of many proposals.

To understand the action that aims to provide quality education for young people and adults (EJA) in Brazil, it is important to return to the period of Portuguese colonization, from the entry of the Jesuits who aimed to catechize the population, especially the indigenous people, including children and adults, in order to expand adherence to the Catholic faith associated with the educational process. However, after the arrival of the royal family and the withdrawal of the Jesuits in the eighteenth century, adult education almost ceased to exist and the responsibility for education took a back seat (STRELHOW, 2010). Friedrich et. al (2010) point out that it was only from the 1930s onwards that the adult educational process resumed when, in 1934, the government inaugurated the National Education Plan, which constituted as a duty of the State the entire training process in an integral, free, mandatory and extended way to adults as a right guaranteed by the National Constitution.

At the end of the 40s and beginning of the 50s, Brazil experienced a moment of search for progress as a result of the growth of Brazilian industry, making it necessary to promote and stimulate the education of the population so that it was possible to follow the development of the country, in view of the need to form a contingent of more qualified labor that would supply the industrial and commercial demand (SILVA, 2011). The requests of UNESCO - United Nations Educational, Scientific and Cultural Organization cooperated for the development of different initiatives seeking the eradication of illiteracy, which corroborated the adoption of the National Fund for Primary Education (FNER). Between 1942 and 1947, Brazil established two actions focused on meeting this purpose: In 1942, the Adolescent and Adult Education Campaign (CEAA) was launched, and in 1947, the National Rural Education Campaign (CNER).

However, the two actions did not present the expected results, which culminated in the First Brazilian Congress of Adult Education, marking the beginning for the change in Brazilian pedagogical thinking (SILVA, 2011). From these reflections, Brazil began to identify that the main factors for illiteracy were centered on social and pedagogical issues. This understanding reinforces Freire's (1987) thought, who understood that educational problems have a close relationship with social issues. In the opinion of Baquero (2008), Freire idealized Adult Education associating the literacy process with an emancipatory perspective, since it understands literacy beyond exclusive



learning for the technical knowledge of coding and decoding, but as an interpretation of the world. The whole process of Adult Education suggests the crucial development of the reading of the world, which encompasses a political work of awareness. In this way, Brazil began to receive international pressure, in which UNESCO encourages the preparation of programs for adult literacy.

In Belo Horizonte, the Youth and Adult education program has been managed by the Municipal Department of Education, which adopts as a proposal for the completion of the training course six months for each year. In this way, with a year and a half, the student is able to complete high school. According to data from the Superior Electoral Court, in Belo Horizonte, more than 420 thousand people over 18 years of age did not complete high school. In general, students enrolled in Youth and Adult Education (EJA) cannot be considered "working students", but "workers who study" as well defined by Mônica Gomes². With the cessation of face-to-face classes in the pandemic period due to the Coronavirus, she feared an increase in the dropout rate of students enrolled in this modality and points out that "in Belo Horizonte alone, dropout was 30% in 2019, according to the city hall.

In the opinion of Mônica Gomes, EJA students generally need to prioritize work, and in this sense, education is in the background. For her, some municipalities and even the State of Minas Gerais have introduced remote classes and activities, but not all people have access to the necessary resources such as the internet and computers, and even when they do, they may have difficulty operating the technologies. Another situation pointed out by her is related to the fact that in some homes the family has a single computer, and in this case, they prioritize the use for teaching their children and highlights that, despite all the advances with the use of technology, there is still the point of view that EJA students are past the time to study, which is not true, reinforcing that the school dropout of students in this modality becomes constant and that the flow of these students happens through several entrances and exits in the school environment, which harms the training process.

In the EJA modality, in 2022, there were approximately 150 thousand students enrolled in the state network and another almost 10 thousand in the municipal network of Belo Horizonte, according to data provided by the IBGE (2020), including adolescents who did not complete their school journey within the allotted time to elderly people who are starting the literacy process. In Minas Gerais, there are at least 1 million people over the age of 15 who are illiterate, according to the Brazilian Institute of Geography and Statistics (IBGE, 2020). These data reinforce the importance of always maintaining the discussion on the subject in order to propose effective actions and public policies to conduct and conclude this training process.

² Mônica Gomes is coordinator of the Minas Gerais Forum for Youth and Adult Education (FOMEJA).



In view of the context presented so far, **the objective of the research is to identify the challenges for the completion of the formative process of students enrolled in the Education program for young people and adults, in the perception of teachers, working in schools in Belo Horizonte. To answer the question, the study has the following specific objectives: to describe the profile of EJA students in the researched schools; to identify the dropout rate of students enrolled in the Youth and Adult education program in the schools surveyed; to analyze the challenges for the conclusion of the training process from the perspective of the teachers who work in the EJA modality in the schools researched.**

The study of the theme is justified from a personal point of view by the researcher's interest in the subject, combined with the need to develop the study as a mandatory criterion for completing the teaching degree course in pedagogy. It is also justified as a contribution to the development of public policies with a view to promoting greater engagement in studies for those individuals who were unable to complete the training process within the expected time, which will allow them better training for life and the world of work. The article is structured in four sections. The first addresses the literature review and the theoretical foundation of the theme, presenting the historical trajectory of EJA and the legal frameworks of education, in addition to the characteristics of the student of this modality in the Brazilian context. The second chapter presents the methodology adopted to carry out the study and the third deals with the presentation and discussion of the results. The fourth chapter presents the final considerations.

THEORETICAL FRAMEWORK

The chapter dedicated to the theoretical framework exposes the processes that seek to legitimize the core and evolution of Youth and Adult Education (EJA) in Brazil. The historical trajectory of this teaching modality is presented, as well as the legal frameworks and the characterization of the profile of these students.

HISTORICAL TRAJECTORY OF EJA – YOUTH AND ADULT EDUCATION IN BRAZIL

Reflecting on the schooling process in youth and adult education (EJA) implies considering a plural and heterogeneous flow. Throughout the history of Brazilian education, there have been changes in public policies aimed at serving the public of this category of education, including collective initiatives of a community nature by social organizations. However, the success of this process did not occur in full. Studies carried out by (Paiva, 1987; Haddad; Di Pierro, 2000) suggest that the emergence of EJA in Brazil occurred with the arrival of Jesuit priests in 1549. In that time frame, signs of the practice of teaching adults were mixed with the story of the arrival in Brazil by the Portuguese. The authors report that 15 years after the landing of the Portuguese colonizers in



Brazilian lands, the Jesuit priests arrived to begin the educational process and installed the first school on Brazilian soil, with the objective of disseminating the Catholic faith among the indigenous people who lived here. In addition to religious issues, the teaching process also involved the objective of teaching good manners, since the indigenous natives were considered uncivilized, which demanded, in the understanding of the colonizers, a civilizing process. However, the objective of achieving greater adherence to the Catholic faith met the challenge of language. Thus, Fausto (1995) points out that the Jesuit priests understood that it was necessary to promote the literacy of the indigenous people, and that the literacy action was later extended to slaves in adulthood.

After the independence of Brazil, D. Pedro I approved free primary education for all citizens³. Although guaranteed by the Constitution, this right reached a minority of the population, since it excluded a considerable portion that in that context did not have citizenship, represented by black slaves, indigenous people, and the majority of women (HADDAD (2.000); DI PIERRO; JOIA, RIBEIRO, 2.001). The authors point out that the limitations to reach the population in the process of adult education, present in the first constitution, are repeated in the constitution in 1891, not ensuring the right already granted by the First Constitution of 1824 to free primary education to all, removing it from the text of the new Constitution, as it conditions the right to vote to the literate population (Art. 70, Paragraph 2). In the twentieth century, especially in the decades between 1920 and 1930, little progress was made with regard to the process of adult schooling. In any case, the country develops the bases for educational public policies focused on this type of education. At that time, it is noted that Brazil maintained agriculture as the basis of its economy (FAUSTO, 1995). This author points out that the period of Brazilian industrial ascension, which demanded qualified labor, was one of the stimuli for strengthening educational policies aimed at adult education.

With regard to labor, there were problems in the supply of specialized workers, but there was no shortage of low-skilled workers. They were recruited from among the poor population, for whom Rio de Janeiro was a pole of attraction" (FAUSTO, 1995, p. 286-287).

As highlighted by Fausto (1995), the illiteracy of young people and adults constituted an obstacle to the country's economy, which began to offer night schools to serve the working class, and the commitment to develop a pedagogical plan in which literacy was guaranteed within one year was consolidated. The importance of carrying out this historical retrospective is emphasized in order to allow a greater understanding of the theme, which facilitates the analysis of the practices and policies currently implemented, many of them subsidized by a previous process that was not very egalitarian with regard to attention to the modality of schooling of young people and adults. Next, the

³ (Art. 179, XXXII) of the First Brazilian Constitution of 1824.



educational legal frameworks that can contribute to the understanding of the bases of the implementation of EJA in Brazil will be presented.

LEGAL FRAMEWORKS FOR EDUCATION IN BRAZIL

This session presents a synthesis of the legal frameworks that have blurred Brazilian education from the 1930s to the present day, according to data made available by MEC – Ministry of Education (2023).

1930 - Creation of the Ministry of Education and Public Health Affairs with the function of dealing with matters related to teaching, public health and hospital care (Decree No. 19,402, of November 14, 1930). It encompassed as a responsibility of the ministry, in addition to education, also activities related to health, sports and the environment.

1931 – Creation of the National Council of Education (CNE), an advisory body to the Ministry of Education and Public Health related to teaching issues (Decree No. 19,850, of April 11, 1931). It corresponds to the current CNE, a collegiate body that is part of the MEC, established by Law 9.131, of November 25, 1995, which aims to contribute to the formulation of the National Education Policy, exercising normative, deliberative and advisory actions.

1932 – The Manifesto of the Pioneers of New Education is created, suggesting a free, mandatory public school system for everyone up to the age of 18. The document was signed by educators and intellectuals, who defended the reconstruction of the broader and more popular educational system, with the aim of meeting the needs of an industrializing Brazil.

1934 – The Brazilian Constitution determines that education will be the right of all Brazilians and foreigners domiciled in the country, under the joint responsibility of the family and the Public Powers. However, according to Article 150 of the 1934 Constitution, this educational process guaranteed access and free access only to comprehensive primary education.

1937 - Law No. 378, of January 13, 1937, is born, which constitutes a reform and structuring of the Brazilian educational system, starting with the name of the then Ministry of Education and Public Health, which changes the designation to Ministry of Education and Health. The same law creates the University of Brazil from the union of the University of Rio de Janeiro and the Federal Technical University. New schools emerge to promote professional education, as well as the National Institute of Pedagogy, currently called the National Institute of Educational Studies and Research Anísio Teixeira (Inep), a name adopted since 1938; and the National Book Institute (Decree-Law No. 93, of December 21, 1937), with the objective of encouraging the production and distribution of works of cultural or didactic interest.

1942 - Organization of industrial education (Decree-Law No. 4,073, of January 30, 1942) and secondary education (Decree-Law No. 4,244, of April 9, 1942), which founded the three-grade



educational system in Brazil, with higher education governed by the Statute of Brazilian Universities (Decree-Law No. 19,851, of April 11, 1931). The education corresponding to the first grade consisted of primary education of four or five years, being compulsory for children from 7 to 12 years old and free in public schools. The second grade, after the first, called high school, aimed at young people aged 12 and over.

1947 - The National Campaign for Adult Education is disseminated, with the participation of all states and the Federal District, which resulted in the installation of 10 thousand classes of supplementary education for adults.

1948 - Commission composed of different spheres of education that creates and forwards to the Chamber of Deputies, by consignment of the National Constituent Assembly of 1946, a suggestion for a statute for education, which remained as a reference for the Bill of Guidelines and Bases of Education promulgated 13 years later.

1953 – Law No. 1,920, of July 25, 1953, which changes the name of the Ministry of Education and Health to the Ministry of Education and Culture (MEC), the name currently adopted.

1955 – The National School Feeding Program (PNAE) is created under the name of School Lunch Campaign (Decree No. 37,106 of March 31, 1955) and from 1995, its decentralization occurs through the process of municipalization.

1959 - Decree No. 47,251, of November 17, 1959, the Adolescent and Adult Education Campaign, the Rural Education Campaign and the National Campaign for the Eradication of Illiteracy are launched. The latter aimed at the improvement and development of common primary education in the municipalities and the verification of the socioeconomic validity of the methods and processes of primary education, basic education and rural education in force in the country in order to know the most efficient means of eradicating illiteracy.

1961 - On December 20, 1961, Law No. 4,024 is approved, which establishes the Guidelines and Bases of National Education. The first LDB, as it became known, guaranteed the right to education with State resources and generated didactic, administrative and disciplinary autonomy for autarchic universities or foundations. With the LDB, the Federal Council of Education is created, with the responsibility, among others, of deciding on the operation of federal and private higher education establishments and the recognition of universities through the approval of their statutes and higher education establishments. With the first LDB, there was a decrease in the centralization of the MEC and state and municipal bodies gained autonomy.

1962 - The first National Education Plan (PNE) is approved, a contiguous set of quantitative and qualitative goals to be met within eight years. It was not the result of a bill, but of an initiative of the Ministry of Education already in force of the LDB of 1961.



1964 – Emergence of the National Literacy Program (PNA), based on the Paulo Freire method (Decree No. 53,465 of January 21, 1964). Its objective was to promote mass literacy, with national mobilization that included the involvement of student and professional corporations, sports associations, organized civil society groups, religious entities, civil and military government organizations, employers' associations, private companies, dissemination agencies and teachers.

1965 - The Statute of Higher Education (Law No. 4,881, of December 6, 1965) is approved, which established higher education inseparable from teaching and research in universities for the purpose of transmitting and expanding knowledge.

1967 - Foundation of the Brazilian Literacy Movement (Mobral) (Law No. 5,379, of December 15, 1967). It focused on financial and technical assistance with the objective of promoting nationally, the compulsory teaching in the age group of 7 to 14 years, extension of schooling to the 6th grade, with the inclusion of educational assistance to illiterate people of any age or condition attainable by audiovisual resources in programs that ensured measurement of results, functional literacy and continuing education for illiterate people aged 15 and over, through special, basic and direct courses, equipped with all possible resources, including audiovisual, with an expected duration of nine months.

1971 - The Guidelines and Bases for the Teaching of 1st and 2nd grades, the so-called New LDB (Law No. 5,692, of August 11, 1971), are established, with the objective of providing students with the necessary training to develop their potential, qualification for work and preparation for the exercise of citizenship. Collaboration with companies, through agreements, gave rise to the possibilities of professional internships. Education becomes compulsory from 7 to 14 years old with the provision of a common curriculum for the 1st and 2nd grades and a diversified part, depending on regional differences.

1974 - The National Council of Graduate Studies is founded (Decree No. 73,411, of January 4, 1974), to support measures for the execution and updating of the National Policy for Graduate Studies.

1985 - The objectives of the Brazilian Literacy Movement (Mobral) are redefined with a focus on expanding opportunities for access to and return to school. Mobral is now called the National Foundation for Youth and Adult Education (Educar), with a view to promoting and implementing literacy and basic education programs for those who did not have access to school or left school before completing their entire school career (Decree No. 91,980, of November 25, 1985).

1995 - TV Escola is created, through the Technical Cooperation Protocol No. 1, signed between the MEC, the Ministry of Communications and the Secretariat of Social Communication of the Presidency of the Republic. The main objective was to promote the improvement of teaching,



using open, continuing and distance education, through the radio and television stations of the Roquette Pinto Foundation.

1996 - The Law of Guidelines and Bases of National Education (Law No. 9,394, of December 20, 1996) is enacted, which regulates the entire educational system, from early childhood education to higher education, in addition to disciplining Indigenous School Education. The new LDB replaces Law No. 5,692 of 1971 and provisions of Law No. 4,024 of 1961, which dealt with education. The LDBEN of 1996 was a reference in the trajectory of Youth and Adult Education. Compared to the previous LDBs (1961 and 1971), the 1996 LDBs included the public of young people and adults in a specific way. From that moment on, education for young people and adults has legal support, being supported by the most relevant law in the country that governs education.

1998 – The National High School Exam (Enem) is born as a tool for evaluating the performance of students and schools.

1999 - The National Curriculum Guidelines for Indigenous School Education are approved (Opinion No. 14/99, of September 14, 1999 of the Chamber of Basic Education of the National Council of Education).

2001 - The National Education Plan is instituted (Law No. 10,172, of January 9, 2001), with a duration of 10 years, with the States and Municipalities from then on being responsible for preparing the corresponding ten-year plans. The Union is responsible for establishing the National Evaluation System, colluding the necessary mechanisms to monitor the goals contained in the PNE. The Higher Education Student Financing Fund (Fies) was established, proposed to grant financing to students regularly enrolled in non-free higher education courses and with a positive evaluation (Law No. 10,260, of July 12, 2001).

2003 – Emergence of the Literate Brazil Program (Decree No. 4,834, of September 8, 2003), with the purpose of requiring literacy for young people over 15 years of age and adults out of school before learning to read and write. The priority in the transfer of resources to states and municipalities encourages students to remain in Youth and Adult Education (EJA) classes.

2004 – The National System for the Evaluation of Higher Education (Sinaes) is created with the objective of strengthening the national process of evaluation of higher education institutions, undergraduate courses and the academic performance of their students (Law No. 10,861, of April 14, 2004). Incoming and graduating students are evaluated through the National Student Performance Exam (Enade). The University for All Program (ProUni) is designated, which grants scholarships (partial and full) to low-income young people (Law No. 11,096, of January 13, 2004). The program defines that a percentage of the scholarships must be allocated to the implementation of affirmative policies for access to higher education for people with disabilities or self-declared indigenous and black.



2006 - Established 9-year elementary education, with mandatory enrollment at six years of age (Law No. 11,274, of February 6, 2006). The National Program for the Integration of Professional Education with Basic Education is created, in the Youth and Adult Education Modality (Proeja) and through this program the student learns a profession while completing elementary or high school (Decree No. 5,840, of July 13, 2006).

2010 - Designated by Normative Ordinance No. 2, of January 26, 2010, the Unified Selection System (Sisu), a digital system managed by the Ministry of Education that allows public and private institutions to offer vacancies for their undergraduate courses to candidates who participated in the previous edition of Enem.

2011 - National Program for Access to Technical Education and Employment (Pronatec), seeking to expand the offer of Professional and Technological Education courses, through programs, projects and technical and financial assistance actions (Law No. 12,513, of October 26, 2011).

2012 - Founded by Law No. 12,711, of August 29, 2012 (Quota Law), the reservation of 50% of vacancies in undergraduate courses in federal institutions of higher education to students who have completed their high school education in public schools. Within this percentage, they prioritize students with lower income and self-declared black, brown, and indigenous people, as well as people with disabilities.

2014 - The National Education Plan (Law No. 13,005, of June 25, 2014) is confirmed, with guidelines, goals and strategies for education for the period of 10 years.

2015 – The National Common Curriculum Base (BNCC) is launched, a note that defines the group of essential learning in the course of basic education.

2017 - Approved the National Common Curricular Base (BNCC) by Ordinance 1,570, of December 20, 2017.

2018 - The Support Program for the Implementation of the National Common Curricular Base (ProBNCC) is instituted to support States and Municipalities in the process of reviewing or preparing and implementing curricula aligned with the BNCC (Ordinance No. 331, of April 5, 2018). The More Literacy Program (PMALFA) is established, which seeks to support school units in the literacy process of students regularly enrolled in the 1st and 2nd year of elementary school (MEC Ordinance No. 142, of February 22, 2018).

According to data published by the MEC regarding the theoretical frameworks of education, it is noted that the regulations aimed at the adult training process are much less expressive and most were elaborated with a focus on service aimed at the labor market.



CHARACTERIZATION AND PROFILE OF THE EJA STUDENT

The illiteracy rate of the Brazilian population among adults over the age of 15 is estimated at 6.6%, corresponding to approximately 11 million people. Even though this is a high number, this means a reduction of 0.2% in the total number of illiterate people compared to 2018 (BRASIL/MEC, 2020). The percentages are different when analyzed by Brazilian regions, with the Northeast and North being 13.9% and 7.6% of its population made up of illiterate people, respectively, while the Central-West region has 4.9%, and the Southeast and South regions both bring 3.3% (IBGE, 2020). The elderly population aged 60 and over has grown rapidly in recent years and today represents 15.7% of Brazilians, with about 32.9 million identified in the National Household Sample Survey (PNADC Educação), carried out in 2019 (IBGE, 2020), a percentage higher than that of children up to nine years of age, which is 12.8%. Also, according to the IBGE (2020), in 2019, the existence of elderly people aged 60 and over who were not schooled or literate corresponded to a large part of the non-literate contingent (18%), that is, about 6 million, while the illiterate between 15 and 24 years old corresponded to 6.6% and, between 25 and 40 years old, there are 7.9% of illiterate people.

According to data made available by the National Preparatory Base Document for the VI CONFINTEA (BRAZIL, 2008), distinguishing EJA students constitutes analyzing with and in diversity. This diversity is characterized by the differences that mark the students from each other (black, white, indigenous, yellow, mixed-race; women, men; young people, adults, the elderly; quilombolas, farmers; workers or unemployed; of urban or rural origin; living in the seat of a municipality or in a district; free or deprived of liberty because they are incarcerated; people with or without disabilities). A diversity that constitutes Brazilian society and that comprises different ways of being, living and thinking. People who seek EJA establish different ways of being Brazilian, between conflicts and different ways of building their social, ethnic-racial and citizenship identity. They are diverse individuals who seek spaces to dialogue with each other or, at least, seek to negotiate, based on their differences, places and rights guaranteed by the Brazilian Constitution (BRASIL, 1988).

The Youth and Adult Education (EJA) modality represents a teaching modality that encompasses different levels of basic education, and that strengthens the concept of democratization of access to education in the public network. In this way, young people, adults or the elderly, who for different reasons did not or did not complete their training process in a conventional way and at the corresponding age, can finish their basic training. In this aspect, the profiles of EJA students are, in a different way, diversified in terms of age, social conditions, among others. While a certain number of these students already work in the labor market in different segments, others remain unemployed and see EJA as an opportunity to improve their qualification and professional growth or reinsertion (MARREIRO, 2021).



Data exposed by the Basic Education Census (2022), pointed out that there were approximately 2,800,000 students enrolled in the Youth and Adult Education modality in the country. The number of EJA enrollments reduced by 21.8% between 2018 and 2022, reaching 2.8 million in 2022. The drop in the last year was 6.3%, occurring unevenly in the elementary and secondary level stages, which showed a reduction of 1.9% and 12.5%, respectively. In elementary level EJA, 72.3% of enrollments are in the municipal network, followed by the state and private networks, with 23.3% and 4.4% respectively. In the secondary level, the state network accounts for 86.3% of enrollments, followed by the private and municipal networks, with 10.7% and 2.1% respectively, and the elementary level concentrates, proportionally, the largest number of enrollments in rural areas (29.3%) (BRASIL, 2022). Based on these data, it is evident that in Brazil elementary education still provides a shared mode of enrollment distribution. It is known that article 11 of the Laws of Guidelines and Bases of National Education (LDB) provides for this collaborative resource between the state and the municipalities. With regard to the age group in this type of education, it is noted that it is composed of students under 30 years of age, who represent 50.3% of enrollments. In this same age group, male students are the majority, 55.0%. On the other hand, it is noteworthy that the enrollment of students over the age of 30 is predominantly female, 58.9% (BRASIL, 2022).

In terms of color/race, it is observed that students identified as black/brown represent 77.5% of the EJA at the elementary level and 69.3% at the secondary level. Students declared as white represent 20.2% of the EJA at the elementary level and 29.2% at the secondary level (BRASIL, 2022), reinforcing what is established in Article No. 10 of the LDB, which ensures that it is the responsibility of each federative unit to ensure "[...] high school to all who demand it [...]" (BRAZIL, 1996). In the opinion of Marreiro (2021) after analyzing the data released by the 2020 School Census, it becomes clear that for many students in this modality, this represents the last opportunity to complete the training process, since it was not possible to complete elementary school at the age of approximately 15 years, and high school close to 18 years old. Census data show that in 2019, more than one million students took the National Exam for the Certification of Youth and Adult Skills (Encceja), which demonstrates the great difference and inequality that still persists in our country.

METHODOLOGY

The objective of this work was to identify the challenges for the completion of the formative process of students enrolled in the Education program for young people and adults, in the perception of teachers, working in schools in Belo Horizonte. This section presents the methodology adopted to achieve the objective of the study.



It was adopted as a methodological strategy, as to the nature of applied research with a quantitative approach. As for its objective, it is classified as descriptive, since, according to Cervo, Bervian and Da Silva (2007) the study used observation, registration, analysis, seeking to correlate facts or variables without manipulating them. Andrade (2010) points out that descriptive research is characterized by unification in terms of data collection, so that this can be carried out by applying questionnaires or through observation. The technical procedure used in this research was the case study, which according to Cervo, Bervian and da Silva (p. 62, 2007) consists of a strategy of "research on a certain individual, family, group or community that is representative of their universe, to examine various aspects of their life." According to Prodanov and De Freitas (2013), the case study can be used because it addresses contextual conditions, controlled in laboratories or even situations in which collections and analysis of characteristics are necessary in order to collect data for investigation in the contemporary context.

The research was applied to teachers of the Youth and Adult teaching modality working in three schools in the city of Belo Horizonte, seeking to identify the challenges for the completion of the formative process of students in the perception of these teachers.

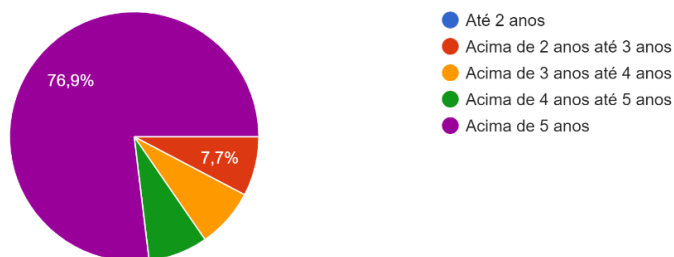
For data collection, the instrument used consisted of a structured questionnaire applied online using google forms as an instrument. The link was sent accompanied by an invitation letter by email to the public schools that offer the EJA modality in Belo Horizonte, and was available for responses between 08/02/2023 and 09/10/2023, having obtained the return of three schools. The questionnaire applied to the teachers (Appendix 1) consisted of two sections. The first sought to identify structural aspects such as time working in the modality; weekly workload; and school and classroom structure; characteristics of the EJA students and in the second, it was a matter of identifying the motivation to return to school and complete their studies, in addition to identifying the reasons and percentages of dropout in each of them.

DATA ANALYSIS AND INTERPRETATION OF RESULTS

This study is composed of a sample of 13 teachers who work with Youth and Adult Education in three schools in Belo Horizonte. The demographic data of the participants indicate that 76.9% have been teaching in the EJA modality for more than 5 years, and the remaining 23.1% have been working in the modality for between 3 and 5 years, as shown in graph 1.

Graph 1 – Time of work in EJA

Tempo de atuação docente no EJA
13 respostas

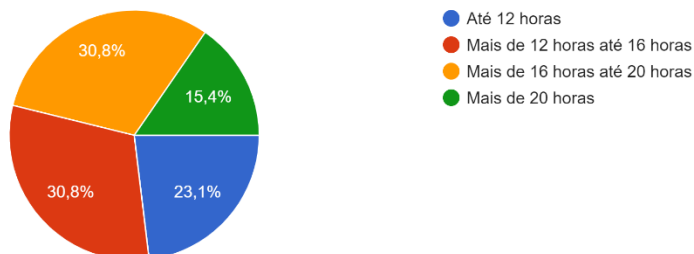


Source: Survey data

Regarding the weekly teaching workload of work in the EJA modality, the data indicate that for the surveyed sample, 61.8% have a weekly workload between 12 hours and 8 pm. 23.1% of the sample has a workload of less than 12 hours and 15.4% have a workload greater than 20 hours per week, as shown in graph 2.

Graph 2 – Weekly workload with EJA classes

Carga Horária semanal com as turmas EJA
13 respostas

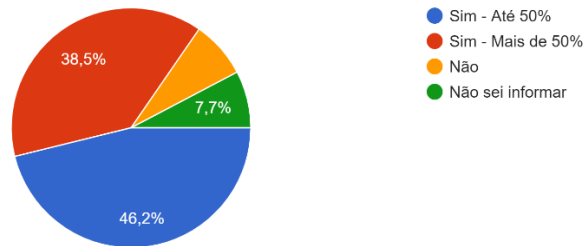


Source: Survey data

Regarding the availability of structure, 100% of the sample stated that in the school where they work there is a specific room for EJA classes. However, when asked about the existence of an appropriate structure in the classroom for adults, 30.8% of the sample said that this structure does not exist. Regarding the profile of the students, with regard to the identification of their performance in the labor market, 46.2% of the sample stated that, on average, 50% of their students are people who work in the labor market, and for 38.5% this percentage represents more than 50% of the students in this condition. Only 7.7% stated that their students do not work and the same percentage for those who could not inform, as shown in graph 3.

Graph 3 – Students working in the labor market

Seus alunos, são profissionais atuantes no mercado de trabalho?
13 respostas

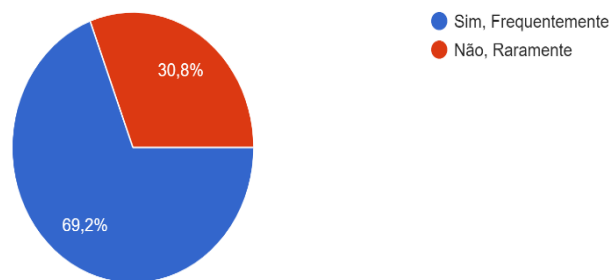


Source: Survey data

The analysis of these data corroborates the argument defended by Mônica Gomes when she states that EJA students should be considered not as working students, but as workers who study. Next, we sought to understand other factors that could cause concern to the student, and for this issue, the result showed that 69.2% of the sample receives complaints from students regarding problems that concern them, as shown in graph 4.

Graph 4 – Problems you need to solve, that worries you

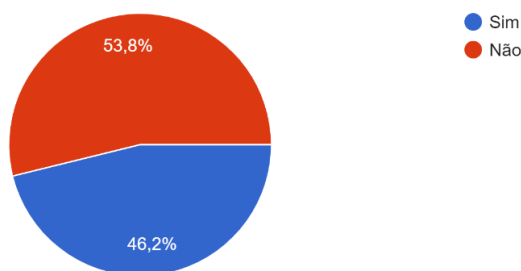
De modo geral, seu aluno, costuma externar problemas que precisa solucionar, que o preocupa?
13 respostas



Source: Survey data

These data confirm that, for the EJA student, educational problems have a close relationship with social issues, reinforcing Freire's understanding, cited by Baquero (2008). Another aspect addressed by the research was to understand the student's participation during the entire class period, and in the perception of the teachers, 53.8% do not remain participative until the end of the class time, as shown in graph 5.

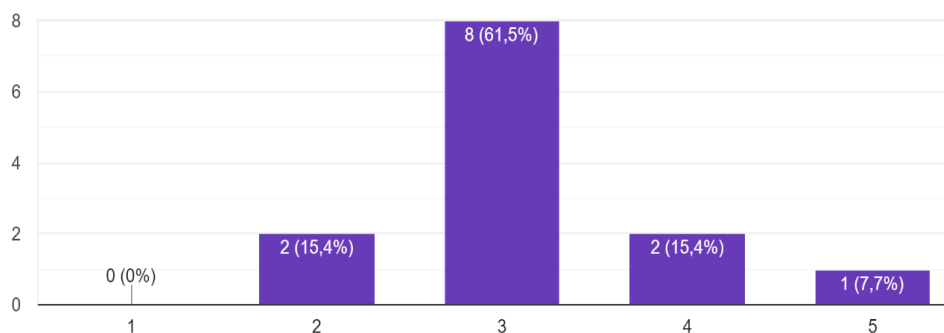
Graph 5 – Participation until the end of class time
 Seu aluno, geralmente, participa das aulas até o fim do tempo?
 13 respostas



Source: Survey data

Regarding the perception of sleep in students during class time, 53.8% of the sample stated that they noticed this state of sleepiness in students. Regarding the student's disposition at the time of classes, it is noted that for 69.2% of the professors the students are in a good mood. These results seemed contradictory, since most of them were sleepy during classes, it was expected that most of them would be less willing because of this factor. It was also sought to identify the motivations for completing the formative process of the students of this modality. To measure these questions, a Likert scale of 5 factors was adopted, with 1 being less motivated and 5 being very motivated. Regarding the motivation to learn basic content, in the opinion of the teachers, only 15.4% are really motivated, a different result when specific content is addressed in which the level of motivation was 30.8%. We also sought to identify the level of motivation of the students to interact with the class, which in the perception of the sample only 23.1% had a satisfactory degree, with a score higher than 4 as shown in graph 6.

Graph 6 – Motivation to interact with the class
 Qual o nível de motivação dos seus alunos para interagir com a aula?
 13 respostas



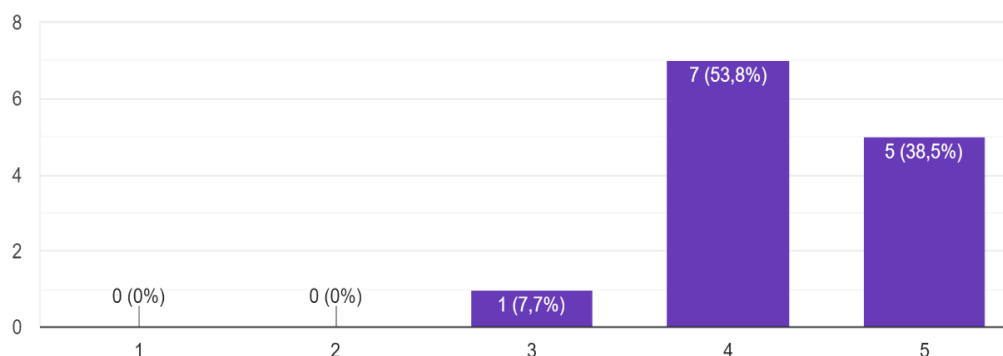
Source: Survey data

It is verified that the motivation of his students to interact with their colleagues presents a different result. In this case, 92.3% of the students had a score equal to or greater than 4 in the level of motivation, as shown in graph 7.

Graph 7 – Motivation to interact with colleagues

Qual o nível de motivação dos seus alunos para interagir com os colegas?

13 respostas



Source: Survey data

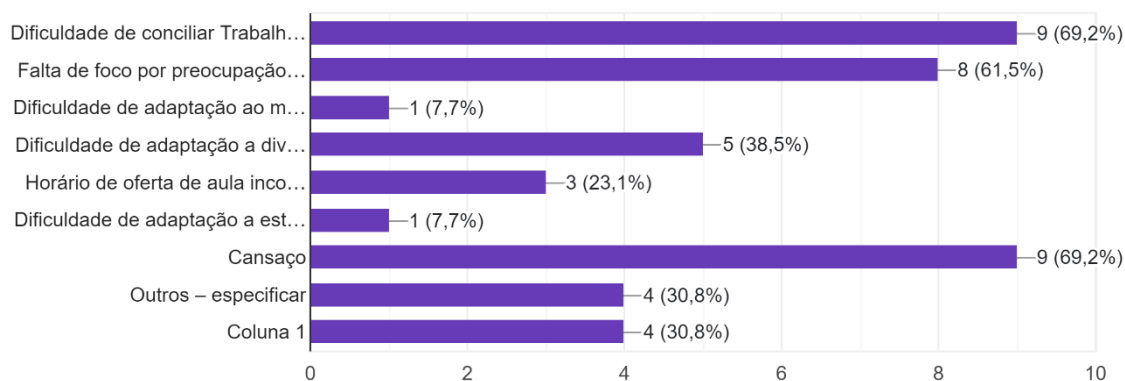
It is noted that the motivation for interaction with colleagues is greater than the interaction with the classes themselves, this reinforces the understanding defended by Baquero (2008), citing Freire who argues that Adult Education consists of an emancipatory perspective, and is a learning process understood as important for the interpretation of the world. Regarding dropout, we sought to identify the dropout percentages during the year, as well as to identify the factors that contribute to student dropout. With regard to the dropout percentage, for the surveyed sample, 61.6% of the students have dropout percentages between 40% and 60% of the class during the year. Regarding the factors for this dropout, the teachers were asked to point out, in order of importance, up to 5 main factors.

It is observed that the main reasons pointed out were fatigue and difficulty in reconciling work and studies with 69.2%; lack of focus due to concerns with 61.5%; difficulty in adapting to the diversity of the class appears at 38.5%. Graph 8 shows these results. This result corroborates the data made available by the Basic Education Census (2022), which pointed to a reduction of 21.8% between 2018 and 2022 in the number of enrollments.



Graph 8 – Reasons for dropout
Marque os 5 motivos principais de evasão, na sua opinião.

13 respostas



Source: Survey data

It is understood that the main reasons pointed out by the teachers for dropping out in the EJA modality are aspects related to the need to remain employed, since the vast majority are workers who study, as pointed out by Mônica Gomes, and another factor that drew attention was the difficulty of adapting to diversity. The Basic Education Census (2020) pointed out that EJA classes are made up of very heterogeneous students in terms of gender, age, ethnicity, among other factors that can contribute to this difficulty in adapting some students.

FINAL CONSIDERATIONS

The main objective of this research was to identify the challenges for the completion of the training process of students enrolled in the Education program for young people and adults, in the perception of teachers, working in three schools in Belo Horizonte. The data collected through the electronic questionnaire applied to a sample of thirteen teachers who work in the EJA modality in the schools surveyed indicate that most students are people active in the labor market and who need to reconcile work activity with studies. This was even one of the most representative factors of the reasons pointed out by the professors as a contribution to the dropout of students in this modality. Another point that deserves to be highlighted concerns the importance of the formative process for social relations, considering that the data pointed to less interaction with classes and greater interaction with classmates, showing that the pedagogical process cannot be designed disconnected from social issues.

Regarding the contents covered, it is noted that the motivation for specific contents is more attractive to students than the basic contents. These results may be associated with the fact that he is a more experienced student with greater experience, which makes him a person with a more critical view of the world. Another point that drew attention refers to the school's structure to receive students in this modality. Although the teachers signaled the existence of a specific room for the EJA



student, they also reported that in part of the schools the room has the same structure for the other classes, which makes the environment unattractive and motivating to an adult student. As a form of contribution, it is suggested that other studies be carried out, and that the perception of the student be investigated, perhaps through a comparative study, which in this study did not have this focus.

Some limiting factors deserve to be mentioned, being the time factor, associated with the little involvement of the schools in participating in the study and asking the teachers to answer the questionnaire.

It is important to highlight the main contributions of the study that the data collected here may have as a contribution to thinking about more effective strategies for retaining students in the EJA modality, as well as providing a specific structure for this audience, in order to increase the level of satisfaction and engagement with the training process.




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Green Hydrogen - How to set up a class for students with deafness

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ABSTRACT

This chapter of the book emphasizes the importance of making chemistry content accessible to deaf students. Using hydrogen as a thematic support, the research carried out as an applied methodology aimed to identify the options for adapting a class to meet the needs of deaf students. Given the lack of adaptation in many classes for this audience, the study proposed the application of the methodology of investigative experimentation, with the principles of the Three Pedagogical Moments.

Keywords: Chemistry, Green hydrogen, Deafness, Libras, Inclusion.

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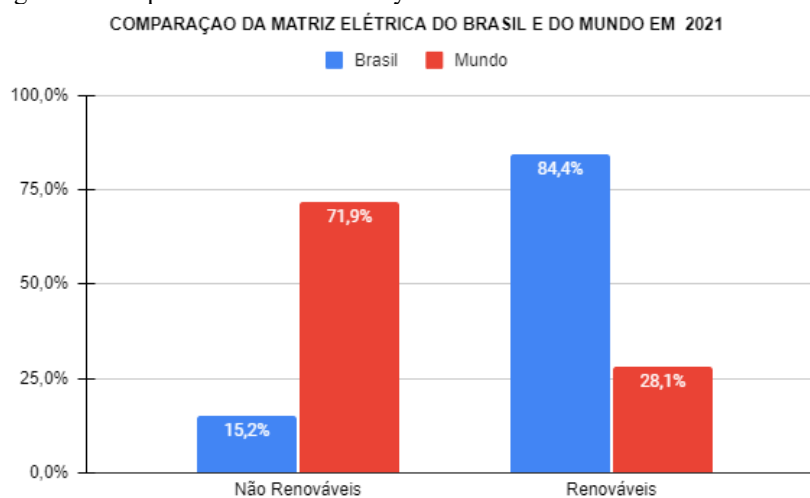
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INTRODUCTION

Hydrogen is recognized as the most prevalent chemical element in the universe. Consequently, the importance of "green hydrogen" as a fuel for the future is evident. The applications are diverse, such as in fuels for car, airplane and ship transport. Hydrogen is obtained by water electrolysis, which is the breakdown of hydrogen and oxygen molecules in water (H_2O), through electricity, using renewable energy sources. To produce hydrogen, we often use natural gas or coal. But this process releases carbon dioxide (CO_2), the main pollutant responsible for global climate change today. Therefore, the green hydrogen applied would zero the release of carbon dioxide, because, with the use of renewable sources, its production would be without the emission of CO_2 [1,2]. Therefore, its high energy potential together with the need to reduce environmental impacts make green hydrogen the fuel of the future.

Brazil stands out in the world market for already using renewable sources such as hydroelectric, wind, solar and biomass [3]. The different percentages of electricity sources used in Brazil and in the world, sources from renewable and non-renewable resources, can be seen in Figure 1.

Figure 1: Comparison of the electricity matrix of Brazil and the world in 2021.



Source: From the author himself, adapted from [3].

As can be seen, green hydrogen is one of the topics of great discussion. However, it does not reach the scientific academy in its equity. Deaf students in many Brazilian public schools, for example, are unable to follow their studies in such a context due to the precariousness of the educational system itself. Therefore, the educational inclusion of these continues to be a current challenge. Scarcity of accessible resources, lack of bilingual teachers and absence of Libras interpreters in some public institutions are some of the factors that intensify the problem. In addition to the challenges mentioned above, it is also essential to consider the physical issues that impact the presence and performance of deaf students. Many additional challenges arising from these conditions



result not only in difficulties in class participation, but also in school delay. The lack of structure and accessibility in educational institutions plays a significant role in this reality, restricting the educational engagement and performance of these students [4].

In this context, the research carried out here explored the concept of green hydrogen with the use of a teacher to assemble an accessible material for a deaf student. In view of the linguistic difference present in the deaf community and the limitations in chemistry teaching methodologies, this work presented a proposal for a didactic resource applicable to a chemistry theme.

METHODOLOGY

To reduce the differences in teaching-learning among deaf students, it was proposed to implement investigative experimentation in the classroom, following the methodology of the Three Pedagogical Moments: Initial Problematization, Organization of Knowledge and Application of Knowledge. The Initial Problematization aims to arouse the interest of students through everyday situations, visually adapted. In Knowledge Organization, students explore concepts, participate in group discussions, and use visual aids to deepen understanding. In the Application of Knowledge, they use learning together with experimentation.

EXPERIMENTAL

MATERIALS AND REAGENTS

To carry out the experiment, the following materials were required: 100 mL Erlenmeyer (04), a small amount of chopped aluminum foil, match (01), bladder (04), funnel (01) and a solution of caustic soda (sodium hydroxide) with a concentration of 0.5 mol. L-1.

EXPERIMENTAL PROCEDURE

Sodium hydroxide 0.5 mol. L-1 is corrosive and toxic. Therefore, this product has been handled with great care. Masks and goggles were used. The package was hermetically sealed. 1 mL of sodium hydroxide was added to the Erlenmeyer Sintra Millimeter, using a funnel for easy handling. Then, the chopped aluminum foil was placed inside the erlenmeyer. The beginning of the reaction was observed by the dissolution of the aluminum foil, and the flask was carefully removed from the erlenmeyer when it was filled. The balloon was tied with a knot so that the gas could escape. Notes about what happened during the process were made by the students. Stretching out his arm, one student held the balloon while another popped the balloon with the match. The procedure was observed by the students, who took note of what happened. The same procedure was repeated for the other erlenmeyers.



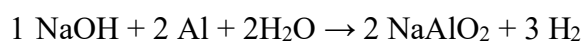
RESULTS AND DISCUSSIONS

The first phase of learning consisted of the theoretical exploration of the approach and the pertinent chemical concepts. Initially, a dialogued survey was conducted so that the students' previous knowledge could be evaluated with the following question: 'When thinking about hydrogen, what comes to mind?'.

Soon after the survey, there was an exhibition of what would be the concept of hydrogen, as a historical part with the help of visual resources, as well as and in the following problem situation: 'In recent months, Brazil has experienced remarkable climate changes, characterized by an increase in rainfall and high temperatures'. These climate extremes have generated a series of challenges in several regions of the country, directly impacting security, local properties and the infrastructure of the places themselves. What could the population do to reduce these climate issues? And what other means could be used as a renewable source of energy?'. Based, therefore, on previous knowledge and information developed so far, the students were guided to create hypotheses for the solution of the problem.

In the third stage, the focus was on the theme of green hydrogen, addressing definitions, applications and related environmental issues. This exploration provided students with information so that they could elaborate more informed answers to the problem-question presented above.

The closing stage involved the participation of students in a practical experiment with hydrogen gas. Here, the students were separated into four pairs to carry out the experiment. When mixing sodium hydroxide and aluminum, the students observed the following reaction:

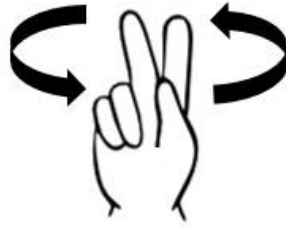


By adding sodium hydroxide, an exothermic reaction occurred, releasing a lot of heat. At this time when hydrogen was produced, all care was taken [5].

The sodium hydroxide reacted with the aluminum foil, generating sodium aluminate (NaAlO_2) and hydrogen gas, which filled the bladder. The bladder, containing enough hydrogen gas, can then rise, since it is lighter than the gases that make up the air. Hydrogen is highly flammable and can go into a combustion state when it comes into contact with a heat source, often a spark or flame.

In addition to experimentation, the teacher can use other resources that already existed, so that he could help students during class in an accessible way in Libras such as the periodic table. For this, it was necessary to have a teacher with skills in Libras so that communication with deaf students was effective. An example of the symbology of the hydrogen element for Libras can be seen in Figure 2.

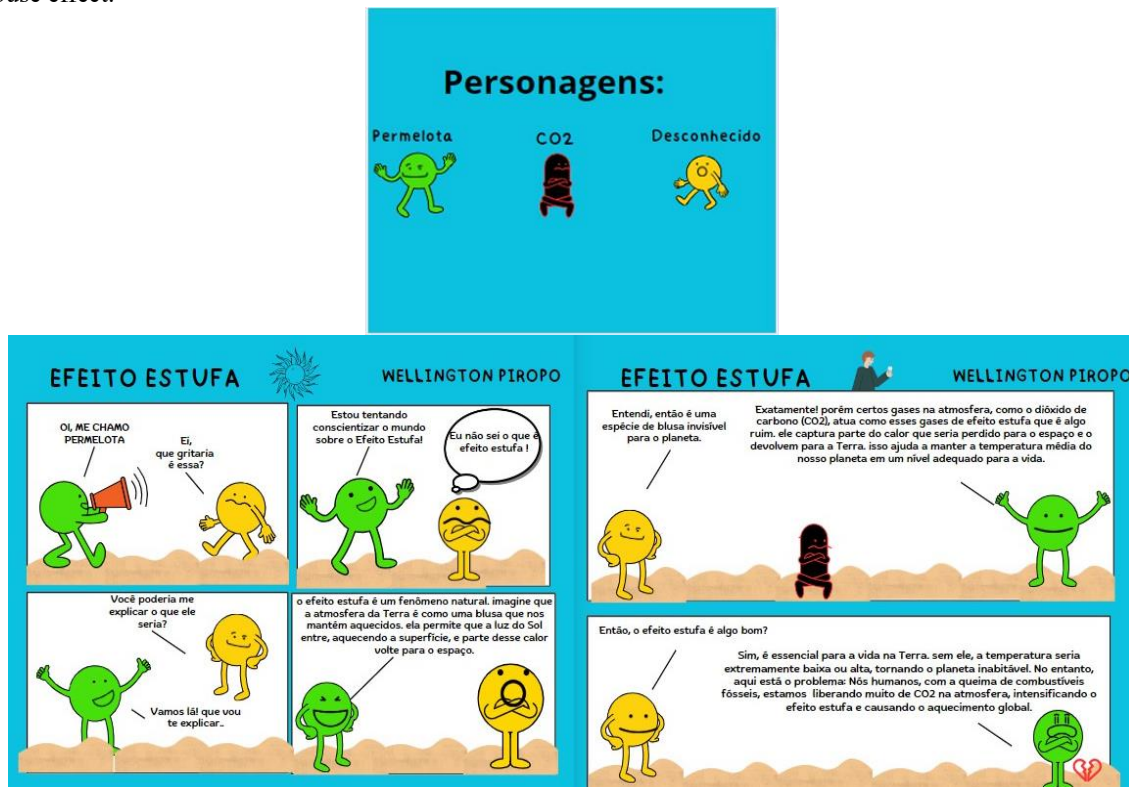
Figure 2: Symbology of the element hydrogen from the periodic table for pounds.

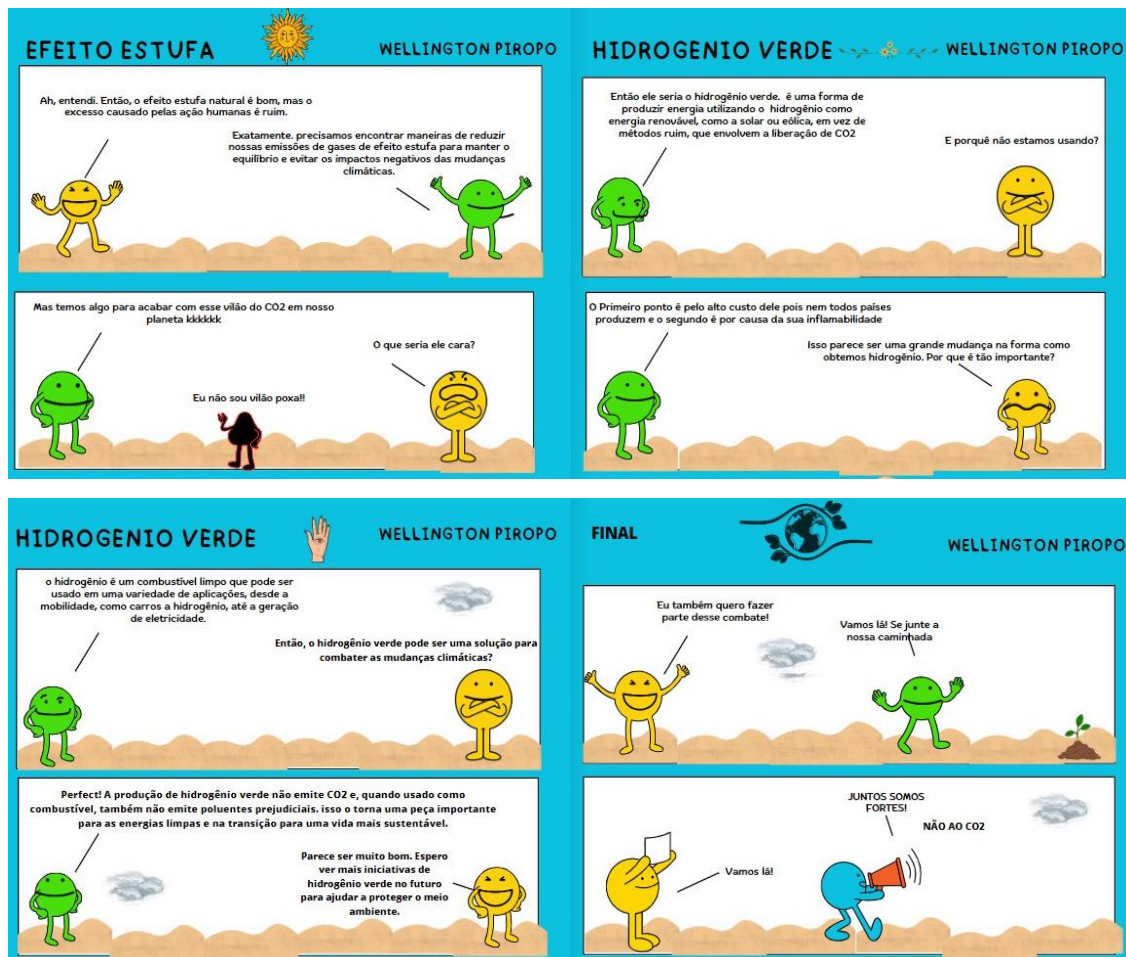


Source: From the author himself, adapted from [6,7].

Another way to address the topic of green hydrogen was through a brief comic book, which can be used as a review of the subject. An example is shown in Figure 3, highlighting the importance of green hydrogen in the emission of carbon dioxide and its consequences, such as the greenhouse effect.

Figure 3: Comic book about the role of green hydrogen in carbon dioxide emissions and its consequences, such as the greenhouse effect.





Source: The author.

CONCLUSION

By adapting the theme of green hydrogen to cater to deaf students, teachers have played an important role in building more accessible classes. The application of the methodology of the Three Pedagogical Moments, with an emphasis on experimentation, was not limited only to the understanding of the content. It also promotes more meaningful interaction between deaf and hearing students. This interaction contributed to the creation of a more welcoming educational environment, where the exchange of experiences between groups is fundamental. In addition, this approach allows deaf students to explore their previous knowledge on the subject and establish practical connections between the theory presented in the classroom and their daily lives.

ACKNOWLEDGMENT


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Enhancing basic education through transmedia: Using media for teaching in Blumenau/SC-Brazil

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ABSTRACT

The overall aim of this article is to present educational proposals focusing on transmedia in education in the municipality of Blumenau/SC. Transmedia refers to the practice of expanding a narrative or content across multiple platforms, allowing for a more immersive and interactive experience for the public. The research is classified as exploratory, descriptive, with a qualitative approach, and is being carried out in the Postgraduate Program in Education (PPGE/Furb). As a result of the work, two distinct proposals emerged: one with video production and another with podcast production, both focused on transmitting cultural elements of the city. The aim is to encourage teachers to reflect on the use of media in education, increasing student engagement. It is hoped that these innovative approaches will enrich teaching and promote learning that is connected to local culture. The study thus seeks to stimulate the adoption of more dynamic and contemporary pedagogical practices in Blumenau schools, fostering interaction between media and education.

Keywords: Education, Transmedia, Culture, Teaching, Blumenau.

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INTRODUCTION

Transmedia, a concept from the field of communication (SCOLARI, 2019; JENKINS, 2022), has proven to be an effective approach for disseminating information and narratives in various contexts. Transmedia refers to the practice of expanding a narrative or content across multiple platforms, allowing for a more immersive and interactive experience for the public. This approach promotes the active participation of the recipient, encouraging them to explore different aspects of the story or concept through different channels, such as movies, books, games, social networks, and other media.

In recent years, transmedia has been applied in the field of education (CUNHA, 2020; NIETO-BORDA, 2021; HAVRILOVA et al. 2022), in which various educators have explored its possibilities to enrich the teaching and learning process. Teachers have been using transmedia elements to engage students more deeply by offering different entry points for understanding a specific subject. This has proved particularly effective in the digital age, in which students are increasingly immersed in a range of platforms.

However, it is important to consider that it is no longer feasible to neglect the impact of the media on young people's daily lives. Amid the many changes that our society has undergone over the last few decades, the media revolution stands out as one of the most influential (CITELLI, 2000; SETTON, 2010). The channels of communication channels and information technologies not only intervene in personal spheres but also have implications for "cultural, communicative and educational processes⁴" (BELLONI, 2005, p. 32). They perform a fundamental role in disseminating society's values and norms, a function that also brings us to another setting of equal importance: the school.

The relationship among media and education is established throughout their processes from the outset, as outlined by Moran (1993), pointing out that "education is fundamentally a process of communication, of interaction, of relationships betwixt people⁵" (p. 9). In addition, Baccega (2009), Setton (2010), and Martín-Barbero (2011) share Moran's view, emphasizing that, with the dissemination of the media, both the school and the family are no longer the only institutions in charge of the educational role and moral construction of young people.

Braga and Calazans (2001) explain that both have repercussions on our lives since education and communication are intrinsically present in all aspects of society and aspects of society and, on certain occasions, intertwine. Therefore, according to the perspective of Soares (2011a), both spheres play the role of communicating as educating. Setton (2010) adds that these two fields face a

⁴ Our translation: "processos culturais, comunicativos e educacionais".

⁵ Our translation: "a educação é fundamentalmente um processo de comunicação, de interação, de relação entre pessoas"



challenge which is the uncertainty as to whether their interests and intentions will be matched by the public/students.

This article arises in response to questions regarding potential proposals for the application of the transmedia approach in the educational context of the municipality of Blumenau/SC. The research presented here comes from the Postgraduate Program in Education (PPGE), of the Regional University of Blumenau (Furb) through the research group Communication and Media Education (Furb/CNPq). The general aim of this work, therefore, is to present educational proposals focused on transmedia for basic education in the municipality of Blumenau.

The use of transmedia in education aims not only to improve the quality of teaching, but also to the quality of teaching, but also to captivate and involve students in an innovative way. By creating more engaging and interactive learning experiences, it is hoped that students will develop a deeper understanding of the concepts covered, while at the same time being encouraged to at the same time as being encouraged to explore different forms of expression. González-Martínez et al. (2019), point out that transmedia has been increasingly used in education, but there is still much to be explored in this area.

Although there are many different approaches to use of transmedia in education, there is little empirical research into the effectiveness of this approach. In addition, the authors highlight the importance of considering the implications of using transmedia in education in order to ensure that students are acquiring the necessary skills for the early 21st century.

The study, part of a larger research project, aims to provide a set of specific transmedia proposals for basic education in Blumenau. In doing so, it is intended that this work can serve as a guide for teachers of various subjects, inspiring them to explore innovative and effective approaches to teaching. Through the implementation of these proposals, it pursues to enhance the educational experience of and promote a dynamic and stimulating learning environment. The larger research project to which this work is linked is entitled *Interdisciplinary transits of education and communication - part III: use of accessible technologies in teaching and learning in the municipalities of the Médio Vale do Itajaí* (Regional University of Blumenau, PPGE/Furb).

TRANSMEDIA AND EDUCATION

The intrinsic relationship between the etymological concepts of communication and education is undeniable since education depends fundamentally on communication and, likewise, communication plays an educational role in itself. By delving into these two domains, we sought to investigate the use of the transmedia approach in education, its possible areas of study, and applications, anchoring ourselves in these two fields.



This relationship has become increasingly evident, especially in a scenario of media diversity. In this context, transmedia emerges as a tool to support both spheres, enabling the development of innovative pedagogical practices within educational environments.

For a comprehensive understanding, it is important to contextualize the origin and meaning of the term transmedia, which derives from “trans-media composition”, a term coined in 1975 by American composer Stuart Saunders Smith, based on his work “Return and Recall”. However, this inaugural reference was only the starting point.

Kinder's (1991) considerations in the early 1990s served as the basis for subsequent studies, which gradually expanded the original conception. In 2003, Jenkins expanded this concept to transmedia storytelling in an article entitled “Transmedia storytelling: movie characters from books to films to video games can make them stronger and more compelling”. He consolidated these and other studies in his seminal book “Convergence culture”, published in 2006 and released in Brazil in 2008 as *Cultura da Convergência*, now in its third edition in 2022.

In this work, Jenkins (2022) explored the concept of transmedia based on an analysis of movie franchises that have expanded their universes beyond the screen, culminating in narratives (transmedia storytelling). These narratives have become stronger and have found growing space in schools, a favorable environment eager to embrace new pedagogical ways of acquiring knowledge.

In contemporary times, the media are numerous and play a crucial role both in our daily lives and in education. However, they have evolved significantly, particularly in the way knowledge is presented to students. Given that students are deeply involved with technology, it is essential that these media are integrated synergistically into the educational process. Although the use of technology in education has been discussed extensively and there is a continuous and there is a continuous effort to bring them closer together, there is still a disconnection that could be overcome through a more comprehensive exploration of their diversity. In this sense, transmedia emerges as a powerful ally in making the educational process more dynamic and meaningful.

Through a literature review, González-Martínez et al. (2019) found that there is a relationship between transmedia and education and identified different approaches for use in teaching. The authors considered that some of the approaches identified in the papers include the use of multiple platforms to engage students in different forms of learning; the creation of transmedia stories to encourage student participation; and the use of transmedia games to promote learning.

Through a theoretical and empirical analysis of an educational project educational project in music and its implementation to improve the transmedia competence of music teachers in a locality, Havrilova et al. (2022) point out that with the creation of this initiative, conducting a survey to study teachers' interest in transmedia activities and disseminating the experience of developing and implementing the project of the project, became effective and improved the quality of teaching.



Sime and Themelis (2020) analyzed educators' perceptions of how and why visual technologies affect their identity in distance education. The results that transmedia identity management is an important part of the teacher's presence in distance education and that they need to develop skills in critical visual literacies to manage their identity effectively.

Transmedia, therefore, reveals itself as a vast terrain of educational and communicational possibilities, a fundamental ally in the task of making the search for knowledge not only effective, but also captivating. Especially with children and young people - often called "digital natives" due to their technological immersion since birth -, optimizing this connection becomes imperative. There is therefore an urgent need to transcend the traditional pedagogy of transmission, embracing a participatory approach that empowers students through active methodologies.

PROCESSES AND METHODS OF EDUCATIONAL PROPOSALS

This study is characterized as exploratory and descriptive research of a qualitative nature. In this context, we seek to understand the potential of the transmedia approach in education. In view of this approach, this paper seeks to present innovative transmedia educational proposals, which exploit the integration of different media to enrich the learning process in the municipality of Blumenau.

One of the proposals in focus is the production of videos related to tourism routes. Through this transmedia approach, students will be involved in the creation of audiovisual content that highlights cultural, historical, and geographical aspects of Blumenau, offering a comprehensive and in-depth view of the region. This initiative will not only increase student engagement, but also stimulate creative and collaborative skills, while promoting contextualized and immersive learning.

Another innovative proposal focuses on the use of themed podcasts during the Oktoberfest. Through this approach, students will be encouraged to explore aspects of the historical, cultural, and social aspects of the town's traditional festival. The production of podcasts will enable research, scriptwriting, and narration, developing oral communication research and organization skills. In addition, this proposal aligns with the festive atmosphere of the Oktoberfest, providing a unique opportunity for students to actively celebrating their local culture while learning in a participatory way.

VIDEOS IN EDUCATION

This pedagogical proposal aims to develop an innovative and collaborative approach to collaborative approach to learning for basic education students, focusing on audiovisual production as a means of investigating and publicizing the tourist potential of the city of Blumenau. The initiative will consist of dividing the class into four groups.



The project will be presented to the students as an opportunity to deepen their understanding of Blumenau and its cultural, historical and geographical peculiarities. Through research and exploration of the topic, students will be encouraged to identify the region's main attractions, traditional festivals, distinctive cultural elements, and relevant aspects of the local historical heritage.

Division into groups: In order to encourage collaboration and cooperation, the class will be divided into four groups. Two of these groups will devote themselves to designing and writing the itineraries, while the other two will be responsible for directing and recording the videos.

Preparation of the itineraries: The groups responsible for creating the routes must engage in a creative and well-founded approach, articulating ideas and building detailed itineraries covering various aspects of tourism in Blumenau. In addition, these may include historical information, local curiosities, interviews with the community and testimonials from tourists.

Training in directing and recording techniques: In order to equip the groups responsible for directing and recording the videos with relevant technical skills, basic instruction in filming and video editing techniques will be offered. The aspects covered will include of framing, lighting, audio capture and other preponderant factors in audiovisual production.

Preparation and rehearsals: The groups will be given adequate time to prepare the essential elements for the recording, such as costumes, equipment, and sets. In addition, the groups responsible for devising the itineraries will have space to hold rehearsals with the actors and presenters with the aim of improving the execution of their proposals.

Shooting the videos: Based on the itineraries prepared, the directing and recording groups will take charge of the filming, working in coordination with the actors and presenters to obtain high quality results that adhere to the creative proposals. Filming can be carried out using equipment found at the school, such as cell phones, tablets, and cameras, adapting to the context of the school.

Editing the videos: Once the recordings have been completed, the directing and recording groups will join forces to edit the videos, adding elements such as soundtracks, visual effects and creating a coherent and attractive final montage. In this context, the teacher will be able to provide guidance on video editing, to improve the result.

Presentation of the videos and teacher evaluation: The final presentation of the project will take the form of a special presentation session, in which the videos produced will be in the class and, if possible, shared with the school community. This moment will not only allow the work carried out to be appreciated but will also provide space for students to share experiences, knowledge and celebrate their achievements.

The evaluation of the project will be holistic, covering not only the performance of the groups in carrying out the tasks, but also their ability to collaborate, creativity, commitment and assimilation of the concepts worked on. In addition, the degree of knowledge acquired by the students about



tourism in Blumenau will be examined and their ability to communicating their discoveries through audiovisual format.

In addition to the internal presentation at the school, the videos resulting from the project can be on the institution's digital platforms, extending the reach of the experience to members of the community and beyond. With this initiative, students will not only strengthen their research, writing and audiovisual their skills in research, writing and audiovisual production, will become agents Blumenau's tourism potential, contributing to the recognition and appreciation of their city. This proposal aims to provide students with an enriching opportunity for practical and collaborative learning, allowing them to explore the fascinating universe of tourism in Blumenau through audiovisual production. By working in groups, drawing up scripts, directing and recording videos, the students will develop essential skills for their personal and professional lives, while at the same time promoting the cultural and historical wealth of their city.

PODCASTS IN EDUCATION

This educational podcast project will be entitled "Oktoberfest in Blumenau: A Festival of Germanic Culture" and is an educational proposal to involve students in an immersion in the German cultural tradition present in the city of Blumenau. Through the production of a podcast, students will have the opportunity to explore and share information about the famous German festival, Oktoberfest, which has become one of the most emblematic region's most emblematic and eagerly awaited celebrations.

Blumenau, founded by German immigrants in 1850, carry in their streets, architecture, and festivities the marked influence of German culture. The Oktoberfest, with its origins in the Munich, Germany, dates back to the 19th century, when it was first held in 1810. Over time, it adapted to the Blumenau context (1980s), becoming a unique event that celebrates the traditions and values of this culture.

The emergence of the podcast marked a revolution in the way people consume audio content in the digital age. Although the idea of audio on demand already existed, the term podcast was coined in 2004. This format allows individuals and organizations to create audio programs that cover a wide variety of topics and that can be streamed and broadcast and downloaded over the internet. The simplicity of production and accessibility to listeners have democratized communication, opening up space for diverse voices and enriching education.

The importance of podcasts in education is significant. Firstly, it provides an accessible and flexible alternative to learning. Students can access high-quality educational content at any time, adapting it to their busy schedules. Furthermore, podcasts make it possible to deepen knowledge in



various disciplines, offering an expert wisdom and engaging debates that complement formal education.

Another key aspect is the diversity of content. Podcasts cover a wide range of topics, from history and science to foreign languages and entrepreneurship. This means that students have access to a variety of perspectives, making learning more enriching. In addition, the intimate nature of audio allows listeners to connect emotionally with the topics, which can increase engagement and retention of information.

It can be affirmed that, in a mediatized society, the podcast offers a platform for under-represented voices in education. Educators, researchers, and experts who may not have access to large budgets or traditional media can share their knowledge and perspectives through podcasts. This enriches the educational landscape, promoting a diversity of ideas and experiences.

Medeiros (2005) reveals that the concept of the podcast was already ready. Using audio recording software and a microphone, Adam Curry, ex-VJ of MTV, produced 30-minute programs, adhering to the traditional format of radio shows, incorporating openings, news, music, and vignettes. This content was made available on the internet for public access (MEDEIROS, 2005, p. 2).

Bonini's (2020) analysis situates the years 2004 to 2011 as the "first era" of the podcast, characterized by its amateur character and often non-profit objectives. Subsequently, in 2012, the so-called "second era" emerged, directing podcasts towards a more commercial aspect, coinciding with the moment when the format gained notoriety and popularity in the United States.

From 2012 onwards, podcast productions in Europe and the United States witnessed significant improvements in their quality, culminating in an increase in audience, popularity, and financial return. Much of the content have been conceived and produced by renowned professionals who previously public radio stations. One of the notable innovations was the creation of episodes in a narrative radio format, exploring themes that ranged from "light/unusual stories" to documentaries and storytelling in general⁶ (CHAGAS; SANTIAGO, 2021, p. 7)

The growth in podcast consumption is driven by a number of factors related to its practicality and agility, in parallel with the relatively lower mobile data costs compared to viewing content on YouTube. The technological evolution has contributed to a significant transformation in the radio industry, including the language itself. In the early days of podcasts, there was question arose as to whether they should be classified as part of radio or as an entirely new and undefined modality (PRATA, 2008). The author also emphasizes that, in order to be considered radio, the podcast lacks

⁶ Our translation: "A partir de 2012, as produções de podcast na Europa e nos Estados Unidos testemunharam melhorias significativas em sua qualidade, culminando em um aumento de audiência, popularidade e retorno financeiro. Muitos dos conteúdos foram concebidos e produzidos por profissionais de renome que anteriormente se dedicavam a emissoras de rádio públicas. Uma das notáveis inovações foi a criação de episódios no formato de rádio narrativo, explorando temas que iam desde "matérias leves/inusitadas" até documentários e narrações de histórias em geral".



the essential element of real-time transmission to the audience and the society in which it is inserted (PRATA, 2008, p. 75).

In addition to its innovation and media aspects, the podcast embraces the concept of convergence, introduced by Henry Jenkins (2022 [2006]). Convergence is defined as an interconnection between media and technology, which is constantly evolving. Jenkins (2022) argues that convergence transcends mere technological change, as it involves a comprehensive relationship between technologies, industries, markets, genres and audiences.

Convergence not only transforms the way the media industry operates, but also influences how consumers consume news and entertainment. Jenkins emphasizes that convergence is not a future event to be awaited, but a current reality, driven by the multiplicity of channels and the mobility of new computer and telecommunications technologies (JENKINS, 2022).

The author adds that convergence not only changes media production, but also reconfigures the way people consume media content. Therefore, it is many of the aspects surrounding the podcast concept can be understood in the light of Jenkins' reflections.

In this context, the main objectives of the educational project are to encourage group work, research, and student creativity. Divided into groups, they will delve into different aspects of the Oktoberfest in Blumenau, such as its traditions, typical food, costumes, dances, and the economic impact on the city. This multifaceted approach will allow them to develop research skills, gain a deeper understanding of Germanic culture and learn to work collaboratively, respecting collaborative way, respecting the diverse perspectives and contributions of each member of the group.

Creativity will also be a key element in the project, as the students will be challenged to create a captivating and informative script for the podcast. The task of transforming complex information into accessible and engaging content will require them to develop their oral and written communication oral and written communication skills. By exploring the language of audio, students will increase their communicative skills, learning to use intonation, rhythm, and sound effects to create an engaging experience for listeners.

In addition, the project also aims to foster interest in culture and traditions, both of Brazil and other parts of the world. Through immersion in German culture and the exchange of information and experiences during the project, the students will be able to see how different cultures enrich and shape a community's identity.

The stages of the project are carefully planned to ensure maximum educational experience. In the initial phase, students will be introduced to the Oktoberfest theme and German culture. Research will be encouraged and guided, with access to various sources of information, including books, articles, videos, and interviews with members of the Blumenau community.



On the basis of the information gathered, the groups will start working on drawing up script. This stage is essential, as it will be the basis for creating the podcast. The students will be encouraged to use clear and attractive language, making the content accessible to the general public. In addition, the structure of the podcast will be carefully planned, dividing the episodes into interesting and relevant topics for the audience.

The next phase of the project will involve recording the podcast episodes. The students will have the opportunity to use recording equipment available at school or even in their homes. This flexible approach will allow all students to participate in the production process, regardless of the resources available.

After the recordings, the students will learn basic audio editing techniques to make the podcast more professional and attractive. Adding soundtracks, adjusting volumes, and cutting out unnecessary pauses will guarantee a quality product, capable of captivating and entertaining the audience.

Finally, the episodes will be reviewed and approved by the teachers involved in the project before being published. The episodes will be published on a podcast hosting platform or on the school website.

The importance of sharing the podcast on social networks and inviting friends and family to listen will also be emphasized, seeking to broaden the reach of the production and greater connection between the school and the community.

After the podcast has been published, there will be a classroom discussion about the creation process, the students' experiences during the project and what they learned about German culture and the Oktoberfest festival in Blumenau. This stage of reflection will allow the students to express their opinions, share learnings and appreciate the results of their teamwork.

The project will provide a unique opportunity for students to explore and share information about this iconic German tradition in Blumenau. Through the podcast, they will develop research, communication and teamwork skills, while connecting with their cultural roots and valuing Brazil's ethnic diversity. At the same time, the initiative will encourage interest in culture and traditions, enriching the educational experience and strengthening ties between the school and the community.

CONSIDERATIONS

This work focused on proposing transmedia approaches in Blumenau, with a special focus on the city's culture. To achieve this goal a literature review was carried out that explored key concepts in the area, the proposals to be discussed. Two distinct proposals emerged as a result of this process, one centered on video production and the other on the creation of podcasts, both aimed at teaching cultural elements of the city.



One of the proposals outlined a tender for the production of videos that delve into the cultural and historical nuances of Blumenau. By adopting a transmedia approach, this approach, this proposal seeks to involve students in the exploration and visual representation of these aspects, allowing them to develop a deeper understanding of their cultural heritage while improving their creative and storytelling skills.

The second proposal focused on the production of podcasts as teaching vehicles for specific cultural themes related to the city, with special emphasis on the famous Oktoberfest in Blumenau. This approach not only capitalizes on the growing popularity of podcasts, but also encourages students to deepen their research, develop oral communication skills and oral communication skills and create narratives. By taking part in the local festival, students not only learn about Blumenau's culture, but also actively contribute to the celebration of their collective identity.

Studying transmedia in education takes on an importance in our digital age, in which where interconnected media and technological immersion are prevalent. The approach not only diversifies the teaching and learning process, but also captivates and involve the students, making education more relevant and meaningful in a world increasingly mediated by technology.

During the preparation of this work, several questions emerged, provoking a more in-depth reflection on the transmedia possibilities to be explored. A possible extension of this study could focus on the intersections between history and tourism in Blumenau, exploring how the transmedia approach could be applied to enrich students' understanding of the municipality's history and its relevance to local tourism. By diving into these complementary areas, we could uncover new layers of learning and enrich the educational experience even more, opening doors to greater engagement with Blumenau's culture and historical heritage.




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Teaching process in times of pandemic: A reflection on inclusive education

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ABSTRACT

This study had as its primary objective the reflection of inclusive education in an educational context of the COVID-19 pandemic, based on educational, psychosocial and humanitarian principles, valuing democratic aspects and seeking a vision of respect for diversity and equality. From this perspective, it is known that it ensures access to regular education for students with special educational needs, including those who have had their right denied for ethnic and racial reasons. Therefore, the school must adapt to be able to receive students with all types of special needs possible. The effects of the pandemic, in a sense, will always be connected to education. The pandemic has resulted in substantial and noteworthy changes. There will no longer be a distinction between in-person and remote learning. Understanding of disability must advance, but more importantly, the voice and practices of people with disabilities must be taken into account and respected so that they are able to connect the possibilities of transforming their own lives to the political, cultural, and scientific spheres based on their experiences, feelings, and meanings.

Keywords: Inclusive Education, Specialized Educational Service, Covid-19 Pandemic.

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INTRODUCTION

As of March 2020, the global educational scenario in Brazil required adaptation and the search for new educational opportunities in the face of the coronavirus pandemic, since social distancing was one of the main strategies to contain the spread of the disease (Dantas; Ferreira, 2024). Numerous challenges and obstacles are faced by special education, including the lack of resources — material, instrumental and human — and adequate training for the necessary adjustments involving the entire school community, among others. Similar to other teaching modalities, it was necessary to modify and rethink the way the proposed curriculum was conceptualized (Marcato; Fernandes, 2022). It also involved experimenting and experiencing new approaches that, despite the difficulties, showed how the family and the school could collaborate to ensure that inclusive education continued even in the face of the suspension of face-to-face activities (Alexandre, 2022).

Inclusive education is an educational action based on humanitarian principles, which values democratic aspects, expanding the vision of respect for diversity, equality, treating people as subjects of rights (Fonseca; Melo, 2019). In this perspective, it ensures access to regular education for students with special educational needs, including those who have had their right denied for ethnic and racial reasons. Therefore, the school must adapt to be able to receive students with all types of special needs possible (Peixinho; Kiefer, 2016).

Special education is a teaching modality that currently targets the following groups: students with global developmental disorders, giftedness and high abilities, as well as students with different levels of physical, intellectual, hearing and visual disabilities (Ferreira; Cruz, 2021). Therefore, the school must adapt its human and physical infrastructure by hiring specialists who can handle the wide range of scenarios that arise every day.

Therefore, this period was one of extensive difficulties in adapting to guarantee the rights to education of these groups served by the school. Based on this, this study had as its primary objective the reflection of inclusive education in an educational context of the COVID-19 pandemic. This investigative process is characterized as a bibliographic research with a qualitative methodological approach. The theoretical framework adopted is based on the dialectical-Marxist perspective that analyzes the object of study from the current conjunctural context. This work is structured as follows: The introduction brings the contextualization of the theme, as well as the justification and objective of the study. Then, the theoretical framework will be presented. And finally, I will present the final considerations, bibliographic references, appendices and annexes.



A HISTORICAL RETROSPECTIVE: EXCLUSION, INTEGRATION AND INCLUSION

"Inclusive education is a theme that, in recent decades, has gained significant space in debates around the construction of quality education for all" (Bez, 2009, p. 16). For the author, however, the discussion about inclusive education implies a reflection "on public educational policies, on the models built to address the educational phenomenon and on the difficulties and obstacles that the school institution must overcome" (ibidem, p. 16).

Only in this way will the school, in fact, become a school for everyone." Inclusive education is an educational action based on humanitarian principles, which values democratic aspects, expanding the vision of respect for diversity, equality, treating people as subjects of rights" (Cartilha, 2013). Therefore, we begin our reflection with a historical retrospective around the issue.

When researching official documents, we realized that Brazilian education in its trajectory reveals that education was for the few. Leite (2014, p. 14), in a monographic work, states that those who were part of the elite of the time were the privileged, whose objectives were to integrate and maintain themselves in economic power and in the social domain. People with disabilities were totally excluded from society. As Mazzotta (2003) points out, historically, people with disabilities were treated in the eighteenth century as people linked to mysticism and occult sciences. Society in this period was greatly influenced by religious beliefs. With this, it was believed that people who were born with a disability suffered the consequences of some erroneous attitude on the part of their family members, and could present spiritual or demonic disturbances. As a result, this century is marked by negligence, in which people with disabilities were marginalized, abandoned, and in many cases, they were led to death.

Over the years, medical scholars have begun to recognize deficiency as a pathological factor. As pointed out in a document from the Ministry of Education (Brasil, 2004, p. 10), "as knowledge in the area of medicine was built and accumulated in the history of humanity, disability came to be seen as a disease, of an incurable nature, a gradation of a smaller amplitude of mental illness". In view of this, people with disabilities and people with mental illnesses were welcomed in asylums, total institutions and residences to be treated and cared for by doctors, due to their "abnormality", thus characterizing welfare. In this regard, Sanchez says:

Special education has traditionally been organized as a specialized educational service substitute for common education, evidencing different understandings, terminologies and modalities that led to the creation of specialized institutions, special schools, based on the concept of normality/abnormality, determines forms of therapeutic clinical care strongly anchored in psychometric theses that, through diagnoses, define school practices for students with disabilities. disability (Sanchez, 2008, p.9).



In a way, there was an advance in the conception of people with disabilities at that time, but this service did not contribute to the recognition of this group in society, persisting exclusion and total segregation, always faced with preconceptions and difficulties in dealing with this public.

In Brazil, the service to people with disabilities since the time of the Empire with the creation of the Institute of Blind Boys (1854-present), Benjamin Constant Institute (IBC) and the Institute of the Deaf and Dumb (1857-current), National Institute of Education of the Deaf (INES), both in Rio de Janeiro, where care for people with disabilities began. In 1926, the Pestalozzi Institute was created, an institution specialized in serving people with mental disabilities. In 1954, the first APAE - Association of Parents and Friends of the Exceptional - was founded.

Subsequently, the actions aimed at the educational service of people with disabilities were based on the provisions established by the first Law of Guidelines and Bases of National Education (LDBEN, n°4.024/61), which pointed out the right of the "exceptional" to education, preferably within the general education system. According to Mazzota (2003, p. 68), "Law No. 4,024/61 which, reaffirming the right of the exceptional to education, indicates in its article 88 that, in order to integrate them into the community, their education should, as far as possible, fit into the general education system". Following the thought of Mazzota (2003), we can deduce that if they are unable to adapt to common education, they will be directed to special education.

Law No. 5,692/71, already in the period of the military dictatorship, ensures "special treatment" to "students who have physical or mental disabilities, those who are considerably behind the regular age of enrollment and the gifted", according to what the State Councils of Education to define. Law 5.692/71 contradicts what was indicated in article 88 of Law No. 4.024/61, making it clear that the "exceptional" can fit into the "general education system" receiving the care that would be their right (Cf. Mazzota, 2003).

According to Richardson (2009, p.146), in the "1970s, the Integration movement emerged, with the concept of normalization, expressing that the disabled should be given conditions as similar as possible to those offered in the society in which they live". The school integration movement defended the inclusion of people with disabilities in the common rooms of regular schools, questioning the segregation and isolation in which the disabled were placed in special education centers. However, due to the confusing definitions of their own concept, little was known about the teaching-learning process they followed (Santos; Velanga; Barba, 2017).

According to Oliveira (2011), in the educational process, the person with disabilities, in order to be in a regular class, should present medium or common difficulties to remain in the regular school. Sanchez also observes "that a student could be integrated, spend a lot of time isolated in the support room, or be in the regular room, but without interacting with his companions" (2005, p. 15).



Still dealing with the issue of integration, Sanchez (2005) draws attention to another aspect, related to the type of evaluation that people with disabilities would be subjected to. For the author, it can be said that these are decisions guided by a vision of special education that interprets learning difficulties exclusively from the student's deficit, which promotes injustice and stops progress in this field.

Certainly, it also conditions the placement of students in common or special schools. Mantoan (2003, p. 22) states that the integration process takes place within an educational structure within which the student is offered the opportunity to move through the school system – from the regular class to special education – in all its types of services, which would be a conception of partial insertion, because the system provides for segregated educational services. Also according to this author,

In situations of school integration, not all students with disabilities fit into regular education classes, as there is a prior selection of those who are eligible for inclusion. For these cases, the following are indicated; the individualization of school programs, adapted curricula, special assessments, reduction of educational objectives to compensate for learning difficulties. In short: the school does not change as a whole, but students have to change to adapt to the demands in situations of school integration, not all students with disabilities fit into regular education classes (2003, p. 68).

Sasaki (1997, p. 34-35), speaking about integration, says that it occurred or still occurs in three ways:

For the pure and simple inclusion of those people with disabilities who are able, by professional and personal merits, to use the physical and social spaces, as well as their programs and services, modification by society (common school, common company, common club, etc.) For the insertion of those people with disabilities who needed or need some specific adaptation in the common physical space or in the procedure of the common activity in order to be able, only then, to study, work, have leisure, in short, to live with people without disabilities. By the insertion of people with disabilities in separate environments within the general systems (Sasaki, 1997, p. 34-35).

Sasaki (1997) observed that, currently, some people use the words integration and inclusion, already in accordance with the modern terminology of the inclusion paradigm. In other words, with different meanings: integration representing "insertion of the person with disabilities prepared to live in society", and inclusion meaning "modification of society as a prerequisite for the person to carry out their development and exercise citizenship" (Sasaki, 2005, p. 22).

Before talking about inclusion and understanding this timeline about the evolution or transitions of paradigms in the struggle that the social group represented by the disabled has been waging for rights and seeking its place in society, it should be noted that throughout this period, a public policy of universal access had not yet been put into effect, the conception of "special policies" to deal with the education of "people with disabilities" remained. According to a document from the MEC:



In mid-1973, the Ministry of Education created the National Center for Special Education (CENESP), responsible for the management of special education in Brazil, which, under the aegis of integrationism, promoted educational actions aimed at people with disabilities and people with giftedness, but still configured by assistance paths and initiatives isolated from the state". (Brasil, 2010, p. 12).

It is important to emphasize that, within the emergence of social movements that claimed social equality, we have the disabled, their parents who sought rights and improved living conditions for this segment (Silva; Nogueira, 2024). As a reference, we have the Universal Declaration of Human Rights, of 1948 in article 85, which reports on social security protection. "Every man has the right [...] subsistence in circumstances beyond his control" and also states that "every man has the right to education" (art. XXVI). According to Mazzota:

It was mainly in Europe that the first movements for the care of the disabled, reflecting changes in the attitudes of social groups, were materialized in educational measures. Such educational measures were expanded, having been first taken to the United States and Canada and later to other countries, including Brazil" (Mazzota, 1996, p. 17).

It is in this scenario that the ideal of equal rights and education for all takes a new direction, as Melo (2011, p. 1) points out:

From the twentieth century onwards, social movements began to fight for equality for all. Little by little, the educational system sought ways to integrate students with disabilities into the regular education system. School inclusion aims to build a society for all, without taking into account differences, thus valuing human diversity, developing the principle of solidarity, thus making a society just and egalitarian.

The twentieth century was marked by the great advance of the struggles in search of equal rights and access to education for all, which represents a change in the positioning of society in which the concept of inclusion is intrinsically related to transformations in the social, cultural, technological and educational spheres, in view of both today's society and the one that is still aspired to achieve (Pereira; Saraiva, 2017; Silva Neto et al., 2018; Lisbon, 2020).

For many, the meaning of inclusive education consists only of the enrollment of these students in regular school, but, according to the Federal Constitution of 1988, this change in the school environment means granting education to all students, both those found in regular classes and students with special educational needs (Mendes, 2019)

These constitutional provisions alone would be enough for no one to deny any person with disabilities access to the same classroom as children or adolescents without disabilities, but it is also worth highlighting the provisions of the **Inter-American Convention** on the Elimination of All Forms of Discrimination against Persons with Disabilities, signed in Guatemala, ratified by Brazil and promulgated by Decree No. 3,956/2001 (BRAZIL, 2005).



INCLUSIVE EDUCATION IN TIMES OF PANDEMIC

Brazil has had difficulties in putting into practice the inclusion of students with diseases, disabilities and syndromes, as well as in making the necessary accommodations for this inclusion. It is evident that improvements are needed for a number of issues, including: inadequate school transportation, which results in students missing school days; dilapidated physical structures of institutions, which causes school dropout; and a scarcity of technology and internet access for all students, which hinders access to information and equal access to culture, among many other imperative adjustments (Fernandes, 2002).

In addition to the fact mentioned above, the difficulties associated with inclusion were further intensified in 2020 with the introduction of the SARS-COV-2 virus in Brazil. Because of this fact, government authorities and the Ministry of Education (MEC) need to take measures to prevent the spread of the virus, which is transmitted by physical contact. The main step that was implemented was the implementation of remote learning to extend the school year. However, the actions taken highlighted the isolation of children with disabilities and learning challenges and presented new concerns to the educational scenario (Ferrando; Rosário, 2022).

Public schools have been forced to quickly adapt to the remote learning environment since the pandemic began in Brazil in March 2020. As a result of this new educational environment, the MEC did not grant any project to help students with disabilities; Instead, schools should allocate initiatives and projects to make accommodations for these students in this new environment in which global education finds itself. For this reason, and because everything happened so fast, little was done to effectively implement the right to education for all without differences, putting the social and cognitive development of this group at risk in the process (Marinho, 2023).

The loss of social connection, noise, physical contact, bodily movement, interactions, socialization processes, and more fruitful community engagement has become apparent to us as a result of school closures. This absence indicates that the social role of the institution — particularly its importance for human development — is recognized. As long as this is recognized, schools are established as a community of political and educational resistance against an ideology that seeks to undermine the creation of knowledge, especially in the human sciences (Souza; Daianez, 2020).

Students should be included in the creation of instructional materials. Report cards written in their native language should be distributed to students so that they and their families are aware of the circumstances they are in and how to avoid contracting the virus. During this time, it is crucial to regularly assess the target audience for special education. In addition, there needs to be a direct line of communication with the family based on each individual's needs, allowing for brief periods of one-on-one mentoring (Cury et al., 2020).



A crucial component is communication between the home, the school and the children. Since there is no direct communication between the instructor and the student, it becomes problematic when the teacher does not receive feedback from the families. This is because it is one of the few methods to observe the results (Bezerra; Rue; Silva, 2020).

From this perspective, the study by Fanchinetti, Spinazola and Carneiro (2021), in relation to the pandemic and the challenge of special and inclusive education, resulted in a compilation of pedagogical strategies and practices in the context of remote teaching, formulated from the reports of experiences of education professionals, as can be seen in Chart 1:

Chart 1 - Pedagogical strategies and practices in the context of remote teaching

Categories	Description
Category 1: Establishment of links	The basis of the ongoing activities was to build relationships with the students and, for this to happen, it was necessary to determine the technical resources available to maintain contact with the students and/or guardians. Although WhatsApp groups have been established, certain problems have been found and fixed over time.
Category 2: readaptation of the curriculum	The curriculum had to be adjusted to maintain the flow of activities. This involved striking a balance between engagement—which kept the student interested and engaged in the remote teaching effort or suggestion—and ongoing management, which confirmed how often the student participated. The environment and the interactions of the students with their parents and/or guardians were taken into account when designing the activities of social, conceptual and practical domain. The following tactics were employed: telephone calls to establish communication and obtain teaching materials; exercises and printed resources in the educational unit; interactions and transmission of activities via WhatsApp.
Category 3: diversification of methods	Activities have been created in a variety of ways that have led to the widespread use of remote learning with synchronous (teachers and students participate online at the same time and place) and asynchronous (students complete activities during class but are not online at that time); Both types of activities are connected to various platforms and tangible resources. The creation of a workbook with daily tasks was an attempt to provide information that was easily accessible, allowing everyone to contribute to the content. The workbook was printed by the school, and parents and guardians picked it up in person at school or sent it home.
Category 4: partnership with families	Anxieties for family and school were evident in the use of remote instruction. However, instructors' evaluations of this collaboration are favorable. When contemplating the routines and realities of the family and putting themselves in their shoes, teachers need flexibility and empathy, particularly when working with students who are the target audience of special education (PAEE).

Source: Adapted from Fachinetti, Spinazola and Carneiro (2021)

Cury et al. (2020) state that the pandemic disrupted daily routines and exposed social, educational, and technological disparities in access to information. To create inclusive distance education, solutions to school closures have been explored.

Simões (2020) draws attention to the challenge that deaf students have in "fitting in" into this emergency remote learning environment. They were the most impacted in the author's research



because they did not have access to technology. The social, linguistic and cognitive conditions of these students were not further assessed. These students were "made" to fulfill this new style of instruction.

Fachinetti, Spinazola, and Carneiro (2021) address the challenges associated with special education, including inadequate teacher training, shortages of material, equipment, and human resources, and these issues provide a foundation for improvements involving the entire school community. Due to the interruption of face-to-face classes, inclusive special education has to adapt, as well as the rest of the student body, to reach the school and the family.

FINAL CONSIDERATIONS

Parents/guardians, government, schools, and teachers must consider that universal and equal education must ensure an inclusive education system at all levels so that everyone can develop their skills according to their characteristics and learning needs, whether in face-to-face classes or, in times of pandemic, online classes.

As a result, the school has full responsibility to organize inclusive activities that offer these students equal opportunities, in collaboration with its faculty. This is due to the importance of collaboration with the SEA instructor, a crucial expert in this process.

The effects of the pandemic, in a sense, will always be connected to education. The pandemic has resulted in substantial and noteworthy changes. There will no longer be a distinction between in-person and remote learning. Consequently, it is critical to take into account the student's unique needs for inclusive education. Instead of having "one school" for every student, the goal is to give equitable access to high-quality education, where the uniqueness of each person is recognized and recognized.

Understanding of disability must advance, but more importantly, the voice and practices of people with disabilities must be taken into account and respected so that they are able to connect the possibilities of transforming their own lives to the political, cultural, and scientific spheres based on their experiences, feelings, and meanings. This will allow them to affect the changing lives of those who have not yet had the chance to confront their normalcy. More research on this era and its connections to school inclusion is therefore needed.



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Consequences of strikes on the professional and personal lives of teachers

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ABSTRACT

This report aims to present the results of the elaboration of a study instrument – a questionnaire – aimed at investigating the impact of strikes on the lives of teachers. Strikes, as a form of protest used by workers to demand better working conditions, fairer wages and career progression, have a significant impact on the lives of teachers, affecting not only their remuneration, but also their emotional and psychological well-being.

Keywords: Strikes, Teachers' lives, Working conditions.

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INTRODUCTION

This report aims to present the results of the elaboration of a study instrument – a questionnaire – aimed at investigating the impact of strikes on the lives of teachers. Strikes, as a form of protest used by workers to demand better working conditions, fairer wages and career progression, have a significant impact on the lives of teachers, affecting not only their remuneration, but also their emotional and psychological well-being.

Variation in questionnaire responses is anticipated, as they may reflect each participant's individual perspective and experience. Some may consider the strike as the only effective strategy to draw attention to teachers' rights and promote substantial changes in the education system. On the other hand, others may believe that there are more efficient alternative methods to solve such issues.

In this report, the steps followed for the preparation of the questionnaire will be detailed, which will be applied to teachers who have or have not participated in the strikes. The aim is to gather data that will allow a comprehensive understanding of how strikes affect the lives of teachers, both individually and collectively.

The study aims to develop solutions to improve the situation of these professionals who are essential to society, especially during periods of strike. To this end, the questionnaire was carefully designed to address various dimensions of the impact of strikes, from financial to emotional and psychological aspects.

It is hoped that the data collected will provide valuable insights into the consequences of strikes on teachers' lives, allowing for the formulation of more effective strategies to address the challenges faced by these professionals during strikes.

The construction of a pool of items is a widely used strategy in the elaboration of questionnaires for data collection. The quality of the items inserted in the pool is decisive for the final quality of the questionnaire.

CRITICAL ASPECTS IN ITEM POOL CONSTRUCTION

VALIDITY AND RELIABILITY

In building an item pool to investigate the impact of strikes on teachers' lives, it is essential to ensure the validity and reliability of the items. Validity refers to the ability of the questions to accurately measure the phenomenon in question, in this case, the impact of strikes. Reliability refers to the consistency of measurements, ensuring that items produce stable and replicable results.

RELEVANCE OF THE ITEMS

The items included in the pool must be relevant and meaningful to understanding the impact of strikes. The questions must address fundamental aspects and be directly related to the topic



investigated. The relevance of the items contributes to obtaining pertinent and useful data for the analysis.

CLARITY AND OBJECTIVITY

It is crucial that the items are formulated in a clear and objective manner, avoiding ambiguities and possible misinterpretations. The clarity of the questions makes it easier for respondents to understand, increasing the accuracy of the answers and the quality of the data collected.

PROCESS OF SELECTION AND VALIDATION OF ITEMS

After the preparation of the pool of items, a rigorous selection and validation process is required. This step involves critical analysis of the items to ensure that only the most effective and relevant ones are included in the final questionnaire. The validation process can include expert reviews and pilot testing.

Questionnaire Tests

Before final implementation, the questionnaire should be tested in a representative group to assess the feasibility, comprehensibility and effectiveness of the questions. This phase allows for the identification of possible problems and the making of necessary adjustments and improvements, ensuring that the final questionnaire is robust and effective.

ADDITIONAL STRATEGIES TO ENSURE QUALITY

Building a pool of items is a crucial technique, but not enough on its The authors to ensure the quality of a questionnaire. It is essential to adopt other strategies, such as:

- **Clear definition of the research objectives:** Establish precisely what is intended to be investigated with the questionnaire.
- **Precise Target Definition:** Properly identify and characterize potential respondents.
- **Adoption of appropriate sampling techniques:** Ensure that the sample of respondents is representative of the population studied.
- **Careful analysis of the data collected:** Use appropriate statistical methods for the interpretation of the data.

The construction of a pool of items, accompanied by rigorous selection and validation, is essential for the preparation of a quality questionnaire. Combined with other methodological strategies, this approach allows the collection of accurate and relevant data, essential for scientific research on the impact of strikes on teachers' lives.

Table 1 Strategies adopted for the construction of an item pool

Strategies adopted for building an item pool		Applied
Literature review	Definition of concepts	Ö
	Theoretical models	Ö
	Evaluation theories	
Instrument analysis	Strengths/Weaknesses	Ö
	Limitations	Ö
	Instruments worth adapting	
Interview	Individual	Ö
	In a group	Ö
	Specialists	Ö
	Target population	Ö

Source: The authors

CONSTRUCTION OF A POOL OF ITEMS TO ASSESS THE IMPACT OF STRIKES ON TEACHERS' LIVES

CHALLENGES IN LITERATURE REVIEW

In this research work, we faced difficulties in finding literature that provides information directly relevant to the construction of the questionnaire, specifically on the impact of strikes on the lives of teachers. Most previous studies address strikes from different perspectives, such as the teaching career, the academic performance of students and the disruptions in the functioning of families. However, the focus of our attention is the impact of the strikes on the personal and professional lives of the teachers themselves.

METHODOLOGICAL STRATEGIES

Keyword and Target Audience Selection

We chose to extract relevant keywords from the existing literature and define the target audience as the teaching class. We used group and individual interviews as a methodological strategy for collecting preliminary data.

Analysis of Existing Assessment Instruments

Our research indicated the absence of specific instruments to assess the impact of strikes on teachers. We identified, however, instruments that assess related constructs, such as crisis management, political and social activism, and physical and mental well-being. These instruments can contribute to the construction of our questionnaire.

QUANTITATIVE AND QUALITATIVE EVALUATION

Statistical Instruments

To quantitatively evaluate teachers' strikes, we can use:



1. **Descriptive Analysis:** Statistical summary techniques, such as mean, standard deviation, and percentiles, to synthesize data related to strikes.
2. **Hypothesis Testing:** To verify whether the differences between variables related to strikes are statistically significant.
3. **Linear Regression:** To analyze the relationship between variables and predict the number of strike days.
4. **Time Period Analysis:** To identify trends and patterns in the data over time.

POLITICAL, ECONOMIC AND SOCIAL CONTEXTS

It is essential to complement quantitative analysis with qualitative approaches for a comprehensive understanding of the contexts in which strikes occur.

WELL-BEING ASSESSMENT INSTRUMENTS

Stress, Anxiety and Depression Scales: EADS (Anxiety, Depression and Stress Scales) and HADS (Hospital Anxiety and Depression Scale) to assess the emotional impact of strikes.

1. **Burnout Scales:** Ryff Psychological Well-Being Scale, to measure psychological well-being and burnout.
2. **PANAS:** Positive and Negative Affect Scales, to measure aspects of life satisfaction.
3. **Flourishing Measures:** Assessment of subjective well-being, positive emotions, interpersonal relationships, self-esteem, self-determination, and sense of purpose in life.
4. **Interviews and Focus Groups:** To gain detailed information on teachers' psychological well-being.
5. **Health Records:** To assess the physical and mental impact.
6. **Financial Data:** To analyze the economic impact of strikes.

GROUP AND INDIVIDUAL INTERVIEWS

We conducted group interviews (focus groups) and individual interviews with teachers, following legal and ethical procedures. The process included:

- **Invitation and Participation:** Invitation via e-mail for the face-to-face presentation of the project, with the participation of 8 teachers.
- **Authorization and Recording:** Authorization to record the session, aiming at the exact transcription of the data.
- **Group Dynamics:** Introduction with icebreaker, presentation of the participants and formulation of questions in a colloquial and structured way.

- **Content Analysis:** Faithful transcription of answers, grouping of information, elimination of exceptions and inclusion in the item pool.

The construction of a pool of items, combined with rigorous selection and validation, is essential for the elaboration of a robust questionnaire. The combined approach of quantitative and qualitative methods allows for a thorough and accurate assessment of the impact of strikes on teachers' lives. This process ensures the relevance, clarity and objectivity of the items, contributing to a solid and informed scientific investigation.

Table 2 Records obtained – Participant 1

Participante 1 - Professora 1º Ciclo, 46 anos, 25 de exercício profissional:
- Sentimento de frustração pela incerteza do que está a acontecer;
- Em termos económicos os docentes estão a perder dinheiro ao fazerem greve
- Uma sensação de pessimismo, pois há o sentimento de que não haverá mudanças na educação
- Dúvidas acerca da legalidade da imposição de serviços mínimos, em consequência disto, surge um sentimento de revolta, pois os docentes só podem faltar com atestado médico
- Divisão dentro da própria família que seja constituída por docentes (cônjuges docentes) porque enquanto um deles vai para as manifestações ao fim de semana, fica sem estar com o filhos e o outro fica sobrecarregada com todas as tarefas familiares.
- Há muita rivalidade entre sindicatos
- Sentimento de injustiça perante a oposição dos serviços mínimos pois se houver algum imprevisto e o docente falta tem de meter baixa médica obrigatoriamente.
- Parece haver mais união entre professores

Source: The authors

Table 3: Records obtained – Participant 2

Participante 2 - Professor 3ª Ciclo e secundário, 49 anos, 30 anos de profissão
- Falta de perspetiva de futuro, de carreira, de valorização do trabalho, de qualidade de vida e de condições de trabalho. O mesmo que é essencial a qualquer outra atividade profissional
- Falta de valorização como pessoa e sentimento de insuficiência e até de culpa.
- Descreditação nas instituições e no estado. Nada muda e ninguém quer saber nem da educação nem de quem educa.
- Esta greve faz-me sentir que estou num buraco e não sei se consigo sair dele. Já estou de atestado há dois meses e não está fácil. O meu corpo não aguentou mais.
- Muitos dos meus colegas abaixo dos 50 ponderam mudar de profissão, aplicando os conhecimentos a outras áreas (empresarial, marketing, programação, etc)
- Talvez invista em formação noutra área para estar preparado para o mundo de trabalho sem ser docência
- A minha companheira é mais nova do que eu 12 anos e está com a carreira feita. Devia ter seguido medicina.
- É muito mau quando olhamos para o lado e colegas que não fazem nada ganham mais 400.00€ que eu e depois, para a opinião publica, somos todos iguais.

Source: The authors

After a content analysis of all the contributions, the main areas were identified:

Table 4: Top Domains Found

Fonte de informação	Informação Recolhida
Revisão da literatura	Palavras-Chave: Greve dos Professores; Impacto das Greves; Relação Professor-Aluno; Ansiedade, Stress, Depressão
Análise de instrumentos existentes	Escalas de Stress; Escalas de Ansiedade e Depressão: Escalas de Bournout; Questionários de bem-estar;
Entrevistas	Frequência de participação em greves; Opinião sobre as greves; Perda financeira; Sobrecarga de trabalho; Saúde; Impacto na Qualidade do ensino; Relação com os alunos e colegas; Participação em atividades interdisciplinares; Impacto na carreira; Perspectivas para o futuro.

Source: The authors

RULES FOR THE DRAFTING OF ITEMS

According to Hill and Hill (1998), the rules that must be followed are: the use of a simple syntax, avoiding ambiguity, using short sentences, neutral items, avoiding persuasive information and avoiding the use of multiple items. So, the rules for the writing of items are essential to ensure the quality and effectiveness of the questionnaires and assessments. However, it is important to note that the rules are not universal and may vary depending on the type of assessment and the purpose of the questionnaire. Based on the author Silva (2021), she adds that, to this set of rules, it is important to use declarative or interrogative phrases, the 3 C's (clear, concise, concrete), and that allow an easy understanding of the items and not to use slang (Silva, 2021).

Moreira (2004) considers that the writing of items should follow some guidelines to ensure that the evaluations are fair, valid and reliable. The first guideline is the clarity and objectivity of the statement. The items must be written clearly and objectively, avoiding ambiguities or words that may generate doubts in the participants. The statement should be brief and concise, without unnecessary or confusing information. The second guideline is the relevance of the content. The items must be prepared based on the previously defined objectives. The items should address the contents that we intend to evaluate and that are relevant to the investigation. The third guideline is the diversity of items. The items must cover different levels. In addition, the items must be distributed in a balanced way among the different contents and objectives. The fourth guideline is the objectivity of the items. The items should be formulated in such a way that there are no ambiguities or subjectivities in the interpretation of the answers by the researchers. The answers must be clear and objective, allowing them to be easily identified as correct or incorrect, if applicable. Finally, the fifth guideline is the adequacy of the format of the items. Items can be presented in different formats, such as multiple-choice, true or false, essay questions, among others. The format must be chosen according to the objectives that you want to evaluate.



In this work, we tried to follow the above-mentioned guidelines so that the questions were clear and objective to avoid confusion and ambiguity. We avoid slang, slang and excessive technical language. The items were designed and written with a level of difficulty appropriate to the target audience and aligned with the previously defined objectives. In this way, we avoid irrelevant questions or questions that are out of focus of the content we intend to evaluate. At the risk of the questionnaire becoming too long, the items included a variety of possible question/answer types to measure different categories or points of interest, avoiding the inclusion of options that could be offensive or discriminatory. It was not easy, and it was necessary to make some adjustments when the cognitive analysis of the questionnaire, but we believe that we managed to ensure that all items were clear, precise and effective, free of interpretation, grammatical and spelling errors. In summary, the rules for the writing of items are important to ensure that the evaluations are fair, accurate and effective, but these rules must be adapted to meet the specific needs of the questionnaire and the target audience, in order to ensure the quality and effectiveness of the items and the questionnaire as a whole and we believe we have succeeded. It is important, however, to admit that it was very difficult, at first, not to bring our previous knowledge to the items and, repeatedly, it was necessary to reformulate to ensure the neutrality of the items. Also, at times, we made conscious choices to break rules and write items that were a little long, but that were necessary for a better understanding of them. A perfect writing of the items requires a lot of knowledge, training and practice and may even be impossible to achieve, but a good practice such as a careful analysis of the items through a pilot study (small-scale, with a small sample), we can evaluate how the participants react to the items and how they interpret them, thus avoiding misinterpretations. In this regard, we will return to considerations later on, in the chapter on the cognitive analysis of the questionnaire.

ANSWER OPTIONS

Moreira (2004) presents some answer options in questionnaires, namely: Likert scale: It is a scale that consists of a series of statements, in which the participant must indicate his degree of agreement or disagreement, using a numerical scale ranging from 1 to 5 (or 1 to 7). For example: "In general, I am satisfied with my work." Answer options: strongly disagree, partially disagree, neither agree nor disagree, partially agree, strongly agree. Category Scale: It is a scale that consists of a series of mutually exclusive categories, in which the participant must select the one that best applies to his or her situation. For example: "What is your marital status?" Answer options: single, married, divorced, widowed, other. Visual analogue scale: It is a scale that consists of a horizontal line of fixed length, in which the participant must indicate his answer through a marking. For example: "How do you rate the pain you are experiencing?" Answer options: the line goes from "no pain" to "the worst pain imaginable". Frequency scale: It is a scale that consists of a series of statements



about how often the participant performs a certain activity or experiences a certain feeling, in which the participant must select the option that best applies to their situation. For example: "How often do you feel distressed?" Answer options: never, rarely, sometimes, often, always. The choice of the most appropriate scale will depend on the objective of the study and the type of information you want to obtain.

The answer options of a questionnaire can be classified as open-ended answers, closed-ended answers, general or tailor's answers (Silva, 2021). Open-ended questions, which allow participants to answer freely, without predetermined answer options. This allows for a greater variety of responses and can generate valuable insights for the survey. However, open-ended questions can also present some challenges, such as the difficulty in analyzing and categorizing the answers and the possibility of obtaining vague or irrelevant answers. To minimize these problems, the authors recommend the use of clear and specific instructions to guide participants in the elaboration of the answers, as well as the use of content analysis techniques for the categorization and interpretation of the answers obtained. Closed-ended questions, on the other hand, refer to a type of question that offers participants a predetermined list of answer options to choose from. These options can include binary choices, such as "yes" or "no," or various options, such as "very satisfied," "satisfied," "neutral," "dissatisfied," and "very dissatisfied." Closed-response options can be useful in market research, as they allow researchers to easily quantify and analyze participants' responses. However, closed-response options also have some limitations. For example, they may not capture the full complexity of the attendee's experience, or they may not allow the attendee to provide a response that reflects their full opinion. In addition, closed-ended answer options may be affected by the wording of the question and the selection of available answer options. Closed-ended response options are a common data collection technique in market research, but they must be used carefully to ensure that questions are phrased correctly and that answer options are carefully selected to avoid bias or incomplete responses. The general answers can be used for each of the questions, in a set of questions, on any topic studied. On the other hand, tailor answers are constructed according to the question formulated and only apply to that specific question and the target population (Hill & Hill, 1998).

Based on the authors Hill and Hill (1998), scales can be nominal, ordinal, interval and ratio. Hill and Hill (1998) state that nominal scales are those that only allow the categorization of data into different groups or categories, without imposing any type of order or hierarchy among them. Respondents' responses are grouped into categories for analysis purposes. They are considered the lowest level of data measurement and do not allow for mathematical calculations such as means or standard deviations. Ordinal scales are those that allow you to classify objects or events in a logical or sequential order, but do not indicate the magnitude of the difference between the categories. That is, there is no information on the distance or the absolute difference between the categories. A

common example of an ordinal scale is the Likert scale, which is widely used in opinion and satisfaction surveys. On this scale, the answers are classified in a logical sequence of agreement or disagreement with statements, such as "strongly disagree", "partially disagree", "neutral", "partially agree" and "strongly agree". Although this scale allows you to classify the answers in a logical order, it does not inform the magnitude of the difference between each of the categories. They measure the intensity of the respondent's response and allow the researcher to compare the differences between the responses.

Interval scales are characterized by the equality of units of measurement, that is, the difference between two points on the scale is always the same. For example, on a rating scale of 1 to 10, the difference between 1 and 2 is the same as between 8 and 9. Interval scales are useful for measuring participants' attitudes, opinions, and perceptions towards a particular topic. They allow the investigator to perform more accurate statistical analyses and provide more robust quantitative data for the interpretation of the results.

Ratio scales are a type of measurement scale in which values are expressed in numerical and continuous terms, with an absolute zero point indicating the absence of the measured characteristic.

Table 5: Response Options

Tipos de respostas:	Exemplos
Fechadas	Participei de uma greve de professores nos últimos 12 meses: Sim Não
Abertas	Tenho alguma sugestão para melhorar a eficácia das greves de professores como forma de protesto
Respostas Mistas	Não
Gerais	Como acredito que as greves afetaram a minha relação com a escola ou instituição em que trabalho? Melhorou significativamente Melhorou um pouco Não afetou muito Piorou um pouco Piorou significativamente
	Como as greves de professores afetaram o meu trabalho? Tive de cancelar aulas Tive de trabalhar mais horas para compensar as aulas perdidas Tive de adaptar o meu plano de ensino Não afetou meu trabalho

Source: The authors

Table 6: Response scales

Estrutura da escala	Exemplos:
<i>O que não é hierarquizável (F-M) (Sim-Não)</i>	Participei de uma greve de professores nos últimos 12 meses: Sim Não
Hierarquizável, do menor para o maior, escalas tipo Likert são consideradas como um contínuo	Como acredito que as greves afetaram a minha relação com a escola ou instituição em que trabalho? Melhorou significativamente Melhorou um pouco Não afetou muito Piorou um pouco Piorou significativamente
Permitem um somatório	Acredito que as greves tiveram um impacto na educação dos alunos Impacto positivo Impacto negativo Não teve impacto significativo
Maior ou menos satisfação.	Acredito que as greves foram um meio eficaz de alcançar mudanças desejadas. Sim, foram muito eficazes Sim, foram um pouco eficazes Não foram muito eficazes Não foram eficazes de forma alguma

Source: The authors



In our work, as there is a need to address different domains of the Teacher's person and, necessarily, to include information from different perspectives in these domains, it was necessary to adapt our questionnaire to different types of responses. We have open answers, to enable the study of new answers, which bring relevant contributions, with the limitation that we cannot study many interviews in depth, nor generalize results. We have closed answers where we only find what we are looking for, since we already have some knowledge about the topic and allow an unlimited number of people we study. Some mixed responses as well, such as "Another reason, please specify." We also included general answers, which include satisfaction scales and tailor's answers, which as we have already mentioned, are answer options that can only be used for that item/question, knowing that they are more difficult to follow and that they give a long look to the questionnaire, but, after pondering, we understood that we really had to gain from this type of answers.

Regarding the scales used, the reasoning was the same: we used nominal scales, for categories that are not hierarchical; ordinal, for hierarchical categories, from more to less or from less to more, greater or less satisfaction; Scalars, false continuum, allow a sum in the subsequent treatment of statistical data in SPSS, in the example of satisfaction responses, which will be classified from 1 to 5, from lowest satisfaction to highest, using the Likert scale. We do not use percentage scales assigned by the participants, as the analysis would be very complex, since as people we are very differentiated, nor do we use forced choice scales, or analogue visual scales, for the same reasons.

INSTRUCTIONS

Hill & Hill (2022) argues that the questionnaire instructions should begin with an introduction with a cordial greeting and a thank you for participating in the study. Then briefly explain the purpose of the questionnaire, as it is important that participants know the reason and objectives of their participation and how their answers will be used. This is followed by providing clear and simple instructions for how participants should answer the quiz questions, including information on how to mark responses, how long it takes to complete the quiz, and whether there is a time limit to complete it. Then, ensure confidentiality and privacy by explaining to participants that their answers will be kept confidential and that they will not be shared with third parties, except in circumstances where required by law. We also inform participants about how their data will be stored and protected, that they have the right to withdraw from the study at any time without penalties or negative consequences. Provide contact information for the investigators in charge of the study, in case participants have any questions or concerns. Finally, conclude the instructions by thanking the participants again for their participation in the study and encouraging them to answer the questions truthfully and honestly.

Table 7: Instructions Construction Rules

Instruções	Sugestões
Objetivo do questionário	Este questionário tem por objetivo avaliar o impacto do movimento de greve na vida dos professores.
Apelo à sinceridade	Não se trata de um teste, pelo que não há repostas certas ou erradas. Queremos mesmo saber o que pensa
Sublinhar a importância de responder+ Enquadramento temporal/contextual	"A sua participação é muito importante para ajudar a compreender como as greves afetam os professores, individualmente e como um todo, e desenvolver soluções para melhorar a situação dos professores em momentos de greve"
Pedido para leitura atenta	"Por favor, faça uma leitura atenta das questões"
Como responder	"responda da forma que melhor reflita aquilo que pensa e sente" e não incluímos questões logisticas porque o nível de instrução dos participantes dispensa instruções gráficas
Como modificar/corrigir respostas	Considerando que o questionário é para professores, poderia ser mal interpretado incluir este ponto
Pedido para verificar se não ficaram perguntas por	Como pretendemos aplicar o instrumento de forma digital, as opções de resposta vão salvaguardar esta situação
Agradecimento	"Agradecemos desde já o tempo dedicado à participação nesta investigação."

Source: The authors

We have prepared our instructions, meeting these guidelines, with the main focus on appealing to participation in a persuasive way and at the same time demonstrating sensitivity and clarifying that this participation is fundamental so that we can develop a respectful and useful tool to evaluate something that no one is trying to talk about, which is the fact that teachers suffer, for valid reasons and for causes they believe in. More than having the instructions written correctly, we intend to be persuasive, respectful and that possible participants recognize sensitivity on our part, as researchers, showing that this study is really important for us so that we can bring a more holistic perspective of teachers to this topic.

GRAPHIC ORGANIZATION/LAYOUT

The graphic organization or layout of a questionnaire should be carefully planned and designed to make the participants' experience more enjoyable and efficient. Moreira (2004) recommends that a legible font of adequate size be used to ensure that the questions and answer options are clearly visible. We must organize the questionnaire in a logical way, starting with simpler questions and progressively addressing more complex questions. Use white space and adequate spacing between questions and answer choices to make the questionnaire more visually appealing. A consistent format for all questions also helps, such as always using the same order of response (for example, always starting with "significantly improved" and ending with "significantly worsened"). We should avoid using too many colors and images, which can distract participants and make it difficult to read the questionnaire.

According to Hill & Hill (2002), the graphic organization or layout of a questionnaire should allow the questionnaire to be easy to read and understand, without unnecessary graphic or visual elements that may distract or confuse the participants, using coherence and consistency from



beginning to end (color, type of font, arrangement of items, etc.), as well as having a clear and visible header, identifying the name of the study, the purpose of the questionnaire, and other relevant information. The questions should be formulated in a clear and direct way, avoiding words that may make it difficult to understand, and organized in a logical and coherent way, following a natural sequence of subjects and avoiding abrupt changes in theme. The questionnaire should also have enough space for answers, avoiding participants having to write in tight or small spaces.

Table 8: Graphic layout – Layout

Layout	Sim
Boa apresentação	√
Disposição lógica e coerente	√
Grelhas	√
Quadrados ou círculos para assinalar as respostas	√
Linhas ou retângulos a separar os itens	
Densidade de apresentação gráfica	√
Facilidade de preenchimento	√
Organização dos itens	√
Legibilidade do questionário: tipo e tamanho de letra	√
Legibilidade do questionário: tipos especiais	
Organização lógica do questionário	√
Esforço mental elevado	
Envolve conhecimentos que possam não dominar	
Refere-se a temas sensíveis	√
Grau de complexidade vai aumentando	

Source: The authors

From all this, we understand that the main idea we should take away is that a well-organized and visually appealing graphic organization/layout can increase the response rate and the quality of the data collected in any questionnaire. So, in our work in particular, and because we tried to address different dimensions of the theme of the study, there were all these concerns, but in particular, there was the need to organize the different dimensions by chapters and within these to number the questions, to give the illusion that the questionnaire is not that long and, also, to facilitate the answers to the participants by preventing them from forgetting to answer a question. For us as researchers, it also makes it easier to evaluate each questionnaire and process the data collected. Our graphic organization/layout was tested in the paper-pencil version and in the electronic version (using the Google forms program).

COGNITIVE ANALYSIS OF THE QUESTIONNAIRE

"In all types of questionnaire it is very useful to ask at least one person, and preferably two or three, to read it and give their opinion on the clarity and understanding of the questionnaire. (Hill & Hill, 2000, p. 166). These authors emphasize that cognitive analysis can help ensure that questions are clear, accurate, and relevant to all participants, resulting in more accurate and reliable answers. Cognitive analysis is a valuable tool in the evaluation of questionnaires, and "helps to eliminate unnecessary questions as well as to formulate more relevant questions (Hill & Hill, 2000, p. 76),



allowing researchers to better understand how participants interpret and respond to questions. According to Moreira (2003), cognitive analysis involves the application of qualitative techniques, such as cognitive interviews, to obtain information about what the participants think when they read the questions and how they interpret the items. Cognitive interviews are conducted with a small number of participants who are asked to "think out loud" as they answer the questionnaire. The results of the cognitive analysis are fundamental for the validity and reliability of the questionnaire.

We asked two people, specialists because teachers, to read the questionnaire so that we could check how they interpreted the questions, if there were sensitive issues and, in general, how they interpreted the questionnaire as a whole. The results of this cognitive analysis showed that, in general, the questions were well interpreted and that the length of the questionnaire was not a problem, since everyone thought it was important to address all aspects taken into account in it, and that this would not be possible as effectively with a smaller questionnaire. However, we felt the need to reformulate two questions, in two domains, as these are more sensitive aspects of the personal and professional lives of teachers and that generated less consensus. We had to consider whether to simply remove the questions or to reformulate them, based on the relevance of the information they could bring to the study. Because we consider these fundamental constructs for the interpretation of the emotional state of teachers, as well as if we want to repeat this questionnaire in the future, so that we can have terms of comparison about them because they are more subjective, we decided to reformulate:

PARTICIPATION IN EXTRACURRICULAR ACTIVITIES:

- 1- The strikes affected my working conditions
 - Significantly improved
 - It improved a little
 - It didn't affect much
 - It got a little worse
 - It has worsened significantly
- 2- The strikes affected my participation in interdisciplinary activities
 - Significantly improved
 - It improved a little
 - It didn't affect much
 - It got a little worse
 - It has worsened significantly
- 3- The strikes affected my participation in activities with students outside of school:
 - Significantly improved



- It improved a little
- It didn't affect much
- It got a little worse
- It has worsened significantly

We reformulate:

Extracurricular activities:

1- The strikes affected my working conditions

- Significantly improved
- It improved a little
- It didn't affect much
- It got a little worse
- It has worsened significantly
- Not applicable

2- The strikes affected my participation in interdisciplinary activities

- Significantly improved
- It improved a little
- It didn't affect much
- It got a little worse
- It has worsened significantly
- Not applicable

3- The strikes affected my participation in activities with students outside of school:

Significantly improved

- It improved a little
- It didn't affect much
- It got a little worse
- It has worsened significantly
- Not applicable

Prospects for the future:

Do I believe that participation in strikes had a positive or negative impact on my image as a teacher?

- Positive impact
- Negative impact
- Had no significant impact

We reformulate:



I believe that participation in strikes had an impact on my image as a teacher

- Positive impact
- Negative impact
- Had no significant impact
- I don't value this aspect

PSYCHOMETRIC AND CLINIMETRIC STUDY

PSYCHOMETRIC QUALITIES

Study of fidelity

An instrument's fidelity refers to its ability to produce consistent and reliable results over time and in different situations. This means that when a test is applied to the same person or group on different occasions, or when different evaluators evaluate the same person or group with the same instrument or with equivalent sets of items, the results obtained must be similar. This consistency is measured by means of a correlation coefficient. According to Ribeiro (2010), to assess the fidelity of a questionnaire, one of the options is to use the test-retest reliability coefficient. This coefficient is calculated from the administration of the same questionnaire twice, with a time interval between them, for a group of participants. Then, the correlation between the scores obtained in the two applications of the questionnaire is calculated. According to the author, "The reference value considered good is $r = 0.80$, although values as low as $r = 0.60$ can be accepted" (Ribeiro, 2010, p.100).

Thus, it is suggested that, ideally, to assess the fidelity of a questionnaire on the impact of strikes on the lives of teachers, participants representative of the population of interest should be selected, applying the questionnaire twice, with an appropriate time interval, and calculating the test-retest reliability coefficient. If the coefficient obtained is equal to or greater than 0.70, it can be considered that the questionnaire already has a good fidelity.

Fidelity evaluates the rigor of the measure, which means that it is in our interest to ensure that the instrument has temporal stability. If we evaluate the teachers today and in a week or two we evaluate them again, it is not expected that there will be very disparate results. We expect stable results, or, if not, our instrument is not very stable. So, with the test-retest we can check if our instrument has temporal stability, otherwise it means that it is mobile and has no rigor. If we have a very broad instrument, it means that it is not very strict in measure. If we apply the test today and people are very worn out and we apply the same at the end of the week and they are no longer there, it will be strange. Test-retest makes perfect sense to show that there is consistency in the answers, that people are not responding randomly, that it is rigorous, and on the other hand that it is stable in time, it is a measure of rigor.



Cronbach's alpha is a measure of internal consistency and theoretically it also shows us if we are evaluating rigorously, because if we are studying facets of a construct, they are supposed to be appropriate. It will appear as a measure of fidelity, of the measure's accuracy, as well as of validity, which verifies whether the measure rigorously evaluates what we intend to evaluate.

In our work, to assess fidelity, we opted for two measures: Cronbach's alpha, and this alpha can even be calculated for an instrument X and for our subscales to check if there is any item that refers to a subscale and does not belong exactly to that domain; Along with the test-retest measure, since there is not exactly the effect of learning, it means that participants will not look for right or wrong answers, on Google for example, and so we can test them in two moments. We then understand that the ideal would be to combine the two measurements, Cronbach's Alpha and the test-retest.

We discard other measures of fidelity evaluation, as we do not consider them valid or of added value to our work, namely:

Regulator fidelity: it didn't seem correct to us either, since this measure allows us to evaluate above all fidelity in the observation grids and there are no doubts here. If you have an evaluator and another checking results, for one and the other the procedure will be the same, for example if the cross is not in the right space, both will consider the answer null, there is no room for interpretation.

Alternative ways: we are not going to apply, since it takes so much work to create an instrument and use other instruments just to ensure that ours is stable in time, it makes no sense, even more so because there is no learning effect here, it is not an instrument of knowledge.

Split-half: it was only justified if our instrument was very large. What would be done would be to ask the computer to randomly separate the instrument into two large groups and calculate the alpha for each one. If there was a huge consistency, in doing this, the same would be demonstrated in these analyses. Being an instrument that is not very large, opting for the split-half can even weaken the instrument.

Study of validity

According to Ribeiro (2010), the study of the validity of a questionnaire can be done through different types of validity. In the case of the questionnaire on the impact of strikes on teachers' lives, it is suggested that studies be carried out on the validity of content, criteria and constructs. For content validity, it is necessary for specialists in the subject and in the area of psychological assessment to evaluate the questionnaire in relation to its adequacy in terms of content, clarity and objectivity of the questions, as well as its relevance to the topic under study. As content validity is basically a judgment and not an exercise in objectivity, one of the ways to identify the most appropriate judgment is through the analysis of several judges who are experts in the content of the



domain under evaluation (Ribeiro, 2010, p. 102). For the validity of the criterion, it is suggested that the questionnaire be applied together with other instruments that assess aspects related to teachers' strikes, such as, for example, working time, remuneration, professional performance, among others. Validity related to a criterion indicates the efficiency of a test in predicting the behavior of an individual in a given situation (Anastasi, 1990, Ribeiro, 2010, p.103). For construct validity, it is necessary to perform a factor analysis to verify the internal structure of the questionnaire and the relationship between the different dimensions evaluated. That is, compare these tests with others that evaluate the same theme. Convergent validity refers to the extent to which the correlation of the instrument with instruments that measure the same construct is greater than the correlation with those that measure different constructs. (Herdman, Fox-Rushby, & Badia, 1998). Divergent validity refers to the extent to which the correlation of the instrument with instruments that measure different constructs is lower than the correlation with those that measure the same construct. (Herdman, Fox-Rushby, & Badia, 1998). (Ribeiro, 2010, p. 103). Thus, the proposal for the study of the validity of the questionnaire on the impact of strikes on teachers' lives consists of conducting studies of content, criterion and construct validity, according to the suggestions of Ribeiro (2010).

In a simpler way, validity can be evaluated within two major types: internal validity, when we look only at the instrument, and external validity, when we relate it to other instruments. We can, in our instrument, evaluate together with other instruments (to assess anxiety, stress, etc.) and we are hoping that the more they rate the impact of the strike in these, the more they also count on the others. We will not be evaluating exactly the same construct, but we will be evaluating constructs that coincide and will vary in the same direction. But we could also do the opposite, that is, the greater the impact of the strike on anxiety and stress levels, for example, the less well-being, and then they would vary in reverse directions, that is, we would find a negative correlation with well-being and quality of life. When we look at external validity, if the correlation we find in this case with instruments that evaluate the construct in the same sense will be a convergent external validity. We are expecting them to be positively related to anxiety or depression. When constructs relate to instruments in a way that we expect to vary in reverse, well-being, quality of life, we will be assessing discriminant external validity. Then we can evaluate external validity in one sense or the other. We have many instruments in Portugal that assess either way, for example Subjective Well-being Scales, Psychological Well-Being Scales, EADS. What is important here, it seems to us, will be to administer all these instruments together, both for convergent validity and for discriminant validity.

In terms of internal validity, when we look only at our instrument, we have different ways of doing it. Our instrument is organized by sections, in large areas, we can analyze, for example, the factorial structure of the instrument. Do an exploratory factor analysis and see how these items are



organized, that is, if we say that those items belong to a subscale, they are effectively or are not associated with this subscale or another. We can also correlate item-total and item-scales, that is, we can relate each item with scale support and from the outset if it has scale support they will be positively related, and we can evaluate the convergent validity, the correlation of the item with the scale to which it belongs and discriminate the remaining items with the remaining subscales, an item that is from the first subscale should be less related to the second, third or fourth, than with that scale to which it belongs. In other words, internal validity makes sense of the item-total and item-subscale relationship. What is expected is that the items are all related to the total, because they are evaluating the same construct and that each item is more correlated with the scale to which it belongs than with the others. If it is related to the scale to which it belongs, we will have convergent internal validity, less with the others, discriminant internal validity, because I am evaluating one domain and not others. It may also make sense in principal components or exploratory factor analyses, that is, we organize everything into chapters, but are the factors we want to analyze in these chapters there? That is, whether the items created within a given category evaluate these factors. Basically, each subscale or each subcategory is a factor and we can ask the computer to evaluate whether they are present or not. We also have facial validity, it is a construct validity and is merely subjective, it has no statistics and in the end it is evaluated by giving the questionnaire to specialists, without the title, questioning them about what they think the questionnaire evaluates. If it fails there, it is worrying because it will be a sign that we are not at all evaluating what we want.

Study of sensitivity

According to Ribeiro (2010), the sensitivity of a questionnaire can be assessed through its discriminative power, that is, the ability to identify significant differences between groups that are expected to differ in relation to what is being assessed. To assess the sensitivity of the questionnaire on the impact of strikes on teachers' lives, we could conduct a study comparing the results of this questionnaire between two groups: a group of teachers who have been directly affected by recent strikes and another group of teachers who have not been affected by the same strikes. We could then verify whether the questionnaire is able to discriminate between these two groups, that is, whether it presents significant differences in the results obtained between them. In addition, to assess the sensitivity of a questionnaire, it is important to check if it is able to detect changes over time, that is, if it can measure the changes that occur in relation to what is being evaluated. In this case, we could apply the questionnaire twice, with a time interval between applications, to verify whether it is able to identify changes in the levels of impact of strikes on teachers' lives over time. Correlating this point with what we have learned in Experimental Psychology, we believe that the sensitivity of a questionnaire can be evaluated through statistical analyses, such as Student's t-tests and ANOVA,



which allow us to verify whether there are significant differences between the groups or between the results obtained at different times. These statistical analyses can be performed using specific statistical programs, such as SPSS.

However, sensitivity can be viewed in different ways. The first is whether this questionnaire allows testing different levels of the variable in the group being studied. We can see it, for example, with the answer options, for example the percentage of people who answered several options for each item, if they go from one extreme to the other. If we have all the answers represented, it probably means that the instrument is not very sensitive. This may be a first reading of sensitivity.

The second way is to test, depending on the variables, to see if we have a normal distribution. We are not expecting a normal distribution, as it is expected that most teachers will be coping relatively well with the strikes, although saturated, a smaller group with moderate impact and an even smaller group with extreme impact. So everything that is a measure that helps us prove a normal distribution will not be a good bet (means, medians, asymmetries, cuts) because we are not waiting for this normal distribution. But, alternatively, we could have people evaluated at first, make an intervention that would help people deal with this moment of greater stress and anxiety and evaluate people at a second time. If we have a sensitive instrument, it must be able to capture changes, even if subtle, that have been introduced by the intervention. The more the instrument is able to capture these changes, the more sensitive that instrument is.

The difficulty in defining which measures to use was related to the fact that we have no experience in either building instruments or administering them. And, not managing this one too, it is difficult, but as we learned, when we go to the field it is supposed that all this is thought out. We have to be very clear about how we are going to test fidelity, validity, sensitivity. So we will plan everything as if tomorrow we collected the data and then we would do the analyses we set out to do. For sensitivity, we only see the possibility of comparing before and after an intervention, because it is not expected to have a normal distribution, where greater or lesser physical and/or emotional wear and tear would be present here.

CLINIMETRIC QUALITIES

"Now, the essential thing for any measurement to be accurate is, first, that it measures what is intended to be measured and not another different or similar aspect (validity) and, second, that if the measurement is repeated, under the same conditions, with the same respondents, the result found is identical (within an acceptable error) (fidelity)" (Ribeiro, 2010. p.100).

Clinimetric qualities are subjective, taking into account the point of view of each participant that may be different, and are not directly related to the correct and incorrect, but to the perspective of the participants.



We have seen above in the psychometric qualities that in order to verify the validity of content, it is necessary to analyze whether the questions in the questionnaire are relevant to assess the impact of strikes on the lives of teachers. To assess construct validity, it is necessary to analyze the relationship between the questions in the questionnaire and the existing theories on the topic in question. Finally, to assess criterion validity, it is necessary to compare the results obtained in the questionnaire with the results obtained in other measures that assess the same construct. To check the reliability of the questionnaire, test-retest can be used to check the stability of the results over time. Internal consistency, measured using Cronbach's alpha coefficient, can be used to assess whether the questions in the questionnaire are measuring the same thing.

Clinimetric qualities are not statistically tested. They are the target of a subjective evaluation and we can only evaluate three in relation to our work, because most of the other qualities mentioned by the authors are dependent on the context of administration: if it is useful, it depends on the context, if it is practicable, it depends on the context, here what we can evaluate are three clinimetric qualities:

- Overload – we evaluate it starting with two major domains: the size of the questionnaire, the extension and the literature points to the 20 items as the ideal, even if applied to higher education students, and here to people with higher education, reaching 30 items does not seem to be an important question and they can answer relatively quickly. And the emotional load, that is, the questionnaire can be small, but it can be an emotional burden to answer (if it forces us to think hard before answering, for example if it is a questionnaire about euthanasia, it forces us to think about our beliefs and personal choices before answering). We have to check if we have such sensitive topics in the content of the item that they can make it difficult to answer, or not. So the overload evaluates the extent and the theme.

- Interpretability – this has nothing to do with the person's ability to read and interpret well, but rather with the ability of the evaluator to look at the scores and give them meaning. For example, most questionnaires end and have a sum, and then this value needs to be significant. We have to think about our instrument in order to increase Interpretability.

- Impact – it will probably work with quality of life or well-being. The easiest way is to turn the scores into a percentage. Zero is the minimum possible, one hundred is the maximum possible, what is the impact? If the score is at 70, for example, it has a high impact, if we are close to zero, it has a low impact.

We could still assess acceptability, but it seems right. Is the instrument well accepted by the target population? We can anticipate that it will be, after the cognitive analysis, reformulations were made so any sensitive issue was circumvented, there is no reason why they should not accept it.



FINAL REFLECTION

The process of building a psychological assessment questionnaire to assess the impact of strikes on teachers' lives involves several crucial steps.

Initially, it is essential to clearly define the purpose of the questionnaire. This involves identifying which aspects of teachers' lives will be assessed and how strikes can affect these aspects. This step lays the foundation for the development of the questionnaire, ensuring that all included items are relevant to the study.

After defining the objective, it is necessary to prepare a list of items that are pertinent and appropriate to the objective of the study. These items should cover all relevant dimensions of the impact of strikes, from emotional well-being to financial and professional consequences.

To ensure that the questionnaire is valid and reliable, it is essential to conduct validity and reliability studies.

Validity: Validity can be assessed through exploratory and confirmatory factor analyses, which examine the structure of the questionnaire and verify that it measures what it purports to measure. The validity of content, criterion and construct must be rigorously tested.

Reliability: Reliability can be verified by calculating Cronbach's alpha coefficient, which measures the internal consistency of the questionnaire items. A high Cronbach's alpha indicates that the questionnaire items are homogeneous and consistently measure the same construct.

In addition, it is crucial to test the sensitivity of the questionnaire in relation to changes in the variable of interest. This means checking whether the instrument is able to detect changes in the impact of strikes over time. A sensitive questionnaire should capture subtle variations in teachers' experience, reflecting changes in their emotional and professional conditions.

Finally, it is recommended to conduct criterion validity studies to verify the relationship of the questionnaire with other relevant measures. This may include comparing with other instruments that assess similar aspects, such as stress levels and well-being. Studies of clinical utility are equally important to assess the applicability of the questionnaire in clinical practice, ensuring that it is a useful and effective resource for mental health professionals.

The construction of a psychological assessment questionnaire on the impact of strikes on teachers' lives is a complex process that requires meticulous attention at each stage. From the definition of the objectives to the final validation, each phase is essential to ensure that the questionnaire is a valid, reliable and useful tool in clinical practice and scientific research.

CONCLUSION

The teachers' strike can have a significant impact on the lives of these professionals, functioning as a form of protest against the lack of recognition and appreciation of the teaching



profession, as well as for the improvement of working conditions and salaries. However, strikes can also generate negative side effects for teachers themselves.

One of the most immediate consequences is the loss of salary during the strike period, directly affecting the financial lives of teachers, especially those who depend exclusively on their salaries for their basic expenses. In addition, the strike can cause delays in the school calendar, harming the planning and schedule of both teachers and students.

Another relevant impact is the emotional and psychological exhaustion caused by tension and uncertainty about the results of the action. Teachers can face pressure and criticism from society, their students and families, generating stress and anxiety. Internal conflicts can also arise among teachers themselves, due to differing opinions on the necessity and effectiveness of the strike.

On the other hand, the teachers' strike can generate positive impacts, such as raising society's awareness of the importance of the profession and mobilizing for necessary changes in education. Additionally, the strike can strengthen unity and solidarity among teachers, creating a sense of community and collaboration.

The impact of the teachers' strike on the lives of these professionals depends on the specific context in which the action is carried out. It is crucial for teachers to carefully weigh the pros and cons before deciding to strike, considering not only their own needs and desires, but also the interests of students and society as a whole.

Reflecting on the impact of strikes on teachers' lives can be a personal and meaningful experience. This reflection can help to better understand the concerns and needs of educators during these periods of protest and how they affect their routine, emotional and financial well-being.

We intend to use this study as a tool to reflect with teachers on the impact of strikes on their lives. Teachers may be directly affected by strikes occurring in their educational institutions or in the educational sector as a whole. While strikes have an important and legitimate purpose, it is critical for professionals to understand how they can affect their personal and professional lives. Thus, we can create conditions to reduce the negative impacts during strike periods and highlight the need for physical and psychological support in more extreme situations.



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Impacto das greves na vida dos professores

Este questionário tem por objetivo avaliar o impacto do movimento de greve na vida dos professores. A sua participação é muito importante para ajudar a compreender como as greves afetam os professores, individualmente e como um todo, e desenvolver soluções para melhorar a situação dos professores em momentos de greve. Não se trata de um teste, pelo que não há repostas certas ou erradas. Queremos mesmo saber o que pensa. Por favor, faça uma leitura atenta das questões e responda da forma que melhor reflita aquilo que pensa e sente. Agradecemos desde já o tempo dedicado à participação nesta investigação.

Frequência de participação em greves:

- 1- Participei de uma greve de professores nos últimos 12 meses
 - Sim
 - Não

- 2- Quantas greves de professores participei nos últimos 12 meses?
 - Uma
 - Duas
 - Três ou mais

- 3- Qual foi a duração média das greves de professores em que participei nos últimos 12 meses?
 - Menos de uma semana
 - Uma a duas semanas
 - Duas a três semanas
 - Três semanas ou mais


- 4- Com que frequência participei de greves durante a minha carreira como professor?
 - Nunca participei de greves
 - Participei de uma ou duas greves
 - Participei de três a cinco greves
 - Participei de mais de cinco greves

Opinião sobre greves:

- 1- Qual foi o motivo principal para participar das greves?
 - Salários
 - Condições de trabalho
 - Benefícios
 - Outro motivo (por favor, especifique) _____

- 2- Acredito que as greves são eficazes na luta pelos direitos dos professores.
 - Sim
 - Não
 - Não tenho certeza

School and family: A necessary partnership in the teaching-learning process

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ABSTRACT

This book addresses the need for a partnership between school and family for the success of the teaching-learning process. Emphasizing the value of each one and its importance in the formation of a healthy and active social subject in the environment in which they live. It is not intended to accuse or defend the institutions for the current problems faced by the Brazilian school, only to point out the characteristics of each one and the paths they can follow, to guarantee quality education. Highlighting the personal, professional, and social advantages that occur in a person's life and in society when both come together and pursue the same goal. The research addresses the importance of the limits established by the family, the current problems faced by the school and the teachers and the need for a partnership between the family and the school for the child/student to succeed inside and outside the school. It aims to analyze how the family and the school can come together forming partnerships and the relevance of this union to improve the quality of education inside and outside the home. We hope it will be relevant for many people, as it is a current and worrying topic. From it, we hope that all those involved in the educational process can identify their difficulties and seek together, family and school, the ways to solve them.

Keywords: Education, Teaching-learning, Family, School performance.

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INTRODUCTION

To report and reflect on the importance of family participation in the teaching-learning process, the present study is based on an analysis of the family structure, its evolution and its arrangements, seeking to define its role in society. Addressing the role of the family in school education through a successful family-school partnership.

It is known that the family is the basis for any being, we are not referring here only to the blood family, but also to families built through bonds of affection. The family plays an important role in the formation of the individual, as it allows and enables the constitution of his essentiality. It is in it that man gives his roots and becomes a being capable of elaborating and expanding his own competences (Branco, 2013). The family is, therefore, the first social institution that forms the child. The personality of the adult that the child will become depends largely on it. However, the family has gone through several stages in its way of expressing itself as an institution, whose mission is the socialization of the person and their contribution to the construction of society (Silva, 2022).

Currently, we live in a time when the disintegration of values are the greatest obstacles for human beings. Values such as ethics and citizenship are being banished and often left out of the formation of individuals. Therefore, social institutions such as the family and the school cannot let this continue to happen without doing anything to change the situation (Neto, 2017). It is necessary to build a partnership between these two institutions with common goals and responsible personnel, to try to rescue these values that are so important in the formation of the character of the students. And this can only be done through mutual trust between them.

Ideally, family and school should set the same goals simultaneously, providing the student/child with security in learning in a way that creates critical citizens capable of facing the complexity of situations that arise in society. Because, without the union between the family and the school, it will be almost impossible to build a quality education (so desired by all) (Lima et al., 2023).

Socially, we believe in the importance of this work because it presents the child/student as a social being and who needs family and school support to recognize and act as such. Research shows that education needs to be taken seriously and effectively assumed by both institutions, otherwise, the problems will tend to increase (Virgínio, 2020). And society is not so conniving with those who do not conform to it. In this way, the student needs to be prepared for real life, for life in society, knowing in advance that he has the right, but also duties to fulfill in this environment that surrounds him and in which he is inserted (Freire, 2014).

This work aims to verify the importance of limits and rules in the construction of the child's personality; analyze the importance of the family in the school life of the children in order to help them achieve success inside and outside school; discuss the problems currently faced by the school



with regard to its coexistence with students and their families; understand the advantages that the family-school partnership brings to a person's life.

The research will point out the importance of the formation, rules and limits placed by the family as a guarantee for their child to become a socially healthy adult. It will report on the importance of learning for the development of the subject and for the construction of a better and fairer world. It will emphasize the union between the family and the school as an indispensable factor in a person's life, highlighting the attitudes that parents should have towards the school and the education of their children, as well as what they can do to help them in the various situations presented by school and life. Pointing out tips and suggestions on how both institutions can relate and act together in the construction of a fair, responsible, active, critical and supportive citizen.

For the preparation of this book, a research was carried out in the various existing informational supports, with authors such as Içami Tiba, Augusto Cury, Paulo Freire, Gabriel Chalita, among others.

CHAPTER 1

CONCEPTS OF FAMILY

The family can be considered the oldest social unit of the human being, which, historically, even before man organized himself into sedentary communities, was constituted in a group of people related from a common ancestor or through marriage (Engels, 2019).

As a result, the family is an important social unit that impacts and is impacted by other individuals and organizations. It is a collection of individuals or many domestic groups united by marriage, adoption, or proven or specified ancestry from a common ancestor (Jesus, 2018). The term is used as a synonym for clan in this meaning. There is always some degree of connection within a family. A family's surname is often inherited from their heterosexual ancestors. The family is held together by a variety of bonds that can sustain its members for generations and throughout their lives on a moral, material, and reciprocal basis (Alesina; Giuliano, 2014).

The family is composed of two structures related from a legal point of view: groups and ties. Blood, legal, and emotional relationships are the three categories of ties that can exist together or apart. Family ties serve as the basis for the formation of various family groups, which include the marital group, the parental group (parents and children), and the secondary group (other relatives and relationships) (Abraham, 2017).

The Federal Constitution of 1988 gave special treatment to Family Law, reserving a chapter detached only for this branch of Law (Chapter VII of Title VIII), which has undergone a profound transformation. In contrast to the authoritarian and patriarchal model defined by the Civil Code of 1916, the family model deduced from the constitutional text is founded on precepts such as equality,



solidarity and respect for the dignity of the human person, founded and at the same time objectives of the Brazilian State. The constitutional norms that provide for the family were only regulated by infra-constitutional legislation with the enactment of Law No. 10,406, of 01/10/2002, the current Civil Code.

Among the relevant novelties brought by the Civil Code of 2002 is the express equality of spouses within the family, extinguishing patriarchal power, as well as the updating of adoption, without any distinction between blood children and adoptees; the regulation of stable union between man and woman, as well as the recognition of rights arising from concubine relations.

Thus, it can be seen that the new civil law, in line with precepts radiated by the Federal Constitution of 1988, covers in its text several types of family, formed by blood relations, solemn legal acts or affection.

In the transformations of the family and its Law, the course catches a 'community of blood' and celebrates, at the end of this century, the possibility of a 'community of affection'. New ways of defining Family Law itself (Fachin, 1999, p. 305). All of this is part of a family. Any person, any family, institution or company, before launching into a relationship, game, task or adventure, needs to have self-knowledge of their qualities, defects and potentialities.

THE FORMATION OF THE FAMILY STRUCTURE

The process of globalization of the capitalist economy has brought about a series of changes at the socio-political and economic levels. These developments affected the dynamics of the family structure as it exists now and allowed modifications to its customary organizational structure. National regulations emphasizing the value of the family in education were enacted in the 1990s, which sparked debate and reflection on how families engage with educational institutions (Pereira; Castilho Júnior, 2022).

Family structure is influenced by a variety of elements, including social, cultural, political, economic, environmental, and religious aspects that determine various compositions. The term "domestic slave" (*famulus*) in Latin is the root of the word "family" (Nader, 2017). The first family units were identified by kinship and blood relations. Tribes composed of surviving members emerged as they grew and became substantial in number (Engels, 2001).

In the annals of human history, schools are a relatively new institution. The descendants of the nobility did not go to school in the past. To expose children to the arts and sciences of the time, they employed experienced tutors (Meyer, 1977). Religious aspirants had access to formal education and were competent to teach, and religion played a significant role in education. As the bourgeoisie grew, the children of affluent merchants began to expect an education as a right (McClellan, 1999).



The growing needs of an increasingly industrialized and digitized society have led to the adoption of schooling as a standard practice (Collins; Halverson, 2018). Schools nowadays lament the absence of assistance from parents in observing their children's growth and academic performance, the inability of parents to set boundaries, and the failure to impart moral and ethical principles necessary to interact with society (Santos et al., 2022).

In this parallel world, it becomes essential to recognize that, between these two worlds, children are, eager to learn to discover the world around them. Içami Tiba, psychiatrist and psychodramatist, wrote about the changes that occurred in the family context, regardless of the era in which one is. For him:

"One of the communities that has managed to survive everything, from the beginning more than 10,000 years ago, to the present day is the family. It adapts to all kinds of changes: of number, of power, of politics, of society, of wealth, of culture, of gender, of religion, of language, of race, of color, etc." (Tiba, 2009, p. 144).

Therefore, the family has been, is and will always be clearly present with the biological functions, of ensuring the protection and care of the generations, and social, of transmitting standards and norms of culture as well as many other functions.

We are in the twenty-first century: educating is no longer following the standards of our parents, but breaking old models, updating them with new paradigms. Parents and educators need to absorb the new rhythm of the current generation, which immersed in so many new stimuli, often merges with the identity of the groups, allowing it to overlap the family structure (Mochon et al., 2022).

The problem is that the vast majority of Brazilian schools, whether public or private, are not prepared to receive the family as a partner. And we, educators, are the link between the family and the school. Therefore, we need to rethink our actions and act with a certain urgency in relation to family/school/student, to try to break the existing paradigms in the various and obscure behaviors in the childhood phase, and which will always be surprising us and giving instruments and field for research on the behavior and development of the human being.

CURRENT FAMILY AND FAMILY CITIZENSHIP: IMPORTANCE IN FORMATION

Women's freedom resulted in a change in the way families operated. While the traditional system still divides roles, with the mother serving as queen of the home and the father as the provider, the mother is also responsible for the education of the children. However, parents are now aware, albeit slowly, of their equal status in a relationship that is more horizontal than vertical (Costa; Souza, 2019).



But to get here, there was an evolution from caves to residential condominiums. The current family has to function as a team, the team spirit began long before the parental family, that is, the nucleus with father and mother. Before agriculture existed, the matrilineal family was more of a team than the parental family, since fatherhood was not practiced. Men who maintained survival by hunting both defended their large family and their territory and attacked others (Pinsky, 2015).

Women were protected by men and took care of children. This was already a division of tasks and probably each member did what they knew best how to do. There should be a leader, certainly the mother, because it was around her that the group was formed and united. The woman in the matrilineal family should be the most experienced, have a vision of the future (food shortages, arrival of winter, etc.), know how to communicate well with everyone, resolve conflicts between people, demarcate the duties and rights of each one, stimulate the union of the group, unite individual interests for the benefit of the collective, deserving all the respect and trust of each of its members (Chanter, 2009). Later, this leadership passed to his father and came to the present day.

A family is a particular type of community, with the home serving as its center. Each member of the group has responsibilities and rights. Children are their dependents on the path to freedom, and parents serve as providers and instructors. Given that parents start from nothing and work to create global citizens, this is a mission that borders on the divine. Parents teach their children the language, take care of them and shape their culture and morals (Costa; Souza, 2019). For this construction, parents have a deadline that is short for them, but long for their children. Family citizenship is the practice of not doing at home what one should not do in society and of doing outside the home what one should do. Compared to spontaneous growth, orchestrated education emphasizes family citizenship more (Soares, 2010).

A child should learn that play only ends when he puts away the toys and leaves the place as tidy as it was for other people to use them. "In natural growth, the child who is not educated develops less professional competence and in the future will pay dearly for this current *carpe diem*." (Tiba, 2009, p. 114).

Therefore, the family today needs to act as a mediator, to be flexible, but consistent. It is the matrix of the formation of the individual's personality. Therefore, parents need to know how to impose the rules, be firm in what they determine to demand respect, but show that they have common sense. After all, they exist to help guide the behavior of their children and it is through rules that transformations in societies are materialized, which, in turn, will influence future relationships.

In light of the fact that new conceptions of education require reforms of the social system for the necessary changes to materialize, citizenship education is a political practice that offers justifications for our demands and ongoing struggles for alternative educational models in the hope of a better future (Santos, 2018).



The family must decide how boundaries will be imposed when performing their duties. As children grow, parents encounter a variety of behavioral scenarios. Given the importance of the family in family education, it is imperative that they have received guidance in this area of self-determination from their parents or guardians. "Fathers and mothers should always ask their children to tell what they did at home, what they learned at school, what they saw on their outings... And that they also know how to listen, in addition to participating in their lives, even if they are physically absent." (Tiba, 2008, p. 37)

According to Tiba, educating requires dedication from parents to their children. Sit down, promote dialogue, speaking as equals, always in a moderate tone. Show interest in the child's day-to-day events, even if they are not present. Thus, he will feel the constant presence in the course of mistakes, successes and achievements.

The child will suffer during development if the family is not committed to raising him. Utilizing these stages is essential for educating and shaping your values. To use technology to foster better cooperation and contact between parents and children in sharing music, movies, photos, and reminders, children need honest conversations and clear advice (Winnicott, 2023).

Without considering the technological aspect of modern culture, education and training are unthinkable. However, instruction cannot be given through a computer screen. To help their children navigate the world, parents must set limitations. They must exercise responsibility and keep an eye on the environment in which their children are growing up (Neumann; Missel, 2019).

Character development, preparing children for life's obstacles, and maintaining moral and ethical standards are all family duties. The family has a duty to prepare for life, to mold a person, and to develop a person. According to Soares (2010), it is the mother cell of society, where appropriate disputes do not devastate a healthy atmosphere.

The family is an institution where masks have to give way to an open and visible face. Dialogue is necessary.

The authoritarian family perpetuates the authoritarian society. It makes the ideals of obedience and submission remain in the minds of its members, of unquestioning copying of established standards. The individual who only learns to obey will not be prepared for the complex society of this new millennium (Chalita, 2001, p. 21).

According to Chalita (2001), it is important to highlight the need to reflect on the process of family education. Thus, we can affirm the function of the family. By helping tense reasoning a significant portion in positive and negative development, it is possible for this family to assume the perspective of the practices of forms of compartment, knowledge, experiences and worldviews in the face of the school universe.



Considering the family as a fundamental principle as the construction of critical citizens capable of questioning, dialoguing and facing the complexity of situations that arise in the society in which they are inserted. "Society is going through a very difficult period in terms of citizen values. It is made up of families who are also going through difficult periods." (Tiba, 2007, p.269).

For Tiba, the family is losing its commitment and participation, where it involves the responsibility of the family in the formation of each one as a member of society, since each person positions himself in a different way in the face of rights and responsibilities in relation to the social environment. If in the exercise of citizenship the family goes through a difficult period, the important thing is to act to overcome the difficulties and take the first steps.

When we live family citizenship, we place human beings in the world with the potential to transform the harsh reality we live in, both social and ecological. When we create them selfish, individualistic, without ethics and values, we are feeding this social disease that we see not only in Brazil, but all over the world." (Tiba, 2007, p. 221).

According to Tiba, the construction of family citizenship is done with the one present in all societies, it is one of the environments of socialization of the individual, it acts as a mediator in the social system and is responsible for the transmission of values.

When in the family environment, the child does not learn to manage and resolve their conflicts, control emotions, and deal with diversity. The family is causing problems and alternating health behaviors of insecurity, difficulties in establishing with other children, as well as problems of social risk at school and in adult life. "A son who earns everything from his parents, without any merit, thinks he is doing well in finances, when he is still an economic potential. The money is in his pocket, but it is not his. He is financially dependent." (Tiba, 2009, p. 108).

For Içami Tiba, it is of great relevance for the family to guide them to learn how to deal with money, because unfortunately some parents "miseducate" their children by giving them everything they want, thus, economically the child is only increasing the family's loss, he is not preparing for the construction of an education base to which the family is responsible to form its principles. "Declare to your children that they are not at the bottom of your life, but at the center of your story." (Cury, 2003, p. 24-25).

According to Cury (2003), there must be values in the family environment for the child to grow up being stimulated in the family daily life as an important being and transformer of the harsh reality they experience, family valorization is the central basis of the formation of family citizenship in understanding the world with evolution and modification, therefore, the family owes permanent values to the student. "Parents who live to give gifts to their children are remembered for a moment. Parents who care about giving their story to their children become unforgettable." (Cury, 2003, p. 21).



According to Cury, children need to have a solid family structure, which will remain in the family history during their existence, the family bond will remain forever in life, so the child will grow up with values and principles, since the family is considered the first school, capable of forming ethical citizens for life and respecting differences throughout their lives. "The family is an institution in which masks must give way to a transparent face, without disguises. Dialogue is necessary, if in other times a look was enough to correct behavior, today we live in the era of "why" (Chalita, 2001, p. 21).

According to Chalita (2001), today's families exert great contemporary influence, constituting the basis of interaction, it can no longer be seen as a private system of relationships, it has to adapt to the new forms of change in societies. With this, within the family environment, the child learns to manage and resolve conflicts, to control his emotions. These social skills experienced in the family environment refer to the transformations of the family in society, including the knowledge of the values that are adopted.

THE FAMILY AND THE SCHOOL

We are aware that the family is the main agent in the basic development process, working to successfully build the person, promoting values such as responsibility, respect, self-esteem and affection. To produce a more moral citizen who can live in a more just society, it is imperative to achieve more satisfactory results (Zatti, 2007).

Encouraging the school and family to play a stronger social role will help increase the positive benefits of both in collaborative projects and daily routines at home and school. seen as pertinent, as they highlight issues that undermine the true purpose of a more perfect, kind, and just society for the full development of the individual (Gomes, 2023). "No matter how good a school is, no matter how well prepared its teachers are, it will never make up for the lack left by an absent family" (Chalita, 2001, p. 17).

According to Chalita's conception, it means that the family is the base, when feeling motivated the individual has the desire to do something and becomes able to maintain the necessary effort during the time to achieve the proposed goal, so it is necessary that the school reflects on the fundamental role that the family plays in the cognitive structure, This is indispensable for the student to have reasons for action in order to appropriate the knowledge.

In this sense, according to Freire³ (1997):

The citizen school is the one that assumes itself as a center of rights and duties. What characterizes it is the citizenship training of those who use its space. The citizen school is a school consistent with freedom. It is consistent with his formative, liberating discourse. It is

³ Interview conducted on March 19, 1997, granted to TV Educativa of Rio de Janeiro, present at the Paulo Freire Archives, in São Paulo.



every school that, fighting to be itself, fights for the student-educators to also be themselves. And as no one can be alone, the Citizen School is a school of community, of companionship. It is a school of common production of knowledge and freedom. It is a school that lives the tense experience of democracy.

That is why it is extremely important to have a family in the life of the student, outlining the same goals simultaneously, the family and the school form a team, making it impossible to walk in individualism, the school cannot in any way replace and walk without the family (Rodrigues; Locatelli, 2021).

It is important to realize that parents can have a significant impact on their children's school life by engaging in extracurricular activities, encouraging conversations about school and the day's events, taking regular trips to the educational institution, and encouraging their children and teens to be curious, explore their potential, and freely express their opinions. The child's school development phase, in particular, emphasizes the importance of the family by highlighting the influence of its factors, allowing or hindering adaptation to this context. This is in addition to the analysis of the family as a developmental context being considered a complex phenomenon (Santos et al., 2022).

The school needs the family whatever its arrangement. As the family is the cell and the school is the vital organ, communication between these institutions must be dynamic, daily, effective. A relationship of exchange, mutual learning and collaboration.

FAMILY: AN IMPORTANT SOCIALIZING AGENT

From birth, the child is inserted into a family context, making the family responsible for the physical care, psychological, emotional, moral and cultural development of the child socially. "The family is essential for the child to gain confidence, to feel valued, to feel assisted". (Chalita, 2001, p. 26).

For Chalita, in the family the child establishes lasting emotional connections, crucial for development, for proper socialization, the child establishes lasting close emotional connections. The family environment is primary, relating directly to its members, the child grows up, acts and exposes his feelings.

In family life, the citizen's first contact with the world takes place. The maternal and paternal example, the food, the sounds received from the external world, the myths that begin to form, the fears, the ambitions, the learning of language. This process continues throughout life. Even if family relationships change, if children decide to live alone, there is no denying that throughout life the basic structure obtained in the formation of childhood is carried (Chalita, 2001, p. 123).

According to Chalita, these marks can be worked on, evolved, but they will accompany the individual for life. Belonging to a certain family nucleus provides notions of power, authorities. In



addition to allowing you to learn various skills such as speaking, organizing thoughts, distinguishing right from wrong, adapting to different circumstances.

Relationship-related experiences that serve as a foundation for future classroom interactions. Family love can be seen as the energy needed to make learning easier for the child; Emotional bonds serve as the basis for learning motivation.

The family is the first and most significant agent of the child's socialization. It is here that socialization patterns are formed and their learning model is created, which has an impact on their school life (Oliveira; Lopes, 2019). The work assigned by the school depends on the active participation of the family. In this sense, the family is the natural habitat and the best means of bringing humanity and individuality to society.

THE FAMILY AND THE DREAM SCHOOL

The dream family is not perfect. He does not have infallible parents, nor children who do not cause frustration. It is the one in which parents and children have the courage to say to each other: "I love you", "I exaggerated", "I'm sorry", "You are important to me".

In the dream family there are no heroes or giants, but friends. Friends who dream, love and cry together. In it, parents laugh when they lose their patience and children make fun of their own stubbornness. The dream family is a party. A simple place, but where there are happy people. The school of dreams is the one that educates young people to draw strength from fragility, security from the land of fear, hope from desolation, smile from tears and wisdom from failures.

Gadotti during the course: The School of my dreams, stressed the need to reflect on pedagogical practice to seek to improve it, to rediscover the beauty of being a teacher in today's society and how it can be possible to transform what is mandatory content into something pleasurable, which makes sense to both. He pointed out fundamental issues that constitute the legacy left by Paulo Freire (Hack, 2018, p. 97).

The school of dreams unites the seriousness of an executive with the joy of a clown, the strength of logic with the simplicity of love. In the school of dreams, each child is a unique jewel in the theater of existence, more important than all the money in the world. In it, teachers and students write a beautiful story, they are gardeners who make the classroom a seedbed of thinkers.

"Education does not need reform, but a revolution. The education of the future needs to train thinkers, entrepreneurs, dreamers, leaders not only of the world we are in, but of the world we are" (Cury, 2003, p. 153). All this, according to Cury, because we need to form pens that make a difference in the world, that propose changes, that rescue their existential meaning and the meaning of things.



CHAPTER 2

LEARNING CONCEPTS

Learning as a whole, seen as an educational action, aims to help develop in individuals the skills that make them capable of establishing a personal relationship with the environment in which they live (physical and human), using their sensory-motor, cognitive, affective and linguistic structures for this purpose (Cardona et al., 2021).

Learning is inextricably related to the history of man and his evolution into a social creature capable of situational adaptation. There has always been a more or less complex and structured approach to teaching and learning. While there have been theories that have long explained learning, the study of learning is closely related to the growth of psychology as a discipline. However, there was no standard and consistent approach to the execution of this study.

Several schools of psychology have held diverse ideas, and as a result, the study of learning has focused on different areas. The theories listed below are the ones that have received the most traction:

- According to behaviorists: learning is the process by which a subject learns to express himself through largely mechanical relationships between a stimulus and a response; In contrast, cognitivists view learning as a dynamic process that involves the encoding, processing, and recoding of information.
- Cognitive mechanisms: and the environmental factors that enable these activities are the main subjects of research in learning. The person is seen as an entity that engages in interactions with his surroundings, and it is in these interactions that he acquires knowledge;

Humanists: The basis for learning is fundamentally the distinct and individual nature of the learner, drawn from his or her own experiences. Although the learner plays an active role in this process, learning is often seen as something spontaneous (Prado Netto; Costa, 2017).

Different ways and conceptions have resulted from these disparate views on education. But far from being a disadvantage, these distinctions should be seen as a benefit, for they provide a fuller picture without confining the explanation of the variety of this process to a single hypothesis. Nowadays, learning is seen as a dynamic and active process in which people absorb knowledge instead of just passively receiving it. Everyone has the ability to "learn to learn," meaning they can solve problems or find solutions in their own unique ways, drawing on previous experiences similar to their own or designing an "idea" or "solution" they have in mind for the future (Bueno; Mazzafera; Santos, 2024).

For Campos (1986, p.30) "learning can be defined as a systematic modification of behavior, through practice or experience, with a sense of progressive adaptation or adjustment". Gagné (1980,



p.6) says that: "learning is inferred when a change or modification in behavior occurs, a change that remains for a relatively long period of time in the individual's life".

"Learning can be defined as a change in behavior that results from both practice and previous experiences" (KAPLAN, 1990, p. 91). Still conceptualizing learning, Davidoff says that:

"Learning is an activity that takes place within an organism that cannot be directly observed; in a way that is not fully understood, the subjects of learning are modified: they acquire new associations, information, insights, aptitudes, habits and similarities". (Davidoff, 1983, p. 158).

Learning is an extremely complex phenomenon, involving cognitive, emotional, organic, psychosocial and cultural aspects. Learning is the result of the development of skills and knowledge, as well as the transfer of these to new situations. The learning process is triggered by motivation. This process takes place within the subject, being, however, closely linked to the exchange relations that he establishes with the environment, especially his teachers and colleagues. In school situations, interest is indispensable for the student to have reasons for action in order to appropriate knowledge.

These observations apply to any student, but they are particularly important when it comes to students with special educational needs, such as deaf people.

It is the responsibility of educators to create interactive learning environments that encourage students to engage with the material, with each other, and with instructors. While learning occurs in proximity to the person, the caliber of their interactions is where knowledge is built (Ferreira; Muniz, 2020).

To achieve the goals set, the school's educational efforts with these children should include the following: specialized curriculum content that supports and enhances the work that will be created in the classroom using standard curricula. It is important to provide deaf children with opportunities to get involved with the "world of hearing", awakening their interests, desires and motivation to assimilate information and behaviors (Mendes; Vilaronga, 2023).

RELEVANT ASPECTS ABOUT LEARNING

Learning is the process of picking up and assimilating new patterns and ways of seeing, thinking, and behaving that are more or less conscious. As a result, educators cannot confine their knowledge; instead, they should be conscious of their actions and provide justifications. In addition to being an empirical art, the educational mission has its roots in precise scientific research and deep philosophical considerations (André, 2018).

Researchers have turned their attention to the learning process, particularly those in the fields of psychology and education. This process has been ongoing for a long time because, although some



factors are known, many others are still unclear, only observable or totally unknown (Maximus; Marinho, 2021; Medeiros, 2021; Silva; File; Bridges, 2023; Faithful; Nogueira, 2024).

In general, psychologists, educators and researchers have sought answers to the following questions:

- *How does the learning process take place?*
- *What happens inside the subject?*
- *In behavioral terms, what happens?*

Among these, many other questions are present and have been researched. As access to learning processes is not direct, most theorists emphasize what happens to the subject after the learning episode, that is, the observation of performance.

In this way, learning becomes partially understood. It is known that learning is a process that, in turn, begins with birth and only ends with death. In other words, at all times, whatever it may be, the individual is always in the process of learning, and as he learns his behavior, his performance, his perspective and his approaches suffer variations (Leal; Nogueira, 2024).

Learning can also occur in several other situations, given that man interacts in different environments, where this process can occur in a formal or informal context. It is certainly in the informal context that most of them take place and that they constitute a rich and fundamental repertoire of experiences. This type of learning leads the subject to change and evolution (Mochon et al., 2022).

In this way, much is learned without a planned deliberation, it is what is known as circumstantial learning, meaning many learning in human life.

When the reference is located at the classroom level, the focus is on formal learning, where events must be organized, planned and chained in such a way that it is possible, when learning, to glimpse coherence and meaning in what must be learned. In this institution, the teacher is present, on the one hand, investing in his competence, motivation and humanism, and on the other the student, willing to learn, motivated lacking knowledge (Masini; Moreira, 2023).

Teacher and student, together, are elements united in the pursuit of a common goal: the evolution, learning and growth of people, where overcoming the less efficient stages leads to an effective and more powerful functioning.

The learning process and learning itself has a broader meaning than simply acquiring and transmitting knowledge. It is from learning that the learner expands his volume of knowledge. Learning is more, because it means the very change that takes place in the subject through experiences.



SCHOOLS, PARENTS AND STUDENTS: THEIR ROLE IN THE TEACHING-LEARNING PROCESS

Teaching spaces can be seen as responsible for school education: places intended for formal pedagogical work, the understanding of rules, the formation of values, the exercise of citizenship, the experimentation of feelings, etc. In turn, the family is seen as the basis of the individual's formation, the environment in which the child's first contacts and relationships occur, model, referential and (no less important) responsible for the formation of values, among other elements.

The ability to learn how to learn, the search for a broad view of the world, knowing how to think are real challenges for the school of the twenty-first century. The school of the present must form human beings with the ability to understand and intervene in the world in which they live. Not mere spectators, subjects without courage and without critical knowledge to face the revolution of values, techniques and means that has been unleashed (Chalita, 2001, p. 59).

As a result, family and school come to be seen as spaces for purposes and not as different worlds, because, despite being distinct, they seek to achieve complementary objectives. While the school is dedicated to teaching well the contents of areas of knowledge considered fundamental for the instruction of the new generations, it is up to families to welcome their children in a stable, providing and loving environment, beneficially influencing them in the elaboration of their knowledge.

The school can both reproduce the current patterns and also create spaces for new alternatives, favoring a revision of society and the world. We perceive this from the reality that surrounds us, where we have the chance to create a new society, more just and dignified, or simply to continue the one in which we live (Mantoan; Lanuti, 2022).

And, as for the family, this becomes the indispensable place to guarantee the survival and full protection of children and other members. It is the family that provides the affective and material support necessary for the development and well-being of its members. It plays a decisive role in formal and informal education, it is in its space that ethical and humanitarian values are absorbed, and where the bonds of solidarity are deepened.

Thus, the school is characterized as an important educational and socializing space, complementing the work developed by the families. Likewise, more recently, it has been sought to attribute to families the responsibility for equally complementing the work carried out by the school, which includes effective commitment to learning.

"A good teacher educates his students for a profession, a fascinating teacher educates them for life. Fascinating teachers are revolutionary professionals. No one knows how to evaluate their power, not even themselves. They change paradigms, transform the destiny of a people and a social system without weapons, just by preparing their students for life through the spectacle of their ideas." (Cury, 2003, p. 79).



The issue of learning goes beyond the issue of teaching. The learning process, which is the teacher's and the student's, has to be permanent. It ensures that education is not reduced to mere content decided, in an authoritarian way, by people distanced from regional and cultural peculiarities. The enormous challenge of learning to learn is the challenge of forming beings able to govern themselves, to develop participatory leadership, to learn to say yes and to say no (Silva, Souza, 2022).

What is the use of a multitude of beings repeating other people's ideas without the ability to think for themselves? The serious problem of inadequate training is the absence of defined objectives, without the perspective of purpose. For this reason, the school and teachers are challenged to rethink their curriculum and their pedagogical practice in a more heterogeneous and fragmented way, capable of highlighting the problems of respect for cultural diversity and tolerance to religious, political and ideological differences, among others, present in society.

THE IMPORTANCE OF THE FAMILY AND THE SCHOOL IN THE LEARNING PROCESS

The importance of the family's participation in the learning process is undeniable and the need to clarify and equip parents about their possibilities in helping their children with learning difficulties is evidenced when they express their doubts, insecurities and lack of knowledge on how to do it. This generates feelings of anguish and anxiety in parents because they feel unable to deal with the situation correctly (Branco et al., 2021).

It is believed that a family intervention program is of fundamental importance for the development and learning of the child. Family relationships, parents' availability and interest in their children's educational guidance, are indispensable aspects of helping children (Oliveira, et al., 2024).

Through experiences and interpersonal relationships, the family can promote the intellectual, emotional and social development of the child. She can create situations in her daily life that will stimulate these aspects, as long as she is awake to it. In addition, the child's participation in routine activities at home and the formation of habits are also important in the acquisition of the basic requirements for learning, as they stimulate internal organization and the ability to 'do', in general (Kunz; Queiroz; Ruela, 2022).

The family has a central role in the child's development, as it is within it that the basic learning necessary for development in society is carried out, such as language, value system, and control of impulsivity. The characteristics of the child are also determined by the social groups they attend and by their own characteristics, such as temperament.

Children have a natural, instinctive tendency that directs them to the development of their potential. Parents should be aware of this process so that they do not hinder or prevent the child's spontaneous growth. Due to the lack of understanding of the nature and basic needs of the human



being, parents often hinder the child's search for their own development. The way parents deal with their children can help them develop their potential and relate to the world, enabling them to enrich themselves through the experiences that the environment provides them (Mendonça; Rodrigues; Capellini, 2020).

The educational process (gradual development of the physical, intellectual and moral capacity of the human being) must be adequate to enable the child to succeed in learning, providing him with the motivation, interest and concentration necessary for the apprehension of knowledge.

The adequacy of this process includes meeting the child's needs regarding the presence of parents sharing their experiences and feelings, firm guidance regarding appropriate behaviors, possibility of choices, certain autonomy in their actions, organization of their routine, constant opportunity for learning, respect and appreciation as a person.

The child needs a balance between disciplinary conduct and dialogue, understanding and affection. In an educational process, parents experience the need for self-analysis, restructuring of their behaviors, beliefs, feelings and desires. Parents need to conquer, in relation to themselves, first, what they want their children to be: fair, disciplined, honest and responsible (Poland; Dessen, 2005). This process occurs in everyday experiences, as parents and children communicate in a transparent and sincere way, talking about their perceptions, their doubts, goals, emotions, learning from each other.

When the school, the father and the mother use the same language and have similar values, the two main contexts of the child, the family and the school, demonstrate a security and coherence that is extremely favorable to their development (Tiba, 2007, p. 190).

The relationship between family and school is fundamental in the educational process. The child will be much more receptive to disciplinary instructions if family members respect each other, trying to talk and collaborate with each other. It is important for parents to participate in their children's lives, in a coexistence as companions, sharing emotions, which contributes a lot to discipline (Bandeira, 2021).

All these aspects mentioned and many others are fundamental for the child's development to be effective. Therefore, the family needs the help of professionals in the acquisition of this basic and essential knowledge so that it can fulfill its role as facilitator of the learning process of its children, through more adaptive behaviors.

THE SCHOOL AND ITS SOCIAL ROLE

"The school alone is not responsible for the formation of personality, but has a complementary role to that of the family" (Tiba, 2008, p.29).



The school is responsible for promoting the development of the citizen, in the full sense of the word. So it is up to them to define themselves by the type of citizen they want to form, according to their vision of society. It is also responsible for defining the changes it deems necessary to make in this society, through the hands of the citizen it is going to form (Pires; Amaro, 2020).

After establishing its position, the school will seek to develop conscious citizens who can appreciate and question reality, fight injustice, and treat others with respect. School representatives should commit to creating a plan to achieve this goal when they take on the duty of promoting growth and social change. Strengthening this proposition is the development of a political-pedagogical initiative (Souza, 2023).

To ensure that children have access to and stay in school, we need to organize ourselves. Waiting for the answers to arrive from education systems vertically is not enough. It is imperative to develop proposals that actually lead to the establishment of a democratic school with social quality, making sure that the bodies responsible for overseeing the education system can identify this as a top priority, devise fair and convincing legal frameworks, and provide the necessary funding to implement the projects in each school (Lück, 2017).

In the democratic context, the school has one of the great challenges, to educate and build a culture that implies respect and inclusion of all in the public space (Mantoan; Lanuti, 2022). In the democratic context, the school, the community and the public power are triggered by organized society to change their parameters and practices. From stigmatizing traditional practices, the school is called upon to learn to act to promote inclusion as a universal principle.

CHAPTER 3

FAMILY EDUCATION AND SCHOOL EDUCATION

Knowing the need for socialization, because when living in society he does not have purely instinctive actions, like animals, man ends up having to submit to the common process of learning, continuous and inexhaustible, that is, to education. What differentiates man, as a cultural being, from other animal species is that, although they have these facts of life in common with them, man chooses how he will carry them out, within the alternatives given by the limits of his social existence (Ingold, 1995).

"In a changing society like ours, the strength of spontaneous education is increasingly diminishing and that of intentional education is growing, in the urban or rural sphere. Parents, forced by the situation, end up leaving the child's social adaptation to school". (Chalita, 2001, p.62).

However, several existing instances in society end up exercising the educational function, when they influence the subjects in some way, whether those formalized properly and exclusively for



learning, such as schools and universities, or those in which such a role is exercised without being exactly organized for a certain purpose, as is the case of the family, religion, work, leisure and even the media itself.

The antagonistic relations arising from a society composed of widely differentiated classes and resulting from current transformations, intimately affect the existing systems between them, involving exclusively those who depend on it.

In the face of arguments, intensely reformulated from the analysis of the connection between institutions, school and family, their peculiarities and relevances, it is possible to see the emergence of questions about what would be the relationship that currently exists between them, as well as the way in which this would be taking place, and at the same time that answers to the questions are sought, The aim is to create means to narrow it.

The knowledge obtained in the first contacts or primary socializations has its direction around the culture in which the individual is inserted. When an individual plays, pays attention to something or someone, when he walks, talks, takes a bus or taxi, when he drives any means of transport, when he writes a letter or an e-mail, when he watches a class or television, that is, when he performs any action, he somehow ends up educating himself through the situations experienced.

In this social context, all social segments can be encompassed, the family, educational and religious institutions, professional activities, among others, in relation to values, ideas, norms and rules, in addition to adults. Educational absorptions take place through formal education modalities, as is the case of the school, non-formal, as groups are called, such as formal and informal associations, such as the family.

The understanding of transmission, and of knowledge through such modalities, happens through the observation in which one has contact.

THE FAMILY-SCHOOL RELATIONSHIP: AN IMPORTANT LINK IN THE TEACHING-LEARNING PROCESS

The relevance given to the family both by the Constitution in its Chapter VIII, of the family, of the child, of the adolescent and of the elderly in its articles 226, 227, and 228, and by the Statute of the Child and Adolescent in its Chapter III, of the right to family and community life encourages us to undertake an incursion of a theoretical-conceptual nature into the existing laws that endorse the family issue and its relationship with the practices of social policies from an educational point of view.

Examining the real situation, we see that the procedures suggested in the texts represent ways in which schools can plan and execute programs of integration and family involvement. This observation leads us to consider the parameters of the school-family interrelationship in the



community and we try to confirm whether it is feasible to operationalize an orientation that can represent the viability of a more fruitful partnership (Ramos, 2019).

People are often initiated into society's culture, morals, and social conventions through their families. In order for children's personalities to grow harmoniously, their home environment has to represent an ever-progressive educational environment. "The family is the first and fundamental school of sociability: as a community of love, it finds in the gift of self the law that guides it and makes it grow." (John Paul II, 2010, p. 66).

To strengthen the bond between home and school, we need to create communities where people can meet their fundamental needs and strive for a higher standard of living for future generations. To do this, we need to not only become knowledgeable about the fundamentals of community life, but also put them into practice through more beneficial interactions centered around social and educational advancement.

THE IMPORTANCE OF DIALOGUE BETWEEN PARENTS, STUDENTS AND TEACHERS

The participation of parents in the school life of their children plays a very important role in relation to their good performance in the classroom. However, even if the specificity of the roles of the school and the government in the education of children is guaranteed, and the respect for the specialized knowledge that teachers have to develop their work, the strengthening of the relations between school and family can help teachers to exercise their profession more competently (Santos et al., 2022).

While the family plays a crucial role in a child's holistic development, it cannot be held entirely responsible for a student's success or failure in the classroom, since parental involvement and attendance in school are not the only factors that affect a student's academic performance. Children's performance and success or failure in school are influenced by a wide range of other social, political, economic, and cultural issues, including the level of family involvement required (Varani; Silva, 2010).

"This is the basic principle of human construction: to educate for peaceful, harmonious, happy coexistence. Educate for respect, for the exchange of experiences, for example in dealing with others and with oneself. Educate so that all vicissitudes are faced with gallantry. This responsibility is not only of the school, it is of the whole society, starting with the family, the first space of coexistence in which parents become models, myths, examples. After the parents, the teachers, whose attitude can influence, shape." (Chalita, 2001, p. 118)

The unwavering engagement of the family in this process is essential for the success of the school and its function as a community articulator of teaching and learning. As a result, the educational institution must devise strategies to foster stronger ties with families and the community, advising and demonstrating that education is a shared responsibility and not the exclusive domain of



schools. In the reality of the school in question, parents saw themselves as collaborators in the education of their children. But the idea of engagement is really complicated, including a wide range of social, psychological, and cultural aspects (Oliveira, 2024).

In this way, parents, educators and society as a whole need to be aware of the importance of the union between the family and the school in the formation of children. Both have the function of helping the subject to be autonomous, creative, capable of relating well with the other and interacting meaningfully in society.

HIGH-PERFORMING PARENTS AND EDUCATORS

Education is fundamental for the survival of civilization and culture. "Every human being is a potential educator, because an apprentice is already born. If no one teaches him anything, he learns from his own experiences", says Içami Tiba, alerting to the fact that all of us – but especially children – learn from the environment in which we are inserted through interaction with people's attitudes and reigning values. Learning is characteristic of the human species, and it is up to educators to direct this fantastic potential so that it is not wasted in the construction of bad habits and behaviors that do not add value.

Many centuries ago, Socrates—probably the first great educator—alerted us to this fact, creating the expression *maieutics*, which, in Greek, means the art of giving birth. According to the philosopher, the master's function would be to help knowledge to be born, the student to build his own knowledge. To this end, those who assume the function of educating — the noblest among human tasks — assume, at the same time, the immense responsibility of influencing minds, souls and futures.

"An educator is not only the one who proposes to teach. Many teachers did not intend to teach, they simply exercised what they knew. When a person becomes a model for others, it also influences the way he dresses and behaves, and then he is educating himself." (Tiba, 2012, p. 108).

According to Tiba, if the education of young people is not directed, conditioned by useful knowledge and high values, they will learn anyway, but in this case, without guarantee that a dignified citizen will be formed, with their performance oriented to the production of good.

Parents and educators who do not take a step beyond what they are used to doing with their children and students, are marking time. Their students do not develop, because it is not by making mistakes that one learns, but by correcting the mistake. Worse than not learning is learning wrong, that is, doing wrong and thinking you are right and continuing to make mistakes. However, learning where you went wrong and correcting that mistake may have helped you get it right.



The involvement of parents, teachers and the school as partners in children's education is essential to ensure the adaptation and learning of students. What distinguishes the functions of each system are the questions about what competes and what is similar to each of them. The school practices of family involvement described in this review aim to assist in the schooling of students, since they aim to bring the partnership between the systems closer together in favor of student learning (Santos; Coutinho, 2020, p. 42497).

This strategy, in turn, would facilitate the flow of student information between parents, teachers, and administrators, creating new avenues of support and ultimately ensuring the holistic development of students, resulting in exceptional academic performance, exceptional human development, and skilled professionals.

"The motivation to study must be built by the student himself, but the stimuli to the use of newly acquired information can and should be provoked by teachers and also by parents". (Tiba, 2012, p.102). According to Tiba, teaching a motivated student is not difficult. The colossal difficulty of unmotivated students or children in learning needs different stimuli, because motivation — like happiness — cannot be sold, lent or given to anyone: each one has to build their own. What we can, then, is stimulate them to learn.

The teacher's greatest strength is to help the student cross the thicket and find the treasure of knowledge that will change his life. Because, alongside this pleasure in being able to change his own life, it is knowledge that will motivate him to open other thickets.

Information alone is like a loose piece in the mind, which, if it is not transformed into knowledge, is soon forgotten. Building knowledge is pleasurable and useful — because the student perceives the information in action. One action instigates another, and so does knowledge. Each knowledge built instigates the construction of others. Generally, a person who likes to teach also likes to learn. If the one who teaches manages to transmit the pleasure of teaching, the student feels the pleasure of learning. The more you know, the easier it becomes to learn and build new knowledge.

ADVANTAGES OF THE PARTNERSHIP BETWEEN PARENTS AND SCHOOL

The desired success of education will only happen when family and school work in partnership, and this partnership has been sought for many years in the hope of obtaining positive results in education (Soares, 2010).

"The partnership between family and school must be established from the beginning, it is essential that the mother and father choose an institution in tune with family values" (Tiba, 2008, p. 31). When parents are partners of the school, the students' performance becomes better, regardless of socioeconomic or any other condition. The result of the students' learning is the best possible.

When parents are encouraged to participate as active partners in their children's education, the school can better establish the suggested goals and increase the productivity of school work. Any



educational effort that focuses on the child should include seeking a positive connection between parent and school. To provide a comprehensive education for the child, parents and the school work together to discuss, inform, advise, and guide parents on a variety of issues. This is another educational function that the school performs with parents (Campos, 2023).

When parents attend school according to the guidelines that the group has already established, it can be a really exciting experience. Parents can engage in a variety of activities with their children, including: having lunch together at school events; talk about their jobs or careers; instruct your children in a craft they enjoy, such as weaving yarn or working with clay; storytelling; and teaching dances and songs (Vasconcelos; Santos, 2021).

If all families are part of this family-school partnership, engaged in a relationship where there is respect and reciprocity, surrounded by community spirit, they will aim for educational success.

FINAL CONSIDERATIONS

This work made it possible to understand that a cordial relationship between family and school is of paramount importance, making it clear that both must walk together, as this interaction is necessary for students to have a sequential learning, in which parents collaborate directly with the school's proposals. And the school proposes to interact with the community that surrounds it, thus resulting in a good development and growth for both.

Regardless of their composition or form, families are necessary to ensure the survival and complete safety of children and other members. Above all, it offers the necessary resources for the growth and well-being of its members, along with emotional support.

Both in official and informal schools, it is crucial. This is the area where solidarity is strengthened and moral and humanitarian ideals are assimilated. In addition, cultural values are maintained and generational ties are formed in this area.

In this sense, the family serves both as the center of social activity and as the cradle of culture and civilization. Children in the family who have a good education will be more likely to be creative and productive adults. Families have traditionally had the greatest impact on children's education and, by extension, the formation of their personalities and characters.

Therefore, the family is the basis of all learning in schools. And this is the exact time when schools need to start communicating with their children's parents, asking questions, expressing concerns, and working together to find answers to any issues that may arise. In addition, children benefit greatly from this cooperation between family and school, as they begin to feel protected and supported throughout their learning experience.

Given that learning cannot occur in isolation from feelings, we recognize that learning situations will arise from the emotional bonds that are formed between teachers, parents and



students, as well as from their interactions. This is because harmonious sets are formed in these environments, and these sets are able to provide physical, emotional, social, and intellectual development that takes root and completes itself. First of all, learning requires a willingness to develop fully.

To provide their children and students with a better education, the family and school must work together, accept responsibility for each other, and take joint action. It is possible to think that through this cooperation, individuals will become more involved in their communities, responsible citizens who uphold their decisions, respect the differences of others, and care about creating a more just and compassionate society.

Ultimately, we hope that the family and the school will be able to develop their ideas and work together every day to make this collaboration work, improving education in a genuine and, most importantly, ongoing way.



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SCRUM in Education: An approach to teaching programming in technical courses in Internet Informatics

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ABSTRACT

Currently, technology has attracted attention in several aspects, both in terms of launches and new technologies, as well as the demand for professionals in the area. The search for courses around computer science and programming is growing. In line with this, it is possible to observe that the market is becoming increasingly demanding regarding deliveries. Observing this scenario, the present work aims to propose and evaluate an adaptation to the agile method of Scrum development, for the teaching of programming in technical courses of Internet Informatics. For this, first, the method was adapted to the educational context and used by a class of 20 students, in a development discipline. The results show that the approach can be effective and present positive results in terms of teaching the content.

Keywords: Agile Method, EPT, Internet Computing.

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INTRODUCTION

Due to the growing demand for software products, as well as the technological evolution of recent years, the software market seeks to adapt and adjust to the current scenario. Thus, it can be observed that agile methods were present in this evolution. As pointed out in the *14th Annual State of Agile Report* (VERSION ONE, 2020), Scrum and some related variations are the most used agile methodologies in organizations.

In parallel to this, the demand for professionals in the area of information technology is growing (WOLFF, NORONHA AND ANDRETTA, 2021). Wolff, Noronha and Andretta (2021) point out that the area employs 1,196,000 young people. Moreover, it is notable that access to the internet, and even digital literacy, has been current issues. This means that many people who previously did not use the internet and computing devices now use it for specific purposes.

Considering programming professionals, in addition to undergraduate courses, such as computer science, information systems and software engineering, for example, the national catalog of technical courses includes the Technician course in Informatics for the Internet³. Professionals in this area plan, develop, monitor, structure, code, publish, and maintain web and mobile applications, including the management of structural, visual, and database elements.

Taking into account that students will often be inserted in companies that use Scrum as a development method, it is understood the importance of safeguarding students both quality teaching of the stages and particularities of the method and the programming content. This work addresses the interrelationship between the teaching of programming and Scrum, with the objective of adapting the Agile Scrum Method in technical teaching in computer science to the internet, and to evaluate the perception of teachers and students about the application of the method in the classroom.

To achieve the objective, a work proposal was developed with adapted Scrum, in a class of technical course in computer science for the internet, during the Client-side Programming discipline. The students were separated into Scrum teams, and received subsidies to conduct the activity, creating a relationship with the real environment.

After conducting the project, it was possible to observe and evaluate the results of the products prepared by the students, as well as to collect *feedback* from the participants about the application of the method in the study context. In addition, it was possible to collect and document the points observed by the participating professor.

The results of the study indicated positive aspects in the three dimensions analyzed. The perception of the teachers revealed a good acceptance of the adapted method, demonstrating its effectiveness as a didactic tool. The participating students reported mostly positive experiences,

³ National Catalog of Technical Courses: <http://cnct.mec.gov.br/cursos/curso?id=83>



highlighting significant contributions to their training. The adaptation of the method was carried out as expected, preserving its essential pillars and main characteristics.

This work is organized as follows: first, in Section 2 the fundamentals that guide this work are presented. Section 3 presents the methodology adopted in the project, with all pertinent details. Section 4 presents the results obtained with the project. Finally, in Section 5 the final considerations.

THEORETICAL FOUNDATION

The guiding fundamentals of this work are associated with software programming and development, the Scrum methodology and the technical course in computer science for the internet. Below, these essential concepts for the development and understanding of this project will be presented.

PROGRAMMING AND SOFTWARE DEVELOPMENT

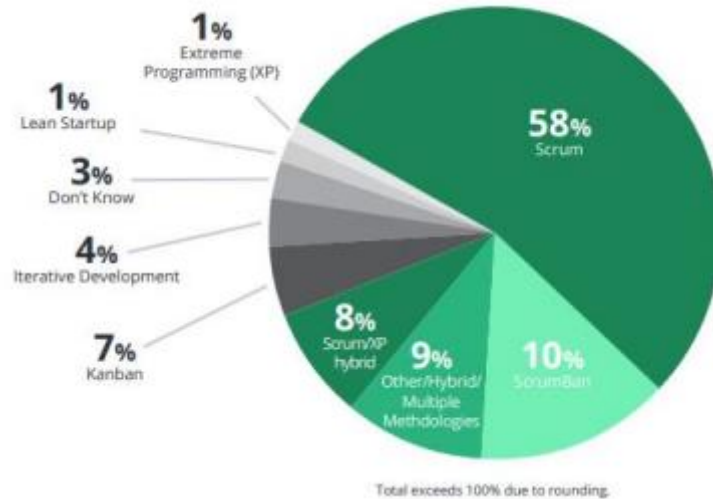
The term programming refers to the language behind the development of software, websites, applications, and various technologies (BALBINO et al., 2021). In this process, a set of instructions is elaborated that a computer can follow to perform certain tasks. Through programming, developers use specific languages to write codes that direct the operation of computers and devices, allowing the creation of technological solutions (BALBINO et al., 2021).

When it comes to software development, there are two approaches that stand out, the traditional approach and the agile approach. As directed by Curcio et al. (2018), there are differences between these two contexts, so that in the traditional context every requirements stage is carried out only in the initial phase of the project, while in the agile context, the requirements can undergo changes and adjustments throughout development (CURCIO et al., 2018; SCHON et al., 2017). Thus, continuous requirements management in agile approaches is essential (SCHON et al., 2017).

SCRUM

Scrum is a framework for developing and maintaining complex products (SCHWABER & SUTHERLAND, 2013). The authors Schwaber & Sutherland (2013) point out that Scrum is a set of guidelines that enable people to approach and solve complex and adaptive problems, productively and creatively delivering products with the maximum possible value. As pointed out in the *14th Annual State of Agile Report* (VERSION ONE, 2020), Scrum and some related variations are the most used agile methodologies in organizations (see Figure 1).

Figure 1: Agile methodologies

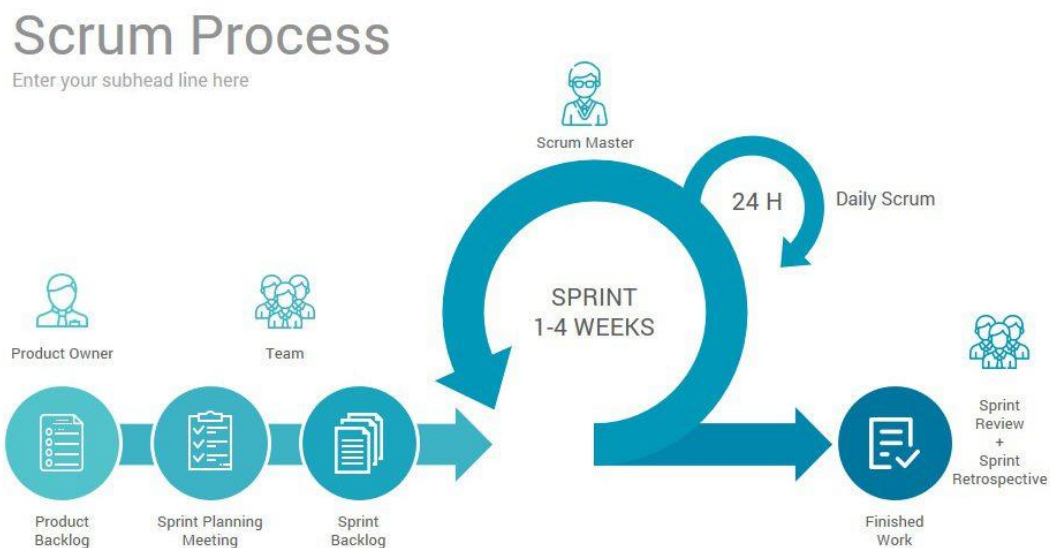


Fonte: 14th Annual State of Agile Report. (digital)

Scrum has been used to manage the development of complex products since the early 1990s (SCHWABER & SUTHERLAND, 2013). Scrum is not a process or a technique for building products; rather, it is a framework within which you can employ various processes or techniques (SCHWABER & SUTHERLAND, 2013).

The Scrum framework is composed of Scrum teams, linked to roles, events, artifacts, and rules (see Figure 2). Each element within this framework has a specific function and is crucial to the application and effectiveness of Scrum.

Figure 2: Scrum Process



Source: Training Marketing Team

TECHNICAL COURSE IN COMPUTER SCIENCE FOR THE INTERNET

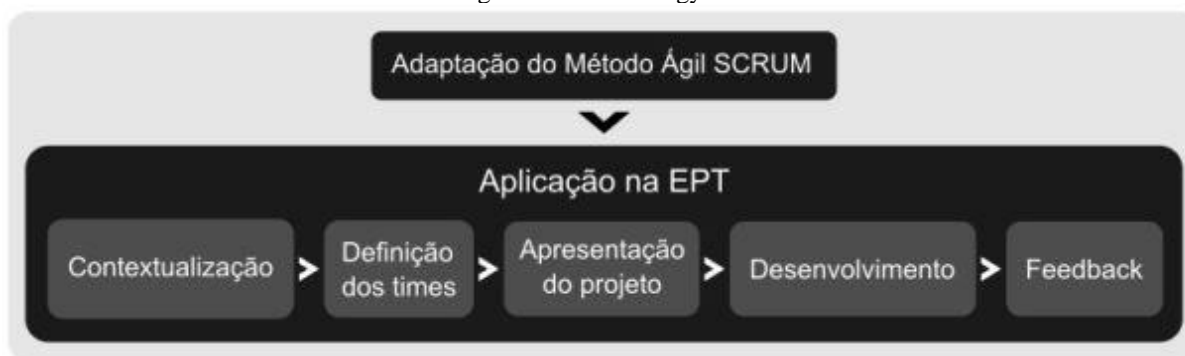
The Technical Course in Informatics for the Internet is part of the National Catalog of Technical Courses⁴. Among the activities developed by professionals in this area, *client-side* development; interface development for web pages; front-end testing; database modeling and implementation; *back-end* testing; web systems development; among other activities.

It is expected that the graduate of this course will be able to develop web systems, produce interfaces, databases and functionalities, according to methodologies and standards of quality, usability, ergonomics, accessibility and security.

METHODOLOGY

To achieve the established objective, a methodology was defined (see Figure 3) divided into two stages. The first stage consisted of the adaptation of the Agile Scrum Method, followed by its implementation in the context of technical education.

Figure 3: Methodology used



Source: from the author

SCRUM'S ADAPTATION

To adapt the Scrum method, it was first necessary a detailed analysis of the method itself, which is usually intended for a real development environment. This analysis sought to identify key factors of the method, that is, characteristics that are essential for its use.

After understanding the official method, the adaptation to the desired context began. Considering all the details of Scrum, the method was divided into three parts: Pillars, Events, and Roles.

According to Schwaber & Sutherland (2017), the Pillars refer to the fundamentals that support the method, such as transparency, inspection, and adaptation. Events encompass the scheduled activities that structure and organize the workflow, such as planning meetings, reviews,

⁴ Link: <http://cnct.mec.gov.br/cursos/curso?id=83>



and retrospectives. Finally, Roles define the responsibilities of team members, including the Scrum Master, Product Owner, and Development Team.

Tables have been developed (which will be presented in Section 4) for each part of the Scrum method. Each of them was separated into three columns, so that the first column demonstrated the terms (Pillars, Roles and Events), in the second column the definitions of these in their original form and the third column the adapted definition.

To make the adaptation, it was necessary to consider the classroom context, specifically in the technical course in computer science for the internet. The adaptation was conducted in stages, so that, for each pillar, role or event, the original definition was read, understood and analyzed for its applicability in the school environment. This process was carried out in detail for each of the topics.

The importance and need for teacher participation and experience at this time is highlighted, as this allowed the consideration of routine and common situations and behaviors in the classroom. This was fundamental to ensure that the adaptation was in fact appropriate for the educational context.

IMPLEMENTATION OF THE PROPOSAL IN EFA

The adaptation of the agile method aimed to apply it in the context of technical education. In this sense, the proposal of this work consisted of the second crucial phase: to apply the method in a real environment of programming study, specifically in the technical course in computer science for the internet. The proposal was carried out in a class composed of 20 students, with an average age of 18 years. It is important to note that none of the participants had previous knowledge about the Scrum method, since they were all at the beginning of their professional careers.

Over the course of a week, during school days, students were actively involved in the proposed scenario. The project was conducted over four hours a day, with 15-minute breaks, in a computer lab. This configuration allowed all students to have access to computational devices for the development of the proposed project.

Contextualization

The initial phase of the application involved contextualizing the students in relation to the Scrum method in its original form. This stage played a key role in allowing students to understand not only the concepts inherent to the method, but also the reason why it is widely adopted in the context of development, highlighting the importance of acquiring knowledge to integrate teams that use this method throughout their professional careers. This phase was conducted through the method



of dialogued exposition⁵, which enabled the interaction of the students, allowing them to clarify doubts at any time and share different perspectives.

A slide presentation was prepared to facilitate the explanation of the method. During this presentation, each concept of SCRUM was carefully addressed, offering detailed information for an understanding of the method. At the end of the contextualization, this presentation was made available to the students, serving as a support resource and a reminder of the concepts, in case they needed to remember any information.

Definition of the teams

In the adapted context of the project, each Scrum team consisted of four participants, totaling five teams. The selection of members followed a specific criterion: initially, five volunteers applied to assume the role of PO (Product Owner) in their respective teams, with emphasis on the need for an appropriate profile based on the concepts studied.

After choosing the POs, each one selected a colleague to act as Scrum Master, considering the understanding of the content presented during the contextualization phase and the ability to play this role. That left ten students to form the development teams. To compose the Scrum teams, the teacher in charge selected a student for each team, taking into account the profile and skills demonstrated throughout the classes, aiming to create balanced teams. The last member of each team was defined by lottery.

In this way, five Scrum teams were established, in which members created a name for their teams, consisting of a PO, a Scrum Master and two developers.

Presentation of the project

With the teams already formed, a presentation of the project that would be developed throughout the week was held, focusing on the overview and avoiding specific details, which would be addressed later. The project consisted of creating the *front-end* of an equipment maintenance demand management system, covering corrective, preventive, and other categories.

In this stage, it is highlighted that the teacher played the role of client, presenting the demands, preferences, perspectives and expectations in relation to the deliveries. During the presentation of the project, the client (represented by the professor) held meetings with the POs of each team to gather requirements, seeking to provide more details about the demands. It is important to note that the professor, at this moment, avoided the use of common technical terms among

⁵ An educational strategy in which the teacher acts as a mediator, facilitates the active participation of students, considering their previous knowledge and encouraging questioning.



developers, assuming the posture of a lay client in programming. This approach sought to simulate a real context as much as possible, aiming to improve the students' skills.

Development

With the requirements properly documented, the teams began the development phase of the project. Following the adaptation mentioned in Section 3.1, each day was treated as a *sprint*. At the end of each day, the teams committed to delivering an increase in the product. For this, in addition to the beginning of the class, considering 15-minute intervals, the teams performed the so-called Daily Scrum when returning from the break.

During development, the POs had the function, in addition to assisting in development, of providing support regarding the doubts that arose. The Scrum master aimed, in addition to assisting in development, to keep the team within the proposed method. Dialogue between students and mutual contribution within the team was encouraged. Just as it is provided for in the method.

In addition, the POs took responsibility for defining the prioritization of the *product backlog and the sprint, without direct interference from the faculty member in the students' decision-making.*

The professor encouraged students to seek solutions to the challenges encountered within their own teams, aiming to make the most of individual skills and promote communication and collaborative work. However, at certain times, it was necessary to offer technical support to the teams, limited to the content of the disciplines in progress, without interfering in decisions related to the project itself.

The teams adopted the Trello tool for the management of activities, requirements and support in general, with each team having its own board on the platform. It is important to mention that the professor was included in the staff of all the teams, allowing him to follow and observe the different approaches adopted by the teams in the management of the projects.

In order to ensure daily deliveries of increments in the software, students were brought together in a virtual classroom through *Google Classroom*⁶. To facilitate this process, activities were created for each day, allowing teams to make the corresponding deliveries. The teams delivered their codes, making them available for testing.

Feedback

At the end of the project, a stage was carried out to capture the students' perceptions regarding the application of the adapted Scrum method during classes, aiming to understand not only the teacher's vision, but also the students who effectively participated in the teams.

⁶ <https://edu.google.com/>

Initially, an informal dialogue was held between the students and the professor. In this context, students were encouraged to sincerely express their perceptions regarding the project. Subsequently, using the Google Forms platform⁷, a questionnaire containing nine questions about the use of Scrum during classes was sent to the students. The form included eight open questions to collect information in a qualitative way and a final question based on an evaluation scale, seeking to obtain a quantitative perception of the acceptance of the method by the students.

Table 1 presents the questions made available to students in order to collect feedback.

Table 1: Feedback Collection Questions

Question	Question
1	What were the two main benefits you identified when using the SCRUM methodology during programming classes?
2	How did these positive points directly impact your learning process?
3	What were the two main challenges or negative aspects you encountered when using SCRUM in programming classes?
4	How did these negative points influence your learning experience and interaction with the methodology?
5	How would you describe your general perception of using the agile SCRUM method during programming classes?
6	To what extent did the application of SCRUM contribute to the dynamics of the classes and to the achievement of the learning objectives?
7	In your opinion, what contributed most to your training when using SCRUM in programming classes?
8	What are the specific points that you consider that can be improved in the application of SCRUM in programming classes?
9	On a scale of 1 to 10, how do you rate your learning when using SCRUM in programming classes?

Source: author.

Participation in the *feedback* stage was voluntary, ensuring the anonymity of the students. The link to the form was made available so that participants could respond, without the obligation to participate. In total, there was the participation of 16 respondents. The full answers are found at the link⁸.

RESULTS AND DISCUSSION

The present study presents three main results: the adapted method, the teacher's perceptions about the application of the method and the students' perceptions, based on their feedback.

ADAPTED METHOD

In this section, the modifications and adaptations made to the original method are detailed. The adaptation process was carried out following three perspectives, namely: regarding the Pillars, the Roles and Events. Thus, the results were presented in a similar way. Table 2 presents the

⁷ <https://www.google.com/intl/pt-BR/forms/about/>

⁸ <https://tinyurl.com/uyn6a6m6>

adaptation made to the Scrum pillars (transparency, inspection and adaptation). It can be observed that there were no significant changes regarding the Scrum pillars, since they are the basis of the method and their main characteristics must be preserved. We sought to simplify the description of the topics as much as possible, aiming at ease of understanding and easy adaptation to teachers who are not specialists in agile methodologies.

Table 2: Adapting the Scrum Pillars

Pillar	Guia Scrum (SCHWABER & SUTHERLAND, 2013)	Adaptation
Transparency	Significant aspects of the process should be visible to those responsible for the results. For this, transparency based on a common standard is necessary, allowing for a shared understanding among observers.	Keep information about progress and goals visible, with regular feedback, so everyone knows the status of activities and what's expected.
Inspection	Scrum users should frequently inspect artifacts and progress for variance.	Frequently review the progress of activities and projects to identify and correct deviations.
Adaptation	Adjustment must be performed quickly to minimize deviations. Scrum prescribes four formal events within the Sprint: Sprint planning meeting, daily meeting, Sprint review meeting, and Sprint retrospective.	Perform quick adjustments at any time to correct deviations.

Source: author.

In addition to the pillars of the method, it was necessary to adapt to the Scrum Roles (product owner, development team and scrum master). The adjustments made are presented in Table 3.

It can be observed that the adapted method directly mentions the educational context, through the terms "student" and "students". This adaptation seeks to work in a more specific way, without requiring correlation on the part of the teacher or effort to understand.

Table 3: Adaptation of Scrum Roles

Paper	Guia Scrum (SCHWABER & SUTHERLAND, 2013)	Adaptation
Product Owner (PO)	The person in charge must maximize the value of the product and the work of the Development Team, clearly express the items in the Backlog, order them to better achieve the goals, ensure the value of the work done, ensure the visibility and clarity of the Backlog, and ensure that the Development Team understands the items at the necessary level.	The student is tasked with maximizing the value and effectiveness of the project. It defines and prioritizes tasks, ensuring alignment with goals. It is the point of contact with the faculty member (representing the client) who defines the project requirements. The PO ensures that the team understands and executes what was requested, keeping the project clear and accessible to everyone.
Development Team	Delivers the product at each Sprint, being responsible for creating the increments. They are self-organized and possess all the necessary skills to perform the job efficiently and effectively, ranging usually from 3 to 9 members.	There should be 3 to 5 students who work together to deliver a working version of the project at the end of each stage. They must be organized and trained to plan and manage their own work autonomously. There must be collaboration within the team. Is cross-functional, having the skills necessary to get the job done and achieve project objectives.
Scrum Master	The Scrum Master is responsible for ensuring that Scrum is understood and applied correctly. He acts as a servant-leader for the Scrum Team, ensuring that the team follows Scrum theory, practices, and rules. In addition, the Scrum Master helps people outside the Scrum Team understand how to interact in a useful way with the team, maximizing the value created by Scrum.	The Scrum Master is responsible for ensuring that the principles and practices of Scrum are understood and applied by the group of students. He acts as a guiding leader, helping the team to follow the guidelines and rules of Scrum. In addition, it helps other students understand how to interact effectively with the Scrum Team, identifying beneficial interactions and optimizing them to maximize the value created by Scrum.

Source: author.

The last adaptation perspective addressed the Scrum Events, as shown in Table 4. This perspective was the one that presented the most changes in fact, in relation to the original method. This is because the main difference in contexts is in relation to the time dedicated to projects. In the professional environment, employees usually allocate approximately eight hours a day to the project (considering a 40-hour workweek). The educational environment differs from dedicating daily hours to the project. Furthermore, regarding the time available for each Sprint (see Table 4), since the schedule available for conducting the disciplines must be respected and generally many other issues must be worked on within the discipline.

Table 4: Adapting Scrum Events

Event	Guia Scrum (SCHWABER & SUTHERLAND, 2013)	Adaptation
Sprint	It is a period of one month or less where a usable version of the product is developed. During the Sprint, no changes are made that compromise the objective, quality goals are maintained, and the scope can be adjusted as needed. Each Sprint is a short-term project, providing continuous predictability, inspection, and adaptation, while limiting risk to one month.	Period of a class day, where an incremental and potentially usable version of the product is developed. Each sprint (one day) is like a short-term project, providing predictability, inspection, adaptations, and continuous improvements.
Sprint Planning Meeting	The work to be carried out is planned collaboratively by the Scrum Team. This meeting has a time limit, usually eight hours for a month-long Sprint, and is led by the Scrum Master, ensuring that the event takes place and that everyone understands its purpose. During this meeting, questions such as what can be delivered as a result of the next Sprint increment and how the necessary work will be carried out are addressed.	In the "Sprint" planning meeting (which corresponds to a class), the work to be carried out is planned collaboratively by the group of students. This meeting has a time limit of 30 minutes and is conducted by the Scrum Master, ensuring that the event takes place and that everyone understands its purpose. During this meeting, issues such as what can be achieved during class and how the necessary work will be carried out to achieve the learning objectives are discussed.
Daily Scrum	The Daily Scrum Meeting is a 15-minute event, where the Development Team synchronizes and creates a plan for the next 24 hours. During this meeting, the work since the last meeting is inspected and the work to be done before the next meeting is forecasted. The Daily Meeting is held at the same time and place each day to reduce complexity. During the meeting, the members of the Development Team clarify: What did I do yesterday that helped the Development Team meet the Sprint goal? What will I do today to help the Development Team meet the Sprint goal? Do I see any obstacles that prevent me or the Development Team from meeting the Sprint goal?	Event of no more than 15 minutes, which should occur every 2 hours, where students synchronize and plan their next activities. During this meeting, progress since the last meeting is reviewed and tasks to be accomplished before the next meeting are planned. Keeping the same time and place, students answer the following questions: What have I done since the last meeting to contribute to the progress of the group? What will I do in the next few hours to help the group achieve our goals? Is there an obstacle that is hindering my own progress or the progress of the group?
Sprint Review and Sprint Retrospective	The Sprint Review is performed at the end of the Sprint to inspect the increment and adapt the Product Backlog if necessary. During the Sprint Review, the Scrum Team and stakeholders collaborate on what was done in the Sprint and plan the next actions to optimize value. This informal meeting, intended to motivate and get feedback, lasts 4 hours for a month-long Sprint, and is shorter for smaller Sprints. The Scrum Master ensures the accomplishment and understanding of the meeting's objective, teaching everyone how to keep it within the time-box. The Sprint Retrospective is an opportunity for the Scrum Team to inspect itself and plan improvements for the next Sprint. It takes place after the Sprint Review and before the planning meeting for the next Sprint, lasting three hours for a one-month Sprint, and shorter for smaller Sprints. The Scrum Master ensures the accomplishment and understanding of the purpose of the meeting by participating as an auxiliary member due to their responsibility for the Scrum process.	The Sprint Review and Sprint Retrospective are carried out jointly. It is the moment when students and others involved meet to analyze the progress achieved during the study period and identify opportunities for improvement. During this meeting, the focus is on reviewing what has been learned, celebrating successes, and identifying challenges faced. In addition, participants collaborate to identify ways to enhance the learning process and maximize future outcomes. The Sprint Review and Sprint Retrospective provide a valuable opportunity for reflection, continuous learning, and students' personal and professional development as software developers.

Source: author.



TEACHER'S PERSPECTIVE

Another result obtained with the execution of this project was regarding the perception of the participating teacher about the application of the adapted method. Considering the limitations of classes and teams, only one teacher applied the method. Their perceptions were collected through an experience report.

Among the points observed, the professor reported that the students felt motivated by a different and more participatory approach. They showed interest in knowing more about the Scrum method, and were open to knowing the peculiarities of the method.

It was reported that, during the division of the roles, the students' profiles were present. Thus, more participative and communicative students were willing to lead the roles of PO. Those interested in taking on the role of Scrum master were the students who have a more methodical profile. The less participative students in class did not express interest in taking on roles other than the Development Team.

Analyzing the general context, it was possible to notice that the students were able to understand the Scrum method in its original format, even using the proposed method (adaptation). The professor also noted that the students were comfortable for new challenges using the method. This achieves one of the objectives, which is to provide subsidies so that students can develop the necessary skills to use agile methods in real work environments.

The main negative point reported by the professor refers to the participation of students who worked with the role of "development team". It was possible to observe that the development team at times felt comfortable not having the greatest responsibilities before the group. Involuntarily, these students saw at times the PO and Scrum Master as the only ones responsible for the project, thus relieving the responsibility of the other team members. This fact is not desirable, since it is desired that all members of the group divide the responsibilities in a balanced way, regardless of the role assumed in the project.

STUDENT PERSPECTIVE

In this section, students' perceptions of the adapted method are explored, based on their feedback. Their experiences and opinions about the method were analyzed, as well as suggestions for future improvements.

The main benefits identified by students when using the Scrum methodology during programming classes include improved organization and distribution of tasks, increased collaboration and teamwork, and flexibility and adaptability, as can be seen in Table 5.

Table 5: Student Feedback - Question 01

<p>What were the two main benefits you identified when using the SCRUM methodology during programming classes?</p>
<p><i>"division of activities and organization of projects"; "More organization and good distribution of time and tasks for everyone in the group"; "Learning by working as a team"; "The separation of the 'tasks' of each one in the team, so to speak, helped in the organization of the group to have ideas, separate functions and etc."; "It was very positive, the methodology aims at a single and agile process in a single objective"; "I can't say"; "It made it much easier to separate tasks and communicate between the team, speeding up the delivery of work"; "The main benefit I noticed was that our work team was able to bring an organization and requirements that will be done on the day much more practical and faster, having a distribution of tasks and less time spent"; "The teamwork has been greatly optimized, the simple matter of getting everyone up to date on their respective individual jobs makes the workflow more enjoyable and less burdensome for everyone involved"; "I felt that it was more dynamic and allowed everyone in the group to collaborate"; "To be able to organize the development group"; "Among so many objectives, the two main ones can be highlighted: the increase in flexibility and adaptability of each member of the group to the project worked on and also a higher quality of service, always maintaining a clean path, each member with their proper function"; "Better organization of group activities and better communication among participants"; "Two positive points, in my opinion would be both communication and quality of teamwork, due to the fact that Scrum about its methods"; "Clearer organization of the project and faster execution"; "It makes everyone focus on work and makes everyone bring more results".</i></p>

Source: author.

Many students highlighted how Scrum helped to organize activities and projects more clearly and efficiently, with answers such as *"division of activities and organization of projects"* and *"more organization and good distribution of time and task for everyone in the group"*. This structure helped to speed up the delivery of work and facilitated communication within the group, making the work more enjoyable and less burdensome, as mentioned in *"it made it much easier to separate tasks and communicate between the team, making it speed up the delivery of work"*.

Another significant benefit was learning from working in a team. Comments such as *"learning by working as a team"* and *"teamwork has been greatly optimized"* indicate that Scrum has fostered effective collaboration among students. Constantly updating on individual and collective progress has helped keep all group members engaged and focused, resulting in a more dynamic and productive work environment. The flexibility and adaptability provided by Scrum were also valued, the students highlighted the ability to quickly adjust plans according to needs, as noted in *"increased flexibility and adaptability of each member of the group to the project worked on"*.

Additionally, the Scrum methodology suggests an improvement in communication between participants, which is essential for the success of collaborative projects. Answers such as *"better communication between participants"* and *"made it much easier to separate tasks and communicate between the team"* show that the Scrum structure, with regular meetings and clear objectives, promoted more efficient and effective communication.

It is important to highlight that not all students were able to identify clear benefits, as indicated by the answer *"I can't say"*. In addition, the sample of responses may reflect a positive bias due to the specific context and individual perceptions of the students. Extending this analysis to



different educational contexts can provide a more comprehensive view on the effectiveness of Scrum in the learning environment.

Table 6: Student feedback - Question 02

How did these positive points directly impact your learning process?
<i>"practicality and agility of projects"; "yes"; "In a future, knowing how to work as a team"; "I agree that after scrum it is easier to visualize a way of working in a group, in a less limited, lighter way"; "drastically, with agility in the creation process"; "I can't say"; "It's easier to divide each part of the work, and everyone on the team can collaborate"; "A much more elaborate group organization, separating tasks that many have more ease and difficulty, so I was able to perform well in many activities"; "You learn what you need to do your job and you also learn a little bit of the other's work. We also learned that it is an optimized way of working as a team"; "It allowed collaboration between my team members in times when we had difficulties"; "be more productive"; "Provided a clearer understanding of projects, promoting a comprehensive vision and improving continuous adaptation to change"; "Greater ease to understand how the project was going"; "Points that impacted were the fact that you can work in a successful team by having the Scrum method and the tasks make it easier"; "They showed a better way to start planning a goal"; "It helped me stop procrastinating."</i>

Source: author.

Table 7 presents the answers regarding the main challenges or negative aspects perceived when using Scrum during programming classes. From these answers, it is possible to identify common patterns of experiences and challenges shared by students. This provides important *insights* to improve the implementation of Scrum in the educational environment and improve the learning experience for students.

Table 7: Student Feedback – Question 03

What were the two main challenges or negative aspects you encountered when using SCRUM in programming classes?
<i>"judgment as a client and organization of projects of importance"; "I don't remember a single negative point"; "A well-organized work, The lack of courage of a member to take the position"; "maybe in relating the profile of each person to each function, because we don't always assign tasks to people specifically trained to solve that"; "adaptability to change"; "I can't say"; "The separation of tasks for each team member"; "Some negative point that can occur is the lack of commitment and collaboration of the team, occurring instead of using SCRUM to raise requirements and tasks, use it to discuss other types of issues"; "as it was not in a professional sector in fact, people had their difficulties to get into character"; "The main difficulty encountered was to understand how the SCRUM method worked and how we were going to apply it"; "Responsibilities and division of tasks"; "When using the methodology, a VERY impactful challenge in our project is that it required the EXTREME collaboration of all team members, so that a continuous workflow was maintained. Another point I can mention refers to the commitment of the team, in cases of lack of commitment, it hindered a good part of the work"; "In the division of activities there may be some discussions and difficulties with some participants who did not do their part"; "In a matter of discussing team choices, and there may be a conflict of your choices for using Scrum"; "Adapt to the circumstances and communicate clearly with the other team members"; "The biggest challenges were working hard to show results and paths to be followed."</i>

Source: author.

Students' feedback on the challenges or negative aspects of using Scrum in programming classes reveals a range of perceptions and experiences. It is interesting to note that some answers highlight positive points, such as the organization of work, the separation of tasks and adaptability to change, while others reflect more specific challenges, such as the lack of commitment of the team, difficulties in the division of activities and communication between members.



An important note is that some students mention not having identified any negative points, which may indicate different levels of experience or understanding of Scrum. This underscores the importance of a good understanding of the method and proper implementation to ensure positive results. One student said, *"I don't remember any negative points."*

Another relevant point is the issue of team commitment, highlighted by several participants. One of the students commented, *"A VERY impactful challenge in our project is that it required the EXTREME collaboration of all team members to maintain a seamless workflow. Another point I can mention refers to the commitment of the team, in cases of lack of commitment, it hindered a good part of the work"*. This suggests the importance of a collaborative and engaged culture for the success of the Scrum methodology.

Additionally, the need to adapt to circumstances and clear communication between team members are essential to overcome challenges and ensure better method execution. One of the students highlighted: *"The separation of tasks for each team member"* as one of the challenges, while another mentioned: *"Adapting to the circumstances and communicating clearly with the other team members"* as a difficulty encountered.

Overall, feedback provides valuable insights into students' perceptions and experiences with Scrum. They highlight both the benefits and challenges of the methodology, emphasizing the importance of careful implementation, team commitment, and good communication to achieve the positive results.

The negative points identified by students when using Scrum in programming classes (see Table 8) influenced their learning experiences and interaction with the methodology in several ways.

Some students reported that the *"lack of practice for the job market"* and the *"lack of commitment"* of some team members resulted in delays in work, making it difficult to effectively apply Scrum. One student mentioned: *"I mainly find that doing group work has many people not doing their tasks and staying idle, often having one or another person to do many activities."* This type of situation can generate overload for some members, compromising the collaborative learning experience that Scrum aims to provide.

Table 8: Student Feedback – Question 04

<p>How did these negative points influence your learning experience and interaction with the methodology?</p> <p><i>"lack of practice for the labor market"; "no"; "To a delay in all work"; "little denial, it didn't hinder my team so much, but it is to be considered that in other situations this problem may hinder"; "We cannot say negative experience, but rather in great stages to be long."; "I can't say"; "It made it a little complex at first, but then it got easier."; "I mainly think of doing group work that has many people not performing their tasks and being idle, often having one or another person to perform many activities."; "Sometimes you couldn't take the dynamic very seriously, because there was no real commitment."; "There were some delays in being able to implement this method"; "I don't think they are so important to influence learning"; "In a way, these negative points ended up causing others that influenced my experience, as well as the pressure with time management, causing stress, thus making even clearer the importance of internal communication in a group that needs teamwork."; "Leaving some people overloaded and others with little work."; "Different opinions that cause conflicts because not everyone on the team agrees with your ideas."; "They made me reflect on work in real situations"; "They actually helped with learning."</i></p>

Source: author.

The initial difficulty with the methodology was a recurring point, but many students recognized that this complexity was overcome over time, as indicated in the sentence: *"It was a little complex at first but then it became easier"*. The pressure with time management and the need for effective communication within the team were also aspects that negatively impacted, generating stress and highlighting the importance of internal communication. One student reflected: *"In a way, these negative points ended up causing others that influenced my experience, as well as the pressure with time management, causing stress, thus making even clearer the importance of internal communication in a group that needs teamwork."* These challenges, while problematic, have also provided valuable learning opportunities about teamwork and project management in real-world situations.

The students' general perceptions regarding the use of the agile Scrum method during programming classes were, for the most part, very positive, as can be seen in Table 9. Many highlighted the effectiveness of the method in quickly delivering the minimum viable product to the customer, allowing a clear perception of the final product. One student mentioned: *"high quality if applied correctly like this, being able to deliver the faster the minimum viable product to the customer, to have a perception of the final product"*. In addition, the methodology was considered very useful for learning and understanding how Scrum works and its functionalities. One student reported: *"In fact, it was very useful for my learning and seeing how this SCRUM works, knowing more about it and its functionalities"*.

Table 9: Student Feedback - Question 05

How would you describe your general perception of using the agile SCRUM method during programming classes?
<p><i>"high quality if applied correctly like this, being able to deliver the fastest the minimum viable product to the customer, to have a perception of the final product"; "In fact, it was very useful for my learning and seeing how this SCRUM works, to know more about it, about its functionalities"; "A very good learning for the future"; "very simple to understand and put into practice, being effective in many cases, where you know how to use it"; "The Scrum methodology encourages a practical and results-oriented approach to students in an agile way."; "It makes things better, as it makes us able to adapt better to the customer and still make it possible to have better interaction between developers"; "I thought it made it much easier to carry out the work."; "It is clearly necessary, it always happens that many groups have idle members or without ideas, so SCRUM is something that when used can transform the formation of a good work."; "Very good, the method is effective for development and reduces unnecessary efforts."; "It is a way to speed up the programming process formed by groups"; "It was interesting because it flowed well"; "I would describe it positively, as it provided me with a practical and collaborative approach. Despite some challenges, the methodology stimulated agile adaptation, improved communication and promoted the direct application of the knowledge previously studied."; " Very productive. It brought a new way to work in a group that helped in communication."; " It's an excellent method, it can help a lot in a way for your team that will work together, specifically agile, adaptation and how to collaborate."; " Objective"; "My perception is that it makes you challenge yourself to deliver before the deadline, so you have a greater work focus."</i></p>

Source: author.

The practical applicability of Scrum has also been frequently praised. Many students appreciated how the methodology encouraged a practical and results-oriented approach, making it easier to carry out the work. One participant commented: *"I thought it made it much easier to carry out the work"*, while another highlighted: *"The Scrum methodology encourages a practical and results-oriented approach to students in an agile way"*. The methodology was seen as a way to improve interaction between developers, increase productivity, and reduce unnecessary efforts. As one student put it, *"It's a way to speed up the process of programming formed by groups."* These feedbacks indicate that, despite the challenges faced, the use of Scrum in classes provided a collaborative and effective learning experience, improving communication and promoting the direct application of the knowledge acquired.

As can be seen in Table 10, the students positively evaluated the application of Scrum, highlighting several ways in which it contributed to the dynamics of the classes and to the achievement of the learning objectives. One student commented that the method contributed *"on a large scale"* and that *"communication mainly improved, in coming up with ideas together mainly"*. Other students noted that the application of Scrum made classes more dynamic and practical, simulating the real work environment. One student reported: *"a more practical dynamic, simulating the real job market"*.

Additionally, the Scrum method facilitated communication between team members and allowed everyone to track progress. As one student stated, *"By making communication between members simpler and by having everyone keep track of progress."* In addition, Scrum helped to deliver group work in a short time, promoting organization and ease. One student mentioned, *"I think*



SCRUM mainly contributed to delivering group work in a short time, so the team was able to have a great development in a short time with a lot of organization and ease thanks to SCRUM."

Table 10: Student feedback - Question 06

<p>To what extent did the application of SCRUM contribute to the dynamics of the classes and to the achievement of the learning objectives?</p>
<p><i>"high"; "yes, in my view, it contributed a lot to the dynamics in the classroom and to the achievement of my learning"; "On a high scale"; "in communication mainly there was an improvement, in coming up with ideas together mainly"; "a more practical dynamic, simulating the real labor market."; "That it is possible to see the product, to know in which part it is legal or not, always thus generating dynamic issues"; "Making communication between members simpler and making everyone follow the progress."; "I think SCRUM contributed mainly to delivering group work in the short term, so the team was able to have a great development in a short time with a lot of organization and ease thanks to SCRUM."; "It made the classes dynamic, forcing greater interaction between those involved."; "It allowed that throughout the development process, all members were situated that each was developing"; "I think it was very important for us to do a good job"; "Through the methodology, she was able to contribute to promoting efficient collaboration of team members, allowing quick adaptation and developing practical skills. Contributed significantly to the achievement of the learning objectives, providing an experience closer to the 'real world' of work."; " He brought something that can be used in the field of work to the classroom, giving us an experience with the method."; " In my opinion, the dynamics are division of labor, daily meetings and the follow-up also includes that."; " Sometimes it was a little confusing, but it worked well"; "It reduced the conversation and increased the result".</i></p>

Source: author.

Students identified several aspects of Scrum that contributed significantly to their education. See Table 11. Many mentioned the importance of division of tasks and the assignment of positions. One student highlighted: *"jobs with assignment of positions"*. The improvement in communication and collaboration was another crucial point, as indicated in the answer: *in communication mainly there was an improvement, in coming up with ideas together mainly"*.

The practical experience provided by the method was highly valued. One student commented: *"The experience itself in using this method for development, since the vast majority of companies use this method"*. Another student highlighted the efficiency and agile mindset provided by Scrum: *"What contributed the most was the efficient collaboration and agile mindset. The direct application of the situations in real projects strengthened my understanding, while keeping the focus on communication and continuous adaptation improved my personal skills and my approach to the challenges faced in software development."*

Table 11: Student Feedback - Question 07

In your opinion, what contributed most to your training when using SCRUM in programming classes?
<p><i>"jobs with assignment of positions"; "the division of tasks and on time acted the most"; "Companionship"; "in communication mainly there was an improvement, in coming up with ideas together mainly"; "Agility in processes, tactics for working with Scrum."; "I can't say"; "It allowed me to better understand each part of the work."; "Have a team positioning, and also know how to divide tasks that need to be executed, having a good plan so that you can complete something well prepared that needs to be delivered to someone."; "It created in me the idea of teamwork in the development sector. Before I didn't know what it was like."; "The experience in using this method for development, since the vast majority of companies use this method"; "yes"; "What contributed the most was the efficient collaboration and the agile mindset. The direct application of the situations in real projects strengthened my understanding, while keeping the focus on communication and continuous adaptation improved my personal skills and my approach to the challenges faced in software development."; "It showed how group work is in the corporate environment and how the SCRUM method can facilitate these projects."; "It facilitates many things such as ease with work, if you have difficulty it is a simple thing to contribute to help the team participant."; "The form of organization"; "Results of activities".</i></p>

Source: author.

The students suggested several areas of improvement for the application of Scrum in programming classes. The clear definition of the roles of each team member was an aspect mentioned by several students. One student said: *"I believe that making clear the roles of each member of the group so as not to bring problems in the divisions of labor."* Others suggested the need for more careful selection of teams, ensuring that member workflows complement each other. One student noted, *"More thorough team selection, not necessarily people who already get along, but people whose workflows complement each other."*

In addition, some students proposed the active participation of the instructor in some Scrum sessions to provide new perspectives and ideas. As one student suggested: *"I think that some Scrum instructors could participate together with the team, it is not necessary to be all, but with the help of someone outside the group it can generate new visions, so the members do not get stuck in their ideas and can increasingly improve them"*. Others recommend more comprehensive initial training and balanced time management to optimize the experience with the method.

Table 12: Student feedback - Question 08

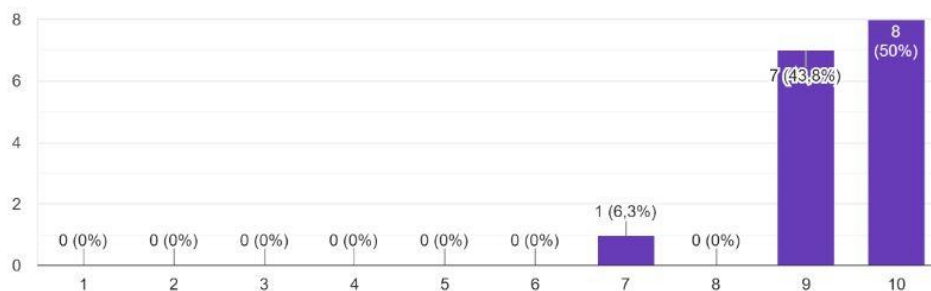
What are the specific points that you consider that can be improved in the application of SCRUM in programming classes?
<p><i>"interaction with team members outside of prioritizing high-risk activities"; "I don't know in my view everything was well explained and with very good works"; "I think this method is good enough"; "in the decision of the leaders, who will be whom, etc."; "I can't say"; "In defining the role of each team member."; "I think that some SCRUM the instructor could participate together with the team, not being necessary to be all, but with the help of someone external to the group can generate new visions, so the members do not get stuck in their ideas and can increasingly improve them."; "A more thorough selection of staff, not necessarily people who already get along but people whose workflows complement each other."; "In addition to the collaboration of the entire team involved, specifically define the roles of the Scrum Master and the Po"; "knowing how to lead better"; "A more comprehensive initial training, balanced time management, evaluation and the possibility of integration with other agile methodologies. These improvements aim to optimize the experience and align SCRUM more effectively with the course objectives."; " I believe that making clear the roles of each member of the group so as not to bring problems in the divisions of labor."; " Thus, it could improve the team ideas more because there are cases where people do not accept the other's idea and go on. But not liking ideas is normal but they can improve instead of fights or conflicts between the team."; " oh I don't know"; "I don't know how to give an opinion."</i></p>

Source: author.

The results obtained from the question "On a scale of 1 to 10, how do you evaluate your learning when using Scrum in programming classes?" reveal a largely positive evaluation of the use of this methodology. Among the participants, one person gave a score of 7, seven people gave a score of 9, and eight people evaluated with the maximum score, 10, as can be seen in Figure 4.

Figure 4: Assessment of learning through Scrum

Em uma escala de 1 a 10, como você avalia seu aprendizado ao utilizar o SCRUM nas aulas de programação?
16 respostas



Source: author.

The score of 7, despite being the lowest among the answers, still indicates a very favorable perception, suggesting that even those who may have encountered some difficulties or limitations in the use of Scrum recognized its educational value. The predominance of grades 9 and 10 demonstrates that most students considered Scrum extremely effective for their learning. The seven grades of 9 point to a near-perfect experience, suggesting that these students saw great value in the methodology, but perhaps identified small aspects that could be improved.

The eight 10 scores indicate that half of the respondents found Scrum to be a complete educational tool, which met or even exceeded their expectations in terms of learning and practical



application. This high level of satisfaction reflects Scrum's ability to engage students, promote better organization, collaboration and adaptability, essential aspects in the training of software developers.

However, it is important to consider some negative points and limitations of this evaluation. The sample of 16 students, while significant, could be broadened to include a greater diversity of contexts and experiences, providing a more comprehensive view of the effectiveness of Scrum. In addition, it is relevant to mention that students can sometimes respond to such surveys with biases, as pointed out by some authors. This bias can be a result of a variety of factors, including a desire to please instructors or a lack of comparative experience with other methodologies. Therefore, while the results are highly positive, it is prudent to interpret them with some caution and consider the need for additional studies to validate these findings in different educational settings.

FINAL CONSIDERATIONS

This article addressed a study with the objective of adapting the Agile Scrum Method to the educational context, specifically in programming disciplines of the Technical Course of Informatics for the Internet. For this, it was essential to understand the Scrum method in its original form and, subsequently, adapt it to the educational environment, including the curriculum and other specificities of the course. The experience report of a teacher was fundamental for this adaptation.

At the end of the project, three main results were obtained: first, the description of the adapted method; secondly, the feedback from the participating students; and, finally, the feedback of the participating teacher.

The proposed method proved to be viable for adaptation and use as a teaching tool in technical computer courses. The students' reports indicated that most perceived the use of the method as productive, highlighting the lack of commitment of some team members as the main challenge. The evaluation of the students revealed that most gave grades nine and ten for learning using the adapted method, with only one student giving a grade of seven.


The results were promising in the context and sample studied. However, for a safer evaluation, it is necessary to apply the method in other classes and with other professors, in order to compare the results obtained in this study.



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Gamification as a methodological tool in andragogical teaching

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ABSTRACT

This article aimed to discuss the use of gamification as a tool of active methodology, to assist in the didactic process of adult education, highlighting the importance of understanding the needs of students and improving the teaching-learning process. With the changes that information and communication technologies have caused in the field of education, teachers need to adapt to better teaching methodologies for the new generation of connected students. The active methodologies allowed students to actively participate in classes with the help of tools inserted during the teaching-learning process such as gamification, generating an environment that favors the student's interest and engagement with game reasoning in non-game activities.

Keywords: Gamification, Andragogy, Technology.

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INTRODUCTION

Currently, several methodological tools are used to facilitate the teaching-learning process, with the new generation of students who are entering higher education classrooms, adapted tools are needed to better use this process.

As one of these tools, gamification can be used in methodological applications as a facilitating tool for pedagogical teaching. Gamification is based on the use of game elements, such as mechanics, thoughts, and strategies, in a context outside the games, to motivate individuals, help solve problems, and promote learning (KAPP, 2012 *apud* FARDO, 2013).

To use this methodology, the teacher must have a certain mastery of the technological tools, and prior knowledge about the available methodologies, in addition to the ability to diversify classes to promote the students' enthusiasm to experiment and experience new forms of learning (TOLOMEI, 2017).

The active methodology must be adapted, considering the needs of the student together with the teacher, the principles for applying gamification will be the basis to guide the teacher in his activity. Thus evidencing the importance of studying new methodological tools to better meet the needs of the student, promoting teaching and enthusiasm for learning.

Thus, this article proposes to conceptualize andragogy, technology, and gamification and discuss how games can be used as an active methodology to assist didactic learning in adult education.

ANDRAGOGY

Universities around the world are increasingly debating the need to adapt their teaching practices, recognizing that most adults have learning styles that are different from those of children. In this context, the implementation of active methodologies has stood out as an effective approach to engage students in a more meaningful way in their learning processes.

Taking into account this difference in learning, the term pedagogy, which, according to the writer and philosopher Paulo Ghirardelli (2007) derives from the word *Paidagogo*, originated from *paidós* – child and *agodé* – conduction, was not necessarily someone responsible for the teaching of the child itself, but rather some slave or servant who guided the child to the place of learning. Unlike the origin of the word and its ancient meaning, nowadays, a pedagogue is one who, according to Ghirardelli (2007, p. 6) "[...] deals with the intellectual and technical means that enable teaching and learning optimally".

In addition to Ghirardelli, De Aquino (2008) argues that "'Pedagogy' literally means the art and science of educating children". For the author, in pedagogy, the protagonist is the teacher and not the student. De Aquino (2008) observes that,



[...] In the pedagogical model of learning, teachers take full responsibility for making decisions about what will be learned, and how and when it will happen. This science is based on the assumption that students or learners are not yet mature enough to prepare for life and make the right decisions, and therefore should learn only what is decided and taught by teachers. (DEAQUINO, 2008, pp. 10-11)

At another time, Carvalho (2016) also adds that,

[...] Pedagogy, therefore, would be the science of education that studies the practices, methods, and principles of education. This concept encompasses the educational process, an exclusively human practice of construction and transmission of knowledge within a socio-cultural context [...] (CARVALHO, 2016, p. 81).

Starting from the origin of the word, pedagogy does not seem to be the appropriate term for the educational field at the higher level, since in this we no longer deal with children. In the academic universe, the most appropriate would be the use of the theory of Andragogy (CARVALHO, 2016).

In 1833, Professor Alexander Kapp created the term Andragogy to describe Plato's educational philosophy. In his book, Kapp notes that Plato's documents involved not only the education of young people but also that of adults. In the book, Kapp also justifies the need for adult education and elaborates on what qualities are important to develop, stating that character formation is the main value of human beings (SVEIN LOENG, 2017).

The andragogical process involves different phases in a congruent way and involves both forms of learning: total and individual (KNOWLES, 1980). Knowles mentions in his book the following phases:

- 1) The establishment of a climate conducive to adult learning;
- 2) The creation of an organizational structure for participatory planning;
- 3) The diagnosis of learning needs;
- 4) The formulation of learning directions (objectives);
- 5) The development of a project of activities;
- 6) The operation of the activities;
- 7) The diagnosis of learning needs (evaluation). (KNOWLES, 1980, p. 59)

According to Carvalho (2016), in andragogy, on the one hand, we have the teacher who has a role as a mediator of knowledge and motivator of learning for students. And on the other hand, we have independent students, with autonomy and with experiences that can add to the acquisition of new learning, "[...] Because, for adult learners, the knowledge to attract attention must be contextualized, meaningful and as applicable as possible in personal and professional life. [...]" (CARVALHO, 2016, p. 84).



TECHNOLOGY

Information and Communication Technology (ICT) is imprinting unexpected changes in today's society in all spheres and also in the teaching-learning process. The evolution of ICTs allows the population to have access to information, which brings profound changes in various areas of knowledge, especially in the academic field (LOBO & MAIA, 2015).

To be inserted in the information society does not mean only to have access to technology, but to know how to use this technology to search for and select information that allows each person to solve everyday problems, acting in the transformation of their context, thus favoring the creation of a network of knowledge (ALMEIDA, 2008).

Most university students were born between the end of the twentieth century and the beginning of the twenty-first century and a large part of this public welcomed in universities grew up with access to video games, television, and computers. As a result of the ease of access to information, students have a certain immediacy regarding the applicability of the knowledge acquired, when the application is not possible in the short term, they lose interest in the subject or discipline, compromising the teaching and learning process.

Gamification is an option that can be inserted in the didactics of higher education, to seek improvement in this process, generating an environment that favors the student's interest by introducing elements of games in non-game activities (VIEIRA *et al*, 2018).

In the classroom, the use of ICTs requires a teacher profile with skills that meet a connected generation that is receptive to different types of information and technological devices. The protagonism on the part of the student is justified, since he has in his social practice a certain ease of access to information, based on the principle that using ICTs in a learning process in which students are protagonists in the construction of knowledge (TOLEDO; MOREIRA; NUNES, 2017).

Research shows that, although it is consensual that the use of Information and Communication Technologies (ICT) in education cannot replace the teacher, it is understood that the teaching work can be supported by these means (SILVA; MARCHELLI, 1998; REZENDE, 2002). These digital technologies establish a more collaborative and instantaneous configuration, which transforms the equipment used in the production and dissemination of knowledge as well as the rationality of those involved (ARCOVERDE, 2006; MORAN; MASETTO; BEHRENS, 2004; MONDO *et al*. 2010).

ACTIVE METHODOLOGIES

The complexity of the various sectors of life at the global, national, and local levels, has required the development of human capacities to think, feel, and act corresponding to the issues of the environment in which one lives (BERBEL, 2011).



Formal education is at an impasse in the face of changes in society, and the idea that basic education with its traditional forms is no longer enough for the individual to participate in an integrative and effective way of life in society is recurrent among education scholars in recent decades, with traditional education being essential for the formation itself, but when only retained, memorized and reproduced, students are positioned as spectators of the world (MORÁN, 2015; BERBEL, 2011).

The knowledge society is based on cognitive, personal, and social skills, requiring proactivity, collaboration, and personalization to acquire it. Traditional methods are standardized, evaluating everyone equally, demanding predictable results, and favoring the transmission of information by teachers (ALMEIDA & VALENTE, 2012).

In Brazil, we live with such diverse educational contexts that range from schools where students spend a large part of their time with texts passed on the board to schools that provide students and teachers with modern information and communication resources. Among these diversities, we find schools that are in the nineteenth century, but with teachers from the twentieth century, promoting the formation of students for the world of the twenty-first century. (BARBOSA & MOURA, 2013)

The methods to be used in the classroom must promote meaningful learning, the teacher must understand that the conception of school has changed and that there is a new profile of students to be formed. For David Ausubel (1980), learning meaningfully is the same as reconfiguring existing ideas. "The most important factor that influences learning is what the learner already knows." In this context, the student's prior knowledge should be taken as something fundamental for the presentation of new information, because in the knowledge that the student brings from his daily life, a scientific concept is integrated (TOLEDO; MOREIRA; NUNES, 2017).

In general, it is possible to see that in addition to the change in the profile of students, there is a motivational crisis, especially in the educational scenario, educational institutions find it difficult to engage their students using traditional resources (TOLOMEI, 2017).

GAMIFICATION

Games, or games, emerged as a human construction and served as a means of initiation for young people about their own culture and their economic and social environment (TOLOMEI, 2017). Still in this line of reasoning, Tolomei (2017) citing Huizinga (1993) narrates that, in the past, games served for society to stay together and bring their ties closer. And he also concludes that "[...] games have evolved according to the needs of society" (TOLOMEI, 2017).

In games, there are mechanisms of rules, objectives, results, and rewards. These mechanisms were brought to the concept of gamification (TOLOMEI, 2017).



For Krajden (2017), gamification is a method that involves dynamics, mechanisms, and elements of video games and applying them in real-life situations. Its main objective is to attract people to change their behaviors to achieve specific goals, using fun and creative solutions to solve many problems.

Busarello (2018), using Kapp (2012) as a reference, concludes that "Gamification is based on the principle of thinking and acting as in a game but in a context outside the game". It also describes that gamification, which has as its central point the engagement of people, the motivation of their actions, the promotion of learning, and the solution of problems, is based on four basic principles: the basis of games, mechanics, aesthetics, and game thinking.

Vieira *et al.* (2018) adds that,

Gamification has the potential to involve the student in solving real problems, helping him in the process of attributing meaning to what he studies, and allows the teacher to develop teaching strategies more focused on the students' reality, using a language and aesthetics similar to that found in games, making the learning process more interesting. [...] (ALVEZ *et al.* (2014) *apud* VIEIRA *et al.* (2018))

A great benefit of using gamification is that it can perhaps provide students with a way to visualize the results of their actions and learning, as it becomes easier to capture the relationship of the parts with the whole, in the same way as it happens in games (FARDO, 2013).

DEVELOPMENT OF THE GAMIFIED CLASSROOM EXPERIENCE

Gamification is an emerging phenomenon (FARDO, 2013) and comes from the premise of thinking and acting in a game, but in a context outside the game (BUSARELLO, 2018).

The term *gamification* - which translates from the word gamification - was first used by Nick Pelling in 2002 (VIANNA *et al.* 2013 *apud* MARTINS & GIRAFFA, 2015) and has as one of its objectives to motivate and engage students.

To apply gamification as a real active methodology, some steps and specifications of educational planning must be followed (Alves *et al.* (2014) *Apud* Vieira *et al.* 2018):

1. Interaction with games: interact with games from different platforms to assimilate the various logic and mechanics that games provide;
2. Know your audience: observe and analyze the different characteristics of your audience;
3. Define the basic purpose: define which theme will be addressed, the areas of knowledge involved, the contents that will be associated, and the skills, attitudes, and behaviors that will be developed and enhanced;
4. Understand the problem and the context: ponder on which day-to-day problems can be addressed and explored with the game and how they can relate to the content studied;



5. Define the objective or mission: analyze whether the mission of the gamified strategy is clear and achievable and whether it is in line with the competencies and theme that will be developed;
6. Develop the game's narrative: Verify that the game's metaphor narrative makes sense to the players and the overall goal of the strategy. Think about whether the narrative will engage your audience and whether the aesthetics used will make sense within the story;
7. Define the environment and platform: determine whether the audience will participate from home or another specific environment such as the classroom. Point the main device with the players;
8. Define the tasks and mechanics: establish the duration and frequency of your audience's interaction with the gamified educational strategy. Point out the mechanics and check if the tasks develop the desired skills and if they are coherent with the narrative. Creation of rules for each task;
9. Define the scoring system: check if it is fair, balanced, and diverse. Establish the rewards and how the *ranking* will be done;
10. Define the resources: Carefully plan the strategy agenda and define the resources needed each day. Check your involvement in each task (if you will need to analyze the tasks or if the scoring will be automatic);
11. Review the strategy: check if everything is compatible and aligned. Think about whether the audience will be engaged and whether they will adhere to the tasks. Check if the tasks have clear and objective rules and if the tasks are varied and achievable. Check if the scoring system is well structured if the rewards are compatible with your audience and if they are motivating. Verify that all resources are guaranteed and that the agenda is appropriate for the public (Alves *et al.* (2014) *Apud Vieira et al.* 2018).

In addition to what was pointed out above, other guidelines and characteristics must be taken into account so that there is a greater approximation of students about the engagement and motivation that occur in games on different platforms.

Fardo (2013) cites some observations by Simões *et al.* (2012) and Werbach & Hunter (2012), which should also be considered when it comes to using gamification as an auxiliary teaching methodology:

- Provide various experiments: as in most games, different possibilities must be provided to achieve the solution of a problem, as this encompasses different personal characteristics in the teaching-learning process and contributes to the educational baggage of each student;



- Include quick feedback loops: In games, the effects of actions are always seen in real-time. While in the school environment, the opposite occurs, the results are seen after a long time. The feedback process should be accelerated so that the search for new ways to achieve the goals is stimulated, you can also give time for the strategy that the player is using to be changed if he thinks he is not achieving the expected results;
- Increase the difficulty of the tasks according to the student's ability: good games always make players find challenges that are at the limit of their abilities. For the student to follow his own pace of learning, different levels of difficulties must be proposed to him, as this can help him to have a personal advancement and can also provide the construction of a good sense of growth;
- Divide complex tasks into smaller ones: in games, the larger purposes are divided into smaller, simpler, and easier to overcome. Thus, the student/player will build his knowledge gradually, "observing the parts of the problem as a whole", ensuring greater motivation and preparing him to overcome the greater challenge;
- Include mistakes as part of the learning process: mistakes integrate into games in a natural way. Therefore, it is necessary to include error as a learning and knowledge process, in addition to making the student reflect on why these errors are part of the process;
- Incorporate narrative as context for objectives: game characters usually have a motivation for their actions, that is, a story that justifies doing what they do. A context must be built so that the student sees that there are reasons for his engagement and commitment and also so that he sees meaning in learning;
- Promote competition and collaboration in projects: games always offer a good deal of competition and collaboration, not always mutually exclusive. The narrative can include these elements, organizing a competition between groups, which can enhance the interaction between students and offer more motivation and more context for the objectives;
- Take into account fun: the learning process should be pleasurable. Good games are fun and they are also good tools for learning. "Thinking about this aspect in education can improve the experience that individuals have within learning environments, which ends up enhancing learning as a whole" (SIMÕES *et al.* (2012); WERBACH & HUNTER (2012) *apud* FARDO (2013)).

Although there are basic concepts for implementing gamification, we must remember that this is still a very recent method that can be molded according to the needs of the teacher, as games



bring us several elements and as well as several possibilities of application in the teaching-learning cycle (FARDO, 2013).

In addition, gamification will be in a constant process of evolution, making it possible to add elements that contribute to a better improvement of the technique and reforming what is not working. [...] "The more involvement and application of gamification, the more the teacher can improve and master the technique, getting closer and closer to a format that works well with students." (SANTOS, 2018).

FINAL CONSIDERATIONS

It is known that we are living in the Information Age and we observe a huge change in the profile of students of all ages, since with new technologies we can know whatever we want anytime and anywhere, making our lives less complicated and more connected, both with our friends and family and with different types of information that arrive all the time.

Technological advancement also provides us with more access to cell phones, computers, and video games, which are tools that can be used by the teacher to help the student better understand and absorb the mediated didactic content, both with the use of the internet and through the use of games, since the latter can instigate people and challenge their abilities.

Therefore, gamification, as an active methodology, is a phenomenon still in its early stages, which can be widely explored by educational means, both to promote learning and to motivate and engage the student with it. As long as the technique is applied correctly by teachers, it is necessary to have total mastery of the content to be gamified and there must also be an understanding of the planning characteristics of the technique and the specifications of how it should be applied.



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Chemical Bingo: A playful approach to teaching the Periodic Table

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ABSTRACT

Educational games currently play a very important role in education, offering an innovative approach to learning, facilitating the retention of knowledge. In view of this, it was sought, through the present work, to evaluate the acceptability of the use of games for the teaching of chemistry in the undergraduate course (pharmacy course), more specifically, the teaching of the periodic table. For the analysis, a bingo-type game was used, which was applied and then evaluated through a questionnaire. As a result, an average score attributed to the game of 9.7 was obtained, and positive answers to the other questions were 100%. Thus, good perspectives of this methodology are proven by the students and its effectiveness and efficiency in pedagogical practice.

Keywords: Learning, Playful activity, Basic chemistry.

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INTRODUCTION

Playfulness conquers space and importance in the approaches to the development and learning of skills, especially cognitive, social, affective and motor skills, where such development "exceeds" the usual world, detaching itself from the most classic methodologies.

In education, this playfulness is used through games and games in order to work on the creative sense, not only of the student, but also of the teacher. Given that this action induces collaboration among the participants so that they work together, with a view to the game from the educational perspective, conceiving the development of specific skills, as well as their improvement.

According to Tessaro and Jordão (2007), educational games play a crucial role in contemporary education, offering an innovative approach to learning, facilitating the absorption of knowledge and it is worth noting that the individual who plays and plays is the individual who also acts, feels, learns and develops, and, thus, pedagogical games are innovative tools for education (Robaina, 2008, p. 15).

Thus, in the academic context, as a focus on the area of Basic Chemistry, the use of this dyadic resource is an alternative, since Soares, Okumura and Cavalheiro (2003) already stated that the development of new strategies is recommended to boost the teaching of chemistry.

As much as the use of playful strategies in the teaching of Chemistry, as well as other disciplines, in Basic Education, is already widely reported and practiced, in Higher Education it is still very infrequent, especially in courses that are not literature.

In view of the facts presented, the present work sought to make a chemical bingo on the periodic table (chemical symbols) and to analyze, through a questionnaire applied to students, the acceptability of this methodological strategy for the teaching of Basic Chemistry, in a class of the pharmacy course, of the 2nd academic semester, of the Federal University of Pará.

LITERATURE REVIEW

PLAYFUL PRACTICES IN TEACHING

The term "playful" has its origin in the Latin language, *ludus*, originally meaning game, but with the passage of time, and with the advances in educational psychology and other areas of human knowledge, the term ludic became more comprehensive, coming to be considered as an essential trait of the psychophysiology of human behavior, so that its definition ceased to be the simple synonym of play, as the implications of the ludic need went beyond the demarcations of spontaneous play (Almeida, 2009; Martins *et al.*, 2024).

Playful strategies should be seen as facilitating forms that contribute to the construction of concepts, content reinforcement, sociability among students, creativity and the spirit of competition



and cooperation, in such a way that these strategies lead the teaching-learning process to be transparent, ensuring mastery over the proposed objectives (Fialho, 2011; Martins *et al.*, 2024).

Through playful practices, students become more attentive, more motivated, and engaged in the tasks developed in the classroom, and, thus, the anchoring of new knowledge ends up being more significant (Martins *et al.*, 2024).

Lobo *et al.* (2024) report that there are four criteria that must be observed to choose a game to be applied in the classroom, so that such a playful activity can guarantee the essence of the game and the educational process. These four criteria are:

- 1- **Experimental value**, which leads the student to explore and manipulate, and in this way, teaches chemical concepts through the manipulation of some type of toy, space or action;
- 2- **Structuring value**, which corresponds to freedom of action following specific rules, and supports the structuring of personality that appears in strategies developed by the student and in the way of playing;
- 3- **Relationship value**, which corresponds to the ways of relating to the environment and other human beings (social life);
- 4- **Playful value**, which evaluates whether the objectives have the qualities that stimulate the appearance of playful action.

Lobo *et al.* (2024) also remind that four very important precautions must be taken when applying a playful activity in class, and these precautions are:

- 1st Caution:** prior testing of the didactic resource to avoid unpleasant surprises at the time of its execution in class.
- 2nd Care:** make a brief synthesis of the content to be worked on through the playful activity, as this content must have already been worked on and must be reviewed before the application of the activity, for a better use of the resource employed.
- 3rd Caution:** checking the rules with the students, so that they can clearly understand the activity.
- 4th Care:** elaboration of subsequent pedagogical activities related to the activity to ascertain the value of the ludic activity as a teaching tool, that is, evaluation of the activity developed.

PERIODIC TABLE AND PLAYFUL TEACHING

Chemistry is one of the disciplines that is considered difficult and of little interest by students, whether they are in Elementary School, High School or even Higher Education, because it involves many abstract concepts and is taught in the classroom in a very decorative way and without great

attractions to students. However, this reality has changed in recent decades, and playful activities have contributed a lot to changing this situation, especially in Basic Education. Table 1 presents some existing works on the teaching of the Periodic Table in a playful way.

Table 1. Some works of teaching Periodic Table in a playful way

Title	Authorship	Level
Spelling Brazil with Chemical Symbols.	Franco-Mariscal e Cano-Iglesias (2008)	EB
Periodic Table - A Super Asset for Elementary and High School Students.	Godoi, Oliveira and Cognoto (2010)	EB
Exploring Elements: Play as an Ally in the Teaching of the Periodic Table.	Lobo et al. (2024)	ES
The Use of Playful Activities for the Teaching of the Periodic Table.	Dos Santos et al. (2024)	ES
An educational card game for learning families of chemical elements.	Franco-Mariscal; Oliva-Martínez e Márquez (2012)	EB
Developing and playing chemistry games to learn about elements, compounds, and the periodic table: Elemental Periodica, Compoundica, and Groupica.	Bayir (2024)	EB
An effective method of introducing the periodic table as a crossword puzzle at the high school level.	Joag (2014)	EB

Legend: EB = Basic Education (Elementary and High School); ES = Higher Education.

Several researchers in the Teaching of Chemistry, such as Joag (2014), Bayir (2014) and Franco-Mariscal *et al.* (2016), have addressed the importance of working on the various aspects related to the periodic table of chemical elements in introductory Chemistry disciplines. For example, Joag (2014, p. 846) points out that "the periodic table of elements is the cornerstone of the edifice of conceptual chemistry". The periodicity and predictability of the properties of chemical elements, evident from the similarity in a group and gradual variation over a period, are important characteristics of the modern periodic table. These characteristics make the modern periodic table one of the most fascinating topics in chemistry education, if introduced properly.

METHODOLOGY

ASSEMBLING THE GAME PIECES

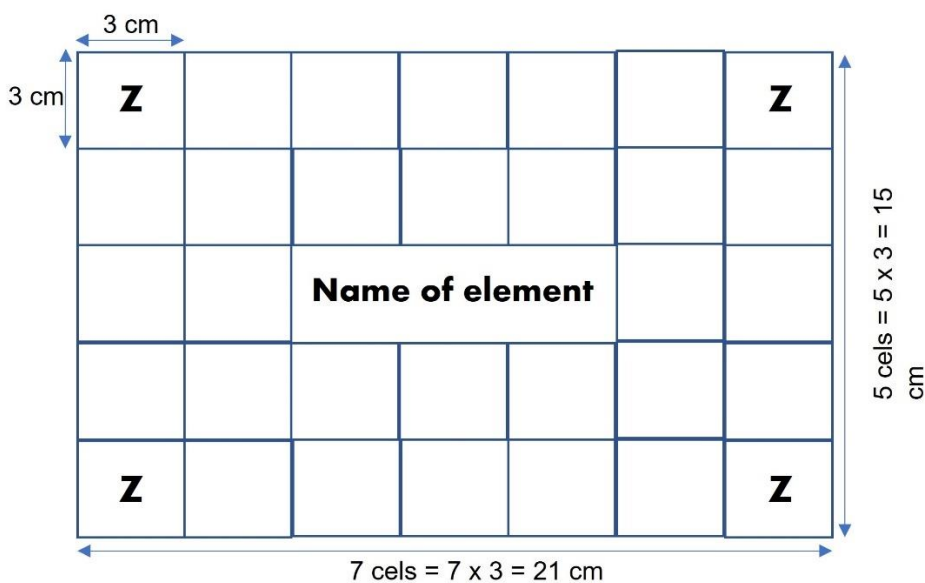
The Chemical Bingo was prepared by the monitors of the Laboratory of Physics Applied to Pharmacy (LAFPA), of the Faculty of Pharmacy of the Federal University of Pará (UFPA), in January 2023.

The elaborate game consists of 118 cards; 118 "stones" of the game, in addition to a box to store the cards and another box to store the "stones" of the game.

The assembly of the 118 cards was carried out only with white cardboard paper and marker pens, in addition to pencils and a common ruler to trace the cards.

The cards made have dimensions of 15 cm x 21 cm, divided into 3 cm x 3 cm caselles, except for a central one that is 3 cm x 9 cm (Figure 1). In this way, there are a total of 30 houses of 3 cm x 3 cm and a central house of 3 cm by 9 cm.

Figure 1. Sizing a game card



Source: The authors (2023).

In four caselas of 3 cm by 3 cm, the four present in the four corners of the cartouche, the atomic number Z of the element whose name is in the central carela (the one of 3 cm by 9 cm) is presented, and this cartouche is called by this name, hence there are 118 cartouches, as there are currently 118 known chemical elements, between natural and artificial. The other 32 caselas in the card are filled with a symbol of other chemical elements. This filling is not random. The first symbol to be written must be the chemical symbol of the chemical element immediately after the element in the cartouche, and the others must be taken every four from this element, so that an equivalent distribution of the 118 elements in the 118 cartouches is obtained. There is no element with much more occurrence in cards than other elements. Figure 2 illustrates the hydrogen (pack 1) and helium (pack 2) packs.

Figure 2. Hydrogen (number 1) and helium (number 2)

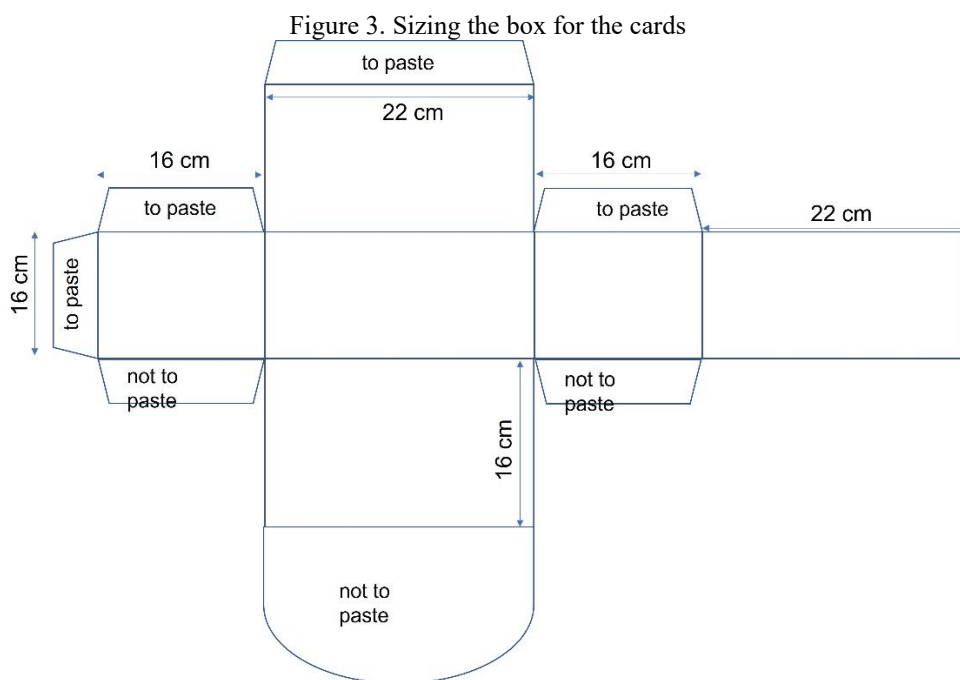
1	He	Ne	P	K	Cr	1	2	Li	N	Na	P	K	2
Cu	In	I	La	Pm	Tb	Tm	V	Co	Ga	Br	Y	Tc	Ag
Ta	Ir	Hydrogen			Tl	At	Sb	Cs	Helium			Pr	Eu
Ac	Pu	Cf	No	Db	Mt	Nh	Ho	Lu	Re	Au	Bi	Fr	Pa
1	Rh	Nb	Rb	As	C	1	2	Am	Es	Lr	Bh	Rg	2

Source: The authors (2023).

As hydrogen is the chemical element with an atomic number (Z) equal to one, in the four corners of the hydrogen card the number 1 was written, and as helium is the next chemical element in

the periodic table, the second casela has its symbol, and the others are placed in fours. This is repeated in the helium cartouche, where lithium (Li) appears in the second casela because it is the third element in the periodic table.

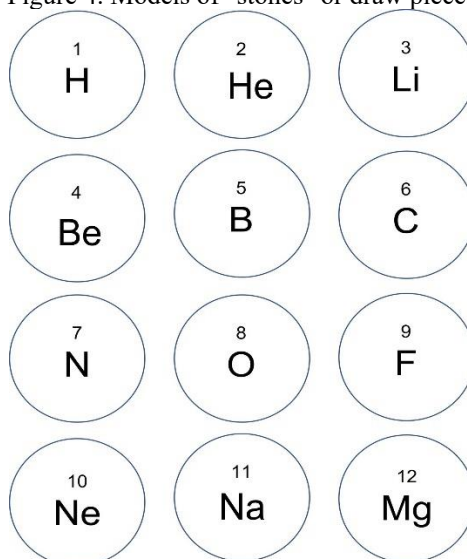
To store and facilitate the transport of the cards, a box was made with cardboard and paper glue, and using pencils, rulers and scissors. The dimensions of such a box are described in Figure 3.



Source: The authors (2023).

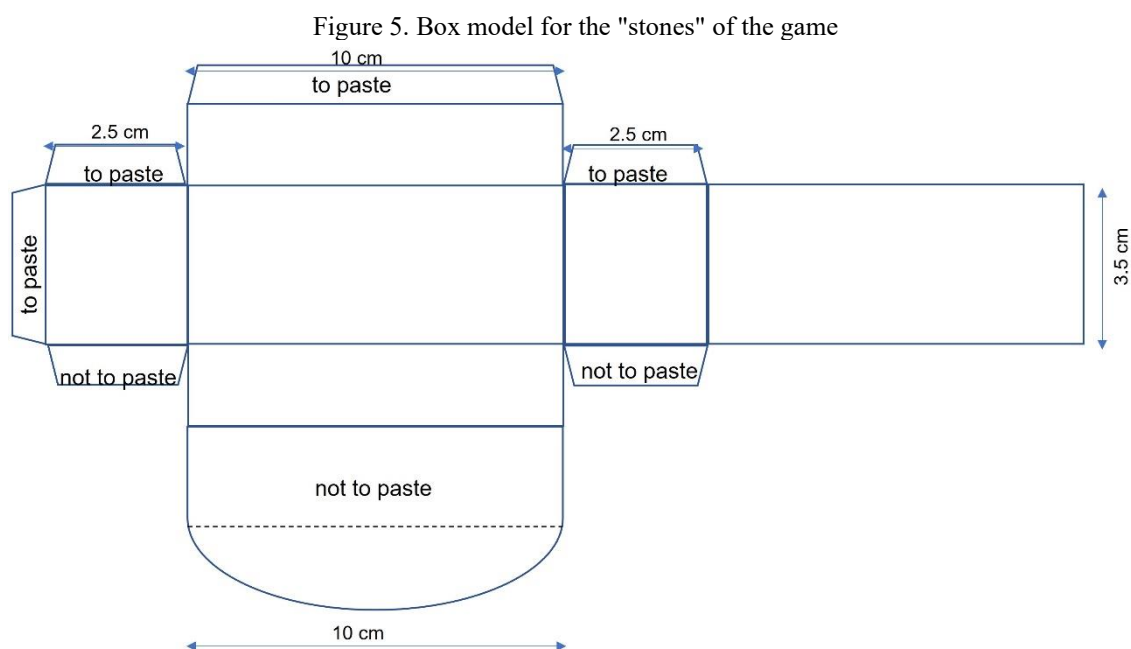
The draw pieces or "stones" were made with white cardboard paper and colored pens, as well as pencils and rulers for their tracings and scissors for cutting. They were elaborated in circular pieces with a radius of 2 cm, in a number of 118, one for each chemical element (Figure 4).

Figure 4. Models of "stones" or draw pieces



Source: The authors (2023).

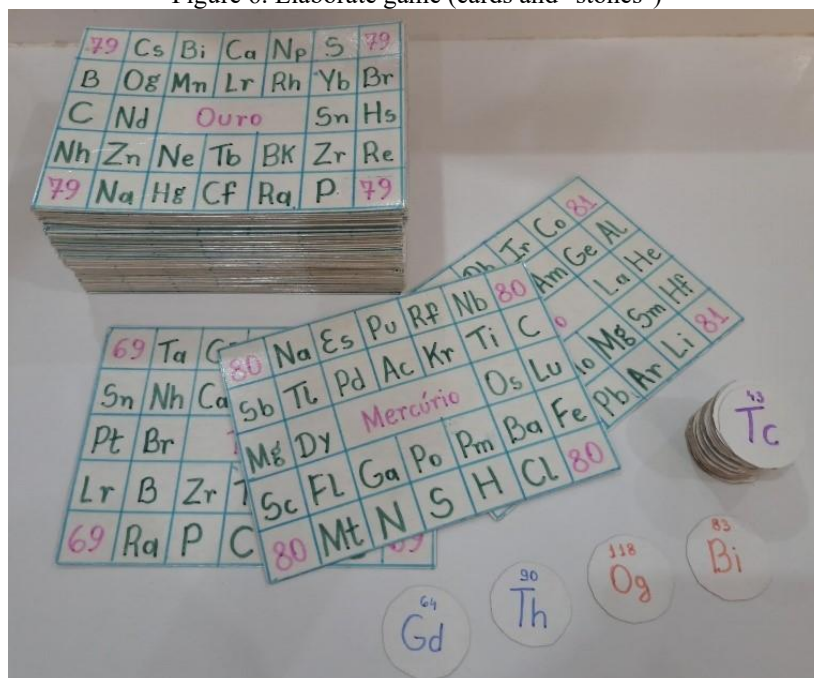
To store and facilitate the transport of the "stones" of the game, a box was made with cardboard paper and paper glue, and using pencils, rulers and scissors. The dimensions of such a box are described in Figure 5.



Source: The authors (2023).

Figure 6 presents a photograph of the ready-made game, with its 118 cards and "stones".

Figure 6. Elaborate game (cards and "stones")



Source: The authors (2023).



GAME RULES

The rules of elaborate bingo are similar to those of traditional bingo, with minor adaptations, the following rules:

- 1- Each student must choose only a single card, by lottery;
- 2- After all the students have their cards, the teacher or a student chosen by him, proceeds to draw one of the stones of the game, placed beforehand in a dark bag;
- 3- The teacher (or the chosen student) reads the name of the chemical element drawn, and not the chemical symbol present in the stone. For example: if the stone says K, the teacher should say potassium;
- 4- Each student checks if he has this element on his card (the symbol). If you do, mark the symbol drawn with a grain of corn or other small object;
- 5- The teacher draws a next stone and the students again check if they have this name element on their card;
- 6- The drawing of stones proceeds until a student completes their entire card or, alternatively, a horizontal or vertical column of the card. This issue should be agreed upon with the class at the beginning of the game;
- 7- The student who fills out his card first must go to the teacher to confirm that he has marked correctly, at which time he must say the names of the elements drawn.
- 8- A round of the game ends when a student fills in the card and correctly says the names of the symbols drawn, and there may be other rounds, which is defined at the beginning of the game.

GAME TEST

After having its pieces and rules elaborated by the team of students (monitors), the game was tested with a small group of students (five, in total, being the two monitors and three other students invited by them), in order to perceive the applicability of its rules and collect possible modifications favorable to the good progress of the game and acquisition of knowledge, and following the recommendations given by Lobo *et al.* (2024), who point to the prior testing of the game as being the first care for the use of the didactic resource, with the intention of avoiding unpleasant surprises at the time of its execution in class.

APPLICATION OF THE GAME

The game was applied to a Basic Chemistry class of the Pharmacy course at the Federal University of Pará (UFPA), in the 1st semester of 2023, more precisely in the discipline "Bases of Chemistry and Physics Applied to Pharmacy" which is a component of the 2nd semester of that

course. This class had 42 students, however, on the day of the application of the game only 37 students were present.

The reading of the "stones" (names of the chemical symbols) was done by the teacher of the discipline and the students had to mark the "stones" on their cards. When they completed the card, they should come to the teacher's desk and check if they had correctly associated the symbols of the cards with the names read (according to the rules already described).

At the end of the activity, each of the 37 students received an evaluative questionnaire (Figure 7) about the activity performed.

Figure 7. Applied appraisal form

UFPA – ICS – FACULDADE DE FARMÁCIA – BQF

ALUNO (A) : _____ Data: __/05/23

FICHA DE AVALIAÇÃO DA ATIVIDADE

1- Você daria que nota para a atividade lúdica desenvolvida, entre zero e dez? Nota: _____

2- Você gostaria de ter mais atividade como esta ao longo da disciplina? () Sim () Não

3- Você acha que aprendeu mais sobre o tema através da atividade desenvolvida? () Sim () Não

4- Qual a sua opinião sobre a atividade desenvolvida?

Resposta:

5- Você teria alguma sugestão a dar sobre a atividade?

Resposta:

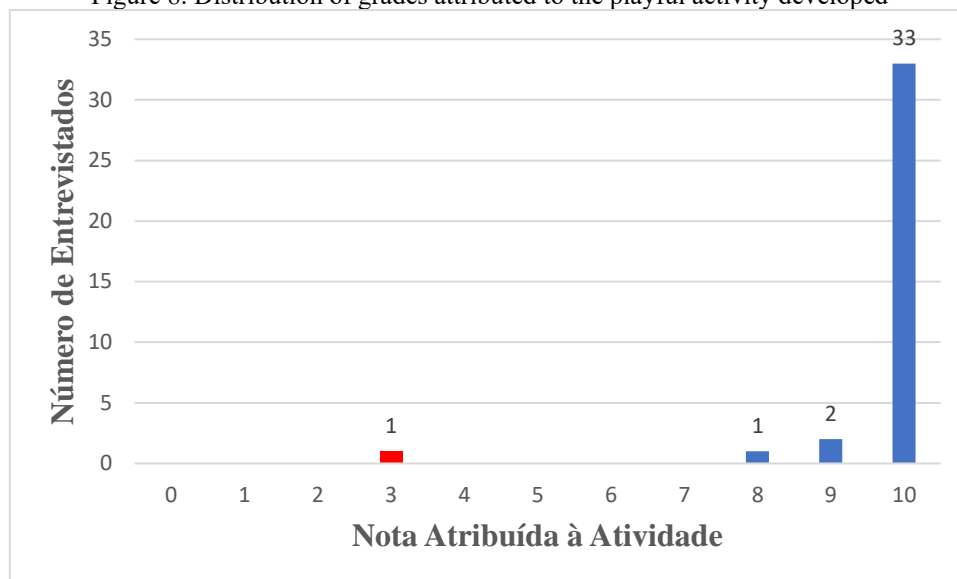
Source: The authors (2023).

The students' answers were spreadsheets in the Excel 2010 program and the data were analyzed in terms of descriptive statistics, in addition to the construction of an appropriate graph.

RESULTS AND DISCUSSIONS

Figure 8 shows the distribution of grades attributed by the students to the first question (would you give what grade for the playful activity developed, between zero and ten?), with an average of 9.7 being obtained, and only one student (2.70%) attributes a low grade (3) to the development of the activity, which demonstrates good acceptance of the activity by the students.

Figure 8. Distribution of grades attributed to the playful activity developed



Source: The authors (2023).

For the second and third questions, 100% of the students chose the alternative "yes", proving their acceptance and interest in playful methodologies, also highlighting that they affirmed greater learning with the applied methodology.

For the 4th question, the following comments stand out:

Student A: "It's much easier and more fun to decorate the elements this way, it doesn't get so boring";

Student B: "It's good because it's not worth a point, then the concern is much less";

Student C: "a lot of fun."

Through these three statements, it is again clear the acceptance of the activity and the recognition that through the applied activity there was a more pleasurable and meaningful learning.

These statements agree with what Barros *et al.* affirm. (2016), who consider games as innovative tools that enhance the teaching-learning process by leading students to spontaneous participation, which do not make them worry about mistakes, thus contributing to the quality of learning. Zanon *et al.* (2008), who applied the game "Ludo Química" in the teaching of organic chemistry, evaluated the performance of the methodology, and verified the favoring of the acquisition of knowledge. Souza and Silva (2012), obtained good acceptance of the methodology by using a game called "Organic Data".

When asked to give suggestions (question 5), the students suggested the application of more didactic games such as dice, cards, races, among others, and that also addressed other subjects of Basic Chemistry, such as chemical bonds; inorganic functions (acids, bases, salts and oxides); chemical reactions; laboratory glassware; chemical calculations; among other topics.

The acceptance of the game in the Chemistry class finds support in Vigotsky (2007), who says that such a resource can stimulate the student's curiosity; to get him to take initiatives; become



self-confident; improve the development of language and concentration skills, provide better interaction between them and contribute to teamwork.

FINAL CONSIDERATIONS

The game was designed to work as an auxiliary and facilitating tool for the teaching and learning process of Basic Chemistry, subject chemical elements, within the scope of an introductory course of a higher education course in the health area (pharmacy). But it can be perfectly applied in similar disciplines of other courses in the health area (nutrition, nursing, etc.) or even in other areas such as engineering and exact and natural sciences.

The game pieces were made quickly, practically and at low cost, a fact that further boosts its use. But they can also be made with other materials, as discussed before. Therefore, the result of this work is configured as a tool of multidisciplinary applicability and easy access.

The playful activity developed in a Basic Chemistry class of the Pharmacy course was well accepted by the students of this class, who considered its use as a learning strategy as positive.

By adopting playful approaches, such as educational games and practical activities, the work suggests that it is possible to transform the learning environment, making it more engaging and accessible to students.

The use of the proposed game aims not only to illustrate the concepts of the periodic table, but also to promote the active participation of students and other participants (teachers and monitors).




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Education and the labour market: Building bridges to the future

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ABSTRACT

The article explores the intersection between the education system and the labor market, highlighting the need for adequate preparation of students for the professional demands of the twenty-first century. Through a comprehensive analysis, the essential skills that should be developed in basic and higher education, the importance of continuous training and the role of public policies in creating a favorable environment for employability are discussed. The article also addresses the influence of new technologies and the need for a flexible curriculum that adapts to the rapid changes in the job market. Through a literature review, four articles on the context of the theme were analyzed.

Keywords: Education, Labor market, Continuing education.

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INTRODUCTION

Education has always played a crucial role in economic and social development. Traditionally, the education system has been structured to provide students with knowledge and skills that would prepare them for specific occupations. However, the rapid pace of technological change and the increasing complexity of the contemporary labor market require a more flexible and interdisciplinary approach. Professions that were once seen as safe and stable are being transformed or even eliminated by automation and artificial intelligence. In this context, adaptability, critical thinking, and problem-solving skills become as important as or more important than specific technical knowledge.

In addition, globalization has intensified competition in the labor market, making it essential to train professionals with intercultural skills and the ability to communicate in multiple languages. Companies are looking for employees who not only have a strong technical background, but who are also able to work in diverse and global teams, deal with different cultures, and adapt quickly to change. This places a new responsibility on education systems, which need to incorporate these soft skills into their curricula.

Therefore, the relationship between education and the labor market is a topic that is gaining more and more relevance in a world in constant transformation. Technological changes, globalization, and new economic demands require deep reflection on how education can adequately prepare individuals for the challenges and opportunities of the future. This article aims to explore this relationship, highlighting the importance of an adaptable and innovative educational system that trains professionals able to navigate and thrive in a dynamic and competitive job market.

THE EVOLUTION OF THE LABOR MARKET

The labor market has undergone significant transformations in recent decades. Automation, digitalization, and artificial intelligence have redefined the nature of jobs and the skills needed to fill them. Traditional professions are being replaced by new careers that require technological competencies and interpersonal skills. This change creates a challenge for education systems, which need to adapt their curricula to prepare students for an uncertain and dynamic future.

Globalization has also contributed to the reconfiguration of the labor market. Companies are looking for talent on a global scale, and professionals need to be prepared to compete in a highly competitive market. Fluency in foreign languages, understanding different cultures, and the ability to work in multicultural teams have become essential skills.

Modern education should prioritize the development of core competencies such as critical thinking, problem-solving, creativity, and communication skills. In addition, digital literacy and mastery of new technologies are crucial for insertion in the current labor market. Integrating these



competencies into the school curriculum can prepare students to face complex challenges and excel in a competitive professional environment.

THE IMPORTANCE OF EDUCATION IN PREPARING FOR THE FUTURE

Education is key to empowering individuals to meet the challenges of the job market. However, preparation should not be limited to teaching traditional academic content. It is crucial for education to develop skills that are directly applicable in the professional environment, such as critical thinking, problem-solving, collaboration, and adaptability.

Table 01 - Ways to align education with the needs of the labour market

<p>Technical and Vocational Education</p> <p>These courses offer practical and specific training, preparing students for occupations that are in high demand. Additionally, apprenticeship programs and internships allow students to gain real-world experience, making it easier for them to transition into the workforce.</p> <p>Continuing Education and Lifelong Learning</p> <p>With the rapid evolution of technologies and professional practices, lifelong learning has become a necessity. Professionals need to continually update their skills to remain relevant in the job market. Continuing education programs and short courses are essential for this constant updating. Universities and educational institutions must offer these opportunities in an accessible and flexible way.</p> <p>The Integration between Education and the Labor Market</p> <p>To build effective bridges between education and the labor market, a joint effort between educational institutions, companies and governments is needed. Strategic partnerships can create educational programs that meet market demands while providing students with hands-on learning opportunities.</p> <p>Partnerships between Educational Institutions and Companies</p> <p>Partnerships between educational institutions and companies are one of the most effective ways to align education with the labor market. Companies can collaborate with schools and universities to develop curricula that reflect the needs of the market. In addition, internship and apprenticeship programs can be established to provide students with hands-on experience and professional networking.</p> <p>Public Policies and Government Incentives</p> <p>Governments play a crucial role in the integration between education and the labor market. Public policies that encourage technical and vocational training, as well as investments in educational infrastructure, are essential. Tax incentives for companies that invest in the training of their employees and partnerships with educational institutions are also effective strategies.</p> <p>Technology as an Enabler</p> <p>Technology can be a great ally in building bridges between education and the labor market. Online learning platforms offer flexibility and accessibility, allowing professionals to study at their own pace and juggle work and studies. In addition, emerging technologies, such as virtual and augmented reality, can provide practical simulations that prepare students for real-world situations in the workplace.</p>
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Source: Prepared by the author, 2024.



TABLE 02 – CHALLENGES AND OPPORTUNITIES

Despite efforts to align education and the labor market, there are significant challenges to be addressed. Rapid skills obsolescence and unequal access to quality education are obstacles that need to be overcome. However, these challenges also present opportunities for innovation and continuous improvement.

Challenges	Opportunities
<p style="text-align: center;">Skill Obsolescence</p> <p>Rapid technological evolution makes skills become obsolete in a short period. To address this challenge, it is essential to foster a culture of continuous and flexible learning. Educational institutions must be prepared to update their curricula regularly and offer retraining programs for professionals.</p>	<p style="text-align: center;">Innovation and Continuous Improvement</p> <p>Innovation is essential to overcome challenges and seize opportunities in the integration between education and the labor market. Educational institutions must be open to new teaching methodologies, emerging technologies, and partnerships with the private sector. Continuous improvement should be a constant goal, with regular feedback from students and employers to adjust and enhance educational programs.</p>
<p style="text-align: center;">Inequality of Access</p> <p>Unequal access to quality education is one of the biggest challenges for the integration between education and the labor market. Less developed regions often lack adequate educational infrastructure and learning opportunities. Public policies should focus on reducing these inequalities, ensuring that everyone has access to an education that prepares them for the job market.</p>	

Source: Prepared by the author, 2024.

For Kuenzer (1991), entering the labor market is part of the worker's needs, and, therefore, the school should not ignore it, as long as it does so from the perspective of promoting access to scientific and technological knowledge, which allows the worker to insert, participate and enjoy the benefits of the productive process. Regarding the relationship between the school and the labor market, for Kuenzer, it is not the school's responsibility to solve labor market issues, but rather the responsibility of organizations by training their employees for their functions, which they already do with great competence.

Sacristán (2003), on the other hand, experience is the teaching or learning that is acquired with the use, practice or experience of the person by himself, even if it can be helped or provoked by others. It is the very way of relating to the world: act on it and receive its effects. Education consists, first of all, in making available to the subject the experience that he, by his own means, could not obtain. While education is related to the distant or near preparation for the world of work, economic



globalization has effects on the distribution of productive activity among countries and regions of the planet, on the margins of national borders, and on school systems.

METHOD

The methodology adopted was the systematic literature review. As inclusion criteria, there is a search for journals with a publication date between 2019 and 2024, on journal platforms such as *Google Scholar*. The analysis of the selected articles focused on the research methods used and the results presented.

The searches on these platforms occurred with the keywords: education and labor market. Thus, 10 journals were found. However, as an exclusion criterion, the following discernment was used: presence of an abstract in the structural body of the journal. After adopting the exclusion criterion, four journals were selected for this production.

LITERATURE REVIEW: SELECTION AND DISCUSSION

Table of authors analyzed

Nome(s) to(s) author(s)	Production Title	Year of Publication
Rego <i>et al</i>	Professional and Technological Education as an alternative to Academic Market	2021
Moraes <i>et al</i>	Youth, Education and the Labor Market: A Theoretical Essay	2021
Avila	The World of Work and Education	2021
Carvalho <i>et al</i>	Professional Education and the Labor Market: Critical Reflection	2021

Source: Prepared by the author, 2024.

DISCUSSION

Rego *et al* (2021), states that professional and technical education is an alternative that facilitates the entry into the labor market of employed workers and that they have greater qualification in the performance of their activities, in addition to serving as an effective tool.

Moraes *et al* (2021), mentions that the Brazilian reality in relation to work is characterized by social inequalities that cause a large part of young people to suffer violence, premature and/or precarious entry into the labor market, unemployment and school dropout. However, in the face of huge inequalities, the government has taken some steps to democratize public education and higher education, including the creation of RFEPCT, a program that has brought public higher education to many previously disadvantaged areas. These actions democratized admission and changed the profile



of students, creating challenges for educational institutions. On the other hand, higher education alone cannot integrate the majority of students into the formal labor market because the problem of unemployment in capitalist societies is structural.

Avila (2021), demonstrates some of the conditional implications in the concept of education for work through an analysis of the way humans organize and implement production and its existence throughout history, with the aim of better understanding their values. Permeate this relationship in the current context.

Carvalho *et al* (2021) *state that* in contemporary society, the adulteration of capital in education and work has been repeatedly found in setbacks in crises. Capital is not only restricted to the channels of obtaining knowledge in education, but also has major destructive effects on employment. This is reflected in the various marginal reforms that have existed in Brazil in recent years, which increasingly reinforce the educational duality of bourgeois power that plagues the educational system, turning to the labor market in search of profits from capital accumulation.

FINAL CONSIDERATIONS

Building bridges between education and the labor market is key to ensuring a prosperous and sustainable future. Education must be aligned with market demands, preparing individuals for dynamic and challenging careers. Strategic partnerships, effective public policies, and the use of technology are key elements in this process.

By investing in the integration between education and the labor market, we are creating an environment where individuals can reach their full potential and contribute to economic and social development. Preparing for the future begins with quality education, adapted to the needs of the labor market and focused on the integral development of students.


Ultimately, education and the labor market are not isolated spheres, but rather interconnected. By building bridges between them, we are paving the way for a future where talent and opportunity meet, driving innovation, prosperity and well-being for all. In the next research, it can be investigated how academic curricula can be more aligned with the needs of the ever-evolving labor market and comparative analyses can be made between different educational systems and their approaches to integrate competencies demanded by the market.



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The context of Professional and Technological Education in pandemic times: On curricular practices and the use of digital technologies

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ABSTRACT

This article refers to a completed research on a remarkable moment experienced throughout the Brazilian educational context: the unexpected transition from face-to-face to remote teaching, during the period of social isolation, caused by the Covid-19 pandemic. The focus of the research was directed to Professional and Technological Education, with the Federal Institute of Espírito Santo (Ifes) as the locus of the investigation, covering the movement of implementation of non-face-to-face pedagogical activities (APNPs) in the institution, in a period of remote classes and flexible return to face-to-face classes. It is, therefore, a research that seeks to problematize the implementation of these practices with emphasis on the perspectives of curricular integration and integral human formation, as well as highlights the connections that occurred between the use of digital technologies and the integrated curriculum in the context of technical courses integrated with high school. As theoretical assumptions, the ideas of authors considered as references for the study of the themes of work and education, integral human formation, integrated curriculum, Professional and Technological Education (EPT) and digital technologies applied to the school context, such as: Frigotto, Ciavatta and Ramos (2005); Mancorda (2017); Kuenzer (2002); Mill (2014); Kenski (2011); Bacich, Neto and Trevisani (2015); Pischetola (2018) and Moran (2007). The approach used in the research is qualitative, exploratory, with emphasis on research with daily life and presents as its main methodological resource the semi-structured interview. As a result of the research, it is highlighted that after the pandemic period, digital technologies began to be more used in the context of Integrated High School (EMI) courses, as well as reaffirming the need for the use of these technologies to be increasingly present in classrooms. The research thus points to the expansion of the use of Digital Information and Communication Technologies (DICT) in curricular practices, being necessary to guarantee adequate working conditions, as well as the realization of permanent teacher training processes. During the research, an educational product was also produced, consisting of a continuing education course for teachers (in E-book and MOOC formats) entitled "Digital technologies applied to Integrated High School in the context of Professional and Technological Education", with emphasis on contents, resources and procedures for pedagogical practices, seeking to collaborate with the expansion of the use of these technological tools in Integrated High School, in addition to contributing to the integral human formation of students.

Keywords: Professional and Technological Education, Integrated High School, Non-Face-to-Face Pedagogical Activities, Curricular Integration, Digital Technologies.

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INTRODUCTION

ON THE THEME AND THE PROBLEM OF THE RESEARCH

Like other teaching modalities, Professional and Technological Education (EPT) survived the real "earthquake" that the Covid-19 pandemic meant in our country. Considering this context, our study problem arose from the interest in investigating a recent event that occurred throughout the educational context: the unexpected transition, which occurred in an emergency manner, from face-to-face teaching to remote teaching and, later, to flexible teaching - with remote and face-to-face activities - during the period of the pandemic caused by the spread of the SARS-CoV-2 virus. It is worth noting that we are considering "remote teaching" to be teaching-learning practices carried out in an online format, through digital platforms and technologies, without the presence of teachers and students in the physical spaces of schools.

The pandemic experienced and faced by the world until the year 2023 – since the World Health Organization (WHO) decreed the end of the pandemic caused by the Coronavirus on May 5, 2023 – forced, in a way, that teaching was taught remotely by educational institutions, especially during the most critical period of proliferation of the virus. Teachers, students and families had to adapt to the new educational and life reality, after all, humanity was subjected to a picture of destruction. It is worth mentioning the data presented by the Ministry of Health website⁵, referring to our country: the records made since the most critical period of the pandemic accounted for 22,287,521 notified cases and 619,056 confirmed deaths as notified cases and deaths between March 2020 and December 2021 in Brazil, as well as the update of the website, verified in November 2023, confirming 38,048,773 notified cases and 707,470 confirmed deaths, with 184 deaths caused by Covid-19 still in 2023⁶.

In the context of the pandemic, when analyzing the case of the Integrated High School (EMI) courses at the Federal Institute of Espírito Santo (Ifes), which had, at the time, their structure organized in a fully face-to-face manner, it was possible to observe an abrupt transition from face-to-face teaching regularly offered to remote teaching, in the 2020 school year, offered through non-face-to-face pedagogical activities (APNPs)⁷, considering the urgent need for social isolation by the academic community for what was called the "new normal". The use of masks, constant hand hygiene and the limitations of crowding of people made the entire population start to experience another routine.

⁵ The <https://infoms.saude.gov.br> website was constituted as a platform for data and strategic information on Covid-19 made available in an analytical way, as the description itself is given on the page, containing the profile of cases, number and distribution of resources, beds, tests, medicines, ventilators and Personal Protective Equipment (PPE).

⁶ Update verified on 11/18/23.

⁷ Non-face-to-face pedagogical activities (APNPs) was the term adopted to name the activities carried out *online*, provided for in the Resolution of the Superior Council of Ifes No. 001/2020, which regulated and standardized the replacement of face-to-face classes with remote classes.



This transition movement had a great impact on the lives of those involved and some questions arose at this point in the investigation: *Would it be necessary to prepare students and families before implementing online activities in the curricular practices of face-to-face courses? What technologies currently exist could be used for this implementation? Would it be necessary to continuously train teachers in the use of digital technologies applied to education, considering a teaching format with virtual activities? Is it possible to implement online activities in the expected and mandatory workload of EMI courses?*

In view of this scenario and seeking some clues for the investigation, it was possible to observe the technological leap that has occurred in teaching-learning practices in recent years. We highlight, in this sense, that the school has been expanding the use of technologies and gradually being equipped, and we cannot deny that the pandemic period "advanced" the realization of this process by a few years, as remote teaching ended up reaching places that were not so inhabited by technological tools before. For Mill (2014), the presence of Digital Information and Communication Technologies (DICT) has caused relevant changes in the educational context, related to the ways of teaching, the resources used, the attitude of teachers and even the way educational systems are organized.

We understand, therefore, that the realization of the APNPs, in the initial format of remote teaching, guaranteed the continuity of studies, by the students of integrated high school, in the midst of the situation of social isolation and in the face of the health crisis in which we found ourselves, being an important "way out" found by managers and teachers, as an action undertaken by the Federal Institute of Espírito Santo.

RESEARCH OBJECTIVES: GENERAL AND SPECIFIC

In view of the above, our main objective is to problematize the process of implementation of APNPs in Integrated High School, within the scope of the Federal Institute of Espírito Santo - Ibatiba campus, through the pandemic context, with an emphasis on the investigation of curricular practices produced between face-to-face and *online activities* and from the perspectives of curricular integration and integral human formation.

In addition, other guiding axes of our research are also to investigate the uses of digital technologies applied to education, driven by APNPs, as instruments of innovation in the curricular practices of EMI courses; discuss the perspectives of curricular integration and integral human formation at EMI considering the activities experienced between face-to-face teaching and non-face-



to-face teaching; investigate the curricular practices produced between teachers and students at EMI during face-to-face and online activities, in a pandemic context, at the Ibatiba campus of Ifes⁸.

APPROXIMATIONS OF THE THEORETICAL FRAMEWORK, METHODOLOGICAL PROCEDURES AND DATA PRODUCTION OF THE RESEARCH

During the entire research, we used theoretical assumptions related to the perspective of integration and curricular production, as well as discussed the use of technologies in this context and integral human formation as a pillar of Professional and Technological Education.

As theoretical intercessors for the work, we sought the ideas of authors considered as references for the study of the themes of work and education, integral human formation, integrated curriculum, Professional and Technological Education and digital technologies applied to the school context. In this sense, we dialogue with the studies of Frigotto, Ciavatta and Ramos, (2005); Manacorda (2017); Saviani (2007) and Kuenzer (2002) to broaden the discussions of EFA in Brazil and, also, considering that one of the objectives of the research is related to discussing the use of technologies during and after the implementation of APNPs, as an instrument of innovation in the teaching and learning process in EMI courses, we approach the ideas of researchers of digital technologies in the school context, with emphasis on Kenski (2011); Bacich, Neto and Trevisani (2015); PISCHETOLA (2018); Moran (2007) and Mill (2014).

In this sense, some highlights are made during the research to reaffirm, for example, the important *permanent updating of the curricular organization*, since the world is in a constant process of change, both in social, political, cultural contexts and in economic aspects and focused on the productive sector; the search for *understanding and discussing the social relations of production and work*, because one of the principles of EFA is to form a citizen who understands the entire production process and the stages of this process, as well as the social relations intrinsic to these processes, as Frigotto (2005, p. 58) taught us when he pointed out the necessary "[...] deepening the understanding of work: in its dimension of creation of the human being (ontocreative) and [in] the historical forms that work assumes in class societies, [in] the current context of globalization or [in] the globalization of capital."

Hence the need to broaden the discussion of curricular integration a little more, essential for the proposal of the courses of Technical Professional Education at the Secondary Level. We can say that, currently, we have the structure for the offer of Integrated High School more consolidated in our

⁸ The Federal Institute of Espírito Santo (Ifes), Ibatiba campus, is located in the municipality of Ibatiba, located on the banks of BR 262, in the south of the State of Espírito Santo and is inserted in the micro-region called "Caparaó" - a large area of environmental and forest preservation located in the southwest of Espírito Santo and southeast of Minas Gerais. The Caparaó region is well known for its vocation for agritourism and ecotourism.



education system, but we also know the challenges we face in the face of the proposal of integral human formation of the subject. Chisté (2017, p. 41) contributes by stating that

[...] it is possible to assume that, with the current structure of Integrated High School, meeting all legal and theoretical prerogatives becomes increasingly difficult, if possibilities of overcoming it are not thought of, through public policies and the reflection of the collective of teachers and other professionals. It is necessary to systematize the integration of knowledge in the search for propositions that put an end to the instrumentalization of young people and their preparation for the labor market in the technicist molds. On the pedagogical level, this proposal presupposes the integration of all disciplines, without compartmentalizing knowledge.

The strategy of not compartmentalizing content and knowledge can be considered one of the greatest challenges in the EMI proposal. As much as the Pedagogical Projects of the Courses (PPCs) are built aiming at curricular integration, in the performance of daily activities, even seeking that the dichotomy between theory and practice is not present, a lot of effort is needed for more interdisciplinary and contextualized actions to occur in the curricular practices of these integrated technical courses.

Other relevant highlights concern the *intellectual mastery of technologies and the expansion of their uses*, considering that it is not the objective of EFA to train a worker who is only operational, but who can master multiple languages and tools for the creation of new knowledge and techniques, that is, who can also express himself through numerous forms of creation, “[...] formulate their thought and express themselves as an author” (Pischetola, 2018, p. 198) and with *the knowledge required to exercise their profession with autonomy and responsibility, guided by ethical, aesthetic and political principles*. In other words, we defend an education that gives the citizen the perception of different conceptions of society and work, as well as a critical understanding of their necessary ethical action, aiming to ensure the creation of a less unequal and, consequently, more just and solidary society, based on “a praxis capable of transforming the social relations in force in society and in educational processes” (Frigotto, 2005, p. 58).

We understand, therefore, that the integral education of the student in EFA is related to personal, academic, cultural, professional aspects, among others, as presented in the National Curriculum Guidelines for High School (DCNEM), Art. 5, item I: “integral education of the student, expressed by values, physical, cognitive and socio-emotional aspects” (Brasil, 2018).

In the context of digital technologies, the research points out that it is interesting to think of these technologies as providers of interactivity among students. According to Candau and Sacavino (2018, p. 213), “[...] What technology does today is integrate different spaces and times. The articulation in the processes of teaching and learning between the face-to-face and digital worlds”, which we understand can expand the possibilities of connection between students and the content to be worked on in the school context. It is about seeking an approximation between the “virtual world”



already known by many and the activities proposed by the curricular components of the integrated technical courses, considering the context of EFA.

The introduction of ICT [Information and Communication Technologies] in education demands didactic strategies capable of promoting a variety of learning processes and alerts to the urgency of a review of pedagogical practices. Facing the implications of these changes presupposes seeking new methodologies for the pedagogical use of ICT, not only reproducing traditional practices with other supports, but creatively exploring the new possibilities made possible by the new media (Pischetola, 2018, p. 199).

Based on Mill (2014), we consider an update of the expression Information and Communication Technologies (ICT) to Digital Information and Communication Technologies (DICT), when the author also states that the presence of DICT has caused relevant changes in the educational context, both in conventional classrooms, face-to-face teaching, and in the Distance Education (DE) modality. relating these changes to the ways of teaching, the resources used, the posture of teachers - who now assume a more collaborative, orientation profile - and even the way educational systems are organized.

According to Pischetola's (2018) ideas, the concept of pedagogical innovation has also been associated with DICT, which are seen as "support tools" for teaching practices, when "used as 'allies' by subjects who have overcome their 'resistance' to use in the classroom" (Idem, p. 187). In fact, we consider that there may be some resistance on the part of teachers because they do not feel safe, often because their training processes have not emphasized the use of digital technologies, alternatives and methodological resources possible from this use, in the most diverse educational spaces and times. In addition, the author herself points out other obstacles to the use of these technologies more broadly by the different education systems in our country, such as the lack of infrastructure (equipment, operation, adequate facilities), technical support and bureaucracies.

Thus, when we consider these issues related to the uses of digital technologies in the curricular practices of integrated education, that is, thinking about the insertion/expansion of these technologies in the curricular context of EMI courses, it leads us to the idea of an extension of the methodologies used, leading us to highlight, once again, teaching beyond the "physical" classroom. This perception also deconstructs the idea that digital technologies could only benefit the Distance Education modality, because, for Moran (2007, p. 9) "the physical and virtual worlds are not opposed, but complement each other, integrate, combine in an increasingly larger, continuous, inseparable interaction".

Regarding the methodological procedures, the approach used in the research is *qualitative*, with an exploratory character and based on the assumptions of research *with daily life* (FERRAÇO, 2003), with the semi-structured interview as the main methodological instrument. The approach was also chosen taking into account that the production of data had the direct participation of the subjects



of the investigation, being teachers who work in Integrated High School courses and some professionals from the administrative/pedagogical structure of Ifes.

Considering the exploratory character, according to Gil (2010, p. 27), "exploratory research aims to provide greater familiarity with the problem, with a view to making it more explicit or to construct hypotheses". This exploratory bias arose because our work constituted direct contacts between the researcher and the research space and the experiences lived and shared by the research subjects, in a way, also guided the course of the research throughout the process.

The analyses based on the assumptions of research *with* everyday life were carried out from our desire to immerse ourselves deeply in the *locus* of the research, in the chosen context. About the research *with* everyday life, Esteban (2003, p. 200) explains:

Research in everyday life poses some questions that require specific methodological prepositions, and an adaptation of the instituted procedures is not enough, as it is not a research that intends only to construct explanations for the phenomena found, but seeks to deepen the understanding of reality in a dialogical perspective linked to intervention processes.

Seeking a greater understanding of the context of the investigation, therefore, our work began with a bibliographic study, with the aim of expanding knowledge about the research problem, with emphasis on the discussions of curricular integration and integral human formation, as well as on the use of digital technologies applied to education and the possibilities of articulations and curricular practices experienced between face-to-face teaching and *online* teaching proposals at EMI.

Thus, the first stage of data production comprised a documentary survey of all the regulation of APNPs at Ifes. This stage included a thorough study of institutional legislation from the suspension of face-to-face classes, on 03/17/2020, to the flexible return, in 2021, and the full return of "face-to-face" in 2022. During the pandemic context, face-to-face teaching at Ifes underwent several adaptations, several resolutions and normative instructions were published in order to guide the operation of remote teaching, as well as the evaluation process and the registration of student attendance during the period of remote classes and flexible return to face-to-face classes. In order to highlight the movements carried out in the *locus* of the research, we also sought information and records through internal ordinances, photographs, *screenshots* of the institutional website and social networks in order to demonstrate how the Ibatiba campus of Ifes dealt with the period of remote classes with regard to the implementation of APNPs.

We emphasize that at this stage, when we immersed ourselves in the pandemic period, we realized how Ifes sought alternatives to "deal" with the situations that arose with the pandemic and how that whole process was constantly unpredictable, as the normative guidelines were reviewed and changed according to the context of the pandemic that was maintained and with the *feedback* of the parties involved. Ifes managers cautiously managed the APNPS period, following the guidelines of



the World Health Organization (WHO) and prioritizing student learning through welfare policies to ensure access to the internet.

In the second stage of the investigation, we interviewed thirty professors, a representative of the pedagogical sector of the campus and a professional from the Dean of Education of Ifes. In other words, we listened to professors and professionals from the institution's administrative/pedagogical structure, seeking to share experiences with a focus on the pandemic period and the use of digital technologies used. The narratives produced in the movement of the interviews allowed us to experience the implementation of the APNPs in several aspects. In addition to the semi-structured interviews, we asked the teachers participating in the research for permission to access the virtual rooms, structured in the Virtual Learning Environment - VLE Moodle - in the academic years 2020 and 2021, and the teachers helped us, once again, allowing us to immerse ourselves even more in the daily life studied.

In the midst of the research movements, the elaboration of our educational product also took place, collectively, which consists of *teacher training focused on the discussion of the use of digital technologies in Integrated High School*. The construction of the product began at the time of the interviews, as our intention was to produce teacher training that met the needs of teachers about the use of digital technologies and, at each interview, we had more elements that made us believe that this was an important proposal, since we realized how the lack of familiarity with digital technological tools affected the realization of APNPs. Thus, we dedicated questions from the interview scripts to this purpose, seeking to know from the professors what their desires and needs were about the use of these technologies.

FINAL CONSIDERATIONS

As we have presented throughout this article, the research problematized the implementation of non-face-to-face pedagogical activities, as an action undertaken by the Federal Institute of Espírito Santo in a pandemic period, considering, in this sense, the curricular and didactic-pedagogical dimensions of the practices carried out in the context of Integrated High School (EMI) courses. An investigation that focused, therefore, on the perspectives of curricular integration and integral human formation, as well as highlighted the connections between the digital technologies used and the integrated curriculum in the context of these courses.

Through the reality of the pandemic, a historical milestone for educational processes, it was possible to relive and problematize with the research subjects the entire process of implementing the APNPs, in addition to getting to know more closely the methodological innovations created by teachers in this period and the challenges faced in the face of the need for the constant use of digital technologies in teaching, especially during the period of social isolation.



In this way, the research work helped to understand that teachers are fully able to innovate and expand the use of Digital Information and Communication Technologies in their curricular practices, and it is necessary, however, that the working conditions favor this use – such as resources, equipment, access to the network, etc. – as well as that the training processes are constant, including those related to the incessant innovations and technological acceleration of today.


We also highlight that from this understanding occurred the creation of the Educational Product, during the research, in the format of "continuing education course for teachers" in order to present themes, resources and procedures that can collaborate with the training processes of teachers who work in Integrated High School courses, in the context of Professional and Technological Education, with regard to the use of these digital technologies, understood, in this scenario, as instruments of innovation for curricular practices, especially for a post-pandemic context.



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Chemistry at the tip of brushes: Teaching chemistry through makeup for black skin

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ABSTRACT

According to an interview conducted by the cosmetics company AVON, about 46% of the 1000 black women interviewed have difficulties finding makeup for black skin tones. This research highlights the persistent difficulty faced by Black-skinned individuals in finding makeup products that suit their skin tone, leading many to resort to improvised solutions during the makeup process. In this context, the proposed work aims to explore the relevance of makeup for black skin as an educational tool in the teaching of chemistry. The planned activities aim not only to make students aware of the scarcity of foundation options available for the various shades of black skin, but also to connect this problem with the chemical principles underlying the formulation of cosmetics. In this way, students will be encouraged to reflect on how the science of chemistry can be applied to solve societal issues and promote inclusivity, while also deepening their understanding of fundamental chemical concepts. In addition to promoting self-knowledge about black identity, the approach to makeup for black skin as a tool in the teaching of chemistry seeks to bring students closer to the discipline in a playful way. This is done through an active methodology, which includes hands-on experimentation and a quiz on Google Forms to understand the difficulties students face when looking for makeup suitable for black skin tones.

Keywords: Makeup, Black skin, Didactic sequence and black identity.

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INTRODUCTION

The theme of this work was conceived with the intention of filling the lack of teaching that demonstrates to students the various applications of Chemistry, showing that science permeates their daily activities. In addition, it aims not only to train students, but also individuals capable of critically analyzing their social reality and, consequently, contributing to transform it.

In contemporary society, there is a growing interest among young people, especially among younger girls, in relation to makeup. This phenomenon reflects a significant cultural change, where the search for personal expression and self-esteem has led to a greater appreciation of beauty and care for one's appearance from an early age.

There is a lot of discussion around the difficulty in finding makeup products that cater to the diversity of black skin tones. When found, these products often come with high prices, making them unaffordable for many. As a result, many people have to resort to mixtures of different shades of makeup (one lighter and one darker) to achieve the desired shade for their skin. This reality highlights a gap in the makeup industry in terms of representation and accessibility, as well as highlighting the need for a change in this scenario to ensure that all skin tones are properly catered for.

In addition, many girls do not recognize themselves and the work brings this discussion and self-knowledge, since black identity is a complex journey, often influenced by a variety of social, cultural and historical factors. For many people of African descent, recognizing and affirming their racial identity can be a challenging process, especially in societies where structural racism is still prevalent. The lack of positive representation in the media and negative stereotypes associated with blackness can impact how black people see themselves and are seen by others. However, the strengthening of Black identity can be achieved through a journey of self-knowledge, education, and empowerment within the community, providing a safe space for reflection, dialogue, and celebration of the diversity and beauty of the Black experience.

Lead oxide contamination in makeup products is a growing public health concern, as lead is a heavy metal known to cause a range of adverse health effects, especially when absorbed by the human body. These lead oxides are often found in makeup pigments, such as lipsticks and eye shadows, and can pose a significant risk to consumers, especially those who use them daily. Long-term exposure to lead can lead to a range of health problems, including neurological damage, developmental problems in children, and reproductive complications.

With the objective of making young people aware of the importance of producing makeup suitable for black skin, this work proposes a didactic sequence that enables students to produce their own facial foundation. This becomes essential when they can't find suitable shades on store shelves. The proposal is to present Chemistry as an instrument to live better in society, in addition to



providing autonomy and knowledge so that they can create their own bases using easily accessible materials, thus ensuring that all skin tones are represented and adequately served.

OBJECTIVES

GENERAL OBJECTIVE

Create a didactic sequence with the theme "makeup for black skin" as a tool for teaching organic chemistry to students in the 2nd grade of high school.

SPECIFIC OBJECTIVES

- Propose interdisciplinary activities between the disciplines of Biology, Chemistry and History.
- Show the importance of black identity and its self-knowledge to the student.
- Relating racial factors to chemical science
- Propose a didactic sequence with a theme of the students' daily lives.

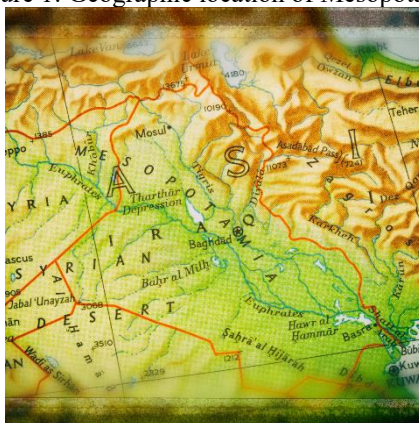
THEORETICAL FOUNDATION

HISTORICAL CONTEXT

The word makeup came from the word "Maquiler" or "makeup" which has the meaning of painting your own face or even beautifying yourself. (Medes, S.) (Bigio, V., 2016)

As much as the concept of makeup has been implemented in more recent times, there is evidence of the use of makeup since the Neolithic period, but its objective was to differentiate the peoples of a certain group. Such as, for example, the leaders of these groups were identified with animal teeth and sorcerers were identified through body paintings. The concept of makeup was only implemented as something related to beauty from ancient history in Mesopotamia, which was located in what we now call Iraq. During this period, body painting was carried out by men and women and made with saffron, red earth, kohl (charcoal) which was used as a base. However, there was a mixture containing lead in the composition, which was widely toxic. (Ramos, S.; Araújo, J; Silva, Ana P., 2022)

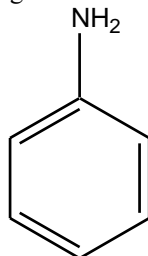
Figure 1: Geographic location of Mesopotamia



Source: (the author)

Throughout history, makeup has undergone several transformations. Initially, users believed that it had antibacterial properties due to the presence of lead, even though it was toxic. The Greeks and Romans improved the makeup of the Egyptians by introducing colors to the eyes and blending the khol, rather than marking it. The rose-cheek culture, popularized by the Romans with the use of red wine, was replaced by a liquid made from wine and red aniline (Figure 2). In the eighteenth century, cochineal began to be used as a rouge, and face powder was made from bismuth nitrate, white as lime. (Galembeck, F.; Csordas, Y.)

Figure 2: Aniline



Source: the author

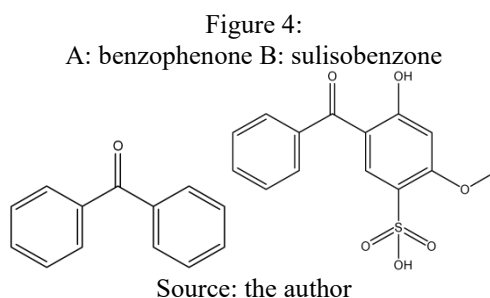
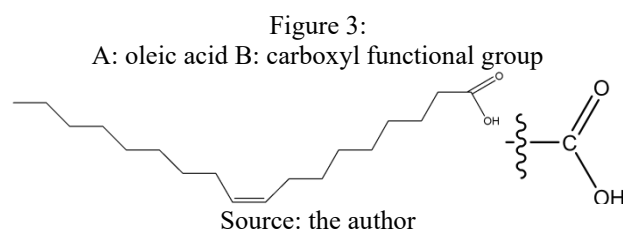
Over time, the compositions of cosmetic products began to change due to harmful chemicals such as lead and the unpleasant odor of bismuth. The evolution of chemistry has driven the progress of makeup, the result of the constant accumulation of information and knowledge by society. The use of makeup has become an everyday practice among people, and this trend has endured to the modern day. (Santos, V., 2018)

Currently, there is a wide market of cosmetics available to consumers, covering products of different levels of quality, from the simplest to the highest-end. It is important to note that the difference in the quality of the products is related to factors such as elaborate, colorful, resistant and eye-catching packaging, which have the power to influence the consumer's choice, manipulating their imagination during the purchase process. (Santos, V., 2018).

FORMULATION OF THE BASES

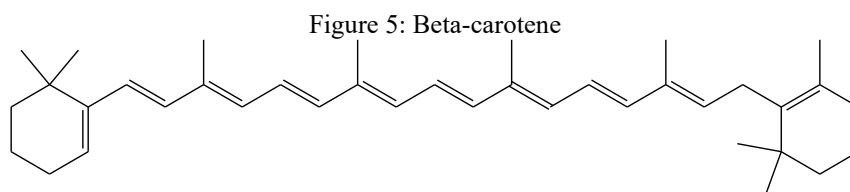
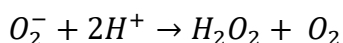
Facial foundations are products that aim to cover and/or disguise skin imperfections, for this to occur, the foundation must be in the same skin tone so that it is very homogeneous. This product may have water, oil and silicone as its main ingredients, and may vary from product to product based on its purpose. (Oliveira, L., 2015)

Cosmetic bases produced based on oil contain emollients (which aim to soften and prevent skin dryness, which are vegetable oils and butters. An example is almond oil, which has oleic acid in its composition (Figure 3 - A), which is a fatty acid and, therefore, an organic acid with an open and long carbon chain, which has the carboxyl functional group (Figure 3 - B) at its end. In this type of foundation, there is also the presence of sunscreens, which are responsible for protecting the skin from ultraviolet rays from the sun, such as benzophenone (Figure 4 - A) that absorbs UVA rays and sulisobenzone (Figure 4 - B) that absorbs UVA and UVB rays. In both structures, there is the presence of a carbonyl that prevents ultraviolet rays from penetrating the skin. (Baki, G., 2015) (Costa, B., 2020)



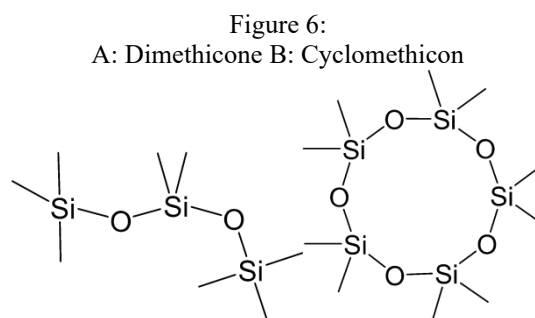
It is worth mentioning the presence of antioxidants whose main objective is to prevent the oxidation of oil-based components from occurring. According to P. Atkins: "the transfer of electrons from one species to another is now recognized as the essential step of oxidation, so chemists define oxidation as the loss of electrons, disregarding the species to which the electrons migrate." (Equation 1). An example of an antioxidant is beta-carotene (Figure 5), which has a protective action against the negative effects of sunlight exposure. (Atkins. P., 2018)

Equation 1: Oxidation example



Source: the author

Oil-free bases, on the other hand, are formed by silicones, such as dimethicone (Figure 6 - A), also present in the composition of some sunscreens, or cyclomethicone (Figure 6 - B), which are polymers - macromolecules made up of smaller parts that are called monomers, and these monomers are repeated. These polymers are synthetic and basically composed of an organic structural portion and an inorganic portion composed of silicon and oxygen. (Baki, G., 2015).



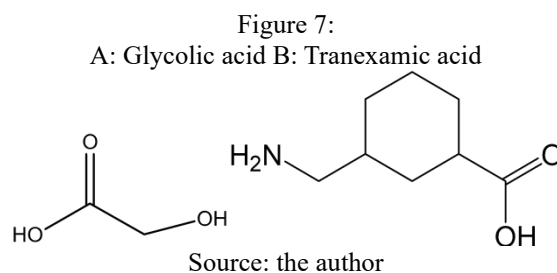
Source: the author

What gives the bases their proper color are opaque inorganic pigments, such as iron oxides (yellow, red and black), ultramarine oxides (blue) and chromium hydrate/chromium oxide (green), which are widely used. To improve dispersion and stability, treated or coated pigments can be used, such as silicone coating, which provides better glide and facilitates dispersion. This coating eliminates the need to grind pigments, which is commonly required for uncoated pigments. Titanium dioxide and zinc oxide are also used, but not for color, but as covering agents due to their white color. (Baki, G., 2015) (Costa, B. 2020)

Emulsifying components are substances that help stabilize the two immiscible parts in an emulsion, that is, the oily part and the aqueous part, preventing their separation. These agents have a hydrophobic part, which interacts with nonpolar substances, such as oil and silicone, and a hydrophilic part, which interacts with water. (Costa, B. 2020)

Nowadays there are already makeup bases that reduce spots from sunlight, and this type of product is responsible for a finish with a matte effect that controls the oiliness of the skin. These bases have nano glycolic acid in their formulation with glycolic acid nanoparticles (Figure 7 - A), tranexamic acid (Figure 7 - B) and sunscreen in their formulation, which has the effect of making the

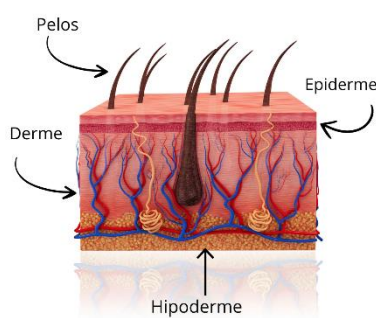
skin smoother, well treated. In addition, it has an action that synthesizes melanin, which results in the reduction of skin blemishes. According to an article produced on the website Universidade estadual Paulista – UNESP- Nanoparticles are tiny objects whose dimensions vary from 1 to 100 nanometers (nm), and 1 nanometer is equivalent to 0.000000001 meters, or 10^{-9} meters in scientific notation. To give you a comparative idea, the average size of a nanoparticle is 15 nm, which means that they are approximately one million times smaller than a shirt button that is 1 centimeter in diameter. (O Boticário, 2023) (Magdalena, A., 2021)



THE HUMAN SKIN

The skin is the largest organ in the human body, accounting for about 16% of body weight. Its main function is to protect internal structures from the external environment. The skin is composed of three layers: the epidermis, the dermis, and the hypodermis (or subcutaneous mesh). (Bernardo, Ana F., 2019)

Figure 8: Representation of the skin layers



Source: Canva

The epidermis is the outermost layer of the skin and has no blood vessels. Its thickness varies from 75 to 150µm micrometers, being thicker on the palms of the hands and on the soles of the feet, where it can reach 0.4 to 0.6 mm in thickness. The main function of the epidermis is to protect against external agents. (Bernardo, Ana F., 2019)

The epidermis is made up of several layers of flattened epithelial cells, arranged in a sequence from the inside out. These layers include the germ or basal layer, the spinous layer, the granular layer,

the lucid layer and the layer. These conventions work together to provide protection and regulation of water loss through the skin. (Bernardo, Ana F., 2019)

Skin color has a wide variety of shades and requires specific care according to age. All skin colors have melanin (Figure 9), but differences arise in the way melanin is distributed within the skin. This difference in melanin distribution results in variations in skin tones, as well as in the characteristics of the skin's response to sun exposure. While these topics are covered in more detail in the chapter on sun protection, here we will discuss the only difference between skin color and response to skin care products. (Bernardo, Ana F., 2019) (Alchorne, Mauricio., 2008)

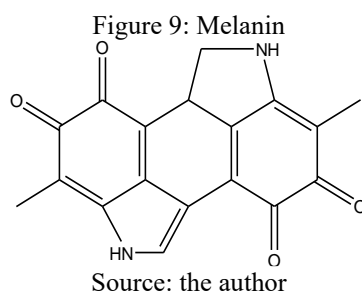


Figure 10: Different skin tones



CHEMICAL AND BIOCHEMICAL ASPECTS OF BLACK SKIN

The proportion of melanin in the outer layer of the skin, known as the epidermis, is higher in people of African descent, with notable discrepancies compared to fair-skinned individuals. This disparity is not related to the number of melanocytes, cells responsible for the production of melanin. Instead, it is explained by variations in the number, size, and arrangement of melanosomes, structures present in both melanocytes and keratinocytes. (Alchorne, Muricio. 2008)

In dark skin, melanosomes are larger and do not aggregate, but are distributed throughout all layers of the epidermis, especially in the basal layer. In contrast, in fair skin, melanosomes are smaller and tend to cluster together, predominating in the basal and malpighian layers and absent in the upper layers of the epidermis. (Alchorne, Muricio. 2008)

This discrepancy in the amount and distribution of melanosomes results in a natural variation in sun protection factor (SPF) between dark and light skin. Dark skin, due to its higher concentration of melanin, offers a natural SPF of around 13.4, with the Malpighian layer playing the main role in



filtering ultraviolet radiation. On the other hand, in fair skin, the natural SPF is lower, and the layer is the main responsible for this filtering. Although the stratum corneum in dark skin contains more layers of cells than in light skin, the overall thickness of the epidermis is similar in both cases. The difference lies in the compaction of melanosomes and their distribution in the various layers of the skin. (Alchorne, Muricio. 2008)

It's crucial to remember that these characteristics are just a few of the many natural differences between skin types, and that everyone, regardless of their ethnicity or skin tone, should adequately protect themselves against the sun's UV rays to prevent skin damage. (Alchorne, Muricio. 2008)

The genetic determination of skin pigmentation is not yet completely understood. Skin color is influenced by a specific combination of genes, resulting in a wide range of shades ranging from very dark to very light, with several variations in between. However, there is no clear global consensus on the definition of "dark skin" or "light skin," and these terms can have distinct meanings in different countries and cultures. (Alchorne, Muricio. 2008)

To try to establish a standardized classification of skin color, dermatology uses systems such as Fitzpatrick's (it is a numerical classification scheme for human skin color), which categorizes different phototypes based on the skin's response to sun exposure. Initially designed for fair skin, this system has been adapted to include darker skin, dividing it into phototypes IV, V and VI, which are less likely to burn and tan easily. (Alchorne, Muricio. 2008)

However, it is important to emphasize that these classification systems are not intended to define ethnicity, but rather to understand how the skin reacts to sunlight, whether through burns or tanning. It would be relevant to develop a classification system that is more suitable for darker skin, based on the propensity of pigmented skin to develop hyperpigmentation in response to inflammatory stimuli and to sustain this hyperpigmentation for a prolonged period, a characteristic unique to pigmented skin. (Alchorne, Muricio. 2008)

BLACK FEMINISM IN SCIENCE TEACHING

Between the 1960s and 1980s, feminism saw its growth on a global scale, and within this period, black feminists began a literary and intellectual production, generating the movement known as black feminism. In the Brazilian context, this movement had its beginnings in the 1980s, with the formation of the first black women's collectives. It is relevant to highlight that black feminism is not restricted to a struggle of identity only, but rather seeks to materialize democratic projects. (Jesus, Cristiane. 2018)

The interconnectedness between feminism and racial issues is crucial for a more complete and inclusive approach to women's experiences, ensuring that Black women's voices and perspectives are



heard and considered in the quest for equity, justice, and social transformation. Therefore, black feminism represents a significant and necessary contribution to the construction of a more egalitarian and diverse society. (Jesus, Cristiane. 2018)

At a certain point, black women were faced with the pressure to choose between engaging in the black movement or in the feminist movement in general. However, it is crucial to understand the intersections and connections between these two movements. Recognizing the diverse ways in which race, gender, sexuality, and class intertwine is essential. (Jesus, Cristiane. 2018)

Therefore, it is essential to address these issues intersectionally, recognizing how different systems of oppression intertwine and reinforce each other. Only by considering all these dimensions and their interrelations will it be possible to create a more inclusive and comprehensive struggle, which understands the complexity of black women's experiences and seeks more effective solutions for the construction of a more just and egalitarian society for all. (Jesus, Cristiane. 2018)

Despite the changes that have occurred in recent years in relation to the racial issue in Brazil, driven by social movements, there is still a long way to go for Brazilian society to understand that the struggles against racism and gender inequality must be addressed jointly, and not only by the people directly affected by these inequalities. Black women face double oppression, suffering from racism and sexism simultaneously. Therefore, the fight against these forms of discrimination must be a cause embraced by all, aiming at a closer approach to social equality. (Jesus, Cristiane. 2018)

To achieve a more just and equal society, it is crucial that people from all walks of life are involved in the fight against racism and gender inequality. Awareness and mutual support are key to combating discriminatory structures that affect the lives of Black women and other marginalized people. Only through solidarity and unity is it possible to move towards a society where everyone has their rights respected and equal opportunities. (Jesus, Cristiane. 2018).

BLACK SKIN MAKEUP AS A MOTIVATING THEME FOR CHEMISTRY TEACHING

Many black people report the difficulties they face when trying to find makeup that is suitable for their skin tone. From our own experiences as black women, we know that it is quite common to get grayish skin when using foundation and powder, even after several attempts at combinations with different shades and brands. This happens because the products available on the market are often not suitable for our skin tone.

The standard of beauty established by the white European colonizers created aesthetic icons that are part of a symbolic system of representation. In this context, black people were never considered beautiful. Beauty in our society, shaped under the influence of European colonialism, is associated with whiteness. Unfortunately, most of the cosmetics industry does not develop beauty products that adequately meet the needs of black people, especially those with darker skin. This leads



to a market segmentation that has a negative impact on a portion of the population that has always been made invisible. The limited supply of products for black skin becomes even more evident when it comes to face foundations or tinted sunscreens. While some brands feature a wide range of colors and shades, there is little diversity to cater to darker black skin.

In Brazil, a country that was the last to abolish slavery of black people in the Americas, the black population has historically faced poverty and a lack of purchasing power. This has caused the cosmetics industry to long ignore black audiences as consumers. Brazilians with black skin needed to adapt to the existing possibilities, resorting to mixtures between different products to find, hopefully, a suitable shade for their skin.

Only in recent years, with a portion of the black population having access to better living conditions due to more inclusive public policies, the industry has begun to perceive blackness as a makeup-consuming public. However, even with this expansion, many black people still have difficulties finding makeup suitable for their skin. This problem can be explored from the perspective of teaching chemistry, through awareness of its importance for the development of the appropriate foundation for each skin tone. With this, it is possible to learn chemistry through this theme.

THE INFLUENCE OF PAULO FREIRE ON THE TEACHING OF SCIENCE

The teaching of Science, as presented, reflects the influence of the positivist conception, which inspired the traditional approach to education, considering knowledge as something to be transmitted to students. The positivist perspective of science sees reality as something objective and immutable, where facts are given, and it is up to human beings to adapt to the world to know it through experiences. (Chapani, Daisi, 2013)

Under the intense influences of the empiricist-inductivist approach, the teaching of Science tends to neglect the socio-historical aspects of the production of knowledge, treating scientific content not as results of human activity, but as truths to be transmitted passively. Even in the face of criticism, this approach persists in school environments, perpetuating a curriculum centered on passive learning. (Chapani, Daisi, 2013)

Paulo Freire highlighted the limitations of the Traditional Conception of education, influenced by positivism, which, according to him, domesticated students through a methodology that emphasized the simple deposit of content and information, in an uncritical and decontextualized way. Considering that the first years of schooling play a crucial role in preparing children to interact with the world around them, we argue that the teaching of Science at this stage should provide opportunities for students to build knowledge through reflection and critical analysis of scientific content. (Chapani, Daisi, 2013)



The teaching of Sciences, based on the problematizing conception, recognizes the historical and changeable nature of scientific knowledge, considering it as an instrument to facilitate the process of humanization and hominization of individuals. In this approach, knowledge is not an exclusive property of the teacher, but rather something to be shared in an interactive and dialogical way with the class. Both the teacher and the students play the role of critical investigators in the classroom. (Ibraim, Stefannie)

It is important to highlight that the learning of Science content does not occur passively. According to Freire (1981), from a critical perspective, students are challenged by the text in its entirety, seeking to appropriate its deep meaning. Freire (1987) stresses the importance of problematizing knowledge during classes, using questions, doubts and challenges so that students develop a progressive understanding of the world. (Ibraim, Stefannie,)

In problem-based education, the central concept of criticality, as explained by Freire (1996), represents the transition from mechanistic thinking to an inquisitive attitude, an inclination to unveil something, expressed by verbalized or non-verbalized questions, seeking clarification. Criticizing the teaching of Science, according to this approach, implies breaking with the empirical-inductive model, transforming classes into moments of active construction and not just passive reproduction of scientific knowledge. (Ibraim, Stefannie,)

Freire points out that epistemological curiosity plays a fundamental role in the development of criticality in teaching. Teachers should stimulate this curiosity in the classroom, challenging students to seek knowledge continuously, promoting an environment conducive to questioning and the active construction of knowledge. (Auler, Decio. 2007)

There are several initiatives underway at different levels of education to make the teaching of Science more critical, adopting premises of Freire's theory. One of these movements is that of science, technology and society (STS), which has shown promise, including for the first years of schooling. It is crucial that students can actively engage in scientific practice, tackling authentic problems in which inquiry is an essential condition for resolution (Auler, Decio. 2007)

The STS focus focuses on the development of students' critical and argumentative capacity, addressing issues related to everyday life. In this teaching model, the presentation of scientific knowledge in the classroom aims to raise awareness, training for citizenship and, above all, the transformation of social reality. Dialogic interactions are fundamental in this teaching process, promoting constant exchange between teacher and student. (Auler, Decio. 2007)

EXPERIMENTATION IN TERMS OF ACTIVE METHODOLOGY

Science teaching needs an innovative pedagogical approach that is able to deal with the complexity of the teaching and learning process, going beyond the mere memorization of



information. The conventional approach used in science teaching does not stimulate students' critical thinking skills, nor does it prepare them to face the real challenges of society. For this reason, it is essential to explore and understand a variety of teaching methodologies and strategies. (Segura, Eduardo. 2015)

Within this context, active methodologies are recognized as effective principles in the teaching and learning process. These methodologies are based on deep reflection, integration and re-elaboration of new practices, in an autonomous and participatory way, placing the student as a protagonist in the development of knowledge. In this type of approach, students are directly involved in all stages of the process, demonstrating in practice what they have learned through creative productions that show their evolution and progress. The role of the teacher is to evaluate and provide feedback, closely monitoring both individual and collective progress of students. (Alencar, Carlos E. 2018)

The scientific method and its experimental phases can be incorporated as a practical approach to complement the theoretical instruction of a content or discipline, following the principles of active methodology. Its classical structure of problematization, hypothesis formulation, experimentation, and analysis of results make it particularly suitable to be used as a central component of teaching by active methodologies such as project-based learning. (Alencar, Carlos E. 2018)

Experimentation provides an opportunity to teach chemistry in a contextualized and relevant way, both in primary and secondary education and in higher education, allowing students to understand chemical phenomena in the context of the classroom. However, in order for teachers to be able to adopt this methodological strategy, it is essential that their training enables them to reflect on their pedagogical practice and to intervene in the educational reality as necessary. (Junior, João B. 2023)

METHODOLOGY

PART 1: DATA COLLECTION

Initially, a questionnaire was prepared using the Google form, intended for application to students in the 1st, 2nd and 3rd years of high school at the Fernando Rodrigues Silveira Application Institute – CAP UERJ. The students were given a period of one week to complete the questionnaire to think calmly about the answers.

The questionnaire consisted of a total of 11 questions, of which 2 were aimed at identifying the participants and 9 of the questions directly addressed the theme addressed in this work. A large part of this questionnaire was chosen objectively so that the questions were standardized, however, 3 discursive questions were chosen for the participants to demonstrate their opinions in relation to the theme of the questionnaire.



DIDACTIC SEQUENCE

Lesson 1: Introduction to the topic (2 times of 50 minutes each)

Description of the activity

In the first 30 minutes of class, a brief presentation will be addressed about the historical context regarding the evolution of makeup, so that in this class it is an interdisciplinary class with the history teacher, so that he can better present the context in which each era was. Example: Neolithic period, Mesopotamia and ancient Egypt.

In the next 15 minutes, the class will be divided into groups of 5 students and then they should draw a period of the story for students at home to research what makeup was like in that period, what it was used for and its composition, this work should be delivered printed in the next class.

Lesson 2: Introduction to the Chemistry of Makeup (2 times of 50 minutes each)

Description of the activity

In the first 50 minutes, there will be a presentation of the basic concepts of organic and inorganic chemistry relevant to the understanding of makeup chemistry, also addressing the theme of heavy metal contamination.

In the next 50 minutes, there will be a discussion about the different types of makeup products and their main ingredients and the presence of heavy metals in their composition, addressing the main consequences of using products that contain heavy metals.

Lesson 3: Skin issues (2 times of 50 minutes each)

Description of the activity

Interdisciplinary class with the biology teacher, addressing the biological part of the skin, such as showing how the skin is divided and what gives the pigmentation of human skin. Lasting 50 minutes.

In the next 50 minutes, melanin and its formula will be addressed, and it will be possible to identify organic functions and other concepts related to organic chemistry such as sigma and pi bonds present in its structure.

Lesson 4: Difference between makeup for black skin and white skin (2 times of 50 minutes each)

Description of the activity

In this class, there should be a debate with the class about the number of makeup for black skin and white skin based on the question "Why is the quantity of foundations for white skin greater



than the quantity of makeup for black skin? Regarding facial foundations for black skin, do you know how many brands have the various colors for black skin?"

From this discussion, the teacher should address the chemical issue of these facial bases so that the reason for the lack of this diversity on store shelves is justified, this activity should be delivered in printed form to the teacher in the next class

Then, students must be divided into groups of 5 people, who will take each ingredient to make the homemade recipe for the production of the base that will be carried out in the next class.

The ingredients needed are: plastic tube, cotton swab, cornstarch, cocoa powder, facial moisturizer and glycerin. It is worth mentioning that the glycerin must be taken by the teacher and all ingredients must be purchased in health food stores.

Lesson 5: Experimental class – production of a face foundation (2 times of 50 minutes each)

Description of the activity

In the first 20 minutes, the experiment script will be given to the students along with a color palette so that each student can identify their skin tone, which will be numbered from 1 to 7.

Students should produce the foundation for the next 30 minutes and should be aware that the cocoa that is used to give the pigmentation of the foundation should be added gradually, since it is to each skin tone.

In the next 20 minutes, students must answer a brief questionnaire individually that must be delivered on the same day. The questionnaire will be carried out on the chemistry present in the products used for production. And in the next 30 minutes, students must write a report on the practice showing the chemical aspects of the practice, identifying the role of starch and cocoa in the production of the handmade facial base.

Lecture 6: Lecture

Description of the activity

Lecture given by a professional from a cosmetics company in which the production process of a base in the industry will be addressed and then the theme of heavy metals present in makeup will be addressed

DISCUSSION

PART 1: DATA COLLECTION

The questionnaire was set up on Google Forms and applied to two classes of 1, 2 and 3 years of high school at the Fernando Rodrigues Silveira Application Institute – CAP UERJ. However, the answers of the students of class 1B were chosen for data treatment, the answers of the students

achieved the objective in question, which was to talk about black skin and the teaching of chemistry, the class is composed of 26 students, and of the class, only 22 answered the questionnaire.

The first question was about identification, with the objective of getting to know the class. Of the 22 students who answered the questionnaire, 55% identify with the gender cis man, 32% identify with the gender cis woman, 4% trans man and 9% preferred not to identify themselves.

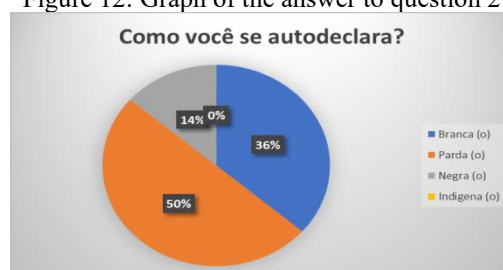
Figure 11: Graph of the answer to question 1



Source: the author.

Only 14% of the class identifies as black, indicating that blacks are still a minority in basic education, even in public schools. However, there is a significant number of students who declare themselves brown compared to whites. This is due to the fact that some students do not identify as white or have a defined black identity.

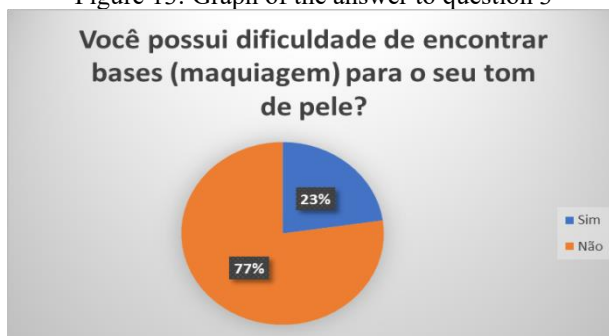
Figure 12: Graph of the answer to question 2



Source: the author

The next question delves deeper into the topic, showing that 23% of respondents report difficulties in finding makeup bases that match their skin tone. This data reveals an inequality in product availability, as 77% of respondents do not face this problem, suggesting that markets offer a greater variety of foundations for lighter skin tones. Thus, the survey shows that there is a predominance of options for fair skin on the shelves, while the various shades of black skin find less representativeness and availability of suitable products.

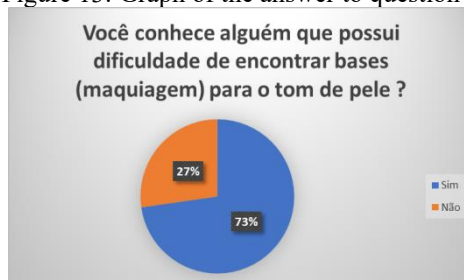
Figure 13: Graph of the answer to question 3



Source: the author

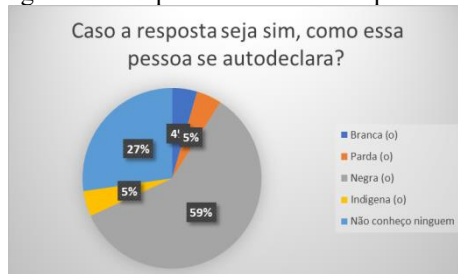
The survey shows that 73% of respondents know someone who faces difficulties in finding makeup bases suitable for their skin tone, and 59% of these people declare themselves black. This situation reflects the lack of options available in the market for darker skin tones. In response to this limitation, 27% of respondents resort to mixing foundations of lighter and darker shades to achieve the desired color. This improvised practice highlights the scarcity of specific products for black skin. In addition, the survey indicates that 73% of respondents prefer not to purchase the product when they do not find the ideal foundation for their skin tone, evidencing frustration and dissatisfaction with the limited supply of products on the market.

Figure 13: Graph of the answer to question 4



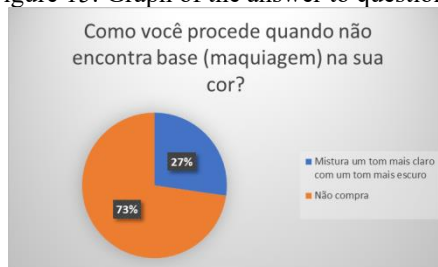
Source: the author

Figure 14: Graph of the answer to question 5



Source: the author

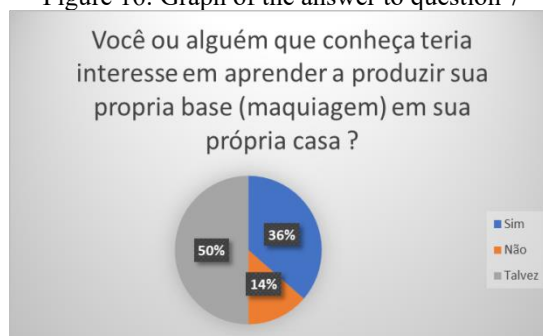
Figure 15: Graph of the answer to question 6



Source: the author

One possible solution to the shortage of suitable face foundations is the artisanal production of cosmetics, according to the research conducted. The data shows that 36% of respondents are interested in manufacturing their own bases, thus seeking products that better meet their specific needs. However, 14% of respondents are not interested in this alternative. This lack of interest can be explained by the fear that homemade products may cause skin irritations, lesions, or allergies, as well as concern about possible errors in the manufacturing process. Artisanal production requires precise knowledge of the right ingredients and methods, which can intimidate some consumers.

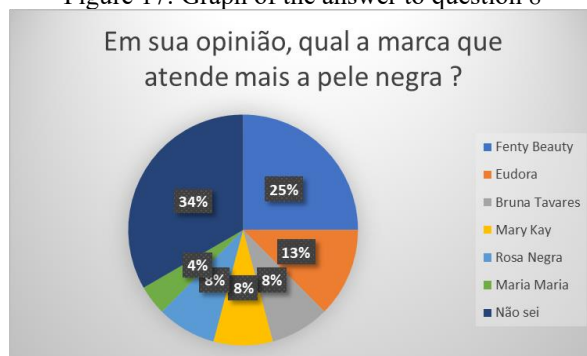
Figure 16: Graph of the answer to question 7



Source: the author

The last question of the survey aimed to identify which makeup brand best caters to the diversity of black skin tones. Among the six brands mentioned by the students, Fenty Beauty stood out as the most mentioned. This recognition is due to the fact that the brand was founded by a black woman, which results in greater care during the production of products and a more comprehensive inclusion of the various shades of black skin. However, about 34% of students answered that they do not know which brand best meets this demand. This shows that some students really do not have knowledge about makeup brands, while others are unaware of brands that promote this inclusion effectively. This data highlights the need for greater dissemination and awareness of the availability of inclusive makeup products in the market.

Figure 17: Graph of the answer to question 8



Source: the author

The last question of the questionnaire asked students to write their opinions about the great difficulty in finding makeup that met the diversity of black skin tones. One particularly striking response came from one student, who not only addressed the issue of diversity of skin tones, but also explored the intersection of gender and race. She highlighted how this difficulty in finding suitable products not only reflects the lack of representation in the beauty industry, but also reinforces stereotypes and social inequalities. Her in-depth analysis brought to light the importance of an inclusive and sensitive approach, which considers the specific needs of Black people and the influence of social constructs of gender and race on the availability and promotion of beauty products.

Figure 18: Last question and your questionnaire answer

Escreva o que você acha sobre a grande dificuldade em encontrar maquiagem para a diversidade de tons de pele negra *

Eu acho que isso ainda faz parte do racismo estrutural, há pessoas/marcas que não se esforçam em achar os melhores tons para as peles negras e com isso os/as negrxs tem muita dificuldade ainda em achar bases para seus tons... pois mesmo com o público falando que bases negras deixam a pele mais acizentada ou deixam mais claras a pele.

Source: the author

PART 2: DIDACTIC SEQUENCE

By the end of the first class, students are expected to gain an in-depth understanding of the evolution of makeup over the centuries. This includes knowing the different forms and styles of makeup used in various eras and cultures, understanding the materials and techniques employed in each historical period, and realizing how social, economic, and cultural contexts have influenced these transformations in the art of makeup.

By the end of the second lesson, students are expected to have a clear understanding of the fundamental chemical concepts that are involved in the formulation of makeup products. Additionally, they should be well-informed about the risks and issues associated with heavy metal



contamination such as lead, including the harmful health effects that these contaminants can cause and the importance of safe regulations and practices in the cosmetics industry to minimize such risks.

At the end of the third class, students are expected to understand in detail the biological concepts that involve the structure and functions of the skin. In addition, they must understand the chemistry of melanin, including how it is produced by melanocytes, the different types of melanin, and how these pigments influence skin color variation between people.

By the end of the fourth lesson, students are expected to understand in depth the issue of the lack of diversity in the foundation tones available for black skin. They should be able to identify how the limited supply of suitable products by a few brands negatively impacts Black-skinned consumers, highlighting the importance of inclusive and equitable representation in the cosmetics industry. Additionally, they are expected to discuss the social and economic implications of this lack of diversity and explore potential solutions to promote greater inclusivity in beauty products.

By the end of the fifth class, students are expected to acquire the ability to create their own facial base using easily accessible materials. During this practical activity, they must understand in detail the chemical concepts involved, such as the selection and function of each ingredient (such as cocoa, which aims to give the product the proper pigmentation, which is replacing the melanin molecule), the chemical reactions that occur during mixing, and the techniques to adjust the shade of the foundation for different skin types. In addition, students must learn the importance of component ratio and stability to ensure the quality and safety of the final product. At the end of the experimental practice, it is expected that students will answer the evaluative questionnaire very clearly and may have understood the chemical concepts addressed during the classes. The evaluative questionnaire and the response pattern are attached in the appendices. (Serbeto, Victoria. *Chemistry at the Tip of the Brushes: Teaching Chemistry Through Makeup for Black Skin*. 2024 UERJ)

PART 3: EXPERIMENTAL SCRIPT

To arrive at the final recipe, tests were carried out in the laboratory that were done in a few stages. Materials used were: Facial moisturizer, Corn starch, Cocoa powder, Turmeric, Glycerin.

In test 1, 4.83 g of moisturizer; 1.91 g of corn starch; 0.71 g of cocoa: 0.71 g; 1.00 mL of glycerin; Saffron was exempted in this test. It was observed that it did not present the color of black skin, since the amount of corn starch used was greater than the amount of cocoa that aims to give the proper pigmentation to the facial bases for black skin, with this, it is observed that this tone would be the ideal tone for lighter skin tones. It was also observed that due to the presence of glycerin, the base tended to be less viscous, that is, more liquid.

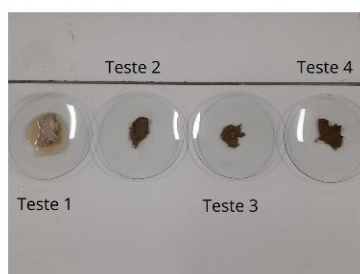
Figure 18: Result of test 1 performed



Source: the author

In test 2, 5.00 g of moisturizer, 0.36 g of corn starch, 0.43 g of cocoa and 0.40 mL of glycerin were used. In test 3, a 2.5 g sample from test 2 was used and 0.94 g of turmeric was added. In test 4, a 1.25 g sample of test 3 was used; 0.81 g of turmeric and 0.30 mL of glycerin. In test 5, 5.27 g of moisturizer was used; 0.36 g of corn starch; 0.36 g of cocoa and 0.80 mL of glycerin. In these tests, a pigmentation color was found, but it was observed that the cocoa beans were not uniform, when passed on the skin, it was possible to see the presence of starch grains on the skin.

Figure 20: Comparison of the results of tests 1 to 4 performed



Source: the author

In test 6, 6.55 g of moisturizer was used; 0.25 g of corn starch; 0.30 g of cocoa powder and 0.3 mL of glycerin. In test 7, 6.55 g of moisturizer was used; 0.15 g of cornstarch; 0.15 g of cocoa and 0.2 mL of glycerin. In tests 6 and 7, even decreasing the amounts of cocoa and starch, the presence of irregular cocoa beans was still observed, so it was necessary to macerate the cocoa so that the cocoa pigmentation in the moisturizer occurs more uniformly. In these last tests, saffron was removed from the formulation since it had a very strong odor of spice, thus decharacterizing a homemade cosmetic. As a result, there was a need to carry out another test, which was bought again: cocoa, which did not need to macerate, since the beans were more uniform. With this, the color

palette was created so that students during the practical class could check what their skin tone would be.

Figure 21: Color palette



Source: the author

FINAL CONSIDERATIONS

The purpose of this study was to develop a didactic sequence composed of practical and accessible activities, designed to be applied in schools that do not have advanced technological resources or specialized laboratories. The proposal aims to ensure that the quality of teaching is maintained, even in contexts with structural limitations. For the effective implementation of these activities, it is crucial that teachers, in partnership with the pedagogical team, dedicate themselves to adapting and applying teaching strategies in a collaborative and integrated manner, thus ensuring the best educational performance by students.

The proposal of didactic sequence seeks to enrich the educational experience by combining the knowledge of Biology, Chemistry and History, promoting an interdisciplinary approach that stimulates student participation and makes the learning process more engaging. It is crucial to emphasize that this sequence is intended to be implemented after the conclusion of the study on organic functions, taking advantage of the concepts and content already covered to deepen students' understanding and promote an integrated view of the disciplines.

In addition, the flexibility of the proposal allows the activities to be adapted according to the needs and time available in the classroom, enabling a better adaptation to the students' learning pace and the demands of the curriculum. This adjustable approach provides greater autonomy to the teacher, allowing him to make modifications according to the context and specific objectives of each class, without compromising the quality of teaching.

The approach to makeup for black skin seeks to involve students in a more meaningful way in the discipline, by connecting an everyday issue - the scarcity of cosmetic products adapted for this type of skin - with concepts of chemistry. This connection between a social theme and chemistry



provides students with a broader and more contextualized understanding, stimulating their reflection on how science is present in relevant issues in society.




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Development of an educational application for the health area

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ABSTRACT

The study aims to describe the experiences about the development of an application in game format for android devices as a contribution to infection prevention in health services. Material and method: descriptive and methodological study, which took place through an experience report. Results and Discussion: the application was developed with a focus on undergraduate students in the health area. The activities took place in the second half of 2023, in three stages. The application of the game took place in three phases, namely: the first phase is related to the issues of elaboration of the game itself; the second phase of its application in the remote environment via Google Meet® during the meeting of the Health Research, Teaching and Extension Project at the University (Pensu) and the third phase, about its distribution. Conclusion: the benefits involved the fixation of the content in a way that transcends expository classes, stimulating the individual's protagonism in the path of knowledge.

Keywords: Remote teaching, Mobile applications, Health information technology.

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INTRODUCTION

In the context of the health area, when looking to the past, it is observed that infection control began in 1935 with the discoveries of sulfanilamide and penicillin. Since then, new research has begun to emerge with the scope of improving and discovering more efficient ways to control bacteria, seeking to intervene in any of the mechanisms (mutation, transduction, transformation and conjugation) that guarantee the continuity of bacteria, since such microorganisms have started to demonstrate resistance to antibiotics ¹.

Within this scenario, the Hospital Infection Control Commission (CCIH) was created in Brazil in 1983, by Ordinance GM/MS No. 196, in the context of awareness, monitoring of outbreaks and health promotion. CCIH is a vital component in ensuring that patients are safe, promoting the quality of health care in hospitals, and for playing an important role in the fight against healthcare-associated infections (HAIs), a public health problem that has a significant impact on morbidity, mortality, and hospital costs².

That said, the CCIH is responsible for providing data that allow the evaluation of the quality of care, in this sense, allowing the deployment of actions and coping strategies in activities related to the control of the environment, personnel, chemical products, creation of standards, epidemiological investigation, continuing education and periodic meetings ³.

The trajectory of the CCIH in Brazil has been marked by historical events that have consolidated its essential role and defined its responsibilities. Created as a deliberative commission by Ordinance GM/MS No. 196/1983, which established its objectives and responsibilities. Subsequently, Law No. 8,080/1990, which regulates the Unified Health System (SUS), included the CCIH as one of the support services for hospital care, increasing its importance. Law No. 9,431 of 1997 made the CCIH mandatory in all hospitals in the country, recognizing its vital role in patient safety ⁴.

The effectiveness of the CCIH depends on the experience of its members, who are a multidisciplinary and interprofessional team. The minimum composition of the CCIH is established by MS Ordinance No. 2,616/1998 and includes physicians, nurses, pharmacists, microbiologists, biochemists, physiotherapists, dentists, psychologists, public health professionals, and other health professionals, depending on the need for the service. The diversity of perspectives and knowledge allows for a comprehensive and effective approach to hospital infection control, ensuring the integration of different areas of health care ⁵.

The responsibilities of the CCIH are broad and cover a variety of activities essential for the prevention and control of hospital-acquired infections. The Hospital Infection Control Program (HICP) is developed, implemented, and evaluated by the HICC. The HICP is a strategic document



that guides all CCIH actions and establishes goals, objectives, and performance indicators for infection control ⁶.

During the pandemic context, the systematic work of the Hospital Infection Control Commission gained notoriety and, without a doubt, was essential to go through a period marked by uncertainty and fear, adopting fundamental protocols and guidelines for the management of the disease during this critical period for global health ^{7,8}.

The present study aims to amplify the current theme through the construction of an application aimed at mobile devices with the android operating system.

METHODOLOGY

It consists of an exploratory methodological study with a descriptive approach, elaborated through an experience report. Methodological research is aimed at the development, validation, and evaluation of technologies or methodological strategies. The purpose of the study was to build a game application to provide reliable information available at the Ministry of Health on the prevention of infections in health services ⁹.

The application was programmed in the C# language in 2D on the *Unity*® platform by a nursing undergraduate and collaborators. The *Unity*® platform has several elements for different creations, serving a different range of audiences. In this way, the features offered fluctuate from the most basic to the most advanced tools, depending on the level of the programmer. In addition, the same free mode offers a compilation of courses of varying levels for a better handling of the platform. This initiative gives individuals access to the world of programming, enabling the first steps within this scenario.

The creation of the game's design was made by using the public domain platforms *Pixabay*® and *Canva*®. Additionally, the theoretical framework selected for the elaboration of the content was the work "Conducts in Hospital Infection Control", written by Professor Márcia Valéria Rosa Lima from the Fluminense Federal University (UFF).

The creation of the game was aimed at devices that use android as an operating system and followed the steps described below:

Figure 1: stages of the elaboration of the CCIH game, Niterói-RJ, 2023

1	2	3	4
Conceitos básicos sobre CCIH	Seleção da Plataforma Unity®	Criação de documento contendo todas as perguntas	Primeiro teste pela própria desenvolvedora
Referência: Livro escrito pela professora doutora Márcia Valéria Rosa Lima: <i>Condutas em Controle de Infecção Hospitalar</i> , uma abordagem simplificada	Jogo em 3 formatos: Verdadeiro ou Falso; Quiz com 4 alternativas e Mini game de desembaralhar.	Seleção de sons e imagens de domínio público : <i>Pixabay®</i> e <i>Canva®</i>	Identificação de erros e ajustes e Segundo teste pelo PENSU
Público - alvo : graduandos em saúde	Busca de material sobre programação na plataforma Unity® e no Youtube®	Construção das Telas do jogo e programação	Disponibilização de modo gratuito na plataforma Zenodo. DOI: 10.5281/zenodo.1054083 5

Source: authors (2023).

Considering that the present study is an experience report, no information or opinion of those involved will be exposed. Thus, ethical implications are avoided, since the research is concerned with exposing only the authors' perspective, excluding information from third parties.

This method consists of the expression of experiences in written form, thus making it possible to contribute to the construction of knowledge and value this experience using critical-reflective thinking with theoretical-methodological support ¹⁰.

RESULTS AND DISCUSSION

The game was tested at a meeting of the PENSU research group held on the *Google Meet®* platform. In the platform's chat, the download link was made available in the mobile application. The activity was supervised by the project's advisor professor. The purpose of this article is to awaken to the new possibilities of continuity of health education. In addition, to stimulate students from different areas of health and teachers about the benefit of uniting other fields of knowledge.

The elaboration of the application followed the following phases of the methodological study:

- 1 Separation of the parts to be worked on within the book "Conducts in Hospital Infection Control", written by Professor Márcia Valéria Rosa Lima of the Fluminense Federal University. It was preferred to work on basic and introductory concepts to the theme;
- 2 Selection of students in the health area as a target audience;
- 3 Survey of the theoretical framework to be used for the elaboration of the questions;
- 4 Choice of the Unity® platform for game development;



- 5 Delimitation of three game formats to be offered: true or false; quiz with four alternatives and minigame to unscramble words;
- 6 Survey of material on the internet to program the selected game formats;
- 7 Elaboration of all questions and words in a spreadsheet;
- 8 Delimitation of the number of screens for the game - main screen, themes screen, true or false (V/F) screen, wanted screen, minigame screen, final score screen, and final considerations screen;
- 9 Selection of visual and sound material in the public domain for creating the design of the game's screens (*Pixabay® and Canva®*);
- 10 Construction of the main screen displaying only the subject of the game and the play button;
- 11 Building Screen Themes: Soldier Button 1 (True or False Game); soldier button 2 (quiz); mini game button (game to unscramble words); information button (final considerations screen) and door button (exit the application);
- 12 Creation of the true or false (V/F) game screen with 13 questions with the correct alternative signaling feature, sound effect signaling error and success, response time of 30 seconds and progress bar exposing the number of questions and quantity answered, as shown in figure 2;
- 13 Creation of the quiz screen containing a challenge with 61 questions, a mechanism for signaling the correct (green) and wrong (red) options, sound effect for error and success, a response time of 25 seconds, a progress bar showing the number of questions and the number answered and a button to exit, according to figure 3;
- 14 Construction of the final score screen common to the two game formats (V/F and Quiz 4 alternatives) with the button to return to the Main Screen, button to the Themes Screen and button to redo every block of questions again. The scoring system is based on the 3-star mechanism, like this: 100% accuracy equals 3 stars, 70% - 90% accuracy gets 2 stars, 50%- 60% accuracy scores only 1 star, and 0 - 40% accuracy no stars. In addition, along with the score, some messages appear depending on the score;
- 15 Construction of the game's final considerations screen showing the references for bibliographic elaboration, menu button to return to the themes screen, name of the project's advisor professor and name of the application developer;
- 16 Creation of the minigame screen containing 12 words within the subject addressed, menu button to return to the themes screen, with a response time of 20 seconds and a score being the sum of the response time, as shown in figure 4;
- 17: First test carried out on the developer's own cell phone;

- 18: Adjustments and correction of errors identified in the previous step;
- 19: Second test of the game by volunteers from the PENSU project on the *Google Meet® platform* in order to identify errors in formatting, buttons and improve the game;
- 20: Adjustments to the functionality of some buttons and fixes to alternatives;
- 21: Developer's observation of university student engagement;
- 22: Creation of a pamphlet, as shown in figure 5, for distribution in the hospital, amplifying the public and bringing another educational initiative;
- 23: Arrangement of the game on Zenodo's free platform. DOI: 10.5281/zenodo.10540835 in order to reinforce education for all, application in the phase of being made available for free on the *Play Store platform*.

Figure 2: V/F screen.



Figure 3: Quiz.



Figure 4: Mini game.



Figure 5: Panfletus.



Source: authors (2023).

Nowadays, games are revealed as a great didactic alternative to traditional teaching spaces, since they encourage learning through challenges, problem solving, and rewards. In addition, games allow the association between pre-acquired and new knowledge, as well as the articulation between different themes ¹¹. Health education is a set of practices that aims to raise awareness and empower individuals about care for their own health and community. In this way, games become great allies to health education ¹².

One of the main benefits of games as a teaching tool is that it allows you to review and evaluate all theoretical knowledge quickly, easily and attractively. Additionally, they promote the articulation between different contents and areas of knowledge, contributing to a greater assimilation of a given subject and the reality of each individual. Thus, removing the old stigma that studying is slow and boring ¹³.

The use of mobile technologies as an educational resource favors individuals by facilitating access to content. This process, in the context of health education, in addition to providing safe information to users, promotes the improvement of the quality of care and decision-making. It contributes to improving communication between health professionals and patients, thus favoring more effective monitoring of the health-disease process. Therefore, these instruments generate benefits in the care provided to the community ¹⁴.

It is also noted that games are a way to insert and complement subjects that are little addressed and commented on in the classroom, stimulating questions and arousing greater interest on



the part of students in seeking more information on the subject. In view of this, one of the main impacts of the use of games as a teaching methodology, in addition to its direct application in the routine of students and health professionals, is its versatility¹⁵.

Healthcare-associated infections (HAIs) have a significant socioeconomic impact, with limited data in developing countries, but evidence from the US and Europe reveals annual costs for American hospitals of between US\$35.7 billion and US\$45 billion, while European hospitals face around \$7 billion¹⁶.

The prevention and control of HAI is crucial, and the effectiveness of the Hospital Infection Control Commission (HICC) was highlighted by a study by the Centers for Disease Control and Prevention (CDC). This study showed a 30% reduction in HAI in hospitals with effective programs, while hospitals without adequate structure experienced an 18% increase in infections over a six-year period¹⁷.

The implementation of actions for the prevention and control of HAI can significantly reduce infections and their impacts on patients, achieving a reduction of more than 30% in rates. Positive examples include a program in the U.S. that decreased the incidence of urinary tract infections by 17% and central line-associated infections by 50%. In Africa, the adoption of a safety culture and prevention program resulted in a 44% reduction in the risk of urinary tract infections¹⁶.

In view of this, one of the great challenges of the Hospital Infection Control Committees (HICC) is, specifically, the training and updating of health professionals to act directly in the prevention of these infections. Game technologies can be used by Hospital Infection Control Committees as a strategy to reinforce content and support in professional training¹⁸.

FINAL CONSIDERATIONS

In general, it can be inferred that the game mentioned in this article enables positive effects in the learning process on the CCIH theme, since it enabled the demystification and provided students with a more interactive space. The main purpose was to stimulate the amplification of the theme, fixation and apprehension of knowledge in a relaxed and creative way, envisioning the creation of other bridges for the continuity of health education.



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owed=y](<https://www.lume.ufrgs.br/bitstream/handle/10183/229325/001130718.pdf?sequence=1&isAllowed=y>).

Misalignments between discourse and grammar studies in Brazilian basic education

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ABSTRACT

In this article, we outline the ongoing tension between grammar-based and discourse-based teaching in Brazilian Basic Education. Historically, institutions like Colégio Pedro II have balanced grammatical instruction with rhetorical and stylistic studies; documents such as the Law of Guidelines and Bases of Education (Brazil, 1996) and the National Curriculum Parameters (Brazil, 1998) emphasize the importance of integrating grammar with the use of the mother tongue in real contexts; curriculum reforms, like the one in 1981 at Colégio Pedro II, reflected changes in the emphasis given to grammar, while more recent approaches, advocated by linguists such as Possenti (1996) and Moura Neves (2011), propose a greater appreciation for language use. In this regard, we advocate for the integration of grammar-based and discourse (text)-based teaching from the perspective of discursive semiotics, which analyzes the construction of meaning on three levels: the fundamental, the narrative, and the discursive. Through analyses of headlines from the G1 portal, we illustrate that grammatical and discursive aspects can be taught together and reinforce the importance of a bidirectional approach for efficient formal learning of the native language.

Keywords: Portuguese language teaching, Grammar, Discourse, Brazilian education, French semiotics.

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INTRODUCTION

A CONFLICT WITHOUT (MUCH) REASON

In recent years, there has been a heated debate among local educators about the alleged lack of space for studying grammatical topics in Basic Education and an overuse of texts in native language classes (Silva; Silva, 2020; Crestani; Marcolin, 2023). Contrary to what various educational guideline movements of the last decade suggest, such as the National Education Plan (Brazil, 2014) and the National Common Curricular Base (Brazil, 2018), we argue that the clash between grammar-focused and discourse-focused pedagogical approaches has shaped the history of Portuguese language teaching in our country³.

An interesting case in this regard is the curriculum of Colégio Pedro II, a public institution of national reference throughout the 20th century. It is worth noting the continuous attention of the institution's curricula, until the 1950s, to rhetorical studies (Vechia; Lorenz, 1998; Razzini, 2000). Grammatical knowledge, concentrated in the early years of student education, was later replaced by the study of rhetoric, stylistics, and, during certain periods, oratory, a clear direction of the teaching-learning process towards the efficient and articulated use of the native language.

With the enactment of the first Law of Guidelines and Bases of Education (Brazil, 1961), the institution's curriculum was limited to the subject of Portuguese Language at both the middle school and high school levels. Interestingly, the roles of theoretical studies of grammar and stylistics, according to this directive, "are merely subsidiary and, consequently, should only serve as a means to develop the student's expressive capacity" (Razzini, 2000, p. 389)⁴.

Obviously, the dimensions of the native language grammar teaching-learning process adopt some notion of discourse/text – albeit vague – as starting and ending points. As stated in the institution's documents, "grammar teaching, markedly practical (sic) and derived from concrete examples, will flow, as much as possible, from the texts" (Razzini, 2000, p. 389)⁵. There is a feedback loop: grammar study derives from discourse/text study to improve students' ability to produce discourses/texts.

From the perspective in which we frame the mentioned issues, the maxim of the National Curriculum Parameters (Brazil, 1998) – that the use-reflection-use triad should be the cornerstone of native language teaching – is an old concern, although this does not imply that it is outdated. The first general document that standardizes contents and approaches aimed at levels equivalent to today's Elementary and High School (Brazil, 1961) advocates that (I) the mother tongue teaching-

³ In more recent decades, the topic has entered the fields of native language education for the Indigenous communities of the national territory and language policies, which is a positive concrete result of the discussions.

⁴ “[S]ão meramente subsidiários e, por consequência, hão de constituir apenas o meio para desenvolver, no discente, a sua capacidade de expressão” (Razzini, 2000, p. 389).

⁵ “[O] ensino da gramática, acentuadamente prática (sic) e derivado de exemplos concretos, fluirá, tanto quanto possível, dos textos” (Razzini, 2000, p. 389).



learning process should be based on the use of grammatical mechanisms in texts and their various facets of communication and expression; and that, subsequently, (II) the uses of grammatical mechanisms should be revisited in light of the possibilities that the underlying structures provide.

Despite not referring to this term, the repealed Law of Guidelines and Bases of National Education adds to the need to combine the understanding of grammatical structures with the identification of their functions (both concrete and potential) in texts the development of an epilinguistic awareness on the part of students. If an approach to mother tongue teaching tied to the identification and classification of grammatical elements is considered unproductive, as it limits the abilities and competencies of the subjects of the teaching-learning processes to a narrow spectrum, an approach that privileges the use of the mother tongue without a critical substrate of the functions performed by grammatical mechanisms does not advance further than its competitor in an identical context, as it equally does not provide the foundations for the construction of an epilinguistic thought.

Almost four decades separate the first Law of Guidelines and Bases of National Education from the National Curriculum Parameters, and some events marked this transition. Under the guidance of grammarian Carlos Henrique da Rocha Lima, Colégio Pedro II reformed its curriculum in 1981. The space for grammar study was expanded, which impacted the objectives of native language teaching. For the first grade, equivalent to middle school, among other objectives, were adopted, "to adequately use the formal variant of the language in oral or written expression" (Brazil, 1981, p. 40)⁶ and "to learn the basic mechanism of the language's grammatical structure" (Brazil, 1981, p. 40)⁷. For the second grade, the objectives were more closely tied to the grammatical component, considering that the student should "consolidate good linguistic habits, by understanding the social value of the formal modality of the language" (Brazil, 1981, p. 40)⁸ and "master, with reasonable security, the grammatical structure of the language" (Brazil, 1981, p. 40)⁹.

The comings and goings of the focus on grammatical studies in Basic Education have resulted in numerous positions. Back (1987), in response to the noted failure of mother tongue teaching, proposes a return to teaching-learning practices based on communication and expression situations, so that the grammatical counterpart of mother tongue study emerges endogenously, as a support to understanding these situations and how they are organized on the structural and socio-discursive levels.

⁶ “[U]tilizar adequadamente, na expressão oral ou escrita, a variante culta da língua” (Brasil, 1981, p. 40).

⁷ “[A]prender o mecanismo básico da estrutura gramatical do idioma” (Brasil, 1981, p. 40).

⁸ “[C]onsolidar bons hábitos linguísticos, pela compreensão da valorização social da modalidade culta da língua” (Brasil, 1981, p. 40).

⁹ “[D]ominar, com razoável segurança, a estrutura gramatical do idioma” (Brasil, 1981, p. 40).

Reflecting on the construction of a native language teaching-learning method, Possenti (1996) argues in favor of abolishing curricula based solely on contributions from the grammatical tradition and its fictional standard norm; and suggests approaching native language teaching to the description of students' vernacular language¹⁰. Following Possenti (1996), Moura Neves (2011) bets on valuing real instances of vernacular language use as a teaching-learning strategy. The proposals of Travaglia (1996, 1998, 2002), in turn, interest us to a greater extent, as they assume an integration between grammar and discourse/text¹¹, thus instituting discourse/text as a product of grammar functioning mapped in its own terms.

In this article, we aim to highlight the possibility of integrating grammar-based and discourse/text-based teaching. For this, we will assume discursive semiotics studies as our discourse/text approach; and we will discuss, on one hand, how grammatical aspects can be transposed to text teaching and, on the other hand, how the teaching of grammatical concepts can emerge from discourse/text analysis. We seek to reinforce the necessary bidirectional approach between the two methodologies and their integration for efficient formal native language teaching.

DISCURSIVE SEMIOTICS AND THE GENERATIVE PATH

Discursive semiotics – also known as French semiotics – evolved from structuralist ethnolinguistic studies (Dosse, 1993). Believing that structural semantics (Greimas, 1976) exhibited inadequacies in its treatment of meaning, semioticians from the Paris School invested in a theory of meaning independent of individual lexical items and developed the hypothesis of an underlying structure to all and any processes of signification (Greimas; Courtés, 1989).

Loosely inspired by the Chomskyan hypothesis that the derivations of constituents and sentences result from combinatorial operations of lexical items in deep structures and, consequently, in surface structures (Bertrand, Estay Stange, 2014), discursive semiotics assumes that the process of meaning construction can be methodologically analyzed through the so-called generative path of signification (Bertrand, 2003).

This path, a methodological simulacrum of signification, denotes that meaning is constructed in levels, moving from the least to the most complex. At the first level of the path, the fundamental level, both basic semantic oppositions that organize the discourse/text and their thymic orientations, related to attractions and repulsions, as well as their axiological orientations, are established. For

¹⁰ We deliberately established a distinction between "mother tongue," referring to the attempt to apply the norms of the so-called educated urban standard in Portuguese language classes, and "vernacular language," which we attribute to the dialects and idiolects of the students.

¹¹ We must also mention Vieira's (2017) proposals regarding three axes for grammar teaching, which, unfortunately, make little progress compared to the discussions of other authors, especially those of Travaglia (1996) and Back (1987). Moreover, it is possible that, concerning the interactional and communicative aspects of grammar knowledge, they contain notable setbacks, which, due to scope limitations, we will not explore in this text.



instance, consider a religious text like the Apocalypse of the prophet John, where the basic opposition is the life versus death relationship: life, attractive and euphoric, confronts death, repulsive and dysphoric. Two concepts are then projected: non-life, which would consist of the state of those left on Earth after the rapture (negation of life, but not an affirmation of death); and non-death, which would correspond to the state of those whose names are written in the Book of Life, awaiting divine judgment (negation of death, but not an affirmation of life).

At the narrative level, the second level of the path, the fundamental oppositions and orientations of the previous level become parts of anthropomorphized schemes, where oppositions are invested, as values, in certain objects targeted by subjects. In the story of Rapunzel, for instance, the reunion with the prince is the condition that allows the young woman to move from a state of disjunction to a state of conjunction with freedom – which is euphoric, as opposed to oppression, which is dysphoric by nature. This is made possible through a narrative program that includes a stage of competence, where Rapunzel discovers how to descend from the tower that imprisons her, and a performance, where Rapunzel escapes and confronts her stepmother, actions positively sanctioned by her marriage to the prince. Both stages can also be represented through modalities, such as /want/ and /can/, which highlight the narrative outcomes and the passions of the subjects: the young woman desires to be free but cannot, a combination that generates passions, such as rebellion.

The discursive level, the third stage of the generative path of signification, is responsible for thematic, figurative, and actorial coverings; for temporalization and spatialization operations; and for a meta-operation that affects both operations, aspectualization. Themes and figures are coverings of the values and objects from the fundamental and narrative levels and outline the ideological direction of the discourse/text (Fiorin, 1998). Freedom, euphoric, can be indicated as a value object at the narrative level and thematized by the theme of entrepreneurship at the discursive level. In turn, the theme can be unfolded into various figures throughout a discourse/text (such as a small shop, an artisanal product, etc.) and lead to the appearance of multiple actors, coverings of the subjects from the narrative level, such as the ride-hailing driver, the manicurist, and the confectioner. Thus, an ideological direction towards free-market principles is perceived when constructing a discourse in which the pursuit of freedom is achieved through entrepreneurship, as evidenced in the stories of the driver who registers with a ride-hailing app, the confectioner who opens a bakery, and the manicurist who inaugurates her beauty salon.

These sets of elements are completed if a space and time specific to the utterance, which is internal to the discourse, are delineated. Temporalization is, therefore, the construction of time and the placement of the narrative level stages in a certain order, while spatialization refers to the construction of spaces present in an utterance. An excess of elements in space can generate effects of opulence or pollution, and an exact temporality constructs verisimilitude effects. Several aspects can



affect time and space, which will support more complex constructions of meaning (Gomes, 2018). Following the meritocratic anecdote of entrepreneurs, an opening of space can generate effects of growth, so that an expansion established in the utterance, such as a store's enlargement, makes the positive result more intense and more relevant; on the other hand, a deceleration of time intensifies the wait for freedom and reconfigures the discourse around the (secondary) value of perseverance.

GENERATIVE PATH AND ENUNCIATION

The three levels together construct the discourse, part of the content plane of text-enunciates. The discourse, in turn, is projected into the world as a text-enunciate, through its conjunction with an expression plane, a determined materiality that expresses such content – a discourse – in a process of semiosis (Fontanille, 2019). Thus, for discursive semiotics, it is possible to analyze content as the materiality of various expressions: a film, a song, a short story, a conversation, and other elements. Each material plane of expression has particularities and demands a proper understanding of this component for efficient analysis. For verbal discourses/texts, knowledge of the grammatical components of the language they use is fundamental, as these will materialize their expression. This conjunction of planes also constitutes a semiotic object that is shared among individuals, communicated between them, and signifies within broader systems, such as semiospheres and cultures (Lotman, 1979).

Starting from a communication device à la Jakobson (2007), the elements of communication can be read as formal positions, where the sender and receiver of the communication constitute actantial positions, with the sender occupying the position of Addresser and the receiver that of Addressee, and the message being the result of a specific action, the act of communication. For semiotics, communication is understood as an exchange in which the objects involved are enunciates. Thus, a subject, S1, gives another subject, S2, an enunciated object constructed in a specific language-code. However, this approach, typical of communication theory, causes certain problems for an immanent approach. With the development of the specific role played by enunciation, the presupposed instance of enunciate production inscribed in it by certain marks (Benveniste, 1989), semiotic studies have incorporated this device.

Language acts, producing texts, are understood by the theory through a narrative scheme inscribed in the enunciate itself, discernible through its construction operations. Thus, the presented enunciated object, as a plane of phenomenal manifestation, projects a structure in which the act of enunciating is taken as a performance by a subject, S1, the enunciator, subject to a sanction by a subject, S2, the enunciatee. This performance is, therefore, cognitive rather than pragmatic, as the enunciator-subject inscribes in the enunciated object the stages of their cognitive performance, mobilizing knowledge, beliefs, and values, defined as a persuasive act. The enunciatee, on the other



hand, positively or negatively sanctions this performance, reconstructing, through an interpretive act, the stages of the enunciator's cognitive performance and validating it (or not).

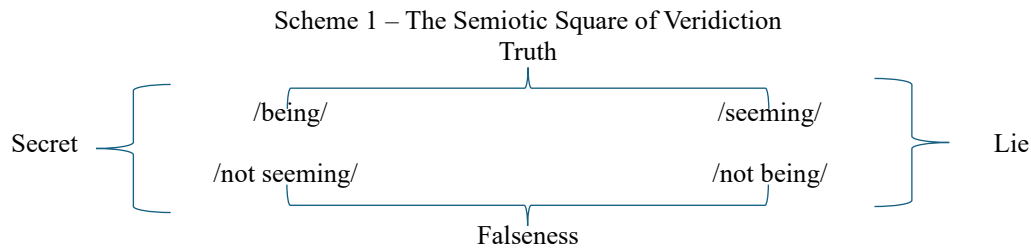
This interpretive act can follow two directions, as Greimas points out (Greimas, 1976). The first direction, the prospection, starts from reading the phenomenal plane, of appearance/manifestation, to recognizing a noumenal plane, of immanence/essence: fiduciary and veridictory relations thus delimit the aspects that constitute, in that specific universe, the being of truth, lie, secret, and falseness, a search for truth through the signs of truth. The second direction, the inferential act, starts from the recognition of a noumenal plane, of immanence/essence, and seeks the signs that, in the phenomenal plane, of appearance/manifestation, support this recognition: the relations thus start from the already established universe of knowledge and beliefs and the already assumed regimes of belief and trust, seeking in the manifestation the confirmation of these regimes.

ENUNCIATIVE CONTRACTS

For this plane to be established and for communicative exchange to function, it is necessary for the enunciator to recognize, in the enunciatee, a legitimate instance of sanction. The establishment of the bond that institutes the relationship between, on one side, the addresser-sanctioner and, on the other, the subject of the performance, is the fiduciary contract (Greimas; Courtes, 1989; Patte, 1986). The fiduciary contract thus accounts for the relationship established between the enunciator, in the position of the subject of performance, who offers an enunciate to be sanctioned, and the enunciatee, in the position of addresser-sanctioner, who receives the enunciate and "verifies" its validity. This sanction, of a cognitive order, occurs through an epistemic act.

The epistemic judgment is, as Greimas (2014) points out, a judgment of recognition and adequacy. Recognition, in this sense, pertains to two instances involved in the enunciative situation. First, it involves recognizing the enunciated object and the cognitive performance inscribed within it, the interpretation itself. Second, it also involves recognizing the ethos of the enunciator through a recognized projection in the enunciate, using various expedients that constitute the quasi-presence of an enunciator's profile, a sketch of identity (Discini, 2015, 2009). In this sense, the fiduciary contract, and the recognition it triggers in the cognitive sphere, presents two specific functions: belief, for the relationship between the enunciating subject and the enunciate, and trust, for the relationship established between the enunciatee and the enunciator's profile that they recognize (Landowski, 1992). Adequacy, in turn, pertains to the prospecting, starting from the plane of manifestation, of a plane of immanence (Greimas, 1976). This prospecting thus begins from the surface of the enunciate, its /seeming/, and leads to its immanent plane, its /being/. The dimension of the epistemic act dependent on the recognition of the enunciate and the cognitive performance inscribed within it, prospecting it, falls within the scope of the veridictory contract.

The veridictory contract can thus be interpreted through a square of veridictory modalities as follows.



Source: Adapted from Greimas and Courtes (1989).

The confrontation of the modalities, /being/ and /seeming/, establishes four metaterms that present themselves as veridictory regimes. These regimes are, in general terms, appropriate ways of establishing the relationship between the two planes. Truth, lie, falseness, and secret thus cease to be understood as transcendent issues to the enunciate, becoming constructed within the very game of enunciation, and can be understood as follows:

- Truth represents the modality where the enunciated content is recognized as true based on its alignment with accepted norms of truth, norms which are aligned with the acceptance of a regime of belief. Thus, there are, for French semiotics, forms of truth: scientific truth, common sense truth etc.
- Falseness represents the modality where the enunciated content is recognized as false, as it does not align with accepted norms of truth established in the communicative situation.
- Lie represents the modality where the enunciated content is true but may not necessarily be so. It deals with appearances and perceived authenticity, and the instituted relations by the enunciative contracts are broken - despite it seems true, the enunciatee-addresser do not recognize the truthiness of enunciator-addressee and/or the truthiness of the enunciate.
- Secret represents the modality where the enunciated content is false, though it may not necessarily be so. It involves appearances that suggest inauthenticity or falseness, despite an instituted and accepted, by the subjects of enunciation, regime of trueness by the fiduciary contract: a secret relies on intersubjective confidence more than objectivity, and there is no secret about X when everybody knows X.

The relationships among these modalities can be visualized in a semiotic square, illustrating the dynamic interplay between truth and falsity, both in their genuine and apparent forms. This tool helps to understand the epistemic judgments involved in the enunciation process, allowing for a



nuanced analysis of how content is perceived and sanctioned as true or false¹². By projecting a profile, inscribing values, or presupposing knowledge, the enunciator selects modes of prospecting that are fulfilled as veridictory regimes in which the recognition and sanction, by the enunciatee, are realized. This differentiation is what allows distinguishing a fisherman's tale from a scientific truth or a news report (Barros, 2022), as their modes of construction direct them towards different regimes.

Enunciative contracts, which underpin singular occurrences of enunciates, delimiting genres of discourse as enunciative practices (Gomes, 2009), lead to the inference of appropriate regimes: in advance, the enunciatee assumes a fisherman's tale as a lie and a news report as truth, even though they may perceive verisimilitude in the fisherman's tale and a lack of coherence in the news report. It is, therefore, a highly tense balancing act that encompasses the entire functioning of interactions through texts, which have, as their cornerstone, grammatical resources that construct connections and images.

ANALYSIS EXAMPLES: GRAMMAR, TRUTHS, AND MEDIA BELIEF REGIMES

To demonstrate possibilities of integrating grammar study with discourse/text study in Portuguese language classes, we will briefly analyze two headlines and their respective leads published on the G1 news portal on June 15, 2024. We will consider these to constitute a whole meaning in verbal language that can be extracted from the report (or news) and viewed as a standalone piece. We will not delve into detailed comments about the nature of the headline and lead genres; nor will we understand them as components of the report genre, since isolating these elements is a widespread practice in media posts on social networks, which justifies their separation from other parts of their context.

¹² There are further developments in veridiction modalities that grade the sense of truth into absolute truth, partial truth, etc. For more details, consult Lisboa Soares and Mancini (2022).

Figure 1– "Haddad says he is not going to Brasília to dialogue, but to defend himself"¹³

Haddad diz que não vai a Brasília dialogar, mas para se defender

O ministro da Fazenda se referia ao PL que equipara o aborto ao homicídio. Na quinta, ele afirmou que vai priorizar a revisão dos gastos públicos, após sofrer derrota no Congresso para tentar aumentar a arrecadação.

Por **Isabela Bolzani**, g1

15/06/2024 15h57 · Atualizado há 3 horas

Source: Prepared by the authors (2024).

We note that the headline is formed by a coordinated structure with an adversative value, so that the second clause of the sentence is given prominence over the first. The choice of verbs implies the presence of different subjects within the scene's structure: a subject who says something; a subject to whom something is said; a subject with whom dialogue occurs; and a subject from whom one defends oneself. These subjects, derived from the grammatical structure, are actorized, in the syntactic function of the subject of the verb "say," by the actor Haddad and the signature of the journalist, occupying the role of "person to whom it is said." The other subjects appear as positions to be inferred by the analyst.

The toponym "Brasília" serves a dual function: it spatially anchors the enunciate, creating an effect of verisimilitude and reality, but also, being a figure, concentrates the theme of politics. The "hidden" actors, thus, for coherence maintenance and isotopy preservation, are interpreted as actors in the political field: they are the politicians with whom dialogue occurs and the politicians from whom one defends oneself.

The emphasis on the verb "defend" in the grammatical structure establishes the presence of two narratives. In one, the subject follows the path of dialogue, an object endowed with certain value, but is prevented from participating in this dialogue, leaving only the pursuit of self-defense (perhaps of oneself?). The omission of the complement of the verb "defend" functions as a means to leave an anti-subject unexpressed, the center of another narrative in which dialogue is presented as a dysphoric object; and in which attack is a method of achieving a goal. It also serves to generalize the forms of actorization of this anti-subject: the attack can be interpreted as directed at either a specific

¹³ "Haddad diz que não vai a Brasília dialogar, mas para se defender".



politician or the entire political class. There is, therefore, a fundamental opposition between dialogue, euphorized, and belligerence.

On the other hand, the lead is a different development of the fundamental opposition between dialogue and belligerence, from which figures such as spending and revenue emerge, linked to public finances and politics, in harmony with the reconstruction of the actor Haddad as Minister of Finance, abortion, and homicide. The figurative noise causes a sense of estrangement by pointing to the fundamental opposition between life and death, not between dialogue and belligerence, which constructs the rest of the enunciate. Although it could be seen as a local incoherence, this dissonance reinforces the notion of a narrative contrary to the subject.

Thus, in the enunciate, the notion is constructed that the eruption of other themes contributes to preventing the subject's conjunction with their euphoric object, dialogue. The abrupt eruption is further marked if, considering the lexical items involved, we see that the second clause of the lead has "defeat" as the complement of the verb "suffer," which directly connects to the verb "defend": both present, as a common semantic base, the dispute between parties. Therefore, the first clause of the lead, renominating the actor Haddad as Minister of Finance, reinforces the effect of displacing themes that point to life versus death oppositions in the political field.

Traditional media texts appear, thus, inserted in a regime of truth, where the enunciatee of journalistic texts must assume such texts as true. The construction of a discursive imaginary is, in this sense, directed by the choices of journalistic texts and the hierarchies presented within them. By grammatically constructing a political actor as unable to achieve dialogue and focused on self-defense, the headline establishes an effect of reality in which the government appears to be a target of attacks on topics it does not address and/or does not consider pertinent. Thus, a constructed image of the government is revealed in which the priorities are, or should be, economic, and not related to topics on which the government defends itself.



Figure 2 – "More than half of the green areas that should serve as a barrier to floods on the Taquari River are deforested or occupied, says study"¹⁴

Mais da metade das áreas verdes que deveriam servir como barreira para cheias no Rio Taquari está desmatada ou ocupada, diz estudo

Segundo o levantamento, dos mais de 6 mil hectares de áreas de preservação permanente que ficam às margens dos 140 km do Rio Taquari, apenas 31% estão cobertos por florestas nativas.

Por Jornal Nacional

15/06/2024 20h50 · Atualizado há 44 minutos

Source: Prepared by the authors (2024).

In this headline, we find the opportunity to understand the distinction between passive and stative forms¹⁵. By constructing the sentence using the present indicative form of the verb "to be"

¹⁴ "Mais da metade das áreas verdes que deveriam servir como barreira para cheias no Rio Taquari está desmatada ou ocupada, diz estudo".

¹⁵ In French semiotics, the distinction between passive and stative forms revolves around the concepts of action and state, often linked to how an action is perceived or described in a "be/ enunciate" or a "do/ enunciate." Here is an explanation of each form and their distinctions.

Passive Forms in French (as in many languages) focus on the action and the receiver of the action rather than the doer. The subject of the sentence is the one affected by the action. The typical construction involves a form of the verb "être" (to be) followed by a past participle and build the sense of a terminative state in the action suffered by the object or a statement of the state.

Characteristics

Emphasis on the Action: The focus is on what happens to the subject.

Action-Oriented: Indicates that an action has been performed on the subject.

Verb Structure: Formed with "être" + past participle.

Temporal Aspect: Often suggests a completed action.

Example: Le livre est lu par l'étudiant. (The book is read by the student.)

Here, the focus is on the action of reading that has been performed on the book.

Stative Forms describe a state or condition that the subject is in, often resulting from a previous action. The subject is in a certain state rather than undergoing an action now. In French, stative forms can also involve the verb "être" but the emphasis is on the state rather than the action.

Characteristics

Emphasis on the State: Focuses on the condition or state of the subject.

State-Oriented: Describes the subject's state or condition.

Verb Structure: Often involves "être" but emphasizes the resultant state rather than the action.

Temporal Aspect: Suggests a lasting condition or state.

Example:

Le livre est ouvert. (The book is open.)

Here, the focus is on the state of the book being open, not on the action of opening it.

Action vs. State

Passive: Emphasizes the action performed on the subject.



(estar), instead of using a past perfect form, it avoids an interpretation of the passage as a passive construction, which would imply an agent, thus forcing a stative interpretation. In this construction, there are no explicit actors present in the enunciate, only figures such as green areas and rivers, which frame the theme of preservation. However, the verbal roots of the forms "deforested" and "occupied" project a scene where subjects who performed the actions of deforesting and occupying are implied, selecting arguments whose fundamental semantic trait is humanity. These hidden actors are placed alongside the figures of deforestation and occupation, related to the theme of environmental destruction. The ensemble creates, at the discursive level, a fundamental opposition: nature versus culture. Even though there is an attempt to create an effect of non-agentivity, which would lead to a desensitization of human responsibility for the deforested and occupied states, a detailed grammatical analysis allows us to infer the underlying narrative of the headline through the mobilized themes, figures, and actors.

The narrative presents the human subject in search of a disjunction with nature and a conjunction with culture. The subject, therefore, is responsible for two actions: deforesting and occupying, which distance them from nature and bring them closer to culture. Overlapping this narrative, the operations of temporalization and spatialization anchor the enunciate in the present and link it to the flood situation in the state of Rio Grande do Sul. The disjunction with nature and the attempt to join culture are sanctioned negatively, stages that are not presented in the enunciate but can be accessed through intertextuality: the separation from nature through deforestation and occupation leads to the described disaster.

The attempt to desensitize responsibility continues in the lead, hiding the human actors who operate, as subjects, the defined actions. The survey, the result of a study by researchers, appears as a creation ex-nihilo, so the statements regarding deforestation and occupation of permanent preservation areas are clothed in an effect of factual observation, devoid of processuality. The enunciate, thus, has its space aspectualized by diminishment, resulting in a closure of preserved areas and a notion of urgency for the risk that natural spaces face. However, constructions devoid of actors

Stative: Emphasizes the state or condition of the subject.

Passive: Focuses on what happens to the subject.

Stative: Focuses on the resultant state of the subject.

Temporal Aspect:

Passive: Often indicates a completed action.

Stative: Indicates a lasting state or condition.

Example Analysis

Passive: Le gâteau est mangé par les enfants. (The cake is eaten by the children.) – The action of eating is emphasized.

Stative: Le gâteau est mangé. (The cake is eaten.) – Can be interpreted as the cake being in the state of having been eaten, focusing on the resultant state rather than the action.

In summary, while passive forms highlight an action performed on a subject, stative forms highlight the condition or state of the subject resulting from an action. Understanding these distinctions helps in accurately interpreting and constructing sentences in French semiotics.



and agents counteract such an effect. Therefore, there is a failed attempt to hide responsibility since grammar (and language) reveals what is being hidden.

This concealment, thus linked to a belief regime that presents journalistic content as truthful, seeks to delimit a real scenario in which deforestation and occupation of preservation areas are timeless facts, so the current tragedies are events that could neither be avoided nor predicted. By investing in this occupation and relying on the enunciator's acceptance, the analyzed journalistic discourse shows that the truth is the tragedies that were never foretold.

PRELIMINARY CONCLUSIONS

The analysis highlights that the dichotomy between grammar-based teaching and discourse/text-based teaching in Basic Education is unnecessary and detrimental to the comprehensive development of students. The history of education in Brazil, exemplified by the curriculum of Colégio Pedro II, shows that different disciplines can be harmonized in Portuguese language classes, focusing on the development of expression skills and competencies. The evolution of educational guidelines, from the 1961 Law of Guidelines and Bases of Education to the National Common Curricular Base, points to the need for native language teaching that combines grammatical reflection with instances of discourse/text use, so that working with the language at least awakens meaning in students.

The discursive semiotic approach offers a robust methodology for this integration, allowing grammatical aspects to be explored in the context of discourses/texts. Understanding the fundamental, narrative, and discursive levels of the generative path of signification can be, in the hands of teachers, a way to help students identify the construction of meanings and the contribution of grammatical structures in this process, fully understanding how possible and potential meanings are articulated and opposed. This method enriches the native language teaching-learning process with the relevant properties of grammar and discourse/text, catalyzing the development of students' epilinguistic awareness, enabling them to manage different languages and various meaning-construction procedures in everyday situations throughout their lives.

The analyzed examples demonstrate how genres of broad social circulation, such as headlines and leads, can serve as effective tools for the integrated teaching of grammar and discourse/text. Through a critical and detailed understanding of grammatical structures and their semantic and pragmatic effects, students can recognize and use verbal resources functionally and contextually appropriately. Instead of knowledge that merely prioritizes an encyclopedic accumulation of theoretical knowledge, the approach we outline converges into an operational teaching-learning process.



As we move towards concluding these reflections, we maintain that pedagogical proposals focused exclusively on one of the various facets of language—be it verbal or non-verbal — limit students' full understanding of the functionalities of their native language and how these functionalities translate into expressive possibilities. Balanced and integrated teaching thus promotes linguistic proficiency, revealing epilinguistic awareness in the socio-communicative situations students face both in and out of school contexts.

Finally, the integration of grammar and discourse/text teaching supports the current generation of students in responding to the communicative challenges of the 21st century, driven by the rapid exchange of information in increasingly shorter time limits. In an interconnected world mediated by digital technologies, the skills and competencies associated with the production and interpretation of multimodal and multisemiotic discourses/texts, correctly articulating grammatical elements, are more relevant than ever as pedagogical strategies. With a well-established theoretical framework, discursive semiotics is a promising alternative to address the historical discrepancies between grammar and discourse/text in native language teaching, contributing to the building of an education that truly proves to be linguistic (and semiotic, why not?).



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Borari Indigenous School: An analysis of the teaching of tourism in the village of Alter do Chão

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ABSTRACT

The research presented here has as its central theme the teaching of geography and the activity of tourism in the village of Alter do Chão and the general objective is to understand the school reality and how the theme of tourism, as a contemporary/generating theme to geography is approached in the classroom, considering, above all, that the seaside village of Alter do Chão, is a district of the Municipality of Santarém – PA, in which its economy revolves around tourist activity, being originally inhabited by indigenous groups that depend on the development of local tourism, the generation of employment and the conscious use of natural resources, coming from this sector of the economy. The study was centered on the Borari Indigenous School of Early Childhood Education and Elementary Education Professor Antônio de Sousa Pedroso. As for the methodology, descriptive observation was adopted, with qualitative field research. The method used to carry out the study was that of dialectical materialism, and the data collection took place through dialogues and the application of previously formulated questionnaires with teachers and students of the School. A total of 72 questionnaires were applied, 30 to the school's teachers and 42 to students in the 9th (ninth) year of Elementary School. The data analysis was carried out through the graphic tabulation of the answers from the questionnaires applied, in which the results indicate that most of the teachers know the place where they work, however, they do not apply this knowledge in their classes, as well as the desire of the students for the theme of tourism, since their families have their income generated in the locality through tourist activities. In this way, it is reflected on the importance of the educator's training in the various areas of graduation, for the realization of activities related to local tourism and the promotion of the critical perception of the contents, through the social and spatial context that students and teachers are inserted in.

Keywords: Teaching, Geography, Tourism, Indigenous School.

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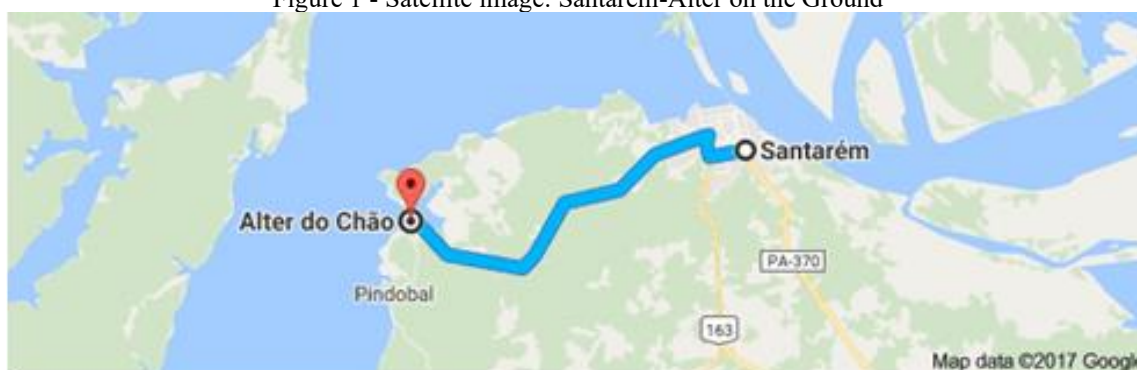
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INTRODUCTION

The research presented here has as its central theme the teaching of geography and the activity of tourism in the village of Alter do Chão, district of Santarém in the west of Pará, and its *general objective* is to understand how the theme of tourism - as a contemporary theme privileged to the teaching of geography - is approached in the classroom, given that, the seaside resort village of Alter do Chão, has its economy focused on tourist activities, which involves the lives of the majority of the resident population, especially workers from more vulnerable social classes, who sometimes find in such an economy the only option for work and survival. We emphasize that the original people where the village is located are the indigenous people of the Borari ethnic group, currently there are many remnants of these and other ethnic groups who still live and work in the region.

We emphasize that the village is located in an APA (environmental preservation area) of the Tapajós River, which confers the conscious use of natural resources. In this way, not all economic activities can be developed in the District, which reduces the possibilities of work for residents.

Figure 1 - Satellite image: Santarém-Alter on the Ground



Source: Google Maps, 2020

The relevance of the research is based on the fact that the village is currently undergoing several spatial transformations, especially concerning real estate speculation, from the construction of summer houses, also called second homes, in addition to the pressure of new commercial enterprises and those linked to the offer of accommodation, on local commerce. Another important factor to highlight is the low supply of formal work for residents, the vast majority of whom are indigenous, which has generated the search for informal jobs, without any kind of guarantees.

In this way, we understand that it is of paramount importance that the resident population understands the transformation processes that the District has been going through, with a view to better social political engagement, so that by understanding the processes they can fight for their rights. In this sense, the development of generating/problematising themes such as tourism in the classroom become essential to critically debate the social impacts of local economic activities, being a bridge between the daily life of students and school life.

The research was carried out with teachers and students of the Borari Indigenous School of Early Childhood Education and Elementary Education Professor Antônio de Sousa Pedroso. As for the methodology, descriptive observation was adopted, with field research of a qualitative nature, based on the dialectical method of analysis. Data collection took place through dialogues and the application of previously formulated questionnaires with teachers and students of the School. In the questionnaires, it was sought to identify which themes worked in the classroom favored the dialectical understanding of the development of economic activities aimed at tourism.

As for the research procedures, we first sought to understand the theoretical framework of geography and the socio-spatial view of Tourism; in a second moment, we seek to understand the relationship between the culture of the places and tourism and from this, we build the general and tourist characterization of the village of Alter do Chão; in a third moment, we analyze the teaching of geography in the Borari Indigenous School, as well as the performance of the other teachers of the school and the practice of tourism activity in the village of Alter do Chão.

RESULTS AND DISCUSSION

GENERAL AND TOURIST CHARACTERIZATION OF THE SEASIDE VILLAGE OF ALTER DO CHÃO

The village of Alter do Chão was founded on March 6, 1758, by the then Governor of the Amazon Francisco Xavier de Mendonça Furtado, when he elevated the province to a village with the same name as a city in Portugal. This elevation had the mission of guaranteeing the Portuguese presence in Brazilian territory. According to Ferreira (2008, p. 12) the objective of such trips to the Amazon was to strengthen the Portuguese dominion in this region, in which he writes:

He made several trips through the Amazon hydrographic basin, getting to know the northern lands under his jurisdiction [...] he named all the Jesuit missions with the names of cities in Portugal in compliance with the Law of June 6, 1755, consolidating the dominion of the Portuguese corroa over this region, [...] on March 6, 1758 he elevated the Mission of Our Lady of Purification to the category of village of Alter do Chão in honor of the city of Alter do Chão Chão in Portugal.

Alter do Chão stands out as the main tourist spot in the lower Amazon region, with a population of approximately 6,000 inhabitants and is located on the right bank of the Tapajós River, about 28 km from the seat of the Municipality of Santarém, with access possible through PA 457, and access by river about an hour, by the Tapajós River.

The economy of the village is based on the trade of services of the tourist activity, and on the civil service. However, tourism was not always present in the productive economic sector of Alter, in which in the past the natural attractions of the place "served as a refuge for the boats that passed through here mainly on stormy days" (FERREIRA, 2008, P. 16).

The existing vegetation in the place is composed of part of the Amazon forest, with typical characteristics of the place, in parts the vegetation presents itself with the formation of savannah vegetation, sandy soil is predominant in this place. Its relief is formed by hills and escarpments, a geomorphological process of tectonic faults, as can be seen in figure 2. Its plains are sandy and the normal tectonic faults evidenced by the escarpments, walls that can be seen mainly when the river is at the lowest level, such as Ponta do Cururu, and the testimony hill also known as "Pira-oca" according to figures 3 and 4, the *features caused by the pediplanation process in this place* can be observed in locus.

Figure 2 - View of the main beach. In the background, Pira Oca hill



Source: FIELD RESEARCH, 2017. Photo: SOUZA, 2017

Figure 3 - Hills with riparian vegetation



Source: Mingote Pousada Archive, 2017.

Figure 4 - Riparian vegetation and beach around the village.



Source: Mingote Pousada Archive, 2015.

In front of the village, the sedimentary deposits at the entrance of the Verde lake, as shown in figure 5, resulting from the deposition of the Tapajós River, the sandy sedimentary deposit (beaches), draws attention for its extension and beauty, these are found in large proportion on the banks of the Tapajós River; There are crystalline waters that allow a visualization of the sediments that form the beaches of this place. The biodiversity in this territory is diverse, and abundant, they are part of the tourist attractions of this place, through the activity of exploiting natural resources.

Figure 5 - Sediment deposit



Source: FIELD RESEARCH, 2017. Photo: SOUZA, 2016.

The tourism developed by the community members also presents typical characteristics of Amazonian riverside communities that had their historical spatial configurations turned to the rivers, as the Amazonian poet Ruy Barata said: "this river is my street"; The economics of this tourism-oriented community say "the nature of this place is my survival."

The development policies designed for the Amazon region have always brought a degrading form of exploitative development because, in their exploitative context, such policies obey a capitalist order that aims at the exploitation of natural resources as a means of subordination to the interests of capital.

Tourism today has developed in this context within a capitalist consumption focused on leisure and culture, in an economic process of exploration of the use of geographic space, this exploitation that, according to Dias (2011, p. 24) "also works as part of a system, a social system analyzed in different ways". The Amazon experienced an intense process of development, especially in its spatial structure, as such policies brought to the region a new form of spatial configuration, contrasting with the old formation and geographic urban organization, in which cities and villages were formed from the dynamics of rivers, called "riverside cities", with their singularities and particularities experienced by their residents, the "riverside dwellers".

In this context, the village of Alter do Chão presents itself historically as a typical Amazonian village that had its spatial organization from the occupation of the territory by the Portuguese colonizers, having lived through several economic cycles, including also the rubber cycle (1950 –

1912), which according to Machado (1997, p. 22) "modified the local conditions [...] in the Amazon. The rubber economy was responsible for the integration of the region into the international market [...] a continuity with the colonial past." Alter do Chão participated in this economic moment in the region in what Ferreira (2008, p. 30) says: as a port that supplied ships that moved by burning wood, ships or steamboats anchored in front of the village to supply themselves with this product extracted from nature. Its inhabitants had their survival in this activity, and from the rivers and lakes they took their food with fishing activity.

Nowadays, tourism is one of the main activities for the subsistence of the residents of this village, from the exploitation of the natural resources of the place, this activity exerts the main economic source in it, "the structural transformations were achieved with improvement in the urban structures of the village" (FERREIRA, 2008, p. 31), as can be seen in figures 6 and 7, the tourism activity developed in Alter do Chão, has become a primary factor for the economy of the municipality of Santarém.

Regarding the tourist activity as the economic base of the village, which once did not have the same economic importance as it does today, Ferreira (2008) states that in the 1980s handicrafts, the extraction of latex from the rubber and family farming with the plantation of cassava, was the basis of the economic sector in the village. He also says that the handicrafts were made by local artisans, who took their raw material from nature in the making of the pieces, and sold them in the stalls in the central square. The same author reiterates by saying that "Tourism leverages the economy in the production of handicrafts, local cuisine, culture with the festivals of Sairé and Borari, are attractions that encourage and foster the economy in this locality".

However, the spatial configuration of this place has been undergoing strong changes in its landscaping, the contrast of the urban structure with the natural form of the local geographic space is noticeable, as shown in figures 6 and 7.

Figure 7 - Alter do Chão waterfront, view of the beach of love.



Source: FIELD RESEARCH, 2017.
Photo: SOUZA, 2018

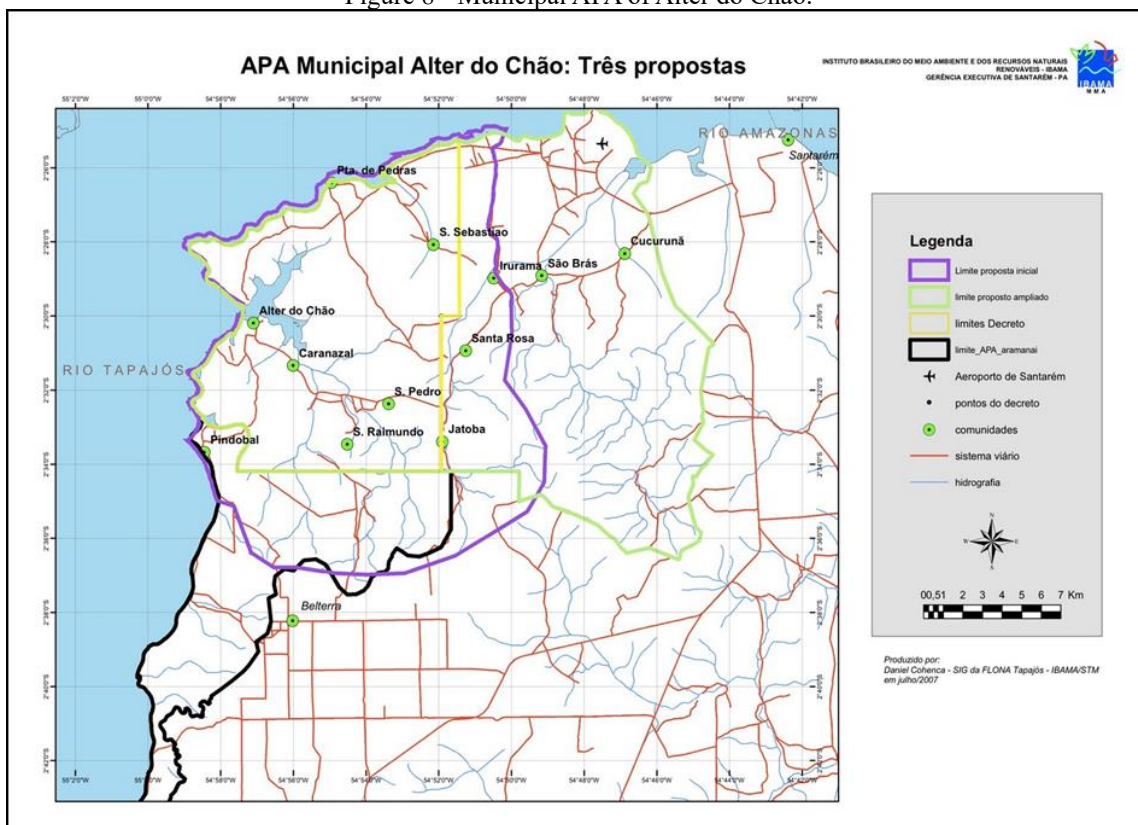
Figure 6 - Hotel for lodging



Source: FIELD RESEARCH, 2017.
Photo: SOUZA, 2018.

In the search to develop tourism in the seaside village of Alter do Chão, the community members appropriate the natural resources with awareness of environmental preservation, because the area that covers this community is within an Environmental Protection Area (APA),³ as shown in Figure 8; the Amazonian biodiversity in this place becomes suitable for tourist activity, considering mainly activities related to ecotourism and community-based tourism⁴.

Figure 8 - Municipal APA of Alter do Chão.



Source: IBAMA, 2007.

³ APA – Environmental protection areas; the APA of Alter do Chão was constituted by the Municipality of Santarém, through Law No. 17,771/2003.

⁴ Ecotourism and community-based tourism are tourism modalities that prioritize the preservation of physical environments and local culture, respectively.

The community offers visitors a receptivity with direct contact with nature. Due to the growth of the practice of tourism, which occurred in the twentieth century and is currently boosted, the hotel sector in the village has been gradually developing, with this sector sought to adapt its structures to meet the demand of tourists who come to Alter do Chão throughout the year, as we can see in figure 6.

The changes made come from the need to serve the tourist, the transformation in the configuration of the local space is noticeable, when arriving in the village the urbanization configurations are clear, which in a way influence the way of life of the community members and the various complementary activities existing in the village developed by the residents, these differences are notorious in the physical aspects of the landscape.

Such changes also influenced the rural mode of the place, the technical informational means present in this process of spatial production contrast with the uniqueness of the place, the transformations in the restructuring of the village serve to provide the conditions for social improvements to the community and tourists, according to the tourist demand the spatial transformations arise relevantly in the community. Figures 10 and 11 show the changes in the landscaping of the site.

Figure 9 - Alter do Chão in the 1970s



Source: Boanerges Sena Cultural Institute Collection, 2018.

Figure 10 - Current and partial view of the urban part of the village



Fonte: Mingote pousada, 2016.

In view of this practice of using natural resources for the development of tourism in the Brazilian territory, Cruz (2001, p.33) makes the following statement, "the natural diversity of



Brazilian environments makes Brazil a country with great potential for nature tourism practices". However, the environmental impacts of tourist activity in the village are already evident to a certain extent, according to Ferreira (2008, p. 36), "in the past, the simple extraction of firewood for steamships, the purchase of seeds, the exploitation of latex, predatory fishing became degrading to the natural environment, without due awareness of the preservation of these resources."

Currently, the exploitation of natural resources has been affected by the pollution of the waters of lakes and rivers, with the lack of investment in the area of sanitation for the treatment of waste released into the waters of the river that cause pollution of the local water system. Real estate investments in the village, the constant deforestation of the headwaters of the streams, these investments produce social and environmental impacts in the community.

These environmental impacts cause damage to the supply of quality drinking water for consumption, the production of fish, used in the subsistence of the community, and as a product in commerce. On the other hand, there are other impacts, those of a social nature, such as the segregation and pricing of urban land, due to the construction of summer houses and the appreciation of land lots, which with each passing year has been greatly exploited by the community itself, the resignification of popular festivals such as Sairé, causing the price of subsistence products to increase, making the way of life of the community with a high cost.

In view of all these environmental and social impacts mentioned above, the tourist activity in the village of Alter do Chão is still a promising and growing activity; This growth, in a way, disorderly, but driven by the demand of tourists, by the glimpse of business opportunity for many who venture to invest in tourism activity.

In addition to these facts, there are the displacements of families from neighboring communities, who arrive in search of economic improvements and consequently, end up disorderly populating the periphery of the village, in these terms land conflicts and deforestation arise in large proportion, producing significant changes in space.

Geography as a science has geographic space as its object of study, in an approach directed to social agents who work in the construction/production of sociocultural space, it seeks a construction of concepts related to the cultural, social, economic, political environment that are fundamental for the discussion in geography classes when dealing with cultural tourism. The cultural relationship of tourism favors contact between the various populations of the same country, contributing to a greater understanding and comprehension of the differences in cultural relations of peoples and ethnicities.

Figure 11 - Sairé Festival



Fonte: Mingote pousada – 2018.

In this sense, the approach to tourism highlighting the local culture contributes to the individual understanding the importance of his presence as a social being; concepts that, if worked on properly, provide a better understanding and interaction of them with their daily lives. The local culture in this context is related to the student's daily experiences, since it is related to their worldview and the development of all transformations.

Thus, geographic science, by inserting contemporary themes in the school environment, provides and provides the inclusion of diversity in teaching; Currently, tourism has been attracting the attention of several sciences in the field of research. In this sense, geography enables the study of these themes in a relationship between society and nature, and how society organizes the terrestrial space, aiming to exploit nature's resources. Thus, the teaching of geography, when addressing the theme of tourism, proposes to the student a possible understanding of the geographical space and how it is inserted in this organization.

Knowing that school is one of the means for the production and dissemination of knowledge, it is important to develop themes with relevance in the social environment and it is necessary that the issue related to tourism integrates part of the school content. "In this sense, we do not defend that Tourism is a topic restricted to geographical discussion, since its breadth requires transversal school work (SALES, 2004, p. 108)". Thus, we will move on to a brief discussion on this theme within the school.

TOURISM AS A GENERATING/PROBLEMATIZING THEME IN EDUCATION: BORARI INDIGENOUS SCHOOL

According to Sales (2004), tourism is a theme that is still little discussed in geography classes, its inclusions are related to economic aspects, based on capitalist principles, so it is noted that themes such as globalization, urbanization, industry, agricultural food production, environmental issues predominate in textbooks, especially geography.



On the other hand, tourism as a generating/problematising theme contributes as a strategic means to carry out attractive classes capable of leading the student to reflect on the theme in their locality, in their daily lives, as well as to know and build new paths for meaningful learning.

In turn, the teaching of geography in school contexts contributes to the critical formation of the student and encourages him to better know the place where he lives, as well as his culture, the economic production of the place, and the new trends of spatial configurations, with tourism being one of those themes of modern geography that brings in its premise great scope in relation to the different areas of knowledge, the necessary support for the understanding of man as an active subject in an extremely dynamic world. Therefore, "The importance of tourism today demands special attention from the teaching of geography and other school knowledge, due to the expansion that is presented and the socio-spatial impacts caused (SOUZA, 2007, p. 25)". Since "The natural diversity of Brazilian environments makes Brazil a country with potential for nature (CRUZ, 2001)".

It is important, therefore, to understand the *locus* of the research, namely: the Borari Indigenous School is located on Travessa São Cristóvão, in the center of the village of Alter do Chão. The school encompasses in its pedagogical political project (PPP) from kindergarten to the 9th (ninth) year of elementary school two of basic education, we decided to carry out the research to ascertain the relationship between tourism and the teaching of geography in the classroom. Education in the village of Alter do Chão, according to Ferreira (2008, p. 26) "began in the twentieth century, being carried out from house to house. The educators were people who had few pedagogical instructions, the instructions were passed on by religious, who maintained the religious mission in the village".

Also according to Ferreira (2008, p. 26), "these people only received a bonus from the community members to teach their classes, they taught to those who requested their pedagogical services". This form of teaching predominated in the village for several decades of the twentieth century.

In the 1980s, with the population increase in the village, the demand for students grew, making it necessary to build a school that would house students from this expansion on its premises. Thus, on March 30, 1985, the school was built, receiving the name of Municipal School of Elementary Education Professor Antônio de Sousa Pedroso, located at Rua Pedro Teixeira s/n, corner with Travessa São Cristóvão, Eixo Region

The inauguration took place on June 1, 1985, starting school activities with 4 (four) classrooms, 49 (forty-nine) students of the 5th grade of elementary school and 6 (six) teachers. The first class completed the 8th grade of elementary school - current ninth grade - on January 26, 1989, with a total of 22 students, with teacher Maria Olivia Araújo Sousa as its first manager.



On May 22, 1992, the Modular Teaching Teaching (SOME) began at the school, in March 1999 the regular high school was implemented, functioning as an annex of the E.E Dom Thiago Ryan, in which two 1st grade classes were placed, with 79 (seventy-nine) students.

The physical structure of the institution was renovated and expanded in 1998, with the construction of a new pavilion, containing 10 (ten) classrooms, a kitchen and bathrooms in accordance with the requirements of the MEC. Currently, the Borari school is managed by Professor Raimundo Garcia Costa, with training in Full Degree in Pedagogy. The school serves approximately 936 students, with a staff of approximately 60 employees, which include: general services; manager; pedagogues and teachers. All professors have higher education in their respective areas of expertise.

Its current physical structure houses 18 classrooms, a computer lab, a library, a kitchen pantry, a cafeteria, male and female bathrooms, a teachers' room, a secretariat, a school board room, a sports court and a tree-lined leisure square. Operating in three shifts, with basic education at elementary level I and II, and the youth and adult education (EJA) modality in the night shift. In 2006 the school began to operate with indigenous education recognized by the Ministry of Education, which gave it the name Borari school.

The inclusion of the school as indigenous is due to the self-declaration of the village's residents when they recognized themselves as indigenous people of the Borari tribe, who already inhabited the region before the arrival of the Portuguese. However, the education system follows the regular education standards of the other municipal schools provided for in the LDB, Law No. 9,394, of December 20, 1996, for the education of the Brazilian basic level and the PCNs of 1998 from the 1st to the 4th cycle for the teaching of geography.

Currently, the school under analysis operates, with 33 (thirty-three) teachers, all with higher education, as informed by the manager of the School, thus demonstrating the importance of offering quality education, seeking qualified professionals to teach.

For a better interaction with the community, there is a committee formed by parents and teachers, the school council, which aims to act in the bureaucratic, pedagogical and administrative issues of the school, helping the management body to develop an integrated work with the community, having bimonthly meetings, with the objective of improving the teaching and learning of the student.

The information provided by the manager demonstrates the historical and social importance that the school has for the community of Alter do Chão, as many fathers and mothers of the current students are former students and have in their memories the memory of the historical beginning of the Borari School, as part of their lives and culture.

On the other hand, the results of the approach of teachers and students of the Borari indigenous school, through the questionnaires applied, indicate that most of the teachers who work in



the school know the place where they work, have some notion about the importance of tourism for the District, especially about the local economy, as well as its direct relationship with the daily life of the school community, however, they do not apply this knowledge in their classes, claiming that they never thought of tourism as a possible generating theme for teaching. Some claimed that their academic training did not prepare them for such themes, as well as that they consider it important that in teacher training there is greater emphasis on transdisciplinary themes, especially on themes that are close to the students' context.

Another important result was evidenced in the students' desire for discussion/debate in the classroom on the theme of tourism, since their families are, directly and/or indirectly, linked to this economy, that is, their parents, siblings, uncles, grandparents, etc., in some way carry out activities pertinent to tourism, either in the direct service of the tourist, or in peripheral activities that supply the inns and hotels with açai, cupuaçu pulp and other foods linked to extractivism and, thus, their lives are impacted by these activities. Most students stated that they would like to discuss and understand more about tourism in the region.

It is important to emphasize that in teaching practice, the teacher has become a link between the student and knowledge, in this way, learning can be differentiated, according to the teaching method that the teacher uses in his classes so that the student develops his learning and externalizes it to the physical-social environment. In this context, the teacher has, in a way, **autonomy** to introduce new teaching methods and apply new methodologies in his teaching practice. In this way, the student performs his pedagogical functions having the necessary knowledge in the area of training, therefore, blaming only the deficiency in the initial training does not fully respond to the neglect of the themes pertinent to the students' daily lives.

At the Borari School, according to the survey carried out, the teachers, when asked about their professional training, said that they have completed the degree to work in their respective disciplines.

The following data were obtained through questionnaires intended for teachers who teach in the respective school. Although in our survey of primary data we are concerned with the opinion and training of all teachers, we will sometimes highlight the geography professional and his training. It is not our intention to put geographical science in the spotlight and/or assert its supremacy in relation to other disciplines, in fact, we understand that the theme of tourism permeates the other disciplines and knowledge, as we explained earlier, our intention is mainly to make a critical analysis of our own training and performance, as geography teachers, that is, to investigate more carefully the practice of this education professional.

Through data collection, we found that the Borari School has only one professional teacher in geography, the others (29) have other backgrounds (mathematics, Portuguese, biology, history, etc.).



As already explained, all teachers have a higher education degree, however, when asked whether or not in the initial/undergraduate training or in continuing education, they had received instruction, indication of readings or debated on the theme of tourism, 35% answered "Yes", but stated that such training is not directly related to their discipline, that is, there is no interdisciplinarity between the theme of tourism and the content in the classroom; 60% answered that "No" had no training on the subject and, consequently, do not address the subject in the classroom either; Only 5% stated that the theme was developed during initial training and that they develop it in their classes.

We consider it important to highlight that the school's geography teacher stated that "she thinks it is very important to work on this theme and that in her practice it involves discussions on the subject, however, without depth, because she does not have access to an adequate material/resource to develop such content". It is also important to reaffirm that in the training of the teaching professional in geography there is an emphasis on understanding the transformations of the social, economic and cultural space and, therefore, at the end of the undergraduate course, this professional must be able to make the didactic transposition of such changes. From this perspective, we understand that there are probably numerous failures in the training of teachers in geography.

Regarding the didactic content acquired for teaching in the classroom, we asked the teachers the following: In your opinion, what are the problems faced by the teachers for the discussion of the theme of Tourism? Of those interviewed, 98% of the teachers stated that there is a lack of teaching material. However, 2% also pointed out the lack of public policies aimed at tourism activity that involves educational processes; Among the total, 2% added that there is an absence of school projects aimed at the tourism theme. This statement demonstrates that the teachers understand the relevance of the theme, considering the fact that the school is located in a seaside village with tourist attractions.

One of the teachers replied that the problem lies in the "lack of knowledge of the subject on the part of the school management team", emphasizing the lack of planning and projects.

Considering that the seaside village of Alter do Chão has a folkloric and religious culture of great relevance for tourist activity in the region, we asked the teachers if they addressed these activities in their classes; 28 teachers stated that it is part of the curriculum and that, therefore, they developed the content in their classes. However, they informed that they still do not relate the local culture (festivals, traditions, religiosity, etc.) with the economic issues related to tourist activities and their importance for the community. The art teacher said that she addresses the cultural issue through literary, cultural and historical productions; The physical education teacher said that he has never carried out any activity in this sense, declaring that such content is not part of his subject.



Observing the teaching practice of the teachers of the Borari school, we noticed that most of them support their classes in textbooks. We emphasize that the books do not deal with the specificities of each location, but with generalizations, so it is necessary that the teacher is aware of the importance of the theme proposed here and includes it in his classes, considering the relevance to the local population. In other words, tourism is a source of income for most families living in the village of Alter do Chão, mentioning its importance and impacts on the local economy and culture, should be better planned by the school team.

Specifically about the training and practice of the geography teacher, the discipline requires from this professional, a knowledge more applied to the contemporary transformations of the geographical space, the advances in communication and technological information, and for many other transformations that intervene in the spheres of social life, provoked economic, social, political and cultural changes that were evidenced by critical ⁵geography by worrying about the contradictions of the society-nature relationship, which are concretized in space. Therefore, inserting the tourism theme in teaching requires the teacher to have a deep knowledge for a possible successful approach with his students.

According to PIMENTA (2012, p. 35),

The exercise of any profession is practical, in the sense that it is about learning to do 'something' or 'action'. The teacher's profession is also practical [...] with the function of preparing the future professional. [...] Practice should be a concern for this professional, as practice is one of the ways of knowing by doing, imitating, copying, experimenting and practicing.

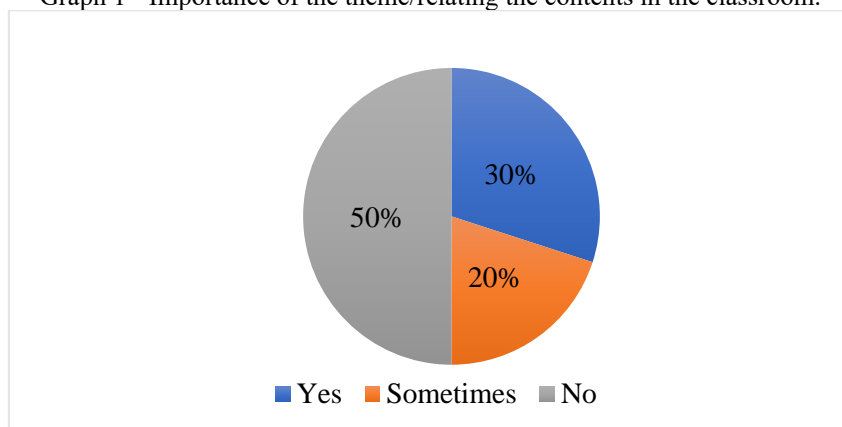
Therefore, as we observed in the course of this work, the teachers of the Borari school, in their majority, still use textbooks as the only source for the treatment of the subjects that make up their lesson plans. This practice tends to limit the teacher's performance by approaching, in a dichotomous way, theory and practice, in addition to preventing the student from knowing/understanding and generating significant learning in the face of his reality, considering, above all, that the textbook deals with generalizations and not with the specificities of the Village. The teaching of Geography, like those of other disciplines, is today faced with several languages and resources, including new technologies, which can contribute to a much more pleasurable class, as well as to a more significant teaching-learning process, in addition to contributing to overcome the deficiencies of the textbook. However, this is based on a choice of the professional, which on the other hand refers us to his initial training, that is, the methodological choice is based on the knowledge and approximation of this teacher with such languages and resources.

⁵Critical Geography – a current of geographical thought that emerged after the 1970s (...)

The teacher is the mediator of the educational process, so he can be a provocateur, or even a facilitator between scientific knowledge, the student's daily life and the classroom. In view of these possibilities, the following question was asked to the teachers: Considering that the Borari School is located in a seaside village and of great relevance for tourism in the region, do you consider it important that the school/teachers work on this theme? Why?

All teachers answered that, "Yes", among the main answers, we have: "I consider it important, because it will allow us to better understand the dynamics of the place, as well as to offer different instruments and possibilities to our students". However, when asked if, in the planning of the classes, they related the content on the theme of tourism to their classes, we obtained the information, as shown in the following graph:

Graph 1 - Importance of the theme/relating the contents in the classroom.



Source: Field Research, 2019. Org.: SOUSA, 2019

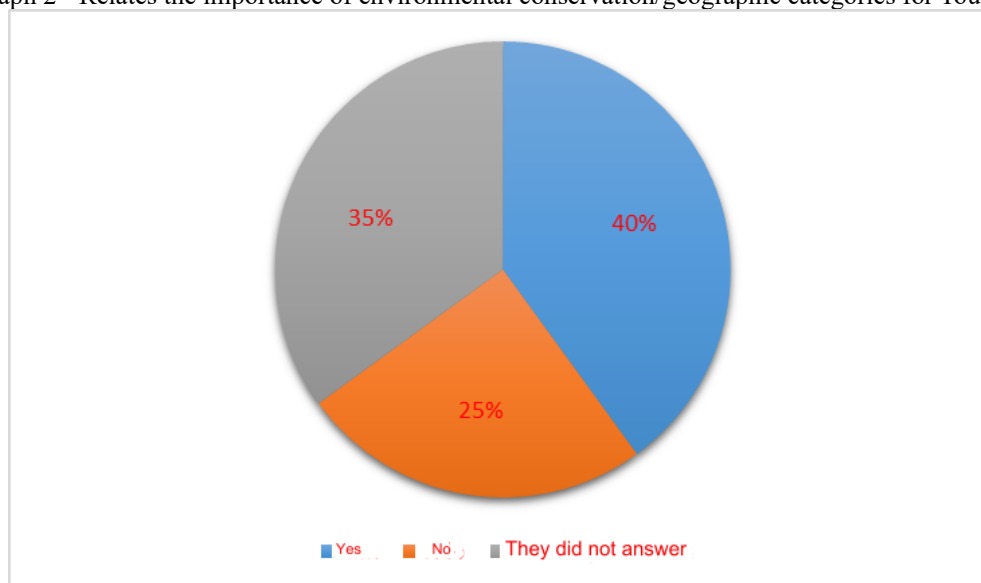
In the data observed in the graph above, we found that half of the teachers do not include the theme of tourism in their lesson plans, however, they all agree on the importance of tourism for the community; 20% even include it in their plans, but without giving due importance to the theme, because they understand that their disciplines have no direct relationship with the theme; Only 30% include the theme in the planning of classes and reported that such discussion in the classroom translates into "the possibility of understanding the dynamics of the place", this statement came from the geography teacher.

Therefore, it was observed that, although the group of teachers affirmed the importance of the theme for the local population, the practice in the classroom points to a contradiction between what is thought and what is actually materialized.

Still related to what is taught at school, the relationship of the place with the geographical categories and environmental conservation in the Village, we ask: In your classes, do you guide your students to evaluate the importance of tourism in environmental conservation, using the local spatial

geographical categories as a relevant factor in this context? The answers to this question generated the graph below:

Graph 2 - Relates the importance of environmental conservation/geographic categories for Tourism.



Source: Field Research, 2019. Org.: SOUSA, 2019

It is noted from the data that 60% of teachers (the sum of those who did not answer with those who say they do not make the relationship) who, although they recognize the importance of tourism for the place, do not relate it to environmental issues, such as the preservation of the environment and space.

Next, we present another question: what methodology do you use to lead your student to the construction of this knowledge in the classroom? Unfortunately, the teachers did not stick to the question, that is, the answers given did not correspond to the proposed question, as an example, we explain the answer of one of the teachers, who stated "that he works on the natural physical aspects of the place to lead the student to a reflection on the activity of tourism in the place", not indicating the methodology applied for this.

Thus, through the answers collected, a lack of knowledge regarding the theme of tourism is perceived, which, in our understanding, unfolds in the non-planning of classes (which include the theme) and in the non-approach in the classroom. We understand, however, that there is a gap to be filled, that is, the offer of extension courses, continuing education, among others, would contribute to teachers being able to qualify themselves in this understanding. We searched for data on the availability of such courses, however, we did not find anything specific.

However, we understand that the geography teacher has in his training the conceptual basis, as exposed, to highlight in his classes and in school projects, issues pertinent to tourism in the Village, which has often not occurred.



In order to better understand the effectiveness of geography classes and to verify whether students understand the subjects covered in the classroom, including the theme of tourism, questionnaires were applied to the students. In the following topic, we will deal with the answers obtained from the students.

DATA COLLECTION WITH STUDENTS OF THE 9TH GRADE OF THE BORARI SCHOOL

The student's learning is related to the way he conceives his own learning, his interest in learning, as well as the way the teacher approaches the subjects. In view of this fact, we sought to understand the students' view of the village of Alter do Chão, the tourism activity and the methodology used in the classes, especially regarding the theme of tourism that is focused here.

The research with the students was carried out through a previously formulated questionnaire. 42 (forty-two) questionnaires were applied in the two classes of 9th (ninth) grade (morning and afternoon). Among the questions, four were directed only to geography classes; If we start from the principle that this professional has in his academic training the bases to work on the categories of place, space, territory, landscape and the issues pertinent to the environmental and sociocultural impacts of tourism activities in the Village, then such discussions should be present in his classes. That said, let's look at the following table, which shows the age group and the number of students in each class surveyed:

Table 1: Characteristics of the participating classes

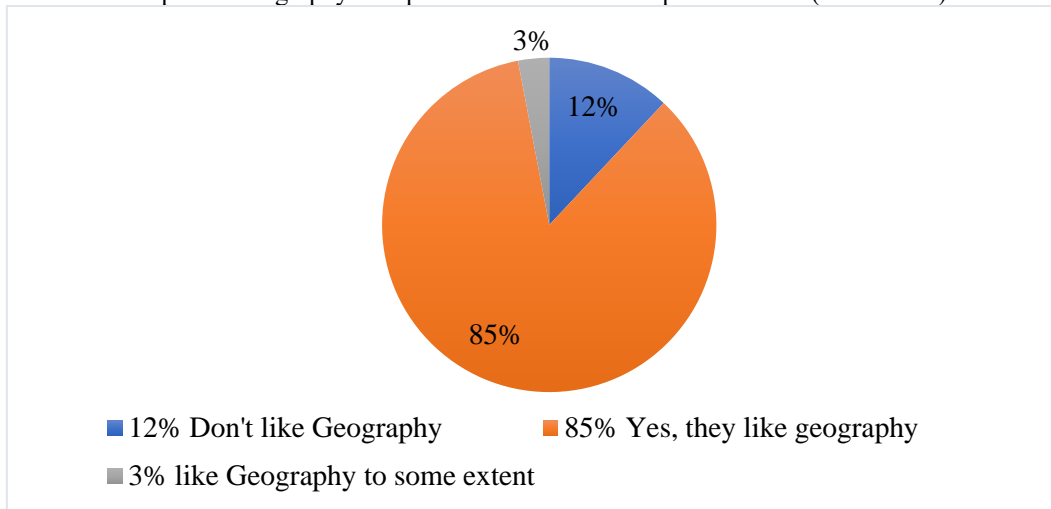
Shift	Class	Age (years)	No. of Students
Morning	902	14 – 16	22
Afternoon	903	13 – 16	20
Total			42

Source: Field research, 2019. Org. SOUSA, 2019

We can see from the data shown in the table that the number of students per class is relatively small compared to the reality of other public schools in the Municipality of Santarém, which have classrooms with up to 40 students. The Borari school, in general, does not have very full classrooms, a factor that facilitates the teaching work.

The first question of the questionnaire given to the students was: do you like Geography as a subject? Why? From the graph we can verify the answers.

Graph 2 - Geography discipline from the student's point of view (like/dislike)



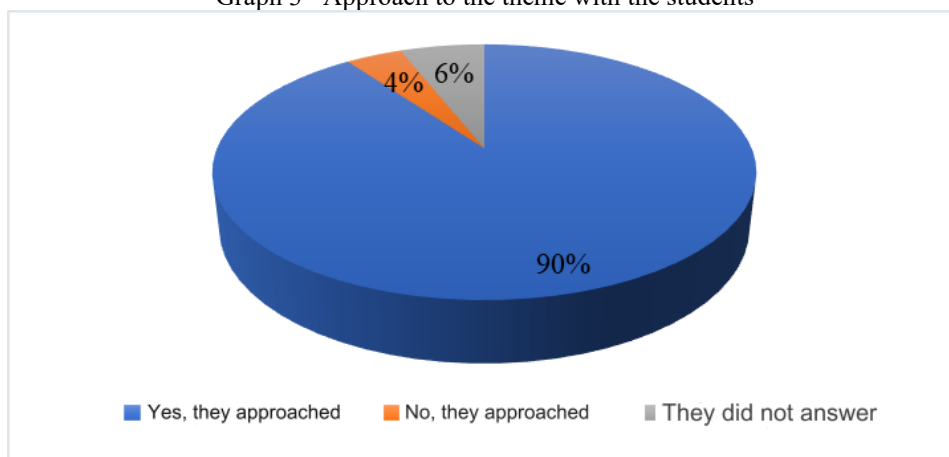
Source: Field Research, 2019. Org.: SOUZA, 2019.

To our surprise, most of the students said they liked the course. The main reasons for liking geography of the 85% were: because it is part of everyday life; for contributing to the knowledge of their community and the world; because they learn to know nature; for addressing issues such as globalization and the influence of tourism on the understanding of the tourist activity of the village of Alter do Chão.

Among the 12% who answered that they did not like the discipline, we obtained the following reasons: "because it is boring"; "Because I don't understand anything." Of the 3% who like it in part, we found that they do not like the way the teacher teaches, one of the students said "the way the teacher teaches is complicated and bad, the content is boring".

When we asked if the teachers had already addressed the subject "Tourism" in class, we obtained the following answers, as shown in graph 4:

Graph 3 - Approach to the theme with the students



Source: Field Research, 2019. Org.: SOUZA, 2019.



We were also surprised by the students' response to the approach to the subject, as 90% say that their teachers have already commented on the topic of tourism. However, we understand that this statement may be related to the answers in graph 3, that is, those who answered Yes may be part of the group of 85% of those who like the course; The 4% of students who say "that teachers do not address" the topic may also be related to the 3% of those who do not like geography and, due to the lack of interest in the contents, simply did not want to think much about the answer.

Continuing with the questions, we ask: Do you think it is important that the school/or teachers work on this tourism theme? Among the answers we have: "Yes, that way I would get to know better the tourism activity that is experienced in the village of Alter do Chão".

More than half of the students (60%) think it is important that their teachers work, even with a certain frequency, on the theme of tourism; Among the comments, we highlight: "To be better informed about the tourist activity that is practiced in the village" and, "Because we live here". Another 40% did not know how to answer the question, as they claimed to have no "interest in the subject".

Regarding geography classes at school, we asked the following question: Would you like your teacher to use the landscape, the landform, the local vegetation to explain issues related to the geographic physical space of the village? Why? In this question, 80% of the students answered "yes", and in their justifications they state that: "they would know better" the place where they are living; 15% did not know how to give an opinion and consequently did not justify their answers, another 5% did not want to answer.

We asked the students what is the main source they use to study, to research the subjects addressed by the teacher; in this answer, 100% of the students said it was the "textbook", that is, they all take the information for their research from the books provided by the school library, a worrying fact, given that the book does not contemplate the specificities of their village.

We also asked if the teachers carry out extra-class classes with the classes (field classes). Such questioning is based on the understanding that this is an excellent methodology to work on the contents related to the place and at the same time lead the student to reflect on everyday issues, in this, also 100% of the students answered that they did not have extra-class classes. It is true that the interdisciplinary teaching of geography allows the teacher to adapt the contents to contemporary facts, in this case, tourism can be an excellent option for extra-class classes, providing significant learning for the student.

Regarding the didactic content studied, we question the following: In the textbook you use, do you present the content about tourism in an easy-to-understand way? In this question, 75% of the students answered "Yes", 25% said they found "in part". It was evidenced in the students' answers the need to work on tourism as a theme pertinent to the classroom, with content that is easy to



understand, as it will contribute to the teaching/learning of the student, making him a participatory citizen in the actions that involve tourism in his community.

Regarding the teaching of geography and tourism in the community, (this question is specifically directed to the teaching of geography/tourism) we ask: would you like to study geography with subjects related to tourism, specifically focused on your place of experience? Justify your answer. In this question 100% of the students said "Yes", in the justifications they also mentioned that "it would be cool, not only to study the world in general, but also the place we live, our community", continuing in their justifications other students mentioned that "It would be good, I would learn more about tourism activity in the village", they also say it is "good, because I would know more about their place".

Therefore, from the data presented, it is implied that: the teaching of geography is well accepted by the school community of the village of Alter do Chão, but lacks didactic improvements for its application; the tourism theme, despite being a reality within the community, still needs to be strengthened within the educational contexts applied in the classroom; and finally, the basic contents of geography still escape the realities found in the experience of the students, and the educator is responsible for reconfiguring the importance of this discipline in the lives of the subjects.

The current teaching of Geography enables the student to develop criticality about the environment in which he lives, deconstructing the transmitting and systematic vision that was employed by traditional education. Since, in traditional education, the student should only memorize the names of rivers, reliefs and other aspects of the landscape, through a teaching that emphasized memorization, which leads to the fragmentation of the students' knowledge and learning.

At the Professor Antônio de Sousa Pedroso school, teaching is no different from the reality (traditional education) mentioned above, where the subjects taught in the classroom are based on content extracted from textbooks, without the necessary depth and contextualization.

Ideally, students should correlate classroom learning with everyday reality. In this way, the geographical knowledge built during classes could be externalized and practiced in the school environment and in the social environment. This concept highlights the importance of geography among the other sciences, that is, its flexibility and interface with other knowledge, allows the introduction of different themes and facts that occur on a daily basis, thus grounding the practices of interdisciplinary knowledge.

FINAL CONSIDERATIONS

This text brought a brief reflection on the importance of tourism as a generating/problematising theme and the possibility of this theme being included in the various school subjects, through the establishment of the relationship between the teaching and practice of



tourism in the locality. To this end, the performance and educational practice of the teachers of the Borari Indigenous School, in the village of Alter do Chão, district of Santarém-PA, as well as the perception of the school's students regarding the theme of the research was analyzed.

Thus, it was possible to discuss the trajectory and importance of tourism as a relevant theme for teaching, especially for geography, today. The difficulties in obtaining literature that would lead us to a coherent approach to the theme made it possible to expose the need and urgency of discussions of this theme in the classroom.

We used as the focus of this research the seaside village of Alter do Chão and the Professor Antônio de Sousa Pedroso School (Borari Indigenous School), because they are directly related to the practice of tourist activity in the locality, and because we find in them a field for the collection of data used in the realization of this work where, during the realization of this activity, it was found that it is of fundamental importance that the educator has a good education; as well as in-depth knowledge of current issues for the development of their didactic skills. Since, this teacher must be able to relate the contents and methodologies of his classes to the reality of his students, thus allowing the exchange of knowledge between teacher and student.

There were qualitative contributions in the result obtained, because through the observation of the experience in the school environment, it was possible to understand some problems that teachers and students face when obtaining subsidies for their contents related to local tourism.

In contrast, it is also possible to understand and have a possible dialogue between the teaching of geography and tourism in the most diverse areas of educational sciences, with a view to the development of interesting and meaningful classes, aiming at the construction of critical perceptions of their students in relation to their social context.

In this sense, the teaching of both geography and other knowledge becomes much more relevant, considering that it becomes a tool for social emancipation, as the student understands the space in which he lives and understands himself as a subject of that space.

However, it is necessary to search for better methodologies, as well as the commitment to teaching. Addressing everyday topics in the student requires the teacher, first, to be responsible for continuous learning, as well as a good dose of curiosity. The research demonstrated the limitations and obstacles faced by the teachers of the Borari school, to the same extent, it showed the interest of the students in classes that contemplate their daily lives. In this way, we understand that despite the challenges, it is possible to renounce the conventional practice of using only the textbook and bet on field classes, in which teachers and students can problematize the lived space, can value their way of life, their culture and the various contributions, impacts and spatial transformations, in particular, that tourism exerts on the community described here.




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Multiple myeloma: A literature review

 <https://doi.org/10.56238/sevened2024.015-016>

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ABSTRACT

Multiple myeloma (MM) is a malignant neoplasm characterized by clonal proliferation of plasma cells in the bone marrow and production of monoclonal immunoglobulin, the changes caused by the disease are related to progressive bone destruction, kidney failure, suppression of hematopoietic and higher risk of infections. It is the second most common hematological neoplasm, being slightly more frequent in men.

Keywords: Multiple myeloma, Clinical and laboratory characteristics, Prognosis.

INTRODUCTION

Multiple myeloma (MM) is a malignant neoplasm characterized by clonal proliferation of plasma cells in the bone marrow and production of monoclonal immunoglobulin, the changes caused by the disease are related to progressive bone destruction, kidney failure, suppression of hematopoietic and higher risk of infections. It is the second most common hematological neoplasm, being slightly more frequent in men.

OBJECTIVES

To describe the clinical and laboratory characteristics and prognosis of patients with MM.

METHODOLOGY

A literature review was carried out in which articles related to the theme proposed in the scientific databases of SciELO, LILACS and MEDLINE/PubMed, in the period 2007 -2022, in English and Portuguese, were selected. The following descriptors were used in the search: Multiple myeloma; clinical and laboratory characteristics; prognosis.

DISCUSSION

Clinical manifestations are related to clonal cell proliferation in the bone marrow and kidney damage. Bone pain is a common symptom at diagnosis and indicates probable disease. In some cases, a reduction in the patient's height secondary to vertebral collapses may be noticed. Weakness is observed and is related to the anemic syndrome, in addition to weight loss that may reflect a possible advanced stage of the disease. Regarding laboratory results, clonal plasmacytosis greater than or equal to 10% in the bone marrow, anemia, renal failure with high creatinine values, and hypercalcemia may be perceived. Less frequently, leukopenia and thrombocytopenia may be observed. In serum protein electrophoresis, according to the literature, the most frequent type of monoclonal protein is IgG, followed by the light chain type. Conventional skeletal radiographs show alterations in most of the patients studied, and the most common involvement was the presence of osteolytic lesions, which are characteristic of this neoplasm. Prognosis depends on patient characteristics, stage of disease, characteristics of neoplastic cells, and accessibility and response to therapy. More recently, a new and simple staging system, the International Staging System (ISS), based on the values of b2 microglobulin and serum albumin, was validated.



CONCLUSION


Several prognostic factors have been identified in patients with myeloma. With the emergence of new therapeutic options, it is essential to recognize clinical or biological parameters that guide the best choice.



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Factors of (dis)satisfaction with body self-image in adolescence

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ABSTRACT

In adolescence, young people have to adapt to almost radical transformations, being the (dis)satisfaction with body self-image a reality.

The aim of this research is to determine the relationship between physical condition and (dis)satisfaction with body self-image. To know how (in)satisfaction with body self-image relates to male versus female and analyse the association with academic achievement at a global level, according to gender and age. Participated 1517 adolescents, 701 males (46.18%), aged between 12 and 17 years.

The physical condition was assessed by Fitnessgram, the (dis)satisfaction with body self-image, using the Collins Silhouette Scale (1991), was adapted by Simões (2014), and the academic performance by the arithmetic average of the curriculum subjects.

There was a statistically significant relationship between (dis) satisfaction with body self-image and physical fitness level groups in the global sample and in males.

The associations between body image (dis)satisfaction and academic achievement, global, male, and female gender, are not significant ($p < 0.05$). Between age and (in)satisfaction with body self-image globally and in women, the correlations are negative, significant, and weak.

Keywords: Adolescence, Physical Condition, (Dis)satisfaction with Body Self-Image, Academic Achievement.

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INTRODUCTION

Adolescence is a period marked by physical and social changes that may be associated with negative body image (Sennin-Calderón, Rodríguez-Tental, & Perona-Garcelán, 2017). It constitutes a stage of our ontogenesis marked by psychological vulnerability, sometimes excessive concern with self-image, often marked by dissatisfaction.

According to Grogan (2017), many researchers have considered body image to be many different things. Body image appears with Collins (1981), assumed as a dynamic concept, for this author, the accuracy of body image depends on the way the individual processes adjust between reality and the rhythm of body change.

In turn, other authors conceive body image as a multidimensional idealization defined by the perceptions and attitudes (affective, cognitive, behavioural) that a given subject has of their body (Cash & Brown, 1989; Conti, 2008; Simões, 2014).

For Simões (2014), it is a dynamic, personal construction, a multidimensional construct, defined by the perceptions and attitudes (affective, cognitive, behavioural) that a given subject has about their body. (Dis)satisfaction with body image concerns the preference for certain bodily characteristics related to the size and shape of the body, different from the individual's perception of themselves (Wertheim & Paxton, 2011). There is an area in the body image process, regarding facial characteristics, skin appearance, musculature, fitness (physical condition) and strength, in which young adolescents most identify with their ideal.

In fact, perceptions of body image constitute a phenomenon that has two underlying aspects: cognitive and affective changes. The present study aims to determine the relation between physical condition and (dis)satisfaction with body self-image globally and in both genders; know if there are significant differences between (dis)satisfaction with body self-image between genders; analyse the association between (dis)satisfaction with body self-image and academic performance globally and according to gender. And determine the relationship between age and (dis)satisfaction with body self-image.

Often during adolescence, the body conveys dissatisfaction and negative feelings to young people. According to Grogan (2017), body image involves perceptions, thoughts, and *feelings* about the respective body. According to Tiggemann (2011) and Grogan (2017), there are cultural variations regarding body shape, increasingly linked to health standards, which includes healthy lifestyles, a fundamental aspect to implement among young people, idea corroborated by Mitchell, Petrie, Greenleaf and Martin (2012).

It is common for young teenagers to falter when faced with so much change in such a short space of time, and body image is logically at the heart of these changes. According to Cash (2011), in a panel of development of influences in the construction of the body image process, the following

can be made compatible: aspects of culture, socialization; interpersonal experiences; physical characteristics with the appropriate changes; personality factors; attitudes; cognitive or even self-regulation processes.

Excessive weight, proven by scientific evidence, is associated with health risks, constituting one of the major concerns of the WHO (2010), expressed in the present study through physical condition, in which Body Mass Index – (BMI); Fat Mass Index – (FMI) and Abdominal Perimeter – (AP), obtained from the *ratio* (Abdominal Perimeter/Height), constitute decisive variables, to place the participant in the healthy zone, the zone of some risk or the zone of high risk.

It is important to include young people, either boys or girls, in comfort zones with their physicality for aesthetics, self-esteem and feeling appreciated reasons. According to Fonseca (2009), teenagers become particularly vulnerable to the impact of social *feedback* on their appearance, leaving their self-esteem weakened. *“Portuguese adolescents defined as obese (with a body mass index – BMI – based on weight and height, self-reported, equal to or greater than P. 95 for age and gender), when compared with their non-obese peers, they more often reported being on a diet with the aim of losing weight (especially females) and they more often considered that they looked worse, were less healthy and even had difficulty on making friends”, Fonseca, 2009, p . 21.*

Considering the nature of feminine *versus* masculine, since there are notable differences with regard to body shapes (dimensions), taking into account various factors (eg, anatomical, hormonal, ethnic, cultural) boys and girls present substantial differences, concept known as sexual dimorphism (Fragoso and Vieira, 2000). In historical terms, particularly since the 1950s, there has been a rebirth of body culture, that is: a rediscovery of the cult of the body, in which the feminine gained space. The School, the valorisation of Physical Education, School Sports and Federated Sports, *Health Clubs* have constituted a decisive foundation in the importance that the cult of the body has assumed among young people. It emerges in different contexts and countries, a concern that has been increasing and comes from the alarming indicators defended by the WHO (2010) and OECD (2017) *guidelines*, at the level of global health strategy and policy, as well as health policies from different countries, particularly in the West (eg. United States; United Kingdom; Scandinavian countries; Spain; Portugal, among others).

According to (Baskova, Holubckova, & Baska, 2017; Murnen, 2011), dissatisfaction with body image, which is generally associated with their weight, is more common in girls, compared to boys who do not have such a strong concern. In the opinion of Murnen (2011) and Crogan (2017), the ideal female body is strongly associated with thinness and the addition of breasts, as well as other meanings of sensuality. While men are also associated with elegance, most clearly with the visible muscular structure. For Rodriguez and Cruz (2008), dissatisfaction with body image increases significantly between the ages of 13 and 15, and from the age of 15 it remains constant. The

ectomorphic morphotype pattern predominates (Fragoso & Vieira, 2000), and anything that deviates from this pattern is stigmatized, resulting in dissatisfaction for young people, suffering, social exclusion, as well as less healthy behaviours and causing serious risks for the discriminated young people (Fonseca, 2009). And at the heart of this problem are teenagers, who, due to the need to create feelings of social inclusion, in their peer groups and environments, make them particularly exposed to unrealistic and distorted standards of body self-image. Idea corroborated by Aerts, Madeira and Zart (2010); Basková et al. (2017); Petroski, Pelegrini and Glaner (2009); Scheinder et al. (2012). They identified girls as being more concerned than boys with their body image.

Scheinder et al. (2012), carried out a study whose objective was to evaluate the extent of patterns and predictors of feelings of body dissatisfaction, experienced by German adolescents, females aged between 14 and 17 years. Using *AVATAR 3D software*, they asked young people to estimate their desired body image (individual ideal) and the body image they believed their parents and best friend considered an ideal image for young women and the individual ideal body shape (silhouette) described was significantly thinner. In this logic, Petroski, Pelegrini and Glaner (2009), observed that girls wanted to reduce their silhouette (50.5%), while boys wanted to increase it, 42%). Inadequate nutritional status and body adiposity increase the likelihood of dissatisfaction with body self-image. This study also highlights the social pressure on females to achieve thinness and for males to develop greater volume in order to have a greater athletic structure.

Some studies (eg, Abbot & Barber, 2011; Beling et al., 2012; Burgess, Crogan & Burwitz, 2006; Slater & Teiggmann, 2011) consider dissatisfaction with body image to be a strong reason that can lead girls to away from playing sports. Gomez-Baya, Mendonza, Matos and Tomico (2017), corroborate this idea, considering it important to implement psychological adjustments among adolescents, thus promoting the practice of sport and social acceptance.

Through a qualitative approach, Danis, Bahar, Isa and Adilin (2014), concluded that participants who knew they did not have their ideal weight also mentioned that they felt *stress*, that they sometimes made fun of their body, they were not satisfied with their body and had the intention of losing weight; they did not feel comfortable with their weight; felt dissatisfaction with their body and had negative *feelings* regarding the fact of being obese. However, some participants in this study also admitted that there are people who care about them and who make them feel happy.

Calzo et al. (2012), carried out a study that aimed to determine the association between body mass indexes (BMI), body dissatisfaction and concerns about weight and shape. They also wanted to know how these variables evolve from the end of second childhood, to the end of adolescence, in boys and girls. They observed that girls above the 50th percentile in BMI reported dissatisfaction with their body, compared to girls below the 50th percentile. On the other hand, boys who reported greater body dissatisfaction were above the 75th percentile in BMI (approaching overweight), or



below the 10th percentile (sign of underweight). Body dissatisfaction increased with age for both girls and boys, but gender-specific patterns for BMI effects remained constant. Male and female participants in the overweight/obese BMI range reported greater concern about weight, but among older adolescents (particularly girls), body weight became increasingly associated with greater concern about weight and shape.

A systematic review of methods used to measure dissatisfaction with body image in children and adolescents, carried out by Jiménez-Flores, Jiménez-Cruz and Bagardi-Gascón (2017), using the following databases: Pubmed; *Scielo and EBSCO Host*, in a study with a cross-sectional study design, on studies published between April 2010 and April 2015. They considered variables such as: age; gender; height and methods on the scale used to assess dissatisfaction with body image. Self-perception of body weight was also assessed. Sixteen studies were included in the inclusion and exclusion criteria, and included young people aged between 5 and 19 years. Studies of body image dissatisfaction with overweight or obesity ranged from 44% to 83% and studies whose body image dissatisfaction was due to low weight ranged from 1.7% to 37%. In some studies, dissatisfaction with body image was associated with age, which happened more frequently among girls. But dissatisfaction with body image is also present in some boys.

Body image and social media - it is unequivocal that the aesthetic concept of the body (beauty) has undergone significant changes over time. This process can also vary from society to society, according to norms, standards, and aesthetic values in force in a given sociocultural and historical context. According to Mora (2008), “*aesthetic body standards have been valued differently at certain times in history*”. Often in terms of the context of sociocultural factors, unrealistic images of beauty are fostered by social media (Clay et al., 2005). For example, at the end of the 19th century, women were admired for their “plump” shape, a sign of health and sensuality. On the other hand, the standards of the fifties were very different, slimmer figures were in fashion. Currently there is awareness of the importance of young people being invaded, “massacred, *almost in a relentless battle*” by different media, particularly with the explosion of social networks. New heroes are thus manufactured, personified in models, actors, or athletes, with an ectomesomorph morphotype, in which the main muscle groups are well toned, representing the imagination of each young person. Clay et al. (2005), draw attention to the fact that the girls' exposure to media images can negatively affect body image. Miles et al. (2018); Petroski et al. (2009); Rodriguez and Cruz (2008); Schneider et al. (2012), consider that girls, even with ideal weight, continue to feel obese or disproportionate, which leads to a distortion of body image.

There are some studies that attribute great significance to social media and peers in the formation of young people's body image (Craike et al. 2016; Dohnt & Tiggemann, 2006; Mils, Musto, Williams, & Tiggemann, 2018; Tiggemann, 2011 ; Tiggemann & Slater, 2013; Voelker, Reel



& Greenleaf, 2015), refer to the influence of the media society and peers in the formation of young people's body image. For Dohnt and Tiggemann (2006), this process begins very early, through television (musical programs, *video shows*, radical programs and magazines) are some of the examples pointed out by the authors and which help to explain the emergence of this social phenomenon and which, in their understanding, of these researchers, represents a negative influence on young girls from an early age, both in the construction of their body image and in the development of self-esteem. According to Rodriguez and Cruz (2008), the media have a great impact on the body image of young adolescents, as body dissatisfaction increases in Latin American girls, the level of influence by social structures increases (social communication and activities to enhance the body also increase).

Tiggemann and Slater (2013), found in adolescent girls, aged between 13 and 16, a significant increase in time spent on the *internet* and *Facebook*. Likewise (Mils et al., 2018; Murnen, 2011; Voelker et al., 2015), they consider that they are the means media and peers, who help to form beliefs about the perception of the ideal body. In fact, the internalization of this process is in accordance with what is socially prescribed by the ideal body and will help to explain the relationship between weight *status and body image* (Mitchell et al., 2012). In this sense, Craike et al. (2016) consider that health messages should include strategies that reduce dissatisfaction with body shape and increase body self-esteem, but do not focus on the ideal of a thin body (thinness).

According to Tallat, Fatima, Fiza and Adiya (2017), the lack of self-perception reduces self-efficacy and self-esteem, which disrupts academic achievement, and body image affects academic performance, as most young people are distressed about their self-image and it is those who reveal satisfaction with their self-image, who have the highest grades. However, this study took place in a different educational context, of a higher education.

According to Veas et al. (2015), body image (dis)satisfaction is present in boys, which supports the importance of including non-cognitive variables along with cognitive variables to predict an academic performance model. Regarding the analysis of articles that consider the association between (dis)satisfaction with body image and academic performance, there are very few existing references (very rare), which reinforces the importance of the present study, giving it the exploratory study nature.

METHODS

SAMPLE

The sample was obtained by convenience and consists of 1367 participants, aged between 12 and 17 years old, of which 734 (53.69%) were female participants. Regarding the overall sample, 849 are in the healthy zone, 260 in some risk zone and 259 in the high-risk zone. Influence of body

image (dis)satisfaction on academic performance, 1,493 adolescents participated in the study, 800 (53.58%) of whom were female. Regarding the association of the age variable with (dis)satisfaction with body image, the study included 1,517 participants.

The participants in this study do not have a mental, physical, sensory, or emotional *handicap*. They attend regular schools at the 3rd cycle level of schools in the Algarve.

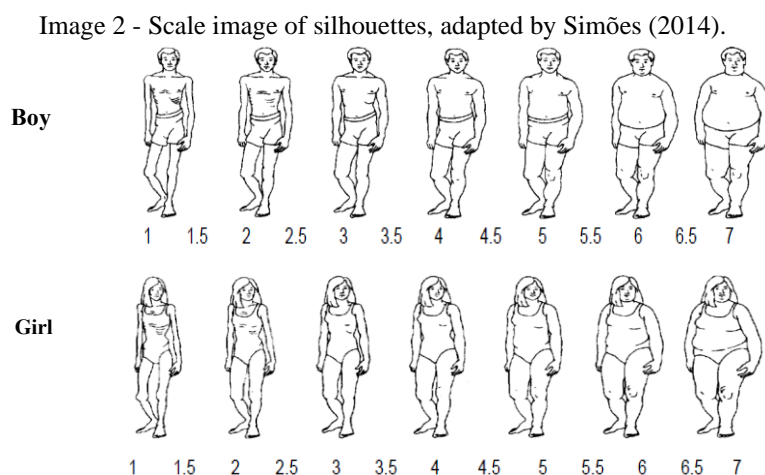
INSTRUMENTS

Sociodemographic characterization was carried out, which contains information regarding the averages obtained in the various subjects and which makes it possible to obtain academic performance.

Assessment of (in)satisfaction with body image

Collins' silhouette method (1991) was used, validated for the Portuguese population by Simões (2014) - (Appendix II).

The images are presented separately, according to the participant's gender. They are asked to identify the silhouette they consider closest to their body image, as well as the number of the silhouette they consider most consistent with their desired body image.



PHYSICAL CONDITION ASSESSMENT

Physical Condition is assessed using an instrument called *Fitnessgram*, which consists of a physical fitness program for health, aimed at the young population attending Portuguese schools at secondary level, 3rd cycles and secondary education.

Based on a set of physical fitness tests at the respective ages, according to Bai, Saint-Maurice, Welk, Allums-Fearstheron and Anderson (2015), motor performance was assessed at three possible levels: risk zone and need for to improve; zone of some risk and also needs to improve and within or above the healthy zone.

Taking motor performance as a reference, the table in Attachment IV presents values for boys and girls.

ACADEMIC PERFORMANCE

Academic performance was obtained through the arithmetic average of the subjects in the *curriculum*.

DATA TREATMENT AND ANALYSIS

Computer software, version 25.0 of *IBM's Windows environment*, was used.

Regarding sample characterization procedures, the mean and standard deviation were determined. Descriptive statistics were also used with regard to frequency analysis at a global level and with regard to age and gender.

We chose to apply a parametric test, the *One-Factor ANOVA test*. Later, to find out where the differences were, the *Post-Hoc test*, *Bonferroni test* and *DMS* were used. In order to verify the existence of significant differences between females and males, the *T Student test* was used.

At determining the correlations between the variables (dis)satisfaction with body self-image, academic performance and age, the *Pearson r* test was used. The effect size was also determined based on *Cohen's d* and η^2 coefficients, depending on the statistical test.

A significance level α of 0.05 was considered.

RESULTS

In the present study, we intend to analyse the relationship between physical condition and (dis)satisfaction with body self-image according to table 8.

Table 1 - Characterization of the sample at a global level – Physical condition/(dis)satisfaction with body image.

Physical condition	<i>N</i>	<i>M</i>	<i>DP</i>	<i>F</i>	<i>P</i>	η^2
Global Sample				4,570	0.011	0.007
Healthy zone	848	0.18	0.94			
Zone of some risk	259	0.27	0.99			
High-risk zone	260	0.38	0.98			
Male				3,296	0.038	0.010
Healthy zone	449	0.11	0.93			
Zone of some risk	85	0.31	0.88			
High-risk zone	98	0.34	0.98			
Women				1,615	0.220	0.004
Healthy zone	398	0.26	0.95			
Zone of some risk	174	0.26	1.05			
High-risk zone	162	0.42	0.99			

Note: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

For the global sample, using the One-Factor *ANOVA statistical technique*, a statistically significant value was obtained for the relationship between physical condition and (dis)satisfaction with body self-image. It was found that there are statistically significant differences ($p < 0.05$) between (dis)satisfaction with body image, in the different physical condition groups. According to the value of η^2 , the effect size can be considered low.

Bonferroni and *DMS* multiple comparisons test were applied. The results point to statistically significant differences between the healthy zone and the high-risk zone (Average Diff = - 0.201; $p = 0.010$), with the value of the healthy zone being lower than that of the high-risk zone. For the remaining levels of physical condition, no statistically significant differences were found ($p > 0.05$) between the means of (dis)satisfaction with body image.

With regard to males, using the same analysis technique, a statistically significant value was obtained for the relationship between physical condition and (dis)satisfaction with body self-image. It was found that there are statistically significant differences, $p < 0.05$, between (dis)satisfaction with body self-image, in different physical condition groups. According to the value of η^2 , the effect size can be considered low.

DMS multiple comparison test point to statistically significant differences between the healthy zone and the high-risk zone. (Average Diff = - 0.223; $p = 0.032$), with the value of the healthy zone being lower than that of the high-risk zone. For the remaining levels of physical condition, no statistically significant differences were found ($p > 0.05$) between the different groups, level of physical condition and the means of (dis)satisfaction with body self-image.

Regarding females, no statistically significant differences were found between the means of (dis)satisfaction with body image in the different physical condition groups ($p > 0.05$). According to the value of η^2 , the effect size can be considered low.

Still regarding the statistical relation between the variables age and (dis)satisfaction with body self-image, using the *Pearson coefficient*, no significant correlations were found between the two variables, either in males ($r = 0.006$; $p = 0.879$) or females ($r = - 0.035$; $p = 0.319$).

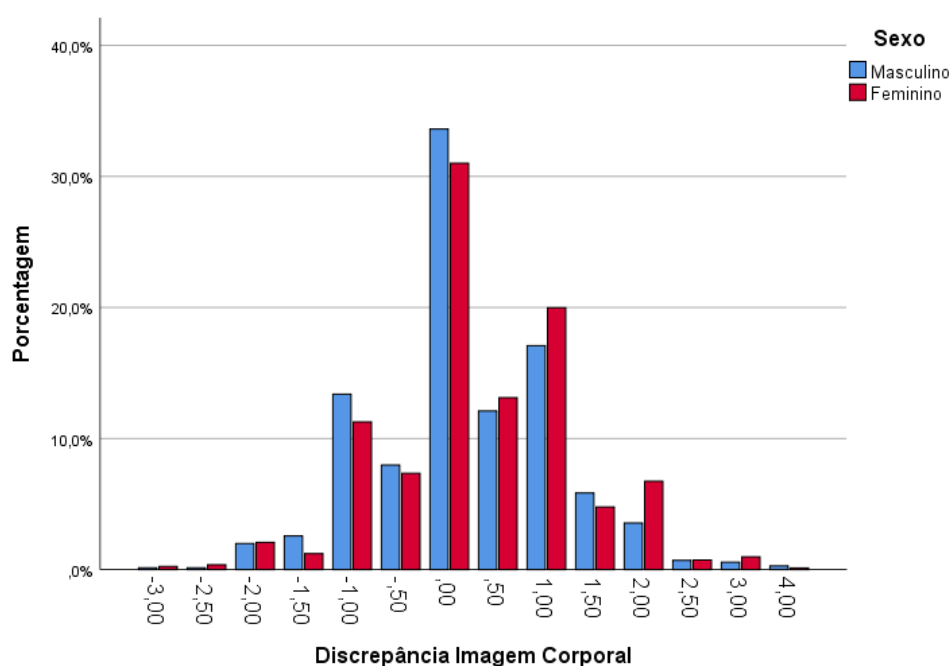
According to the values assumed by the participants, 53.7% of males and 51.30% of females are almost completely satisfied with their body self-image, with only (- 0.5 or 0.5) being apart. And 84.6% of male participants and 85.5% of female participants are one value (-1; + 1) apart regarding the degree of (dis)satisfaction with their body self-image. Graphic 1 illustrates the situation.

Table 2 - Degree of (Dis)satisfaction with Body Image, according to the gender of the participants.

Values Assumed	Discrepancy IC (male) - N	Percentage	Discrepancy IC (female) - N	Percentage
-3.00	1	0.10	two	0.20
-2.50	1	0.10	3	0.40
-2.00	14	2.00	17	2.10
-1.50	18	2.60	10	1.20
-1.00	94	13.40	92	11.30
-0.5	56	8.00	60	7.40
00	236	33.60	253	30.80
0.5	85	12.10	107	13.10
1.00	120	17.10	163	19.90
1.50	41	5.80	39	4.80
2.00	25	3.60	55	6.70
2.50	5	0.70	6	0.70
3.00	4	0.60	8	1.00
4.00	Two	0.30	1	0.10
Total	702		816	

In table 2, it can be seen that in males, as in females, a large percentage of participants are within the limits of (-1 to 1), corresponding to 84.20% in male participants and 82.50% in female participants.

Graphic 1 – Distribution of the (dis)satisfaction of body self-image on percentual terms, according to males *versus* females.



According to graphic 1, there is a balanced distribution in percentage terms between males and females regarding (dis)satisfaction with body self-image.

In order to determine whether body self-image (dis)satisfaction differs depending on gender, the *T Student test was used*, and the results indicate the existence of significant differences ($p < 0.05$) between the female and male means. ($t = - 2.448$; $gl = 1516$; $p = 0.014$). Female participants have a higher average value than males, regarding the discrepancy with (dis)satisfaction with body self-image. According to *Cohen's d value*, the effect size can be considered insignificant.



(DIS)SATISFACTION WITH BODY SELF-IMAGE AND ACADEMIC PERFORMANCE

With regard to the association between body image (dis)satisfaction and academic performance, with a N of 1,493 participants, the statistical test called *Pearson* Coefficient was used, and no significant correlation was obtained ($r = 0.015$; $p = 0.575$) regarding the total number of participants.

At the male level, with 693 participants, the correlation obtained is not statistically significant ($r = 0.008$; $p = 0.833$). Regarding female participants, with 800 participants, the correlation obtained is also not significant ($r = 0.016$; $p = 0.646$).

(DIS)SATISFACTION WITH BODY SELF-IMAGE VERSUS AGE

In the overall sample, a significant negative and weak correlation was obtained ($r = -0.099$; $p = 0.002$). In males ($r = 0.056$; $p = 0.277$), the correlation obtained is not statistically significant and in females ($r = -0.140$; $p = 0.001$), it is statistically significant, negative and weak. In summary, *Pearson*'s linear correlation coefficients point to the existence of negative, weak, and significant correlations ($p < 0.01$) between (dis)satisfaction with body image and age, globally and female gender.

DISCUSSION

The present study that relates physical condition to (dis)satisfaction with body self-image is found in some studies (eg, Danis et al., 2014; Gomes-Baya et al., 2017; McCabe et al., 2001; Petroski et al., 2009), resonance in anthropometric variables such as weight, body mass index (BMI), fat mass index (FMI) or abdominal perimeter (BP) and are in line with the results of the present study, in which participants in the healthy zone bring themselves into higher levels of satisfaction in their body self-image.

Grogan (2017) considers that a reduction in (dis)satisfaction with body self-image and positive formation of body image, will have an impact on behavioural variables that involve the internalization of elegant as an ideal physical form, and, to promote a positive body image, the discrepancy between the ideal body and the desired body must be zero or almost zero. According to some studies (eg, Beling et al., 2009; Calzo et al., 2012; Craike et al., 2016; Fonseca, 2009; Schneider et al., 2012), reveal adolescents' concern about their body self-image, corroborating our study. In fact, there are several studies that argue that future school programs should increase weight control in adolescents (eg, Burgess et al. 2006; Craike et al., 2016; Danis et al., 2014; Jiménez-Flores et al. 2017).

In the present study, at a global level, participants who reveal greater satisfaction with their body image are located in the healthy zone in terms of physical condition and those who show

greater discrepancies in terms of (dis)satisfaction with body image are in the high-risk zone. A statistically significant relation was found ($p = 0.05$). Regarding males, a statistically significant relationship was also obtained between physical condition and (dis)satisfaction with body self-image. According to (eg, Basková et al., 2017; Beling et al., 2012; Gomez-Baia et al., 2017), boys are least concerned about their body image, but they are also those who are most keen on practising sports (Slater & Teiggmann, 2011). Corroborating these results, also in our study, it is boys who reveal a lower degree of (dis)satisfaction with their body self-image.

Overall, 490 of the participants (33%) are completely satisfied with their body image, not revealing any discrepancy *score*. However, a large percentage (67%) actually reveals dissatisfaction with their body self-image. According to table 9 and graph 1, the discrepancy values assumed by male and female participants are very identical, which contradicts some studies consulted (eg, Basková et al., 2017; Calzo et al., 2012; Ricciardelli & McCabe, 2011; Voelker et al., 2015).

According to Calzo et al. (2012), dissatisfaction with body image and concern about weight intensify during adolescence. For these authors, boys are generally more satisfied with their bodies compared to girls. For (Basková et al., 2017; Murnen, 2011; Schwartz & Brownell, 2004; Tigemann & Slater, 2013), body image is especially prevalent in adolescence, where the majority of girls experience dissatisfaction with body image and express the desire to be thin. Corroborating this idea, Markland & Ingledew (2007), opine that the difference with regard to gender in the effect of body mass and perceived discrepancy in body size and autonomous motivation to exercise, can be explained through different sociocultural expectations, which can help to understand this male/female balance, with regard to the discrepancy in (dis)satisfaction with body image in our study.

A statistically non-significant correlation was obtained between the variables (body image discrepancy and academic performance, with an effective value of ($r = 0.015$). *This result* is in line with the study by Veas et al. (2015), in which adolescents, vulnerable to changes in body image, particularly girls, tend to develop discrepant values of (dis)satisfaction with body image. However, we are convinced that a periodic assessment accompanied by positive reinforcement strategies is justified, with the aim of reducing discrepancies, which makes this study even more pertinent, as well as carrying out more extensive studies at other schools in different regions of the country, as well as at other levels of education.

Regarding the relation (dis)satisfaction with body self-image and age, the fact that a statistically non-significant correlation is obtained in males, but significant in females, is plausible and is in line with some literature (eg Basková et al. 2017; Gomez-Baya et al. 2017; Murnen, 2011; Schwartz & Browell, 2004; Tigemann & Slater, 2013). Also, Jiménez-Flores et al. (2017) and Mils et al. (2018), consider that females feel more (dis)satisfaction with their body self-image.

In short, in the development of body image, the essential thing is to understand your own body as unique, different from others, as “I”, which also corresponds to the apprehension of yourself as an “object” and also as a “subject”. Therefore, it requires a careful look and continued research in different school, cultural and gender-based contexts.

According to Smolak and Cash (2011), future challenges in the approach to body image must take into account: a) investing in the approach to body image, as a multidimensional context; b) take into account the diversity of study contexts from which the samples come (eg, ethnicity, age, culture, social classes, sexuality); c) assessment tools must be more sensitive and in line with the objectives of the intervention.

In the present study, there was a “certain balance” with regard to the discrepancy values of (dis)satisfaction with body image between boys and girls. Instead, there are studies that consider this concern to be more evident in girls (eg Aerts et al., 2010; Baskova et al., 2017; Calzo et al., 2012; Jiménez-Flores et al., 2017; Schneider et al., 2012). In statistical terms, the impact of the effect size leaves us apprehensive and motivates us to continue studying this topic. And the fact that practically the references that analyse the relation between body self-image and academic performance are non-existent, which reinforces the relevance of the present study, as well as the continuity of this line of research.

CONCLUSIONS

The (dis)satisfaction with body self-image in individuals with a healthy physical condition is significantly lower than that of individuals at high risk, both globally and among females.

Regarding (dis)satisfaction with body self-image, male participants differ from female participants, with lower discrepancy values.

There is no association between (dis)satisfaction with body self-image and academic performance, at the level of the total sample and for both genders.

Age and (dis)satisfaction with body self-image are negatively associated, both globally and among females.

STATEMENTS

For this submission there is no funding to report. There is no Conflict of Interest. The procedures to get the Informed Consent were taken, namely the authorization was requested from official bodies: National Data Protection Institute; Regional Education Delegation; Directors of the Groups that allowed us access to the data. Authorizations from Parents and informed consent from students were also included. The Compliance with Ethical Standards statement in the Ethical Compliance Section should include whether the study was performed in accordance with the ethical



standards as laid down in the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards.

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Analysis of student performance using the Fuzzy intuitionist model

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ABSTRACT

In the Public Education Network, the Mathematics teacher from the 6th to the 9th grade is faced with the abyss between pedagogical planning and learning. Evaluations plus bonuses for complementary activities can be considered extra-class excesses, as they generate unrealistic results for the education system. The Fuzzy Intuitionist modeling allows the recognition of patterns for the evaluation of learning using degrees of pertinence and non-pertinence as a function of the results of the three mandatory measurements in the course. Personalized assessment would be more coherent with the student's profile, combating the discouragement generated to "school failure", formative assessments are suggested, which can provide the student with greater feedback, directing him to structured knowledge. It is vital to help a teacher feel good about himself and his performance, not minimizing the emotional balance and psychological resilience to live with the stress generated by the current building and educational conditions, avoiding psychosomatic effects. In this domain, it is essential that pedagogical processes are in an appropriate position to contribute to functional learning, that is, skills (activities) that encompass self-care, hygiene habits, school attendance, commitment to tasks and interpersonal interaction.

Keywords: Fuzzy Set, Intuitionistic Fuzzy Sets, Similarity, Functional Learning, Fuzzy Adaptive Weighter for Assessment scenarios.

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INTRODUCTION

The Mathematics teacher in the Public Education Network, when working from the 6th to the 9th grade, is faced with the abyss between the current school pedagogical planning and learning, often there is a disparity between what is planned and what is actually accomplished.

The evaluations of the students, when added to bonuses for activities complementary to the activities in the classroom, can be considered true extra-class excesses, as they often mask the gaps in knowledge, generating unrealistic results for the education system. It is not uncommon to find students who arrive at high school with difficulty in basic operations, especially in relation to Division, the basic operation of Mathematics.

It is noteworthy that the importance of teaching focused on the themes of the National Common Curricular Base (BRASIL, 2018) should be recognized, with regard to universality, plurality and fluidity between disciplines. It is noteworthy that despite so many efforts, learning problems, especially in Mathematics, persist over the years. The experience in Youth and Adult Education in terms of the basic operations of Fundamental Mathematics, allows us to perceive the extreme difficulty in the algorithm regarding division (getting help in my master's work and other works). It is worth reflecting on the importance of its use in financial planning, especially in the notions of family budget, home economics, where the mastery of at least the four arithmetic operations are fundamental. The abyss between the political pedagogical project and curricular learning masks the problem, since extra-class activities generate bonuses for basic curricular subjects, often without any connection in relation to the teaching of Mathematics, since the bonus is only due to the student participating in the quadrilha of the June festivals without there being any correlation with the concepts of fundamental measures referring to the average time of executions during the square rehearsals and geometric shapes in the operational of dance.

This reflection motivates the use of Intuitionist Fuzzy Modeling in the evaluations applied in the first quarter of 2023 regarding one of the 8th grade classes in a municipal school to confront the performance standard as a way to outline strategies that can improve student learning in order to optimize school management, mitigating possible deficiencies of students, which can support future innovative pedagogical and curricular strategies to improve the teaching and learning process. The general objective is to show that Intuitionistic Fuzzy Modeling can provide pertinence values that help in verifying the student's response to teaching strategies. To this end, an analysis of the first trimester of an eighth-grade class from a municipal public school system was carried out. In this segment of education, the evaluation takes place in a triple way under the criterion of three learning evaluations, hereinafter AV1, AV2 and AV3, where each one has a score of 10, but each one with its own proposal and approach. AV1 is directed to extra-class activities that directly or indirectly involve the concepts portrayed in the classroom, unlike AV2 and AV3 that are restricted to the

contents taught in class. The student's final grade is the sum of the three evaluations. Within this scope, the following specific objectives are sought: to analyze the performance of students according to the grades assigned to the evaluations of the syllabus related to AV2 and AV3, adding or not the evaluation AV1 considered extra-class. The results can be considered diagnostic tools, both for the teacher and for the institution regarding the ongoing teaching and learning process.

OBJECTIVE

Propose a method that seeks to analyze student performance to contribute to the proposal, with the goal of a fair evaluation in the Elementary School cycle.

Within this scope, the following specific objectives are sought to be met:

- a) to analyze the performance of the students according to the Fuzzy Intuitionist modeling of the AV1, AV2 and AV3 evaluations.
- b) To compare the results of these evaluations as a simultaneous diagnostic tool of the scenarios of the teaching process.

METHODOLOGY

Initially, a literature review of articles published in electronic databases, from 1990 to 2023 made available by the Sirius Network of UERJ, Scientific Electronic Library Online – Google Scholar, using the descriptors: Fuzzy Sets, Intuitionist Fuzzy Sets, Similarity, Fuzzy Activation Functions and the Department of Education of the Municipality of Maricá, Rio de Janeiro, Brazil.

DEVELOPMENT

CLASSIC SETS

In a *crisp set*, there are only two possibilities regarding the inclusion of an element x in the set A , in a universe of discourse, in which or . The following characteristic function represents the approach in a classical set (SZMIDT, 2014): $Xx \in A'x \notin A' \varphi_A(x)$

$$\varphi_A(x) = \begin{cases} 1, & \text{se } x \in A \\ 0, & \text{se } x \notin A \end{cases}, \text{ being the notation Characteristic function:}$$

$$A = \{ \langle x, \varphi_A(x) \rangle / x \in X \} \quad (1)$$

FUZZY SETS

A Fuzzy set in a universe of discourse is characterized by a function of pertinence where each element of the set is associated with a real value of pertinence in the universe of discourse (ZADEH, 1965). $A'X\mu_{A'}(x) \in [0,1], xA'$

$$A' = \{ \langle x, \mu_{A'} \rangle / x \in X \}, \quad (2)$$

where , is the pertinence function of the Fuzzy Set . $\mu_{A'}: X \rightarrow [0,1]A'$

The Intuitionistic Fuzzy Set was introduced by Atanassov (1983), a generalization of Zadeh's Fuzzy Sets, such that they denote, respectively, the degrees of pertinence and non-pertinence of an element, in a set. $\mu_A(x)v_A(x)x \in XA$

$$A = \{ \langle x, \mu_A(x), v_A(x) \rangle / x \in X \}, \quad (3)$$

where

$$\begin{aligned} \mu_A: X &\rightarrow [0,1] \\ v_A: X &\rightarrow [0,1], \end{aligned}$$

such that:

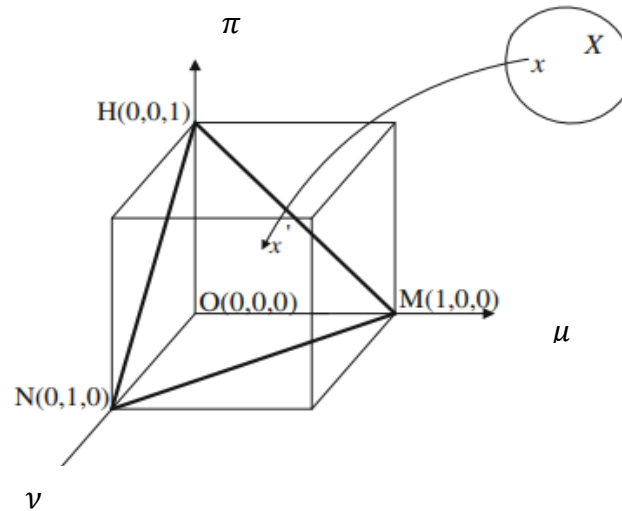
$$0 \leq \mu_A(x) + v_A(x) \leq 1, \forall x \in X \quad (4)$$

The margin of hesitation in a Fuzzy Intuitionist Set, $\pi_A(x)$, defines the lack of information about the degree of belonging of the element in the set, according to the expression: xA

$$\begin{aligned} \pi_A(x) &= 1 - (\mu_A(x) + v_A(x)), \text{ where} \\ 0 &\leq \pi_A(x) \leq 1, \text{ for everything } x \end{aligned} \quad (5)$$

Figure 1 geometrically represents the sets, *crisp*, Fuzzy and Fuzzy Intuitionist (SZMIDT; KACPRZYK, 2000). The triangle MNH represents the surface for the coordinates of the Intuitionistic Fuzzy set, where the points M and N indicate the (μ, v, π) *Crisp set*, where M and N are the maximum values of pertinence and non-pertinence, respectively. Point H registers the maximum hesitation and represents the complete inability to determine the pertinence or non-pertinence of a given element. The MN segment refers to the Fuzzy Set, where there is zero hesitation $(\cdot)\pi = 0$

Figure 1: Geometric representation of the Intuitionistic Fuzzy Model.



Fonte: Distances between intuitionistic fuzzy sets, p.14.

ACTIVATION FUNCTION

The pre-processing of the dataset for the fuzzification process is performed through a vector approach, $V_i = (n_{i,1}, n_{i,2}, n_{i,3}, \dots, n_{i,h})$ in which it denotes the j th component of this data vector. The Fuzzy Intuitionistic conceptual representation of a data set for the vector would be defined as , normalized the result of the expression below: $n_{i,j} hV_i A_i = \{ \langle x_1, \mu_1(x), \nu_1(x) \rangle, \dots, \langle x_h, \mu_h(x), \nu_h(x) \rangle \}$. $n_{i,1}$

$$z_{i,j} = \frac{n_{i,j} - X_j}{s_j}, \quad (7)$$

where \bar{x}_j and s_j are the mean and standard deviation of the sample, respectively. X_j, s_j

Hesitation was fixed, the pertinence and non-pertinence functions adopted for this project were the weighted sigmoid functions ($\pi = 0,1$ INTARAPAIBOON, 2016), given by the following expressions:

$$\begin{cases} \mu_{i,j} = \frac{r_j}{1 + e^{-z_{i,j}}} \\ \nu_{i,j} = \frac{r_j}{1 + e^{z_{i,j}}} \end{cases} \quad (8)$$

Where, $r_j = 1 - \pi$, $\forall j \in [1, k]$. Thus, the following were adopted:

$$\begin{cases} \mu_{i,j} = \frac{0,9}{1 + e^{-z_{i,j}}} \\ \nu_{i,j} = \frac{0,9}{1 + e^{z_{i,j}}} \end{cases} \quad (9)$$

SIMILARITIES

The problem of quantitative properties is best addressed by the *metric conception* of similarity, which postulates that there are certain dimensions of similarity in relation to different aspects, for example, color, shape, or weight, which constitute the axes of a unified metric-space (BLUMSON, 2018). Similarity is a measure widely applied in fields where uncertainty must be considered. Within the scope of Fuzzy Logic, similarity is a measure of equivalence between Fuzzy Sets. Considering two Fuzzy Intuitionistic sets A and B , in a universe of discourse X , in this work several measures of similar measures were obtained, which will be listed below:

Cosine (C_{IFS}):

According to Salton and McGill (1983), the cosine similarity model follows the following representation:

$$C_{IFS}(A, B) = \frac{1}{n} \sum_{i=1}^n \frac{\mu_A(x_i)\mu_B(x_i) + \nu_A(x_i)\nu_B(x_i)}{\sqrt{\mu_A^2(x_i) + \mu_B^2(x_i)} \cdot \sqrt{\nu_A^2(x_i) + \nu_B^2(x_i)}} \quad (10)$$

Weighted cosine (W_{IFS}):

In this similarity proposed by Li and Cheng (2002), a weighting is used for each belonging to the Fuzzy Intuitionistic sets A and B , where: $w_i x_i$

$$\sum_{i=1}^n w_i = 1 \quad (11)$$

Like this:

$$W_{IFS}(A, B) = \sum_{i=1}^n w_i \cdot \frac{\mu_A(x_i)\mu_B(x_i) + \nu_A(x_i)\nu_B(x_i)}{\sqrt{\mu_A^2(x_i) + \mu_B^2(x_i)} \cdot \sqrt{\nu_A^2(x_i) + \nu_B^2(x_i)}} \quad (12)$$

P. Shi e Z. Liang (S_C):

The expression suggested by Shi and Liang (2003) is represented below:

$$S_C(A, B) = 1 - \frac{\sum_{i=1}^n |S_A(x_i) - S_B(x_i)|}{2n}, \quad (13)$$

where: $S_A(x_i) = \mu_A(x_i) - \nu_A(x_i)$ and $S_B(x_i) = \mu_B(x_i) - \nu_B(x_i)$

H. B. Mitchell (S_H):

Mitchel (2003) proposes the following expression for the calculation of similarity:

$$S_H(A, B) = 1 - \frac{\sum_{i=1}^n |\mu_A(x_i) - \mu_B(x_i)| + |\nu_A(x_i) - \nu_B(x_i)|}{2n} \quad (14)$$

E. Szmidt e J. Kacprzyk (S_O):

Szmidt and Kacprzyk (2005) propose the calculation of the following expression for a similarity measure:

$$S_O(A, B) = 1 - \sqrt{\frac{\sum_{i=1}^n (\mu_A(x_i) - \mu_B(x_i))^2 + (\nu_A(x_i) - \nu_B(x_i))^2}{2n}} \quad (15)$$

H.W. Liu (S_{HB}):

Liu (2005) suggests for the calculation of similarity:

$$S_{HB}(A, B) = \frac{\rho_\mu(A, B) - \rho_\nu(A, B)}{2}, \quad (16)$$

where $\rho_\mu(A, B) = 1 - \sqrt{\frac{\sum_{i=1}^n |\mu_A(x_i) - \mu_B(x_i)|^p}{n}}$ and $\rho_\nu(A, B) = 1 - \sqrt{\frac{\sum_{i=1}^n |\nu_A(x_i) - \nu_B(x_i)|^p}{n}}$

W. L. Hung e M. S. Yang (S_e^p):

Hung and Yang (2007) present as a measure of similarity:

$$S_e^p(A, B) = 1 - \sqrt[p]{\frac{\sum_{i=1}^n (\phi_\mu(x_i) + \phi_\nu(x_i))^p}{n}}, \quad (17)$$

Where $\phi_\mu(x_i) = |\mu_A(x_i) - \mu_B(x_i)|/2$ and $\phi_\nu(x_i) = |(1 - \nu_A(x_i))/2 - (1 - \nu_B(x_i))/2|$

L. A. Zadeh (S_{HY}^1):

Zadeh (1965) expresses the following expression for similarity:

$$S_{HY}^1(A, B) = 1 - d_H(A, B) \quad (18)$$

T. Gerstenkorn e J. Manko (S_{HY}^2):

Gerstenkorn and Manko put forward the following proposition:

$$S_{HY}^2(A, B) = (e^{-d_H(A, B)} - e^{-1}) / (1 - e^{-1}) \quad (19)$$

I. K. Vlachos e G. D. Sergiadis (S_{HY}^3):

Vlachos and Sergiadis (2007) denote the following result for the calculation of similarity:

$$S_{HY}^3(A, B) = (1 - d_H(A, B)) / (1 + d_H(A, B)) \quad (20)$$

DEVELOPMENT

After obtaining results from the AV1, AV2 and AV3 evaluations for one of the eighth-grade classes of a Municipal Public Education Network, the grades of each student were standardized in units of the standard deviation (σ), for each of the 28 students ordered alphabetically. In this study, three curricular evaluations will be addressed, AV1, AV2 and AV3, which were submitted to the fuzzification process according to the Intuitionist Fuzzy modeling to obtain pertinences and non-pertinences using the "weighted sigmoid functions" (INTARAPAIBOON, $x_i z_i$ 2016), with hesitation being fixed. $\pi = 0,1$

Subsequently, the similarity measures (S) mentioned above were calculated for these evaluations combined in pairs, S(AV1, AV2), S(AV1, AV3) and S(AV2, AV3). When it came to the Cosine Weighted Similarity, 6 different weights were used. A weighting based on the student's performance in each assessment, average weighting obtained through the arithmetic average of the weights assigned to the three assessments and the other weights, mean square, $(W_{IFS})(\overline{W_{AV}})(\overline{W_{AV^2}})$ mean cubic $(\overline{W_{AV^3}})$, based on the arithmetic quadratic and cubic averages of the assessments, respectively. Simulations of the various similarities discussed above were performed, and in the specific case of the models proposed by Hung and Yang (2007) and Liu (2005), they were calculated for three different sensitivities, with p ranging from 1 to 3. The results of these similarities are shown in Table 1 and were compared with the six Cosine Weighted Similarities to evaluate the best weighting that translates the profile of performance in Mathematics in Elementary School.

Table 1: Comparison similarities between the AV1, AV2 and AV3 evaluations.

SIMILARITIES	AV1, AV2	AV1, AV3	AV2, AV3
Ponderada Cosseno (ponderador av1) W_{IFS} –	0,799	0,860	0,943
Ponderada Cosseno (ponderador av2) W_{IFS} –	0,918	0,911	0,949
Ponderada Cosseno (ponderador av3) W_{IFS} –	0,871	0,911	0,945
Cosine Weighted (W_{IFS} - weighter) $\overline{w_{AV}}$	0,863	0,894	0,946
Cosine Weighted (weighting) $W_{IFS} - \overline{w_{AV^2}}$	0,862	0,898	0,943
Cosine Weighted (W_{IFS} - weighter) $\overline{w_{AV^3}}$	0,862	0,902	0,941
Cosine (C_{IFS})	0,861	0,888	0,953
P. Shi e Z. Liang (S_c)	0,790	0,805	0,875
Similaridade H. B. Mitchell (S_H):	0,790	0,805	0,875
E. Szmidt e J. Kacprzyk (S_O)	0,718	0,750	0,844
H.W. Liu usando $p=1(S_{HB})$	0,790	0,805	0,875
H.W. Liu usando $p=2(S_{HB})$	0,718	0,750	0,844
H.W. Liu usando $p=3(S_{HB})$	0,665	0,712	0,822
W.L. Hung, M.S. Yang (usando $p = 1S_e^p$)	0,790	0,805	0,875
W.L. Hung, M.S. Yang (S_e^p) usando $p = 2$	0,718	0,750	0,844
W.L. Hung, M.S. Yang (usando $p = 3S_e^p$)	0,665	0,712	0,822
L.A. Zadeh (S_{HY}^1)	0,895	0,902	0,937
T. Gerstenkorn e J. Manko (S_{HY}^2)	0,842	0,853	0,904
I. K. Vlachis e G. D. Sergiadis (S_{HY}^3)	0,810	0,822	0,882

Table 1 shows the comparison of the similarities of the evaluations expressed in units of the standard deviation. The highest degree of similarity corresponds to the AV2 and AV3 evaluations, indicating that there is greater similarity for the written evaluations. On the other hand, in these measurements, it indicated that the lowest degree of equivalence was between the AV1 and AV2 evaluations, signaling a greater discrepancy than the previous comparison. It should be noted that AV1 has a quantitative evaluation, but with qualitative items. AV2 is based on an exam with questions inherent to the concepts of Mathematics. The difference between these two evaluative proposals influences the students' performance due to contextual diversity, a factor that probably influenced the results obtained. The AV3 evaluation, when compared with AV2 and AV1, showed that the values of the similarities can become differentiated according to the approach of the different authors, which influences the interpretation. In S_{HY}^1 Zadeh's model, the degree of similarity of AV1 in relation to AV2 and AV3 are similar. It is noteworthy that in the Hung and Yang (2007) model, the similarity when using $p = 3$, there is a more expressive discrepancy. It was observed that there was an identical measure for the similarities attributed to Shi and Liang (2003), Mitchell (2003) and Liu (2005), the latter using the exponent $p = 1$.

In this table, cosine-weighted similarities were treated according to weights. Initially, three weights were calculated, one for each respective evaluation, obtained by dividing the evaluation score expressed in unit of standard deviation, ordered in ascending order. The "unit order weight" was obtained by the ratio between the standardized score and the sum of the same, which resulted in the weighting for each student, whose sum was equal to 1, a condition previously expressed. The list



of students for each evaluation was ordered alphabetically, with the respective weights of each evaluation, with these weights being added per student and this value divided by the sum of the weights of the three evaluations, which resulted in the average weighting for each student. Similar procedures were adopted, but standardized quadratic and cubic values were used, resulting in quadratic mean and cubic mean weights.

By using weightings inherent to cosine weighted similarities, greater sensitivity is obtained in the measurement of the knowledge acquired by the student. The unit weight, when applied to the AV3 evaluation, showed proximity in relation to the other similarities in the table, which indicated that this evaluation in relation to the others carried out was able to translate with more coherence the level of learning acquired over the period, about the contents taught. On the other hand, the unit weighting for evaluation AV1 resulted in indices with greater disagreement with the other similarities, that is, this test was not very representative about the acquisition of specific knowledge of Mathematics. The quadratic and cubic mean weights did not reflect great sensitivity in relation to the unit mean weight.

FINAL CONSIDERATIONS

The Fuzzy modeling proved to be an optimized tool for the analysis of school performance in Elementary School, providing important excerpts regarding the first trimester of an eighth-grade class in the municipal public network. Although schools have managers and pedagogues, there is no concern in the logical analysis of pedagogical processes in the scenario of Elementary Education, contributing to the compromise of the education chain, dragging on to High School and College.

The learning gaps inherent to the fundamental knowledge of Mathematics should not be neglected, because the extra-class evaluations, designated as events, have not contributed in a strong way to recover learning deficiencies, masking the learning deficit that accumulates, especially in the concepts of Mathematics that will be the foundations of disciplines of the Exact Sciences.

The proposed method that deals with cosine-weighted similarity using the unit weighting in AV3, provided to differentiate the adoption of the basic concepts of mathematics when the AV2 and AV1 assessments are applied, since AV2 does not make the full curricular assessment. Therefore, it is necessary to take a more refined look at the treatment present in these activities examined outside the classroom, so that they have greater affinity with the mathematical knowledge addressed within the classroom. In cosine weighted similarity there is a reinforcement when the unit weighting is used in which AV3 is highlighted as the option with the highest sensitivity for knowledge acquisition.

The weighting associated with the students' results in AV1 was the one that most differed from all the similarity measures performed. This fact indicates that this is, in itself, an assessment that does not reflect the reality of the students' knowledge in the period analyzed. Another significant




fact was that the exam with the largest scope of contents covered, AV3, was the one through which the best weighting was obtained, that is, the one whose measurements found among the tests was the one that came closest to the other measurements made. No less important, its results for cosine similarity are close to those found with the use of an average weighting between the three evaluations, indicating that the written evaluation with the greatest magnitude of subjects addressed, better expresses the reality of the class in the period in question, better exposing its deficiencies. It is understood that AV3 translates with good reality, the performance of students in the assessments, and the relationship between the performances in the different tests for each student. Finally, it is suggested for future approaches, different types of weights, seeking the one that best approximates the other measurements, believing that the weighted cosine similarity provides, in addition to the measures of similarities themselves, depending on the weighting used, additional information about each fuzzy set in relation to the others.



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The hybrid and multimodal training of graduate students in education

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ABSTRACT

This study is an excerpt from the research project entitled "STEAM Education: A Collaborative Construction with Sustainable Educational Robotics", under development with the support of CNPq and presents the experience of offering a discipline, developed, in a hybrid and multimodal way, with a STEAM approach and with a focus on Project-Based Learning. It was offered in the second semester of 2023 to master's and doctoral students in the Graduate Programs in Education linked to a private university in São Paulo. In this perspective, synchronous meetings were used, via Google Meet, asynchronous activities via Moodle/WhatsApp and face-to-face meetings.

Keywords: STEAM Education, Projects, Hybrid and multimodal teaching, Post-graduation, Training.

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INTRODUCTION

This work, reported here, is part of an excerpt from the research project entitled "STEAM Education: A Collaborative Construction with Sustainable Educational Robotics", ongoing since March 2023, with support from the National Council for Scientific and Technological Development (CNPq), according to CNPq Call No. 09/2022 - Research Productivity, in partnership with Universidade Nove de Julho (Uninove/SP/BRASIL). This project aims to analyze how Brazilian public schools, especially those that offer Basic Education, especially in high school courses integrated with technical education, can implement a pedagogical architecture oriented to Project-Based Learning (PBL), integrated with a STEAM (Science, Technology, Engineering, Arts and Mathematics) approach, aiming at the insertion of sustainable educational robotics in pedagogical practices. In this context, a hybrid and multimodal perspective was adopted to promote the training of master's and doctoral students linked to the disciplines entitled: Distance Education in the Digital Age: Fundamentals, Technologies and Online Practices and Culture, Education and *e-Learning*, offered in the second semester of 2023 in the Graduate Programs (*Stricto Sensu*) in Education at the aforementioned university located in the municipality of São Paulo, Brazil.

As both disciplines discussed learning and teaching in the online modality, as well as the use of digital technologies and the impacts of digital culture on Education, it was thought that the best way to lead students to actually experience this new way of teaching and learning, would be to offer part of the discipline in virtual mode and another part in the *face-to-face* classroom, in the hybrid format. In addition, these disciplines proposed to be supported by a STEAM approach and Project-Based Learning (PBL).

It was expected that throughout the semester, graduate students would be able to acquire enough knowledge to reflect on ways to resignify teaching and learning, using digital technological tools, in a STEAM approach. To this end, they were allowed to carry out readings, various individual and group activities, as well as to participate in moments of dialogue about the studies carried out on the topics addressed.

In this sense, the objective of this article was to highlight the formative action within the scope of the disciplines mentioned above. To this end, the theoretical framework that supports the reported experience is addressed, the methodological path adopted for the feasibility of this experience and data collection, the analysis and discussion of the results achieved with this research excerpt and, finally, the final considerations.

THEORETICAL FRAMEWORK

As we faced the consequences of the global covid-19 pandemic, one of the realities we had to experience was the need to offer remote education at all levels and modalities of education. The use of digital technologies as a means of mediation between teachers and students has become almost



mandatory. Today, many of those who were against teaching mediated by digital technologies are able to better accept the possibilities of using the tools offered to offer remote education.

These possibilities and technological tools can be combined with the virtues of face-to-face teaching in the methodology known as hybrid teaching. According to Moran (2015), hybrid teaching integrates face-to-face activities with virtual ones and allows personalized paths for the needs of students. For Valente (2015), in addition to combining face-to-face activities with activities mediated by digital technologies, hybrid teaching places the focus of learning on the student and no longer on the teacher. The student studies in different situations and environments. The face-to-face classroom becomes the space for debate and collective activities. For Bacich, Tanzi Neto and Trevisani (2015), in general, the definitions for hybrid teaching indicate the convergence of the face-to-face learning model with the online model, *where the face-to-face classroom and the virtual space gradually complement each other*.

About hybrid teaching, it is worth noting that it was mentioned as one of the examples for new pedagogical architectures, by Thuinie Daros in an interview for the Education Challenges Portal (2023). On the occasion, Daros listed in January 2023 five pedagogical trends to monitor throughout the year, namely: (1) ubiquitous learning; (2) learning objects and resources based on the attention economy; (3) cohort-based courses; (4) new pedagogical architectures and (5) new certification models⁹. These trends were reaffirmed in December of the same year, when asked again about these five trends that she had indicated to follow in 2023. According to Daros, hybrid models, by promoting the "integration of face-to-face activities with advanced digital technologies, create a richer and more engaging learning experience." (Education Challenges Portal, 2023).

According to Mattar (2022):

[...] It can be predicted that hybrid teaching and learning may even become a requisition [...] at least in some specific situations. A theoretical (and practical) awareness may have developed that (and how) it is possible to properly combine face-to-face and online in the teaching and learning process. Perhaps it is no longer possible to defend a content-based and decontextualized distance education; But it may not be possible to defend a 100% face-to-face education, with little use of technologies and without "mixing" the online, more and more, in its practice. (Mattar, 2022, p. 14).

It is in this interaction and complementarity of teaching forms that the definitions of hybrid and multimodality teaching are connected. According to Schlemmer and Moreira (2020), multimodality is the educational modality that hybridizes different teaching modalities. The use of multimodality in teaching enables the integration of a variety of resources and technologies that transcend mere verbal exposure, incorporating different tools in learning environments; synchronous and asynchronous. This implies the diversified use of technologies, such as videos, *podcasts*, images

⁹ For further information, see: <https://desafiosdaeducacao.com.br/tendencias-pedagogicas-2023/>.

and *online* meetings, among other possibilities. When considering education in its entirety, including its technological infrastructure, it becomes crucial, perhaps indispensable, to adopt new strategies capable of engaging teachers and, consequently, their students, encouraging them to actively participate in the learning process and making it more conducive to educational development.

In these different ways of making training processes viable, the STEAM approach is included. By opting for the STEAM approach, it was defined what kind of knowledge could be brought to the classroom, as a way to enrich the pedagogical work. This approach integrates Science, Technology, Engineering, Arts and Mathematics and is understood by Bacich and Holanda (2020), as follows:

STEAM is not considered a methodology [...]. The STEAM that we defend is the one based on the realization of projects, which has project-based learning (PBL) as a methodology, and which will promote in students a sense of relevance of the scientific knowledge developed in basic education. (Bacich; Netherlands, 2020, p. 5).

Corroborating Bacich and Holanda (2020), the authors Maia, Carvalho and Appelt (2021), in one of their studies, also recognize STEAM Education as an approach to "pedagogical work", which contributes to the development of an "active" and "creative" learning process, favoring students in situations in which they are instigated to make choices, analyze and issue *feedback*, based on interdisciplinary projects, triggered to the search for the resolution of emerging real-world problems. "Experiences like these provide opportunities for higher cognitive processes such as perception, reflection, reasoning, generalization and reelaboration of concepts and procedures" (Maia; Oak; Appelt, 2021, p. 70). In this scenario, the way chosen to create a more conducive environment for the construction of this "active" and "creative" learning was the methodology known as Project-Based Learning (PBL).

According to Bacich and Moran (2018, p. 60), PBL:

[...] It is a methodology in which students engage with tasks and challenges to solve a problem or develop a project that meets the needs of life. It is important to emphasize that in PBL the issues to be solved require interdisciplinary work, with students acting both alone and in groups. In these activities, critical thinking skills are exercised, as well as creative thinking.

PBL requires focusing on a real need. According to Bender (2014, p.15) "[...] 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." In this way, the work in the STEAM approach and from the perspective of Project-Based Learning are articulated to build an educational environment that fosters autonomous work and that privileges the protagonism of students.

In this context, educational robotics has been understood as one of the technologies, demonstrating that it has progressed to a comprehensively educational and pedagogical proposal, discussed as a learning tool in the classroom, as well as the science and technique of designing and building robots. Santos, Moura and Araújo (2017) believe that educational robotics emerges as a didactic resource that can contribute to teaching and learning processes. The authors point out that educational robotics has been incorporated into teaching practices, allowing students to apply concepts learned in theoretical classes, favoring the development of skills such as logical reasoning, creativity, responsibility and cooperation. The Educa Brasil portal¹⁰ defines educational robotics as a learning environment that brings together materials from scrap metal to *assembly kits*, with motors and sensors programmed through *software*, such as Arduino, which is a platform that enables the development of electronic projects, that is, it is an electronic prototyping platform. The Arduino is made up of *hardware* and *software*, thus making it possible to carry out various technological projects, which explain its operation (Menezes; Santos, 2015).

It is also worth considering, according to Chitolina, Noronha and Backes (2016, p. 57 *apud* Moala; Nunes; Custódio, 2022, p. 98-99), that:

[...] Educational robotics, when applied in an articulated way to curricular content in the teaching and learning process in Brazilian schools, is managing to cultivate logical reasoning, a taste for scientific investigation and group work from a very early age. In addition, it can and becomes a space rich in possibilities for the development of creativity and support in the development of skills such as problem-solving skills, mutual collaboration, initiative, good oral and written communication, information analysis, problem-solving skills, creativity, curiosity and imagination of the student, the teacher and the institution in general.

Moala, Nunes, and Custódio (2022, p. 100) also emphasize that "robotics provides practical learning articulated with theory, and can be used as an attractive didactic-pedagogical resource, which makes sense and difference in the students' routine, as well as in the continuous training and development of teachers [...]". Thus, in the development of the experience portrayed in this study, it was expected to contribute to the training of trainers (master's and doctoral students) based on the STEAM approach and Project-Based Learning (PBL), aiming to promote a pedagogical practice that stimulates the exploration of new ways of developing projects in the context of Basic Education, including educational robotics.

METHODOLOGICAL PATH

The activities linked to the disciplines were carried out in 15 weekly meetings, in the second half of 2023. In this context, synchronous meetings were held through the *Google Meet platform*,

¹⁰ Portal Educa Brasil: *Online portal* that offers continuing education courses, in distance education and with certification. Learn more: <https://educa-brasil.com/>.

asynchronous meetings using the Moodle Virtual Learning Environment and a group created on *WhatsApp*, as well as *face-to-face meetings in the format of workshops* at the university's facilities.

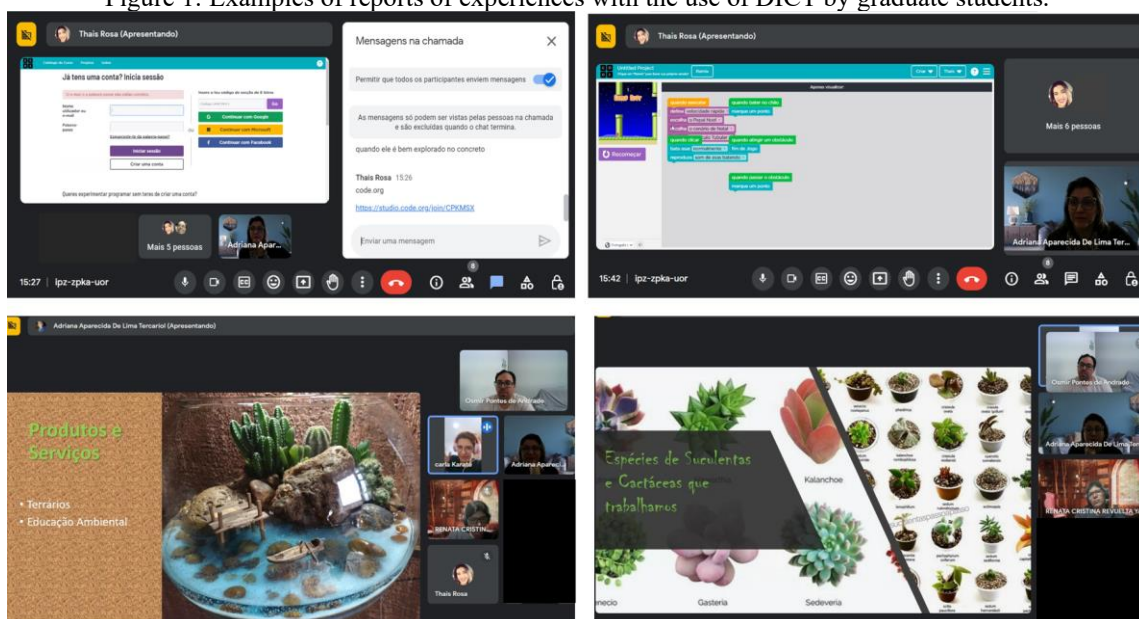
The following is a brief characterization of the direction of this formative process in the different modalities mentioned:

SYNCHRONOUS AND ASSYNCHRONOUS ENCOUNTERS

To carry out the *online meetings* that could allow a meaningful debate among the graduate students, as well as the interventions of the mediator professor, the videoconferencing platform *Google Meet* was used. *Google Meet* is an online meeting tool, which allows audio and video, instant communicator, and screen sharing. In this way, synchronous interaction was made possible in the meetings scheduled weekly on this platform. The university offers faculty and students full access to *Google* tools, which include videoconferencing services, without limitations on time and number of participants. In synchronous virtual meetings, an initial *brainstorming* was done, guided by the mediator teacher. It sought to support graduate students to understand the highlighted concepts, based on readings carried out in the week prior to synchronous classes, opening spaces for dialogue, criticism and reports of experiences, in line with the theme that was being addressed in each meeting, reaching the sharing of ideas to use this knowledge in favor of their pedagogical practices.

Next, the figure presented brings examples of images that exemplify the dynamics adopted online to provide graduate students with space to socialize research or classroom practices, since most were teachers in Basic Education. In these reports, they evidenced the use of DICT, in a STEAM approach, as tools that enhance a more active and creative learning, as mentioned earlier.

Figure 1: Examples of reports of experiences with the use of DICT by graduate students.



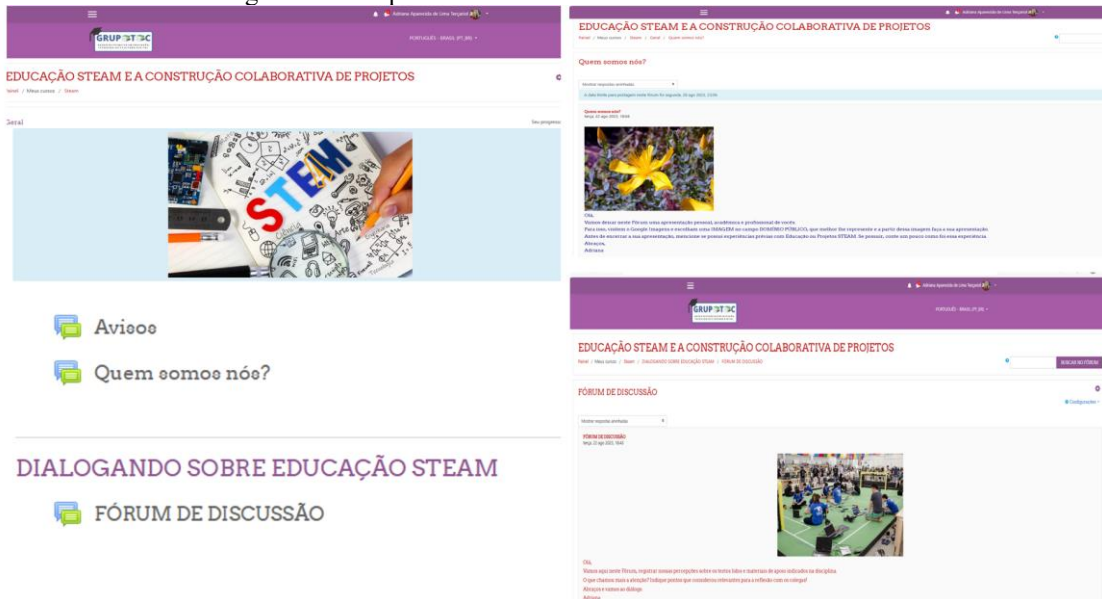
Source: Personal Collection of the Authors.

In the figure, above, specifically, the images presented at the top show the presentation of the Code.org platform¹¹, adopted by one of the graduate students for the elaboration of games in the early years of Elementary School within the scope of her Master's research, entitled: "The STEAM Approach and Project-Based Learning: the development of Computational Thinking in the early years of Elementary School" (Rosa, 2022). Through this presentation, her peers were able to learn about the methodological direction of her study, as well as understand some of the possibilities offered by this platform to the teaching and learning process about the curriculum to be addressed with the audience involved. In this same set of images, it is also possible to note the presentation made by another graduate student, who brought as her theme "Terrariums and Environmental Education". In her presentation, she showed how she led the development of a project with this theme in high school classes, where she works as a teacher. With this, the other graduate students were able to reflect on the importance of the theme in the context of Basic Education, as well as had the chance to identify numerous actions that can be broken down with the PBL methodology, in conjunction with STEAM, to stimulate student engagement in the development of artifacts, using reusable and technological materials.

The asynchronous activities, on the other hand, were carried out through the Moodle virtual environment. Moodle is a *free software*, to support learning, running in a virtual environment considered a "*Learning Management System*" (LMS), a Learning Management System, which provides a series of resources, synchronous and asynchronous, that support the learning process, allowing its planning, implementation and evaluation (Cefor, 2018). The dynamics used in asynchronous classes, via Moodle, usually began through contact with videos and texts. Then, questions and reflections were proposed, motivating interaction between participants in forums of the platform, created by the mediator teacher. These activities allowed students to learn about the theories covered in the course and discuss STEAM and PBL education. Below, the figure exemplifies interfaces adopted for the organization of this virtual environment, as well as illustrates the calls of two forums, one of which is dedicated to the personal, academic and professional presentation of graduate students, while the other was created for dialogue and exchange of impressions on the proposed readings that brought "STEAM Education" and "Collaborative Construction of Projects" as central themes.

¹¹ For further information, see: <https://code.org/>

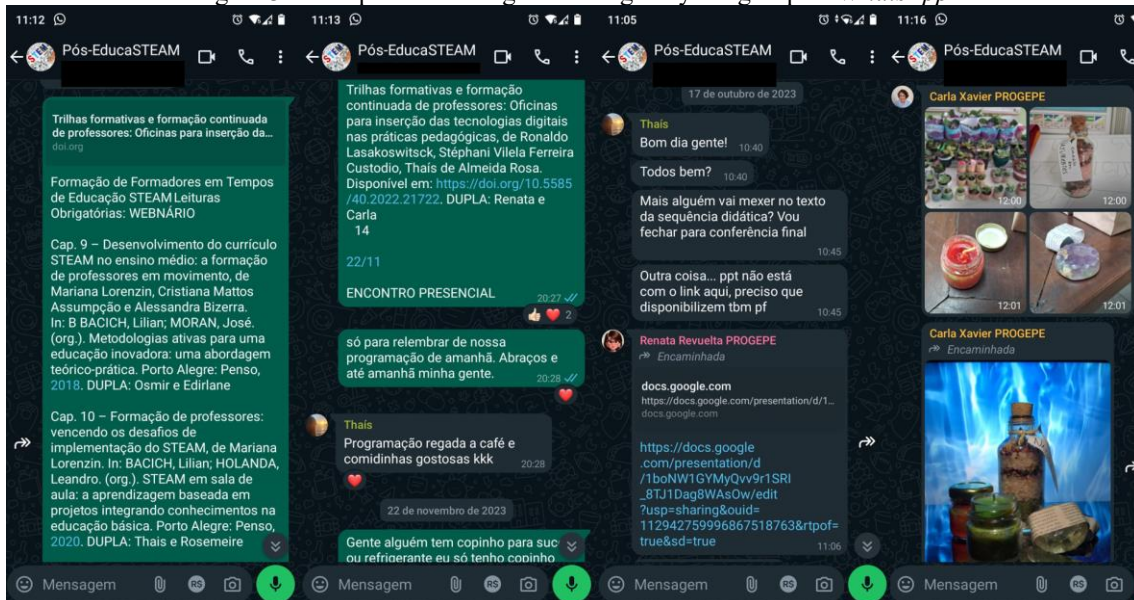
Figure 2: Examples of Moodle virtual environment interfaces.



Source: Personal Collection of the Authors.

Another resource used as an asynchronous space was the WhatsApp communication application. As everyone involved had access to the application by *smartphone* or *desktop* computer (or *notebook*), a messaging group was created on *WhatsApp*. In this environment, the mediator teacher shared documents and *links*, proposing and monitoring tasks and communicated with the group, both collectively and individually.

Figure 3: Examples of messages exchanged by the group on *WhatsApp*.



Source: Personal Collection of the Authors.

There was also the exchange of complementary materials between the graduate students in this space, other reports of experiences they were developing in their classrooms, in addition to those



shared on *Google Meet* and requests for support from colleagues for the development of some proposed activities.

Finally, the *online meetings* sometimes took place synchronously and sometimes asynchronously, taking place through different environments – *Google Meet*, *Moodle* and *WhatsApp*, which expanded the opportunities for dialogue, as well as the construction of new knowledge, skills and abilities, essential for teacher training in times of STEAM Education.

FACE-TO-FACE MEETINGS

In the time allocated to face-to-face meetings, preference was given to practical activities, such as the face-to-face workshops entitled "Basics of Educational Robotics" and "The construction of terrariums in a perspective of STEAM projects", carried out as part of the graduate program. They were conceived with the purpose of providing the participants of the disciplines with the construction of new knowledge, especially with regard to the design and implementation of STEAM projects in the context of Basic Education. This initiative aimed to allow teachers in training a practical experience of the principles they wish to apply in their pedagogical practices with their students.

It was expected that graduate students could experience, in their own training process, what they want to apply to their students in the future. For the dissemination of the STEAM approach to be effective in educational institutions, it is believed to be essential that teachers ponder these concepts, promote dialogues among peers and experience, in a practical way, the planning and development of STEAM activities. In this way, they will be able to acquire, in a more significant way, theoretical and practical subsidies to conceive and implement new practices capable of positively impacting the educational environment, mobilizing their inventiveness, previous baggage of knowledge and establishing partnerships, both internal and external to the school.

In this sense, the focus is not restricted to the mere transmission of content, but encompasses methodological and didactic aspects. It is crucial to understand that the integration of the STEAM approach to pedagogical practices, through active methodologies such as Project-Based Learning (PBL), requires a deep understanding and experience of these methodologies throughout the training process. This implies recognizing a continuous process of knowledge construction that goes beyond the mere assimilation of concepts in the classroom, training professionals to deal with emerging challenges, based on everyday situations in the school context, transcending the traditional boundaries of school disciplines.

In the first workshop, called **Basics of Educational Robotics**, the construction and programming of small prototypes of simple robots was proposed, using educational robotics kits and scrap electronic components. The objective of this workshop was to lead graduate students to learn about the principles of educational robotics, with basic concepts of Arduino programming, promoting



the reuse of electronic materials that have already been discarded. The trainer presented the available materials, the basic principles of assembly and the initial programming commands. Participants were challenged to create prototypes of simple robots and perform some basic movement commands. During the process of exploration in the construction of robots, the workshop participants experienced sensations and difficulties analogous to those of students when exposed to similar situations. This experience provided graduate students with a reflective opportunity on how they can mitigate certain challenges or facilitate others, in a more didactic and effective way, in the context of training aligned with the STEAM approach and PBL.

In the second workshop, called **The Construction of Terrariums in a STEAM Project Perspective**, the focus was to teach concepts of basic electronics and Biology. With basic gardening materials and remains of electronic devices, the graduate students should set up a terrarium with internal lighting in a glass jar. It was discussed during the assembly how it would be possible to create this environment, the terrarium, so that the vegetation there could stay alive even with the pot closed for months. After the resumption of the basic concepts regarding the maintenance of life indoors, master's and doctoral students were able to set up their own terrarium in the glass jars. Next, they were challenged to develop the electronic circuits that would allow lighting the inside of the pot. The workshop mediator taught the basic concepts of assembling electronic circuits for the installation of a small LED lamp. The activity of building the terrarium, together with the use of technology, fostered a reflection and dialogue among the participants about the adoption of diversified investigative approaches in the classroom, exemplified by the terrarium, and the potential contribution of this approach to the construction of scientific knowledge in the context of Basic Education. In this way, the learning objectives were achieved effectively, establishing throughout this educational experience a connection between different areas of knowledge, such as electronics and Biology.

DISCUSSION OF THE RESULTS

Based on the experience portrayed in this study, the graduate students were asked to prepare a Reflective Memorial at the end of the semester, of six participants, five of whom gave their testimonies about the experience lived. This Memorial was organized in *Google Forms* with 12 essay questions, but the data issued only in the questions indicated in the table below are presented and discussed. It is worth explaining that the testimonies shared in the table were chosen to exemplify the answers of the graduate students issued for each question presented.

Chart 1 – Excerpts from the answers.

Questions	Testimonials
<p>- What have you learned or would you highlight as new in this discipline?</p>	<p><i>The very way the discipline was offered was very productive, in the hybrid form. We were able to exercise the various tools for hybrid teaching via the meeting platform and the MOODLE system. In addition, the discussion and practice of the STEAM approach was very enriching. We were able to study the most relevant authors, elaborate and apply a project. It was great. We learned a lot about the STEAM approach, about active methodologies and project-based learning.</i></p> <p><i>The novelty was to have other people collaborating in the activities.</i></p>
<p>- Regarding the use of virtual environments: Moodle, WhatsApp and Google Meet in the context of the course, offered this semester, what would you have to say? Any specific suggestions? In your perception, what were the contributions of each of these technologies adopted in the course?</p>	<p><i>The combination of WhatsApp, Google Meet and Moodle tools is the perfect combination for hybrid teaching. The Moodle environment is great for creating centred activities, discussions and depositing materials. Google Meet is the best video conferencing system available on the market. It allows meetings in a fast and intuitive way, including the use of presentations, chat and screen sharing. For daily and dynamic communication, WhatsApp is the perfect tool. Enables real-time integration, for any decision-making and urgent notice.</i></p> <p><i>WhatsApp for me was the most perfect tool, with synchronous and asynchronous interaction and immediate mediation. Google Meet was an efficient facilitator for synchronous meetings.</i></p> <p><i>Google Meet was a productive tool for collaborative work and it worked well. But WhatsApp was the one that most sustained the group's dynamics. I found the participation and interaction of the whole group through WhatsApp and Google Meet fantastic, however Moodle was less used, due to the delay in accessing and writing. The other means were faster and more dynamic and this greatly facilitated our communication and interaction with the group.</i></p> <p><i>Moodle, in my view, was the most "static" tool in the process, which despite being dynamic did not allow us to interact in real time, it was more "bureaucratic".</i></p>
<p>- Regarding the theme PROJECTS and STEAM APPROACH as guiding elements of the discipline this semester, did it make sense to you as a professor and/or researcher?</p>	<p><i>Yes. It made a lot of sense to discuss the project theme in the STEAM approach. With the support of the texts of the author Lilian Bacich and other collaborators, we were able to have the basis to better understand the topic of STEAM, with its advantages and challenges. Among several topics, one chapter in particular drew my attention to the need to reflect on the use of technologies in the classroom. By inserting technologies into the class, we cannot act only to meet market demands. We need to use technological resources as a means of emancipating students and not of reproducing practices of unbridled consumption.</i></p> <p><i>Yes. It made a lot of sense to me to use both the Projects and the STEAM approach, because I do not believe in the effective construction of knowledge from traditional methods, because they do not make the student the protagonist of their learning and in this way, in addition to not achieving the best results, they make learning unattractive to students.</i></p>

Source: Personal Collection of the Authors.

In the answers given by the participants, it was evident that the proposal of hybrid format activities was very well received by the graduate students. The interactivity and collaborative nature of the activities were mentioned several times as a positive point.

The use of *Google Meet* in combination with *WhatsApp* was also praised, as they allowed interaction during classes. Especially through *WhatsApp*, the graduate students and the mediator professor were able throughout the week to clarify doubts and share extra materials to support synchronous dialogues. It was also evidenced that the possibilities of immediate interaction and ease of access made the *WhatsApp* environment essential for communication, to the detriment of the

Moodle environment, which was considered "more static and bureaucratic". However, it is important to highlight that *Moodle* has several resources that contribute to the teaching and learning process in the different teaching modalities (distance, hybrid and face-to-face), as it can be used to provide the educational process in its entirety or just be used as a support. In the case of the experience reported in this article, this virtual environment was adopted for asynchronous dialogues between participants about the proposed readings, prior to synchronous and face-to-face meetings, a dynamic that was new to some.

In this scenario, it is important to consider the specificity of each platform adopted, its potentialities and possibilities of contribution to the proposed training process. The integration of various technologies is not so simple, it requires participants to be open to knowing and experimenting with new ways of learning. In addition, it implies the commitment, engagement and time management of all those involved to move between the spaces created, making the most of the resources adopted in the training.

The option for PBL and the STEAM approach, with its practical development, to the detriment of more traditional methods, was praised, as it motivated collaboration and protagonism. According to Bacich and Holanda (2020, p 11): "As a way to stimulate autonomy and protagonism, it is necessary to give space for students to choose what they will produce and how to do it".

These notes indicate that the integrated use of digital technologies, including mobile devices, can increasingly become a great ally of training processes aimed at teachers, due to the ease of access and agility in interaction.

FINAL CONSIDERATIONS

It is believed that the training triggered through multiple teaching modalities may have facilitated the acquisition of theoretical and practical knowledge by teachers in training, enabling them to reproduce, improve and innovate, thus expanding this knowledge beyond what was acquired, incorporating them into playful, diversified and interdisciplinary activities in their respective places of school activity.

From the training made possible in various environments and modalities, it was also possible to contribute to teacher training regarding the STEAM approach and Project-Based Learning (PBL), as a strategy to promote a pedagogical practice that stimulates the exploration of new methodologies for project development in the context of Basic Education. It was evident that PBL has the potential to improve cognitive development, by providing those involved with the opportunity to face real problems and seek multiple solutions to the challenges presented.

It is imperative that the teacher learns to teach in this new paradigm, which requires understanding how his students learn. This implies abandoning outdated conceptions, such as the



idea that the teacher is the only holder of knowledge, and adopting a posture that recognizes the joint construction of knowledge, in a constant process of transformation, adaptation and study, which are fundamental for effective and meaningful learning.

In this way, it seeks to extract from this experience and future practices principles that support the design, planning and implementation of public policies aimed at the creation of specific programs of continuing and in-service training for teachers, considering the introduction of STEAM Projects in Basic Education, including Technical Education Integrated to High School, through innovative methodologies for active learning, creative, sustainable and aligned with the emerging demands of Digital Culture.

THANKS

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Reflections on medicalization in education: Perspectives of school psychology and human rights

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ABSTRACT

The phenomenon of medicalization in education has been a growing concern due to the increase in diagnoses and the use of medications among school-age children. The medicalization of school life often results in a reductionist approach, ignoring the social, political, and cultural factors that influence student learning and behavior. In addition, medicalization can lead to exclusion, labeling and treating students differently, reinforcing stigmas and isolating them from their peers.

The formulation of generalized diagnoses, based on standardized and widely disseminated symptoms, can disregard the individual particularities of children, their environment and the issues that involve them during the process of development in childhood. School medicalization, which connects neurological problems to school failure or inappropriate behavior, has become common in schools and health services.

To address this issue in a more conscious and equitable way, it is essential to adopt a broader and more contextualized perspective, considering the social, political, and cultural aspects that influence the teaching-learning process. Promoting inclusive education, which respects diversity and human rights, is essential to ensure a healthy and welcoming school environment for all students. Critical reflection on medicalization in education is an important step towards more conscious and equitable pedagogical practices.

According to this, this work proposes an in-depth investigation on medicalization in education, in order to provide a critical analysis to deal with the challenges arising from this phenomenon. By adopting a critical and interdisciplinary approach, it seeks not only to understand the causes and consequences of medicalization, but also to promote a more inclusive and rights-based education, which meets the needs of students in a more comprehensive and contextualized way.

Keywords: Medicalization, Education, School Psychology, Human Rights.

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INTRODUCTION

The growing trend of medicalization in education has raised concerns about its impact on students and the school environment. The widespread medicalization of issues in the educational environment has led to an increase in diagnoses and medication use among school-age children. This phenomenon not only influences individual students but also has broad social, political, and educational implications. Understanding the latent factors that drive medicalization in schools can contribute to the development of strategies that promote the well-being of students and, in this way, obtain positive learning results.

The main objective of this study was to analyze the impact of medicalization on the educational scenario, with a specific focus on the role of school psychology and human rights. By examining the complex interplay between medicalization, education, and human rights, we seek to contribute to an understanding of the challenges associated with this phenomenon. And in this sense, this research aims to advocate for a more inclusive and rights-based approach to meeting the needs of students in educational settings.

Historical-Cultural Psychology addresses the issue of the medicalization of childhood and its impact on child development, overcoming reductionist views that explain the phenomenon in an individualistic and biologizing way. Using fundamental concepts of this approach, which understand the structuring of the psyche as a biological-social unit, we sought to problematize the biological reductionism of the conceptions that sustain the growing medicalization.

The problem of the medicalization of childhood has been the subject of national and international debate, especially due to the growing use of controlled medication in increasingly younger children. This question raises questions about the broadening of the spectrum of psychiatric disorders and pathologies, which have been addressed both in the scientific field and in mass communication vehicles.

METHODOLOGY

In order to achieve the proposed objectives, this research adopted the qualitative research method. Searches were carried out in academic databases, such as SCIELO and REDALYC, using the keywords: medicalization, school psychology, education and human rights. The selection of materials was guided by relevance to the proposed discussion, with emphasis on studies that addressed medicalization in education from a critical perspective.

The research methodology proposes a qualitative analysis, where the researcher aims to analyze, interpret and identify the hidden and/or distorted meanings present in his research object. According to Chizzotti (2003, p. 221), "[...] the term qualitative implies a dense sharing with people,

facts and places that constitute objects of research, to extract from this interaction the visible and latent meanings that are only perceptible to sensitive attention [...]"

It aims, according to Lüdke and André (1986), to discover and interpret the phenomena, to clarify a situation based on the awareness of the problems and the conditions that produced them, to study the meaning and intentions of human actions with the objective of elaborating means and strategies in order to propose interference when it is not satisfactory or even to change conditions perceived as transformable.

The analysis of the data collected in the chosen texts aimed to identify patterns, trends and emerging challenges related to medicalization in education. In this way, we sought to obtain a broad and contextualized understanding of the phenomenon of medicalization in the educational environment. This interpretative approach allowed the extraction of visible and latent meanings, contributing to the elaboration of strategies and interventions that can promote positive changes in the conditions perceived as transformable in the context of medicalization in education.

THEORETICAL FRAMEWORK

THE CONCEPT OF MEDICALIZATION

According to Moysés (2001), medicalization is the process through which problems that are part of the daily life of the subjects are transferred to the medical field, that is, phenomena that can be understood from a social and political genesis, come to be seen only from a biological origin, and that are specific to each individual.

When we understand children's psychic development as natural, eminently biological, that is, when we do not understand the child as a "social being" from birth, there is room for pathologization and consequent medicalization of any alteration that presents itself in its development, taking it as of an individual/biological order. (Franco; Mendonça and Tuleski, 2020)

In this way, children and adolescents start to receive diagnoses more frequently and the treatment is mostly medication. We cannot fail to observe that such a situation is highly advantageous for the pharmaceutical industry, which is constantly growing worldwide, and corresponds to the ideals of productivity of contemporary society, as it offers the illusion that a good part of the complex human problems can be solved by ingesting a few pills. (Decotelli; Bohrer, and Bicalho, 2013).

But it is not, of course, a question of criticizing medication for diseases, nor of denying the biological basis of human behavior. What is defended is a firm opposition to attempts to transform existential problems into pathological symptoms or to explain human subjectivity exclusively through organic aspects. (Meira, 2012)

HISTORICAL-CULTURAL PSYCHOLOGY

This perspective defends the importance of theoretically grounded teaching, which promotes human development, highlighting social relations and the appropriation of culture as fundamental aspects for the constitution and development of children. Therefore, Historical-Cultural Psychology emphasizes the importance of considering the social, cultural, and historical context in which children are inserted when analyzing issues related to the medicalization of childhood and its impacts on child development. (Franco; Mendonça and Tuleski, 2020)

According to the approach, the cultural development of the child is influenced by two lines, the biological and the cultural, which are intertwined during the process of child development. Vygotsky highlights the importance of interactions and intercorrelations between these two levels of development, forming a complex system in a dialectical way. In addition, the Law of General Genetics of development, according to Vygotsky, highlights the importance of higher psychic functions, such as voluntary attention and logical reasoning, which have a social origin and are internalized throughout the child's life, structuring his personality. (Franco; Mendonça and Tuleski, 2020)

RESULTS AND DISCUSSION

STUDIES IN THE AREA

There are no studies in Brazil that map the number of children diagnosed and medicalized. On the other hand, in an unsystematic way, we have observed in the last three decades an increase in the number of children referred by schools, from an early age, for various types of specialized care, such as psychotherapy, speech therapy, neurology, psychiatry and psychopedagogy, due to learning disorders. Many of these children receive diagnoses and have the use of controlled medication as a therapeutic indication. (Franco; Mendonça and Tuleski, 2020)

Moysés (2001) has highlighted in his studies several manifestations of this process of biologization. Research carried out by the author shows that both health and education professionals unanimously attribute learning problems at school to biological causes. According to the author, these "explanations", repeated incessantly and frequently evoked as consecrated scientific truths, focus predominantly in reality on two major themes: malnutrition and neurological dysfunctions.

According to **Meira (2012)** this 'epidemic' of diagnoses results in a corresponding 'epidemic' of treatments, many of which are highly harmful to health, especially when they are not really necessary.

This can be verified from the results of the multicenter research carried out by Franco; Tabuti and Tuleski, published in 2021, which sought, through its studies, to provide situations for the implementation of actions aimed at equipping professionals from different areas who work with

children diagnosed with learning disorders from 36 regional education centers in the state of Paraná. A total of 893 children participated in the study. And of this total, the results indicate that 812 children consume controlled drugs and 87 children (10.7%) use two or more controlled drugs in combination.

The research data showed that in the first cycle of Elementary School, of the 87 children who use drug associations, 4 of them are at serious risk of suffering the effects of drug interactions caused by drug associations, not to mention the side and unwanted effects, of which one can even highlight chemical dependence, physical and psychic substances. Thus, the fact that having medication as the only treatment resource does not promote psychic development and much less learning is highlighted. (Franco; Tabuti and Tuleski, 2021)

According to the authors, the possible consequences identified in the study in relation to the use of multiple controlled drugs in children include the risk of drug interactions that can create deep marks throughout the adult life of these individuals. In this sense, the authors warn of the danger of these interactions and highlight the importance of considering the long-term impacts of the use of drug combinations in children at such a young age.

The drugs most commonly used in combination by the children in Franco's study; Tabuti and Tuleski were: association of a stimulant (methylphenidate) with an antipsychotic (risperidone), being used by 38 children; association of a stimulant (methylphenidate), an antipsychotic (risperidone or chlorpromazine) and an antidepressant, used by 5 children; The association of antipsychotic (duplicate), anticonvulsant and anxiolytic, being used by two children, with the fifth substance being a stimulant for one child and another anticonvulsant for the other.

The main diagnoses made in the first grades of Elementary School, according to the document, are related to Attention Deficit Hyperactivity Disorder (ADHD). This diagnosis is commonly repeated in the findings of Early Childhood Education, indicating a continuity in the identification of this disorder throughout the first stages of formal education. It is important to note that ADHD is one of the most commonly diagnosed disorders in children and can lead to prescriptions for psychotropic medications. (Franco; Mendonça and Tuleski, 2021)

The authors explain that the increase in the diagnosis of children with ADHD in the early grades of elementary school is related to the complexity of the cultural skills that children need to acquire at this stage, such as writing and arithmetic. These skills require a reorganization of children's behavior and psychic functions at a more advanced level, which can lead to difficulties in the learning process. In addition, it is highlighted that the education of conduct through school content is being replaced by a pharmacological approach, evidencing a trend of medicalization in the school environment. This is corroborated by the data presented on the most frequent diagnoses and



the most prescribed medications in the initial grades of Elementary School, where ADHD and Ritalin are predominant.

SCHOOL MEDICALIZATION AND THE VIOLATION OF RIGHTS

The discourse that connects neurological problems to school failure or inappropriate behavior, according to school standards, has become increasingly frequent in the daily life of schools and in public and private health services, which receive large contingents of students with school complaints.

From this perspective, it is considered that children have school difficulties due to neurological dysfunctions or disorders (congenital or caused by injuries or chemical agents), which interfere in areas considered prerequisites for learning, such as: perception and processing of information, use of cognitive strategies, motor skills, attention, language, mathematical reasoning, social skills, among others. (Meira, 2012)

The medicalization of school life has been common among children who exhibit behaviors that diverge from those expected by the school, resulting in an epidemic of diagnoses and a significant increase in the use of medications by school-age children and adolescents. The phenomenon of medicalization goes beyond the simple prescription of drugs, also involving social, political, and educational issues. (Meira, 2012)

We can identify the main problem in the way the diagnosis is formulated. By generalizing symptoms through their systematization and wide dissemination, one loses concern with what is really happening to the child, their environment and the issues that involve them during the long process of development in childhood. The list of symptoms – which is external and disregards the particularities of the individuals involved – facilitates the diagnosis, which can even be suggested by parents and teachers, for example. Diagnosing is no longer a clinical problem and becomes the definitive solution: parents believe they know what the child has, the school has a label for the problem-situation he/she faces (different from the standard student) and the psychiatrist or neurologist (often confused nowadays) can opt for drug treatment, easily supported by the pharmaceutical industry. which expands the supply of medications indicated for the most common symptoms. (Bernardino, 2010)

Medicalization and school exclusion are two critical phenomena that intersect, influencing the educational and social trajectory of many students, particularly those from vulnerable groups. When the challenges faced by students are interpreted predominantly as medical problems, it can lead to a reductionist approach that ignores the broader context of their lives. This medical perspective often fails to recognize how external factors—such as poverty, racism, and unequal access to resources—impact student learning and behavior. Additionally, medicalization can lead to a form of exclusion,



where students are labeled and treated differently, reinforcing stigmas and isolating them from their peers.

Although many children are able to attend school, this does not mean that they are having full access to their rights as students. Impeding attitudes such as discrimination, social distancing, disrespectful relationships, unequal distribution of affection, aggression, Eurocentrism in academic content, vexatious police approaches, and threats represent violations of the basic rights provided for by the ECA. It is exactly this type of violation of rights to which we refer, and which also influences the formation of subjectivities in these spaces. (Moukachar and Paula, 2021)

Exclusion represents a form of violation of several rights established by Brazilian law and results in the creation of individuals subject to oppression, alienation and exclusion. On the other hand, inclusion is the fulfillment of these rights and results in the formation of citizens with rights and responsibilities, integrated into the society to which they belong.

FINAL CONSIDERATIONS

Through this study, we can infer a criticism of medicalization, for reducing broad issues to explanations circumscribed to the domain of medicine, ignoring social, cultural and educational aspects involved in child development.

To face this problem, it is essential to promote the training of education and health professionals to identify and deal with learning difficulties in a more comprehensive way, considering social, emotional and cognitive aspects. In addition, it is essential to encourage the creation of spaces for discussion between different sectors, aiming at prevention and adequate monitoring of children without resorting to medication indiscriminately.

Investing in educational practices that value children's development, considering the social and cultural context, can contribute to more integrated school environments, and consequently a decrease in drug solutions, non-drug alternatives, such as educational and psychosocial interventions, should be prioritized to meet children's learning needs, avoiding excessive medicalization and its possible long-term impacts.

The critical analysis of medicalization in education evidenced the need to rethink school practices and discourses that tend to pathologize behavioral and learning issues. Medicalization, by shifting complex problems of daily school life to the medical field, can negatively impact the development of students and reinforce educational inequalities.

In this sense, it is essential to adopt a broader and contextualized approach, considering the social, political, and cultural aspects that influence the teaching-learning process. Promoting a more inclusive education, which respects diversity and human rights, is essential to ensure a healthy and




welcoming school environment for all students. Critical reflection on medicalization in education is an important step towards more conscious and equitable pedagogical practices.



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Art, transdisciplinary education and spirituality: Music and vibrational therapy in formation

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ABSTRACT

The research presented has as its theme art, transdisciplinary education and spirituality, its relationship with music and vibrational therapy in the formation of the reader of elementary school, basic education. The general objective of the research is to understand and verify how music and vibrational therapy are constituted from transdisciplinarity and spirituality as a proposal for the formation of the reader in basic education, more specifically, in elementary school. The research is qualitative and exploratory, it consists of a transdisciplinary approach, based on bibliographic studies and activities with music education and vibrational therapy, Aesthetic Experiences (Parode, 2004), made possible by the educator and music therapist in elementary school in a municipal school in Porto Alegre/RS. In order to delimit the field of research and to account for it and the analysis of data produced with this theme, the searches, investigations, and observations took place from March 2022 to March 2023. To obtain the research data, websites, Google articles, Google Scholar, books, theses and dissertations were investigated. Some references such as Parode (2004, 2007, 2010, 2019), Nicolescu (2001, 2002), Morin (2000, 2001), Freire (1996), Capra (2008), and others were punctual for the execution of the research. The theoretical-practical articulation of the research occurred, at first, with the bibliographic survey and then from the execution of practical activities of Music and Vibrational Therapy over a period of one year (2023) with students from the Gilberto Jorge Municipal Elementary School located in the south zone of POA/RS. From this study it is possible to affirm that art with its multiple artistic languages, Music and Vibrational Therapy that constitute a transdisciplinary education approach are fundamental in the process of education and formation of the reader in elementary school, since they provide knowledge, knowledge, the awakening of creativity, creative processes, of the imagination through the Education of the Sensitive (Parode, 2004)), the development of sensitivity and human development from childhood, in addition, that transdisciplinarity as an approach that is between, through and beyond the discipline, a paradigm that transcends the Cartesian and linear vision, the traditional model of education, effectively and directly linked to life, enables an education for the Wholeness of the Being (Parode, 2004) and expansion of its consciousness. The research also found that the spirituality worked on in the formation of children, by a systemic pedagogy in elementary school, is a process that can imply an aesthetic, ethical and epistemological posture of commitment to the truth of the Being throughout its evolutionary journey, being able to generate adult beings no longer with a shallow, anthropocentric vision, but with a vision of deep ecology (Capra, 2008), so urgent and necessary in contemporary times.

Keywords: Art, Transdisciplinary Education, Spirituality, Music, Training.

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INTRODUCTION

The research presented has as its theme art, transdisciplinary education and spirituality, highlighting its relationship with music and vibrational therapy in the formation of basic education, more specifically, elementary school.

In search of answers to the questions, the General Objective of the exploratory qualitative research is to understand how art, transdisciplinarity and spirituality can contribute to the formation of the elementary school reader, from a project with music and vibrational therapy through an interdisciplinary, multidisciplinary and transdisciplinary education approach in basic education. The specific objectives were to verify, through experiential activities, how music and vibrational therapy can generate knowledge and knowledge, instigate the creativity and development of children and young people in training;

Contemporaneity presents a time of great challenges in all sectors, art is one of the ways to overcome these daily and school challenges. Contemporary education, which according to Parode (2004), still perseveres in most schools, is constituted from the traditional, Cartesian and linear model, education that practically does not use projects, rare exceptions, nor art resources, much less therapy, often not considering the importance of interdisciplinarity and transdisciplinarity in the teaching and training of children, young people and adults. In this sense, it does not account for the challenges that are presented in the educational process as a whole, nor in its relationship with society and culture, thus, music and vibrational therapy can constitute a transdisciplinary education project in the formation of the reader of basic education, especially in elementary school where children are in the process of formation.

For an education that is more consistent with these new challenges of today, it is important to consider the emergence of a new paradigm, certainly, one that is based on transdisciplinarity (PARODE, 2019). I perceive the need and importance of art, transdisciplinary education and spirituality, and these related to other areas of knowledge and knowledge, providing opportunities in the teaching action, reflections, thoughts on the basis of the multidimensional philosophy Parode (2010), for an education that generates the wholeness of the Being, which makes it possible through its theoretical-practical methodologies, to work on the body, the mind, emotions and spirit of children, young people and adults.

It is also important to consider that in this transition of paradigms, teachers also need to go through many training courses that allow self-knowledge and self-transformation, so that there is a change in pattern and for a transformation in the teaching processes to occur, which will certainly impact the entire educational, social and cultural process. Initially, we believe that we need to develop our human side and that for this it is necessary to work on self-knowledge and self-training, so that we can find ways to be able to lead students. To lead them, to support them to trace a path,



also, of balance between knowledge and self-knowledge, and for this art, more specifically, in this case, Music and Vibrational Therapy point to countless possibilities, proposals, projects that provide opportunities for the development of knowledge, creativity, imagination, creative processes that instigate thoughts, reflections and actions in the approach to transdisciplinarity.

It was with this intention that we started this study, from a journey as art educators and as a music therapist over a year at the Gilberto Jorge Municipal Elementary School in POA/RS, in order to understand the theme, the research problem, referring to the issue of art, transdisciplinarity and spirituality, and its relationship with music and therapy in the formation of the reader, the use of art, more specifically, music, the articulation of art with education, which provides for the Education of the sensitive (Parode, 2004), through the approach of transdisciplinarity (NICOLESCU, 2001).

Thus, the exploratory qualitative research, with a transdisciplinary approach, was carried out at first, seeking bibliographic data on websites, articles, dissertations, theses, books, in order to highlight, understand and justify the importance of the theme presented, in addition, the process was developed in the classroom, at the Municipal School of Elementary Education Gilberto Jorge in Porto Alegre/RS, with elementary school classes. In any case, it was necessary to delimit the focus of the research, and, in order to deepen the study and theoretical-practical understanding of the process, the research took place from the search for bibliographic references on Google, on Google Scholar, considering the year from March 2022 to 2023. After obtaining the research data, articulated from the theoretical-practical relationship and analyzing the results, we highlight the importance of art, transdisciplinarity and spirituality in the formation of basic education, more specifically, elementary school.

ART

Art, transdisciplinarity and spirituality, and their relationship with music and vibrational therapy in the formation of the reader of basic education is extremely relevant in all phases of the human life cycle, but, essentially, in Elementary School when the child is in the phase of development and formation. According to Amaral () we cannot define art, because there is no closed concept of art throughout the historical process, but we can understand its meaning, art as a universal language that has the ability to transform people and the world around it through creativity, subjectivity, reflection, action, complexity and innovation.

Art and its multiple expressive languages, music, sound, dance, movement, performances, visual arts, performing arts, etc., enables transformations, especially when articulated with life, through its experiential processes, it ends up generating many results. It provides Aesthetic Experiences (Parode, 2004) of renewal and transmutation of forms from the material to the spiritual world, in all instances of the multidimensional world (Parode, 2010). The expression of the soul,



connected with the universe, with the whole, related to the context of our society and culture and other cultures, implies the way we feel life, and art can transform.

To transform the subject and his life and the world around him. As stated by Parode (2004), in his poetry "Life is Art, Art is Life", which appears in the book *Vibrational Aesthetics* – a multidimensional process of Expansion of Consciousness, in addition, when Parode (2004, page 18) states that:

Art as an act, a social and cultural phenomenon related to the totality of human existence, must be committed to the penetration of life and to the metamorphoses of reality.

From the above quote, we can see the relationship that the author establishes between art and life. In addition, when he emphasizes in his work, "*Vibrational Aesthetics*" the importance of art as life and as "Aesthetics", the issue of spirituality in the approach of Science, as well as when he highlights the importance of aesthetics, which indicates the ability of the human being to feel himself and the world as an integrated, interrelated whole.

But, it is also important to highlight that not all artistic processes and projects have the purpose of a deeper, existential and constructive reflection, which the author points out, which establishes this relationship and aims at an improvement, human development, even if they enhance creativity from art, which add knowledge and knowledge for a certain questioning, reflection.

Therefore, relating art to life is paramount, as well as to spirituality, through a transdisciplinary approach that will certainly make all the difference in the education of children, young people and adults in basic education, in addition, in the training of elementary school teachers. The important thing is to transcend the discipline and advance through art, the Education of the Sensitive (PARODE, 2004), education based on multidisciplinary, interdisciplinarity, transdisciplinarity (NICOLESCU, 2001), which generates, through art and spirituality, the "Esthesia", which according to Parode (2004), breaks with the "anesthesia of everyday life", activates the imagination, the creative processes and provides new knowledge and knowledge, as well as the expansion of the consciousness of the Being.

The "Education of the Sensitive" of which Parode (2004) speaks, made possible by art and its multiple expressive languages, provides knowledge and knowledge, the sensitivity of teachers and students, which is so important and which gives us the opportunity as educators to see the needs of students. It is sensitivity that makes us motivate a child to move forward when there is a difficulty in his development and/or learning process, providing teaching and appropriate methodologies for the wholeness of the Being (Parode, 2004).

Art, according to Parode (2004), provides a movement of reversibility between sensible and intelligible, and it is in this movement of expansion of consciousness that it can help in the process of



knowledge and formation, as it enhances the strength of imagination, generating alchemy and the wholeness of the Being. The education of sensibility, according to Duarte Jr. (2001), can take place in the relationship between art and education. According to Parode (2019), in the relationship between art and education, in the transdisciplinary approach, it provides the opportunity for the articulation of multiple intelligences (Gardner, 2002), also, the awakening of different aspects, to the extent that it gives the individual the opportunity to feel one with himself, as well as with the family, with society, culture, one and full with the multiverse. In this sense, it can be understood that through art, education and sensitivity, transformation processes can be generated, in addition, the person can acquire knowledge and wisdom and feel belonging to a spiritual journey. Especially because each Being is on this planetary path in a different way, with a different level of consciousness, and art provides sensitivity in existence, knowledge along with self-knowledge, which brings the necessary connection, an encounter with our soul, with other beings on the planet and with the cosmos.

ART IN EDUCATION, MUSIC, AND VIBRATIONAL THERAPY

Art, transdisciplinarity and spirituality in the view of science, which can be constituted from art in education, from a transdisciplinary education, music and other integrated, articulated arts, performing arts, visuals, dance, performances enhance the strength of the imagination Parode (2010), more specifically, and in this case, music, vibrational therapy in the formation of the reader, of elementary school children, makes it possible to relate aspects of personal searches for improvement. In addition, we can understand this articulated process as part of the construction of identities, generation of knowledge and knowledge, as they are interconnected and promote impacts in the emotional, physical, mental and spiritual spheres. The creative processes (OSTROWER, 2008), arising from the interconnected artistic processes can act concomitantly in the formation of the person, they can be a differential in the formation and conduction of systems and access of students and children.

The practice of music education (BRITO, 2001), musicalization for children, covers and contemplates various aspects of growth and learning. By working on melody, rhythm, intentions, dynamics, different timbres and musical interpretation, we are proposing to children a stimulus to communication, interaction, the development of psychomotor systems, artistic and musical sensitivity, and musical knowledge. This practice seeks to instigate interest in music, communication, stimulating speech and the expression of sounds, babbling, singing and vocal expression, along with body and gestural expression, such as body percussion.

Through these experiences, which can generate Aesthetic Experiences (PARODE, 2004) we can enhance the sensitivity that children already bring with them, inviting them to integrate the musical games and the musical artistic atmosphere. These musical experiences are games, activities



and games that involve singing, music, body expression, drawing, meditation, dramatic games, etc., with the main focus on the development, learning, and participation of the child. Singing, the vocal expression, focused mainly on the exploration, creation and decoding of sounds, is essential for creative development, for the assimilation of the language, and for the process of literacy and literacy, in the same way as the musicality already existing in each child.

Singing makes children reveal their timbres and discover different sound forms through their voices, in a freer and more creative expression of sounds, and the decoding of letters with sounds is developed in a playful and fun way. In the same way as the decoding and resignification of the world that is becoming known, and transformed from the readings, songs and expressions of children, a world that is being read, sung and shared through music education.

According to Soares (2012), "In addition to emphasizing what is being proposed: literacy – the deciphering of linguistic social codes and literacy – the construction of the reading of the world and its real social function", it is also important to highlight the meaning of the word in our daily lives, and the exercise of the spoken voice and the singing voice. Below I quote Bourscheid (2011), who expresses in his text, reflection in this regard, also signaling the mutual development of speech and singing and how one can help the other:

In addition, it is important to question how the work of the spoken voice could contribute to the work of the singer and how the work of singing could help in speech, as well as the importance of the vocal coach in this process. The spoken voice together with the singing voice. Not working on "two different voices". That is, to seek the intersection between the spoken voice, the singing voice, the body, the emotions, all developed together.
(BOURSCHEID, 2011, p. 41)

In the same way that the development of the spoken and sung voice can help in literacy and literacy, the approach also modifies the form of acceptance of what is being proposed, that is, the approach is fundamental to instigate all these linguistic, sound, social, affective and cultural capacities.

Music Education (BRITO, 2001), proposed in an experiential way, conducted by a transdisciplinary approach, allows children to experience the practices, generating their own meanings, sensations, and developing their own affective and social aspects. To facilitate processes of knowledge construction, through transdisciplinary education, as the proposal is to go beyond the disciplines, focusing on the child and their meanings, their rhythm and perceptions.

Enable relaxation and spontaneity in the school environment, reinforcing the fact that the growth process as a whole needs a welcoming environment, for learning experiences and even mistakes. To instigate through music a freer expression, self-expression.

From art in elementary school, transdisciplinarity, through an approach of transdisciplinary education and spirituality articulated with Music and Vibrational Therapy, to provide a freedom of



vocal expression, so that the child and/or the student can know their voice, the sounds they can create, knowing themselves and the emotions that are felt when revealing themselves.

ART IN ELEMENTARY SCHOOL

Regarding elementary education in school, the National Common Curriculum Base (BNCC) establishes knowledge, skills and abilities that all students are expected to develop throughout basic schooling. As defined in the Law of Guidelines and Bases of National Education (LDB, Law No. 9,394/1996), the Base must guide the curricula of all public and private schools of Early Childhood Education, Elementary and High School throughout the country. With the Curricular Guidelines for Basic Education (2013), Art as a subject in Elementary School became mandatory.

The curriculum of the common national base of Elementary Education must mandatorily cover, according to article 26 of the LDB, the study of the Portuguese Language and Mathematics, the knowledge of the physical and natural world and of the social and political reality, especially that of Brazil, as well as the teaching of Art, Physical Education and Religious Education. (BRASIL, 2013, p.114)

Music also becomes a mandatory content in the Art curricular component, as well as the visual arts, theater and dance. Thus, it is expected that the teaching of art in Elementary School, final years, contributes to learning in different languages, in dialogue between them and with other areas of knowledge, proposing to students greater autonomy in artistic experiences.

From all these reflections on teaching in basic education, in the discipline of Art in Elementary School, it shows differentiated demands that teachers are having to deal with. In this sense, what can be seen is that teachers are needing to develop new skills, aptitudes, so that the work as educators is elaborated with more tranquility and harmony. Children bring from home and from their personal lives many problems, anxieties, fears, in addition, many imbalances and prejudices that manifest themselves, so how can we not consider art, music and therapy through a transdisciplinary approach, which is constituted beyond discipline as an act of educating, being totally necessary for pedagogical practice?

The important thing is to mediate the process of knowledge through art, through the Education of the Sensitive (PARODE, 2004), because it is practically impossible to dissociate these emotional and subjective issues from the educational process, as all this is manifested in the daily life of the school, of the classroom. The important thing is to work on the curricular content through art, music with some pedagogical experience. The question is how to make this become a meaningful proposal in the classroom, which provides opportunities for the engagement of students in making music or in doing education.

We realize how much art, music can be transformative as a teaching act. Educational practice that, in our view, should also be therapeutic, because it interferes in the emotions, in the behaviors of



students in the classroom, at school and beyond, which can modify the relationships between students and even with teachers and families. Therefore, art is very important in elementary school for children and young people, as it makes it possible to work on the aspects of the sensitive, the subjective and the intuitive in the "classroom", although, nowadays, it is perceived that this is still a great taboo.

TRANSDISCIPLINARY, INTERDISCIPLINARY, MULTIDISCIPLINARY EDUCATION

Transdisciplinarity, according to Parode (2010), proposes the holistic paradigm of the unity of knowledge, thus contemplating disciplinarity, multidisciplinary and interdisciplinarity. In addition, it is an approach that presupposes a concrete action on reality and that arises precisely from the need to respond to the challenges of this complex world, the problems of the contemporary world. According to Nicolescu (2001), the transdisciplinary approach is the tendency to bring together the disciplines in a totality, in the face of natural phenomena. Establish relationships between disciplines in a common space of exchange, dialogue and integration. Such an approach makes it possible for natural phenomena to be seen from several different perspectives at the same time, generating a holistic view of this phenomenon. But, according to Nicolescu (2001), this holistic understanding does not fit within any discipline, because it is between, through and beyond any discipline.

Morin (2001) states that the great purpose is to stimulate unity in diversity, as opposed to the mistaken tendencies of single thinking, from now on it is up to education to make a transdisciplinary effort, which can break with a unity of method and the accumulation of fragmented knowledge, using a language that seeks formalization and framing, thus unidimensionalizing different dimensions of reality. It is very important to work with methods and methodologies capable of establishing mutual relationships between the parts and the whole, in a complex world and that enable the recognition of human unity and complexity. According to the author, the great purpose is to stimulate unity in diversity, as opposed to the mistaken tendencies of single thinking, education is responsible for a transdisciplinary effort, which can bring together science and humanity and break with the opposition between human being and nature.

ART AND TRANSDISCIPLINARY EDUCATION IN ELEMENTARY SCHOOL

In today's education, in the twenty-first century, we still follow an education structure that was used in the industrial revolution (SACRISTAN, 1998), a fragmented education, based on a disciplinary curriculum. The traditional model of education, based on this logic, according to Parode (2010), needs to be suppressed, as it is based on a paradigm that does not account for the complexity of life and education in the contemporary world, as it is a fragmented, Cartesian and linear model,



which excels only in an education based on the development of cognition, reason, disregarding other aspects, levels of consciousness and human intelligences (PARODE, 2010).

The children of this time are living in a new era, in another time, in a digital, global age, in a networked society, totally "new" in relation to several factors, such as; quantities and varieties of information through access to the internet, with diverse social structures and organizations, a culture reorganized throughout the historical process and at the same time, totally disorganized. A global culture that has been determining new standards and values for the lives of children and all humanity, new conceptions of gender, family, religions, arts and sciences has been taking shape.

We want to say that all the factors of this moment we live in show the complexity and uncertainty of an entire era that is in transformation, in my view necessary for a humanitarian reorganization, which is more consistent with an approach of deep ecology (CAPRA, 1998), which presupposes transdisciplinarity, with a multidimensional approach and a systemic pedagogy, for a holistic, universalist, spiritualist, loving and innovative education, which has been constituted to transcend, according to Parode (2010), the logic of capital, of this materialistic world, where people only think about having, consuming, forgetting the Being, nature, culture and the cosmos, that everything is interconnected like a great network, a web in which life, in its multiple forms of manifestation in different dimensions needs to be respected.

At this moment in life and contemporary education, students and teachers have been facing several challenges, arising from various crises that permeate today's global society, various cultural and social impacts that affect them, referring to the economic sphere, due to the little investment of capital in education, also due to the lack of adequate public policies for the moment, in addition, for a curriculum that is inadequate to the current situation. Another thing that draws our attention are the situations related to the issue of health, both for teachers and children.

When it comes to children, for everything that is not understood about them, their behaviors and sensibilities manifested in the classroom and beyond, such as; hyperactivity, anxieties, fears, autism spectrum disorders, etc., the school presents a diagnosis. This becomes a great challenge for this time of now, for teachers working at this time. Certainly, such challenges are also related to sensitivities that were previously denied or at least not understood by the current system, and that today are at least being detected.

So, we feel the need to work with an education that deals with and observes subjectivities, emotions, and sensibilities, in the construction of knowledge and knowledge of identities, obviously, not denying the cognitive, mental aspects, but all this needs to be worked on by a transdisciplinary approach, in the entirety of the Being (PARODE, 2004), also, we need to highlight the physical aspects, in the training of teachers, children, young people and adults. In addition, ecological, cultural, social aspects, which need to be more worked on in the curriculum, in education, as



everything affects individual and cultural identities that are interconnected and connected with everything and everyone. In this sense, it is urgent and necessary, as Parode states, a transdisciplinary education for the Wholeness of Being (Parode, 2004), which contemplates all the dimensions and all these aspects mentioned, impacting the daily lives of teachers and children in elementary school and also, of young people and adults, at school and beyond it, in school and non-school spaces, in culture and society as a whole.

As educators, we also note the urgency of working from an integrated curriculum (SACRISTAN, 1998), which is multidisciplinary, interdisciplinary, with a transdisciplinary approach, with teachers prepared in their training for this "new" approach, for this "new" paradigm that is configured in transdisciplinarity to account for this "new" time, the time of now, of crises and uncertainties in all sectors of contemporary life, school, education and global culture. It is important to emphasize that it is evident that children and students in general in the daily life of the classroom are signaling this need for changes in this time of transition and transformation.

Freire (2001), in his theory and "Pedagogy of Consciousness" already envisioned the approach of transdisciplinarity, as he emphasized the importance of transcending "banking education", of focusing on knowledge for Literacy, for the construction of citizenship, in this sense, as teachers we would be in a constant process of questioning, questioning ourselves, as every human being should be, for a society that as a whole is learning, And it is a fact that we must be aware of this.

Transdisciplinary education (PARODE, 2004), which contemplates multidisciplinary, interdisciplinarity as a possibility of transforming oneself, of ourselves, which can generate positive access to students, such as the Music and Vibrational Therapy project in elementary school, but which obviously can be expanded to other instances of basic education and higher education. Therefore, in this complex moment in which humanity finds itself, the educational process, it is relevant, important, projects with a transdisciplinary education approach, which actually make it possible to find this union and connection between areas of knowledge and knowledge.

Art, transdisciplinary education, spirituality and Vibrational Therapy can help in the formation of children and young people in elementary school and high school and college. In this sense, it is important to propose activities with music and therapy through a more open approach, where the method is freer, in favor of the process of formation and growth of the child and young person, enabling the formation of the reader, from the reading of texts in a more fluidic, aesthetic, harmonious, balanced and coherent way in this society and culture, providing opportunities for students to build their own meanings consistent with their own trajectory and reality. To read the world, to decode oneself and to be able to write one's life not only between the lines of family, school and society, but in all lines of possibilities, also between the spaces of inequalities, for a new page of



construction of knowledge and knowledge, aligned with the whole and the part, in balance with oneself, with the other and the universe, seeking an improvement in their role in society, and finding joy and lightness in their life as a whole.

SPIRITUALITY

Spirituality in the conception of Parode (2004) is a complex process, which cannot be simplified, nor confused with religious dogmas that are widespread today and that in many cases generate manipulation and alienation of the Being, but a process that enables the interconnection, from the connection of the human energy field, with the cosmic energy field and that in the interrelation of the human and cosmic vibrational fields, spirituality can imply the search for the meaning of Being, healing, renewal, liberation, transmutation of forms for the re-enchantment of living, for understanding the human journey and existence, from the visible to the invisible world, in multidimensions.

In this sense, spirituality for Parode can be constituted from the connection with the "Cosmic Consciousness" (Parode, 2010), from Aesthetics, from the body that feels through "Aesthetics", which breaks with the anesthesia of everyday life, from art, which according to the author, makes it possible to work on spirituality through "transcendence through the sensible", which leads us towards the Education of the Sensitive (PARODE, 2010), to awaken sensitivity, generate Aesthetic Experiences (Parode, 2004), provide opportunities for human development, with a focus on training, self-knowledge, self-training, for self-transformation and expansion of the Being's consciousness.

In this way, spirituality, art and transdisciplinary education, according to Parode (2004), can expand the consciousness of the Being, from an education focused not only on reason, but on the field of the sensible, because the human being, according to the author, is not only reason, but body, emotion, energy that pulsates in various vibrations and dimensions. For the author, the human being has a physical body, but also a Vibrational Body (Parode, 2004), emotions and sensitivity that, if well conducted by spirituality and art, can modify patterns, the way of seeing life and the multiverse.

According to Parode (2019), it is precisely this sensitivity instigated by art, by artistic and creative processes, given from multiple languages and articulated intelligences and spirituality, that the union of self-knowledge with knowledge can occur, which enables us to understand many things, find our place in the world, in society, in culture, which also makes us feel belonging to this universe, Because self-knowledge can also generate more knowledge and knowledge by connecting us with life in its multiple dimensions and forms of manifestations, and consciously, providing opportunities for processes of evolution of our being in multiple aspects and dimensions.

Knowledge articulated with wisdom provides us with advances, leaps of consciousness, according to Parode (2019), show that the paths of the mind are very important and can be sacred, if



articulated not only with the ego, but with the "cosmic consciousness", divine, spiritual, which inhabits our Being and is beyond it, in different vibrations and multidimensions. In addition, the sensibility made possible by Aesthetic Experiences (Parode, 2007), by the connection with spirituality in the "transcendence through the sensible", can also give access to new knowledge, the absorption of new knowledge, in the relationship between the visible and the invisible world, which can also generate for the subjects, a new way of being/being in the world.

According to Parode (2010), we will need to work with art in all areas of knowledge and knowledge, as well as, in all instances of life, with the Education of the Sensitive, an education that was denied by the traditional model in the context of training, but which is important to resignify contemporary educational processes, obviously, without the suppression of the intelligible. In this sense, it is important to develop projects based on transdisciplinarity, projects for children, young people and adults with an approach to transdisciplinary education and spirituality for the awakening of humanity's consciousness. All this to be and be more human, more sensitive, but also rational, in the sense of understanding that it is from this union of sensitivity with reason, from this articulation, from the relationship of mind and heart, from this movement of reversibility, also with intuition, as spiritual intelligence (PARODE, 2019), that we will find the necessary balance for the configuration of a new education, that is focused on transdisciplinarity and better able to deal with the demands of today's elementary school students and children, constantly affected and impacted by this complex world.

FORMATION OF THE READER

To address the issue of education, it is important to highlight that according to Parode (2010), education makes up the human life cycle, that is, it is for life, and that as long as we are alive we will be in formation, training that at first presupposes self-knowledge and self-training. Since reading cannot be understood only as a decoding, according to Koch and Elias (2008), the reader is put in direct contact with the words, in a peculiar way, perceiving the high degree of meaning they preserve. It is also important to consider that reading in the formation of the reader does not occur only through the mastery of the alphabet, codes, images, symbols and written and spoken words that involve literacy, but must imply in the process of literacy of the subject, and the act of reading is constituted by the junction of the subjects with the world, of the interaction of both.

Reading, according to Koch and Elias, enables the interaction of several factors so that there is really the "act of reading", in this sense, we have to consider that it is the reader who attributes meaning to the text, when he processes the information contained in it in a diversified way, on the other hand, it is important to emphasize that reading precedes the word (FREIRE, 1994), hence the subsequent reading of the latter cannot dispense with the continuity of the former, that is, of the



world. Language and reality are dynamically articulated, in this way, the reading of the word cannot fail to consider the knowledge of the world that each reader has from their experiences, life experiences and education. It is also essential to consider the importance of the formation of the reader and the role of the school in the formation of the reader.

METHODOLOGICAL PROCESS

In order to continue with the reflections that the study raised, to understand the theoretical-practical relationship of a theme as complex as this one of the research, it is important to consider the methodological process. Therefore, we opted for qualitative bibliographic and exploratory research that was constituted by a transdisciplinary approach and was configured first, from the survey of bibliographic data collected from March 2022 to March 2023, and for data collection, Google and Google Scholar were used, selected websites and articles related to the theme, as well as books, dissertations and theses. In addition, the student's experience as a teacher in the area of art, music education based on transdisciplinarity, spirituality and Vibrational Therapy with children and young people in elementary school was used. Experiential activities were carried out with Music and Vibrational Therapy to provide Aesthetic Experiences in the formation of the reader of Early Childhood Education and with three classes of 7th grade (30 students), 8th (15 students) and 9th (25 students), at the Gilberto Jorge Municipal School of Elementary Education in the South Zone of Porto Alegre/RS. The results of the research were configured from the theoretical-practical articulation and the data analysis was carried out from the transdisciplinary approach, semiotics and phenomenology of creation (Parode, 2004) from the articulation of thematic axes worked in elementary education; referring to art, transdisciplinarity, spirituality, music, music education and Vibrational Therapy in the formation of elementary school readers. In addition to the axes worked with children and young people in elementary school, the research highlighted in the teaching-learning process, in the formation of the reader, the importance of working with many activities, artistic practices, in addition to music with different artistic and expressive languages, some activities carried out are included in the appendix of this work.

DATA ANALYSIS/ RESEARCH RESULTS

When starting the research to obtain its results, some questions guided the study, such as: Is it possible that art, through its multiple expressive languages, more specifically, music through the Education of the Sensitive (Parode, 2004) generates transformation and personal improvement, modifies the performance of the student and the teacher? How can art and transdisciplinary education act in the process of building knowledge and developing the child? Can spirituality make a difference



in the process of knowledge and formation of the learner and the teacher? How? And if it makes a difference, how and how we see the results as a whole.

Thus, in order to obtain the answers to such questions, at first, we sought theoretical foundations in books, theses, dissertations, articles on websites and to proceed with qualitative research of an exploratory nature and transdisciplinary approach, we sought its meaning, the idea would be to understand its theoretical-practical process to reach the results, and for data analysis three thematic axes were established, Art and Transdisciplinarity - Transdisciplinary Education and Spirituality - Music and Vibrational Therapy in the formation of the reader - In any case, in a second moment, it was necessary to establish the meaning, the importance of art, education, music and spirituality in the formation of the elementary school reader. Soundscapes were carried out, through drawings by the students and creation of soundtracks of these places, for this were carried out the capture of varied sounds, research, singing and vocal creations and other artistic explorations. Some soundscapes produced stories of their routines.

The concept of soundscape was created by music educator Murray Schafer and he believes that knowing how to listen is the center of a good music education, listening to the sounds of everyday life and suddenly even transforming them into music, realizing the importance of the intention we want when producing or performing a sound, a song or soundtrack. The analyses were made through the result of the work, the engagement of the students, and the way they were interested in the creation process. The participation of the students and the changes that were reflected through the classes were observed and verified, considering their speeches and compliments. Each student could be observed individually, each student in his or her process of encounter with Art, with Music and the meaning of knowing himself. Through the approach of transdisciplinary education, we were able to instigate the creative processes of making music, also the therapeutic process, noting that this meeting of music and therapy can generate many possibilities for children and young people in elementary school, as well as provide more creativity, autonomy and the development of the Being.

THE MEANING OF ART, EDUCATION, MUSIC AND SPIRITUALITY IN THE FORMATION OF THE READER

In the classroom with elementary school children, the work option was made in the relationship between art and education, more specifically, relating music to spirituality. There were many activities with vocal expression, focusing mainly on the exploration and search for sounds, precisely because I think it is essential, at first, to instigate the creativity and musicality that already exists in each one. The idea of working on this theme is a search to make children reveal their timbres and discover different sound forms through their voices, from exercises and games where a freer and



more creative expression of sounds was provided, stimulating musical dialogues and developing singing skills and musical content. These types of exercises are significant in the educational formation of a child, young person or adult, for the development of different perceptions and sensations where there is a greater possibility of building a broader and more significant knowledge of musical language and also of contributing to self-knowledge and training.

In this sense, the activities at the Elementary School took place through aesthetic, bodily and symbolic experiences (PARODE, 2004) and games, where the group could experiment with the proposals, generating their own meanings, sensations and creating relationships with the innumerable ramifications that can exist in an experience. In this case, we work with musical content that is articulated with other areas of knowledge, proposals articulated with the "reconnection of knowledge" (Morin, 2001) and a transdisciplinary methodology and approach (Parode, 2007, Nicolescu, 2001). We believe that in this way, the child can apprehend the contents in a more fluidic way and be more creative, expressive and active, in its entirety, from a work of knowing and developing their voice, through activities that will give attention to the creative process, to the discovery of themselves. But, not only because it works on the voice and self-expression of the child and the young person, but because the teacher has to keep an attentive eye, so that in the proposals of experiential activities he contemplates the various aspects of the child, proposing through music, voice and therapy, the self-knowledge of the Wholeness of the Being (Parode, 2004). According to the author Coelho:

The voice is also a code of expression of the soul, as it reveals our deepest impressions through its timbre, its volume, its form of emission, etc. When we work with someone's voice, we put into play their scheme of values, their entire philosophy of life and their entire worldview. (COELHO, 1994, p.11)

In music activities, the musicalization of stories and/or poems enables a greater involvement of children, developing rhythm and movement, through legends and working the imagination through poetry. These proposals aim at an education for sensitivity, and from it a possibility of more harmony and lightness. Babies and children with these activities are captivated and remain attentive, connected and inebriated with singing, with harmonic instruments, such as guitar and keyboard, their rich and complex combination of notes and varied sounds, chords, with interpretations, intentions of musicalization of stories, songs and legends at each children's musicalization class. The rhythm, the desire to imitate the sound with the mouth, the melody, the babblings, the speeches and the lyrics sung and experienced are proposing to every music class, an invitation to a signification and resignification of language, of the culture around us, of our language, of communication as a whole. A dialogue to be made with what is inside us not yet known by the world, and what is in the world,



without being known by us. A dialogue to be made and built by the child, by the young person, generating their meanings, their readings, affecting their Being as a whole.

Music and Multidimensional Vibrational Therapy (Parode, 2010) develop communication and expression and everything that encompasses communicating one's feelings, positions, ideas in the culture and in the family, in the same way, evokes the importance of vocal and musical potential knowledge in oneself, the multiple languages that can and should be developed in an integrated way, in order to reconnect knowledge, capacities and skills, whether emotional, linguistic, affective, spiritual, social and/or cognitive, so that this "reconnection of knowledge" (Morin, 2001) in the teaching process, can help to understand and welcome the student also in this way, in its entirety and complexity, helping their aspects of communicating with the world, with his voice, his music, his language and his meanings. The cognitive and sensitive aspects and sensations, which can generate meanings in the life and formation of the student, in this sense it is important to highlight the Greimasian semiotics:

Greimasian semiotics is based on the idea of perception of sensations, but adds the intelligible character. It is in this relationship between the cognitive and the sensations that the subject accesses the world. Therefore, aesthetics is no longer linked only to beauty, but to aesthetics, that is, to perception through the senses.

The "Esthesia" of which Greimas speaks in his Semiotic theory and Parode (2004) in his theory of Vibrational Aesthetics, is constituted from the senses, from the body that feels in the Aesthetic Experience made possible in the experiential activities provided in the classroom for Elementary School students.

SPIRITUALITY, MUSIC AND VIBRATIONAL THERAPY IN THE FORMATION OF THE READER

The meanings generated through arts activities, music, multiple articulated expressive languages and spirituality and Multidimensional Vibrational Therapy Parode, (2010) can transform a child, a young person and even an adult, in the case of children and young people in elementary school, so that they get to know themselves more and more and find tools to have the ability to know the world in a more harmonious and whole way, to be able to be well with themselves, with society, culture and nature.

The sensations and resignifications that occur from art, in aesthetic, bodily and symbolic experiences (Parode, 2004) with multiple artistic languages, enable this range of interpretations and meeting of meanings, where the student feels belonging, building together, and at the moment this happens, generates a meaning, and in the process of realization, develops as a Being, acquiring capabilities, releasing potentials, skills, self-knowledge and generating new knowledge.



Therefore, it is important to highlight that these artistic and creative processes (OSTROWER, 2008) are constructive for the formation of the Being as a whole, in the sensitive aspects and in the intelligible aspects, providing the opportunity to unite emotionally, cognitively, socially and affectively, and can generate an aesthetic experience for transformation.

The teacher who works with this approach, with this search, understands education as something that can generate plenitude, that can awaken potentials, and its potential can be shared with children and students. As a music educator, I see education as a broad process that can awaken potential, an opportunity for students and educators to reinvent themselves, and from these new interventions and constructions, to be able to generate new looks, knowledge and actions, about ourselves and about this new world that we still want to build. Freire talks about this intervention of teaching in the world.

Teaching requires understanding that education is a form of intervention in the world. Another knowledge that I cannot doubt for a moment in my educational-critical practice is that, as a specifically human experience, education is a form of intervention in the world. (FREIRE, 1996, p.50)

Highlighting what Freire (1996) says about the intervention of teaching, that education is a form of intervention in the world, it is essential to talk a little about the relationship between Music and Vibrational Therapy, as a form of intervention, its importance in the formation of the Reader in elementary school, highlighting mainly music in storytelling. At first, the relationship that exists between music and literature, after all, poems and songs are rhymed lyrics, full of poetry, subjectivity, metaphors and become any type of musical composition. The written word takes another form when it has a sound property, in the sung or spoken voice, a text read or a story told, relate literature/text and music/sound. These languages work together proposing the awakening of imagination and creativity, in order to instigate curiosity in the stories told. Storytelling or a musical story, or even a melodious reading of that story, contain music and with it interpretation, intention and meaning. Taking a book, creating sounds and inviting children to create and produce their sounds for the story, can be a type of storytelling, perhaps a little more informal, but pedagogical I would say, so that children feel comfortable in fact to compose together, creating sounds and putting meaning in them. This creating together and spontaneously is almost as if it were a creative reading, but with the book in hand, also bringing the relevance of the book itself, its illustrations, its format, its importance. According to Bedran:

Telling stories as a pedagogical action is also a stimulus to reading practices. Experiences through narratives are fundamental for the formation of readers, because every listener of a good story that deeply touches their soul makes a run towards the books, thirsty to find in them again imprinted the dream, emotion and affection previously experienced during the "narrate-listen-create". (PG 110)



According to Bedran (2012) it is important to highlight the importance of storytelling as a pedagogical action to stimulate reading practices, as well as to think about the difference between storytelling and educational and creative "reading". A storytelling where the book does not need to be in hand, can already have a more theatrical interpretation or more focused on the presentation, being able to explore other resources, leaving the book aside a little and putting more attention on the story itself. In practice, the difference may be small, but it modifies the approach.

The storytelling makes it possible to develop music, playful activities related to the stories told. And in fact, as obvious as it may seem to talk theoretically about Interdisciplinarity and transdisciplinarity, union of different languages, it is important to develop in a Reading Room, musical activities, but which are also related to reading and that are encouraging reading. This fragmentation of knowledge, of knowledge into disciplines, in my view, hinders the process, which is just the opposite, that of rediscovering in ourselves this integrality that we are, contemplating different areas and experiences. In practice, we believe that children assimilate the story more, when relating some sung game, or song, instruments and didactic materials related to the story. Also, it can give them the opportunity to generate associations with other themes, games and content. Also use drawings after the stories, and all this togetherness, which can add a lot to instigate the interest of children. According to Bedran:

The encounter of the characters and situations that the story contains with the imagination of each child around the teacher-narrator engenders a web, a fabric, a mosaic, revealing expression and creativity. The narrative is a stimulus that generates a diversity of responses within each student, who after hearing, seeing and feeling the story dives into an artistic making enriched with senses, working and creating with numerous materials available (paint, paper, pencil, clay, cloth, seeds, plastic, wood, glue, plaster, newspaper, etc.) (PAG, 109)

So, we can say that storytelling is fundamental for the development of the child, when listening to a story through the characters, having attitudes, values as a reference, developing imagination, and participating in all the culture that surrounds us, and also recreating stories that need to be retold and rebuilt in our society. The child's socio-affective motor development is developed through these other activities related, interconnected and associated with storytelling.

Storytelling is a great tool that awakens the critical and reflective sense not only of children, but of all listeners, and the same text can be interpreted in various ways. It is possible to say that storytelling in the classroom is fun, stimulates the imagination of students and promotes awakening and interest in reading, through the narration of a story it is an exercise in life renewal, a starting point to teach the syllabus to understand what happens to students in the personal field Page 911.

With reading mediation and storytelling, we can see the relationship that exists in storytelling, in the spoken voice, even with interpretations, intonations, along with some song or melody sung during the story, in the middle or at the end. This junction of the song with the story helps to captivate



the children during the unfolding of the story, so, while they follow what happens, they can also enjoy the path, singing until they reach the final outcome. The participation of children singing and creating sounds and voices, makes them also little storytellers, actively acting in the storytelling process, and through playing roles, they can also work on their feelings and postures.

The circle, the practice of oral language, where children can play with words very easily, imitating voices, they start to arouse emotions as if they were living what is narrated to them, the feelings presented allow the child, through imagination, to exercise the ability to solve situations that he lives in his daily life. Page 916.

The child's pleasure of listening to stories also resides in waiting for those repetitions, situations, phrases, formulas. According to Calvino (1990, page 49), children wait for these repetitions, songs and sounds that are schemes that generate curiosity and make them want to hear more and more. This union of languages that takes place in storytelling, also added to interpretation and a certain theatrical performance, and also, thinking of music as the soundtrack of a story, are languages and approaches that we can unite for an engaging reading and/or presentation, which keeps students attentive and curious. Organization is necessary to blend with balance, seeking an appropriate result for each space and intention that exists. Sometimes for a more melodious reading or for a more musical or theatrical story.

FINAL CONSIDERATIONS

From all the experiences in the classroom with elementary school children and young people and theories developed in the research, we can conclude that art articulated with spirituality by a transdisciplinary education approach can indeed be transformative, both for the teacher and for the elementary school student. Spirituality, being seen from a scientific perspective, uniting reason, sensitivity and intuition, promotes growth, a different and necessary human development for this new generation. Thus, what was found is the emergence of an education that transcends the traditional, Cartesian and linear model that is so much talked about in the school corridors, in addition, that education is constituted through art as a transformative act, which can certainly instigate self-transformation.

What was evident in the study is that this approach to emerging education is transdisciplinary, education that is between, through and beyond any discipline, because it is committed to life, to transformative actions, for this very reason it is contagious and emanates enthusiasm through the experiential practices that are constituted by the Education of the Sensitive (Parode, 2004). This enthusiasm is evidenced by learning to learn, learning to be, learning to learn, learning to do and living together, according to the four pillars for education in the twenty-first century (Delors, 2001), which, obviously, is constituted by transdisciplinarity and which, certainly, also proposes



development. So, what was evident with the research is that art is capable of transforming people, consequently, society and culture, when articulated with spirituality, based on transdisciplinarity and transdisciplinary education. Freire already said that it is through love and observation of oneself and the other with sensitivity, that a new teaching practice is possible and this is the great search. We were also able to observe and verify, in classes with elementary school classes, that with the support of spirituality and transdisciplinarity, which make it possible to go beyond discipline, through the proposals of Music and Vibrational Therapy, with storytelling and/or with mediation of readings, it is possible to sensitize children and adolescents and instigate humanity in each one. Spirituality provides this support, of wanting the good and seeking the best for oneself and for all, this vision of interconnection, between human beings, nature and culture, the vision of the "deep ecology" of which he speaks (Capra, 2001), bringing back some of the universal ethical values and principles, which have lately been forgotten. Understanding that well-being, health and the balance between mental, emotional, bodily, spiritual and social issues are very important, relevant in the teaching practice even to acquire more knowledge and knowledge, becoming a training for life, where the experience becomes the individual's life experience and thus generates and provides opportunities for an advance in the family affective sphere, professional and social.

During classes and practices, we all the time deal with the complexity of all these issues that affect children, young people and adults and that manifest themselves in the classroom, from there we can see the importance of art, music and other artistic languages articulated in the formation of elementary school, in short, basic education and even university. As educators, music therapists, and as human beings, we find that these experiences allow us to evolve and continue to build the formation of our being, thus, we observe that this is the path to a calmer and also more coherent, conscious educational practice, that of looking at oneself, enabling constructive readings about teaching and learning, whether they are abstract, intuitive, creative and sensorial readings, but which propose a growth, development and improvement of the soul of the human being. According to Morin (2001), in order to know reality, it is necessary to know the complexity of things, to look at reality in a different way, in a complex way. On the other hand, "it is not enough to know, to know, it has to be", according to Parode (2004), this leads us to the idea that in order to know reality it is not enough to think complex, but to live complexity in the entirety of our being, from our experiences and throughout our existence.




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The curricularization of extension in the context of distance education

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ABSTRACT

Educational practices have evolved over time, above all, due to the challenges faced by educators, who constantly need to combine factors that involve human formation inserted in a context of an imperfect and contradictory society.

Keywords: Distance education, Educators, Human formation.

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INTRODUCTION

Educational practices have evolved over time, above all, due to the challenges faced by educators, who constantly need to combine factors that involve human formation inserted in a context of an imperfect and contradictory society.

From this perspective, the inseparability between teaching, research and extension has been undergoing intense resignification, since the National Education Plan (PNE/MEC - 2014-2024), determined the obligation that at least 10% of curricular credits, in undergraduate courses, be fulfilled in extension activities.

Complying with the provision described in CNE Resolution 7/2018, Higher Education Institutions (HEIs) sought to adapt their Course Pedagogical Projects (PPC), aiming to ensure ways of complying with the extension, through programs, projects, courses, workshops, events and provision of services that impact the local community.

Thus, there is no doubt that the extension curriculum has been an opportunity for higher education institutions to improve the curricular structure and the training of students who opt for distance education, the object of our study. However, there are still challenges in its implementation, especially considering the obligation to comply with the extension practices carried out within the scope of higher education courses in the distance education modality.

This time, through a deductive and bibliographic technique, using, above all, evolutionary data from university extension, the challenges involving the face-to-face integration of university extension will be pointed out, in a region compatible with the face-to-face support center, in which the student is enrolled, concluding, in the end, that hybrid practices are capable of strengthening the interrelationship between teaching, research and extension of higher education courses in distance education.

THE INTERFACE OF UNIVERSITY EXTENSION: CONCEPT AND HISTORICAL EVOLUTION

University extension is an important academic activity developed by higher education institutions, with the objective of promoting interaction between students, professors and the community, seeking to apply the knowledge produced in academia to solve social, economic, cultural and environmental problems.

This interaction can occur through projects, courses, events, programs and the provision of services that involve the participation of students, professors and technicians of the university, as well as members of the external community surrounding the university.

In addition to meeting social needs, it will be possible to personalize teaching-learning, treating students individually who have asymmetric and unequal appropriation of knowledge,



science, and technology, providing improvement and personalized training to deal with complex, real, social and environmental problems.

On the other hand, considering that people are not metaphorically a blank page and learn in a diversified way, university extension can foster the potential and autonomous development of students, placing them in front of a social reality that can be changed, from the practice of their knowledge acquired in life and in the course, that is, The academic community contributes to a just and egalitarian society.

This time, University Extension is considered one of the inseparable functions of the HEI, which aims to promote social development, through the implementation of extension activities, which combine popular knowledge and practices, ensuring the democratic values of respect for the dignity of the human person, non-discrimination, equality and environmental and social sustainability.

University extension is not recent, since there were already reports of its first manifestations in England, in the second half of the century. Evando Mirra (2009) details about this:

The University of Cambridge, in 1871, was probably the first to create a formal program of "extension courses" to be taken by its professors to different regions and segments of society. Starting with Nottingham – the land of Robin Hood – Derby and Leicester, his courses in Literature, Physical Sciences and Political Economy soon garnered a vast clientele and, in a short time, reached all corners of the country. Almost at the same time, another strand emerged in Oxford, with activities conceived as a kind of social movement aimed at pockets of poverty. The first actions took place in London and soon expanded to regions of workers' concentration. Workers in the Northumberland mines, for example, hired a series of history courses in 1883. The century of Pericles was presented in the manufacturing center of Sheffield, Greek tragedy was offered to the coal miners of Newcastle and astronomy classes to the workers of Hampshire (MIRRA, 2009, p.77).

Subsequently, the extension practice spread throughout the European continent, England, Belgium, Germany, reaching the United States, with the *American Society for the Extension of University Teaching*, which boosted extension activities, pioneering, at the University of Chicago, in 1892 (MIRRA, 2009).

Thus, the roots of university extension can be observed at the end of the 23rd century, however, it was from the nineteenth century onwards that higher education institutions began to engage in community service activities, especially in the fields of agriculture, engineering and medicine, focusing on transferring technical knowledge to improve the lives of local communities.

Next, Ana Luiza Cunha (2020) highlights that, during the Popular Education Movement, university extension expanded and, in the 1920s and 1930s, played a fundamental role in the dissemination of knowledge beyond the walls of higher education institutions, through literacy programs, continuing education courses, and community health services.



The consolidation of the extension practice occurred in the post-World War II period, a time when community development programs, technical assistance and professional training became common, fulfilling the mission of HEIs, with a renewed focus on solving social, economic and technological problems.

However, the institutionalization and academic recognition of university extension only occurred in the 1960s and 1970s, when there was the creation of departments or units dedicated exclusively to extension activities, the insertion of specific academic credits, as well as the inclusion of extension courses in university curricula.

In recent decades, university extension has diversified its activities to cover a wide range of areas, including Environmental Education, Human Rights, Social Inclusion, Entrepreneurship, Ethnic-Racial and Gender Relations, among others. In addition, there has been an increase in international collaboration, with outreach projects involving partnerships with institutions and communities around the world.

Currently, there is an increasing emphasis on assessing the impact of university extension activities, as well as promoting the long-term sustainability of projects. This involves measuring the results achieved, actively participating in the beneficiary communities, and developing strategies to ensure continuity of the initiatives.

In summary, university extension has undergone a significant evolution over time, expanding its performance, consolidating its academic status and diversifying its activities to meet the emerging needs of society, believing in the transformation of society, through the responsible exercise of citizenship.

According to Tuttmann, the presence and absence of University Extension are related to each historical moment conditioned by social, economic and political influences, which impacted the role attributed to Higher Education Institutions throughout history. This is because it cannot be forgotten that the HEI is also political and cultural, in many moments, a neoliberal space that privileges research and trains human resources to meet the labor market, in others, it acquires an emancipatory face, as a space of multiple thoughts and plural formations, gaining space as a place of social transformation (TUTTMAN, 2004)

Considering the importance of the theme, it is essential to develop a careful academic program that contemplates university extension, providing for activities that impact the academic life of students, professors and, at the same time, fulfill the mission of the Higher Education Institution to transform the country through education.

In view of the historical context presented, the process of curricularization of extension in the Brazilian education system is verified.



THE CURRICULARIZATION OF EXTENSION IN BRAZIL

Considering Higher Education Institutions as social organizations that follow the evolution and complexity of contemporary society, the importance of their role as didactic-pedagogical mediators between science, technology and society emerges every day.

In fact, it has never been more necessary to reflect on the transformation of science and education than now, in the cybernetic world of the twenty-first century, made up of young people who live with fragmented information available at a click on the internet, however, they carry in their baggage doubts and uncertainties in relation to their professional future.

Although each person is unique and plural, there are behavioral characteristics shared by a generation, which must be considered when planning quality teaching-learning, that is, it is necessary to recognize students in order to propose practical activities that make sense for the academic community.

In this context, there is a growing understanding that research and extension should be part of the daily life of distance higher education courses, placing them at the same level as face-to-face courses. The notion is that the student of the distance course has access to the three areas of activity inherent to higher education institutions, namely, teaching, research and extension, in order to provide opportunities for social experiences that allow putting into practice the theoretical knowledge acquired in academia (CUNHA, 2024)

Following this perspective, Law No. 13,005/2014 approved the National Education Plan (PNE - 2014-2024) and determined guidelines, goals and strategies for Brazilian educational policy, for a period of ten years, specifically establishing, in Goal 12, Strategy 12.7, that higher education institutions must "ensure, at least, 10% (ten percent) of the total curricular credits required for graduation in university extension programs and projects, orienting its action, primarily, to areas of great social relevance" (BRASIL, 2014)

As a result of the provisions of the PNE, Resolution No. 7 of 12/18/2018 CNE/MEC was enacted, defining the guidelines for the Curricularization of Extension in Brazilian Higher Education, by which the following articles stand out, *in verbis*:

Art. 2 The Guidelines for Extension in Brazilian Higher Education regulate the academic activities of Extension of undergraduate courses, in the form of curricular components for the courses, considering them in their aspects that are linked to the training of students, as provided for in the Institutional Development Plans (PDIs), and in the Institutional Political Projects (PPIs) of the educational entities, according to the profile of the graduate, established in the Pedagogical Projects of the Courses (PPCs) and in other specific normative documents.

Sole Paragraph. The Guidelines for Extension in Brazilian Higher Education can also be directed to higher education courses, according to the Pedagogical Political Project (PPP) of the higher education institution.

Article 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 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.

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.

[...]

Article 8. The extension activities, according to their characterization in the political pedagogical projects of the courses, are inserted in the following modalities: programs; projects; courses and workshops; Events; provision of services (NATIONAL COUNCIL OF EDUCATION, 2018).

In this regulatory perspective, University Extension activities have become part of the curricular matrices of undergraduate courses, and can be developed through programs, projects, courses, events, provision of services, advisory services and consultancies in the technical, scientific, artistic, cultural and sports areas, organized in thematic lines that may involve Communication; Culture; Human Rights, Justice; Education; respect for the Environment; Health; Technology, ethical-racial and indigenous relations, Production and Decent Work, among others, which are renewed as Brazilian society develops.

And, for a better development of extension, the PDIs, PPCs and respective normative documents of higher education courses must comply with the provisions of article 2 of the aforementioned Resolution, directly invoking the responsibility of the Structuring Teaching Centers – NDEs and the Course Collegiates, to take the lead in the approval of extension proposals, which make sense for the environment in which they are inserted.

Thus, in compliance with the National Education Plan (PNE) and article 19 of Resolution No. 7/2018 of the National Education Council, as of the first academic semester of 2023, at least one tenth of the workload of the curriculum of Brazilian undergraduate courses must be integrated in the form of extension activities, whether the course is face-to-face or distance learning.

Having demonstrated the regulatory framework of the mandatory extension, we proceed to analyze the compliance with the extension, within the scope of distance higher education courses.

THE EXTENSION DEVELOPED WITHIN THE SCOPE OF HIGHER EDUCATION COURSES IN DISTANCE EDUCATION

Before entering the central theme, it is necessary to make considerations about the concept and impact of distance learning.

Well.

In Brazil, Decree No. 9,057/2017 of the Presidency of the Republic, which regulates article 80 of the Law of Guidelines and Bases of National Education (LDB), conceptualizes distance education in its article 1, *in verbis*:



Distance education is considered to be the educational modality in which the didactic-pedagogical mediation in the teaching and learning processes occurs with the use of information and communication means and technologies, with qualified personnel, with access policies, with compatible monitoring and evaluation, among others, and develops educational activities by students and education professionals who are in different places and times (BRASIL, 2017).

Distance education, therefore, is the educational modality in which teachers and students participate in the teaching-learning process in different places and times, interacting through the most diverse communication technologies.

Such didactic-pedagogical mediation facilitates and makes more flexible access to knowledge, especially by breaking the barrier of geographical and temporal distance between teacher, student and HEI, allowing the student the opportunity to learn at a time and place that best suits him, through the management of technological tools for interaction, such as discussion forums, video classes, glossaries and wikis. among others.

For Hack, the distance learning modality is a way of teaching and learning that provides students who are unable to attend school daily the opportunity to acquire the content that is passed on to students in face-to-face education (HACK, 2024)

Thus, the geographical separation, the logistical ease, the more affordable value of the monthly fee and the freedom to develop asynchronous educational activities, in different places and times, throughout the higher education course, are striking characteristics of distance education, which have led to an exponential growth of the modality.

It should be noted that, according to the Higher Education Census released on October 10, 2023, by the National Institute of Educational Studies and Research Anísio Teixeira – INEP and the Ministry of Education – MEC, the distance education modality had an exponential increase of 288.8% in enrollments, in the period from 2012 to 2022, being present in 3,219 Brazilian municipalities and totaling more than 4 million enrollments in 2022 (4,330,934) (INEP, 2024).

As can be seen, distance education has grown, above all, because it is more accessible and breaks geographical barriers, a circumstance that leads us to seek alternatives on the regulatory determination of face-to-face compliance with the extension workload in distance learning higher education courses.

It should be noted that, according to article 9 of Resolution No. 7/2018 CNE:

In higher education courses, in the distance modality, extension activities must be carried out, in person, in a region compatible with the face-to-face support center, in which the student is enrolled, observing, where applicable, the other regulations, provided for in the proper ordinance for the provision of distance education (NATIONAL COUNCIL OF EDUCATION, 2018, emphasis added).



Considering the determination that extension activities be carried out in person, in a region compatible with the face-to-face support center, in which the student is enrolled, it becomes necessary to guide the actions of the distance education centers, seeking to bring the center closer to the academic and local community.

Only in this way will it be possible to provide educational activities that transform each distance education center into an active place of knowledge, science and technology, providing a cultural meeting for the training of professionals, a space for discussion and reflection on real and current issues, leading to elucidations of the community about the problems experienced by it, strengthening the training of students and teachers of distance learning (CUNHA, 2024).

In this scenario, the university extension practice in distance education centers has been a challenging approach, which aims to extend the activities of HEIs beyond their physical campuses, reaching students, professors and communities in different regions, through synchronous digital platforms and face-to-face support centers.

This is because, understanding that extension creates an opportunity to be ahead of our time, the practice of hybrid and flexible actions composed of innovative and technological approaches is advocated, in the search for solutions to the community's problems. For Evandro José Lemos da Cunha (2024):

The construction of the extension work process, at first, is revealed as a facilitator for an effective integration between the university institution and the community with which it proposes to interact. Such a process presupposes disseminating the knowledge produced within the university and, at the same time, creating conditions that make it possible to absorb the knowledge and culture existing in the communities selected for the execution of the proposals.

In order to establish a dialogue that presupposes this two-way idea when thinking about Distance Education actions, it is necessary to build differentiated university extension mechanisms with diffusion and access to the community, which are both face-to-face and technological diffusion.

Extension proposals should always consider the centers (students and community) as unique and special units. The insertion of the university in these poles aims to contribute to its transformation through the daily practice of research, teaching and extension, but, fundamentally, to open itself, in the search to transform itself and absorb new knowledge. As good examples, we can mention the proposals for the integration of academic knowledge with popular knowledge, the democratization of knowledge, the development of social awareness, the respect and dissemination of the cultural roots of the communities and the proposals for the interiorization of education, health and quality of life. In these situations, both distance learning and extension can establish transformative actions (CUNHA, 2024).

Taking into account the need to build differentiated university extension mechanisms, with dissemination and access to the community, it is essential that the organization of extension work be institutionalized and operationalized, in the form of courses, programs, projects and services that provide a dialogue with various segments of local society.

From this perspective, university extension courses can be offered in a hybrid way, through virtual learning platforms, allowing students to participate in synchronous activities of continuing



education, professional training, language improvement, among others, without the need to be physically on campus. In this regard, it is important to emphasize that the courses offered must be related to the social problems around the distance education centers, to which the students are linked, creating learning communities that will have contact with diversified social realities.

In fact, one cannot lose the richness that hybridity provides, especially considering the possibility of carrying out "synchronous extension courses", with live monitoring by the teacher, being a great opportunity to improve and update knowledge in new areas of training.

In addition, in hybridity, it is possible to optimize the use of HEI spaces, reproducing synchronous activities in digital environments, in order to create learning communities, which can then be part of projects and other face-to-face experiences, which put into practice the knowledge acquired in the respective extension courses. It is the application of an integrated extension, a practice that must be well outlined and articulated in the planning of the HEI.

Lévy is opportune, who, when analyzing the future of education and training systems in cyberculture, highlighted a new relationship with knowledge, influenced by new technologies that alter human cognitive functions. For the author, intellectual technologies favor:

- New ways of accessing information: navigation through hyperdocuments, hunting for information through search engines, knowbots or software agents, contextual exploration through dynamic data maps,
- New styles of reasoning and knowledge, such as simulation, a true industrialization of the experience of thought, which comes neither from logical deduction nor from induction from experience (LÉVY, 1999. p. 157).

In this way, the use of synchronous digital platforms, in the field of university extension, can promote impacts on the training of undergraduate students at a distance, expanding knowledge and enhancing the construction of collective knowledge, which involve different regions at a single time.

Corroborating the notion of using technologies in extension practices in undergraduate distance education courses, Carvalho highlights:

In the field of university extension, from an open university conception, considering the differential of Distance Education, it is possible to think - in a participatory and less expensive way than conventional educational methods - an infinity of possibilities of activities, projects and extension programs aimed at literacy; encouragement of reading; consulting activities; access to and democratization of information, knowledge and practices; technical training; digital inclusion; encouragement and development of research; holding cultural and scientific events; management of resources and enterprises; development of action plans; strengthening and promotion of citizenship and/or culture; creation of community and/or cultural centers; development of disease prevention and control plans or unsustainable activities; production of didactic-informative material; provision of services in the spheres of health, environment (defense and prevention of problems), education and others; promotion and support of work and employment opportunities; creation/innovation of new methodologies and technologies in different areas; promotion of technical-scientific development actions, etc. All of this is facilitated by virtual technologies, satellite communication/education, use of the internet, and other technological facilities that distance education brings to the educational experience and that perfectly serves the aforementioned proposals for university extension (CARVALHO, 2024, emphasis added)



Considering the breadth of social networks, the extension practice can be intermediated by a considerable universe of communicative, educational, flexible and updated tools, available in a democratic way to the actors of the teaching-learning process. Such a reality can make university extension rich, eclectic and impactful, composed of combinations of hybrid experiences, which can involve a mix of digital and face-to-face activities interspersed with each other.

In addition, distance education centers can also be the headquarters for carrying out extension experiences that are articulated in the form of cultural and social events; exhibitions; thematic seminars that raise awareness in the local community on relevant topics; practical workshops that complement the theoretical content of the extension courses; professional workshops, which promote training and qualification aimed at the development of professional skills in the community, such as communication techniques, project management, financial management, humanized leadership; academic orientation workshops for the local community, among other subjects, which provide learning and networking opportunities for students, tutors, teachers and members of the local community.

HEIs can also offer technical assistance extension activities in their distance education centers, making available to the local community, consultancies, training and services provided by students.

In this case, university extension can cover free "Legal Advice" for hyposufficient people who do not have access to legal resources; "Medical Assistance" for needy communities, providing services in free health clinics, vaccination campaigns, preventive health exams and guidance on healthy lifestyle; the "Business Consulting", for small businesses and local entrepreneurs, helping them to develop business plans, marketing strategies, financial management, among others; the "Tax Consultancy", providing tax assistance to the needy community; "Technical Training", providing technical training for local workers in areas such as industrial maintenance, electrical installation, welding, among others; "Social Assistance", acting as psychological counseling, family guidance, support for victims of domestic violence, referral to mental health services, etc.; the "Agricultural Development Activities", offering technical assistance to local farmers, with guidance on sustainable agricultural practices, crop management, pest control, water resources management, among others; "Environmental Assistance", through extension projects, which help communities to face local environmental challenges, such as promoting recycling, energy conservation, cleaning rivers and beaches or clarifying environmental education in general.

These are just a few examples of how "Technical Assistance and Service Provision" can be incorporated into the university extension carried out in the distance education centers, benefiting local communities and, at the same time, providing practical learning opportunities for students and teachers.



Cultural and artistic activities also have space in distance education centers, places where artistic presentations can be promoted that stimulate reflection on topics relevant to society, exhibitions of prototypes and creations by students, theatrical presentations, film screenings, documentaries, musical events, in short, experiences that can contribute to cultural enrichment and the strengthening of community ties.

And that's not all. Thinking about the environment where you live, seeking to create new attitudes and behaviors in the face of exacerbated consumerism, is also an excellent opportunity to develop impactful extension projects in distance education centers.

In this regard, the student will be faced with the environmental problems of his community, being able to make reports and photographic records, and then develop an intervention project, informing the local society about behaviors that are harmful to the environment and suggesting changes in behaviors for a healthy and sustainable life. An interesting intervention, in this hypothesis, would be the offer of mini-courses, lectures and workshops promoted by students and teachers, which involve basic education in this process of environmental awareness.

In fact, from the observation of the context in which they are inserted, it will be possible to identify the individual perceptions of the students in relation to the environmental conditions of the places in which they live, to then suggest interventions that can actively contribute to the local society and to the formation of the undergraduates, from a perspective of citizenship, stimulating the development of skills that contribute to the formation of environmental ethical values of the collectivity.

Finally, it should be clarified that the theme is not watertight and that these are just suggestions through which university extension practice can be carried out in distance education centers, offering hybrid, remote and face-to-face opportunities for education, research and service to the community, in order to reach a wider and more diversified audience.

As observed, extension in distance education plays a crucial role in promoting social inclusion, interaction with the community, practical application of knowledge, civic involvement, professional development and knowledge exchange, contributing to the strengthening of the institution's educational mission and the sustainable development of society.

CONCLUSION

University Extension, in summary, is related to the actions planned by the HEIs, which articulate the scientific knowledge arising from teaching and research to meet the needs of the local community, in order to interact and transform the social reality. In short, extension is a way of learning hands-on, that is, learning by acting for the common good.



In this context, the extension curriculum was presented, a strategy provided for in the National Education Plan (PNE), regulated by Resolution No. 7/2018 MEC/CNE/CES, embodied in the allocation of 10% of the workload of undergraduate courses to extension activities, an action that should have been implemented in 2023, by all HEIs.

The central objective of the mandatory integration of extension is the integral training of students for their professional performance, making teaching and research intrinsic elements of learning, seeking to benefit the reality of the community close to the institutions. The involvement of students with society takes place with the guidance of professors focused on dialogical interaction with the various sectors of society.

In this sense, once extension is implemented in distance education curricula, at some point in their academic life, the student will need to get involved with extension activities related to the curricular components of the undergraduate course.

It was demonstrated that the rules of accreditation of extension imply complex discussions about the curricular matrix, the relationship between IES and society, interdisciplinarity, transdisciplinarity and the inseparability of teaching-research-extension. This is because the Extension Curriculum must be aligned with institutional proposals, inserted in the Institutional Development Plans (PDIs), in the Institutional Political Projects (PPIs), in addition to what is established in the Pedagogical Projects of the Courses (PPCs) and other specific normative documents of the HEI.

The curriculum of HEIs, in this scenario, came to be conceived as a living, non-linear process, through which learning is promoted beyond the contents of the disciplines, promoting a space for the production of collective knowledge, accompanied by new discoveries and questions. Such a measure offers students a solid and critical process of professional training, thus making curricular flexibility effective in the perspective of a curriculum that breaks with the predominance of disciplines and inserts transdisciplinarity as a reference axis for learning.

It was also evidenced that the undergraduate degree in distance education requires a careful and challenging extension operational model, in view of its mandatory face-to-face compliance, linked to the different centers in which students are enrolled.

Notwithstanding this, proposals were presented for hybrid practices that converge to the formation of the student, through planning, diagnoses and intervention in society, which can occur in person or intermediated by technological tools, opening possibilities for HEIs to innovate their curricula and fulfill their regulatory commitments, through significant experiences, which offer communities the best that the academic environment can produce for its development and reduction of social differences.



In this perspective, university extension courses and projects can be offered in a hybrid way, through virtual learning platforms, allowing students to be in front of community problems, participating in synchronous activities of continuing education, professional training, language improvement, among others, without the need to be physically on campus.

It was stated that one cannot give up the breadth and benefits of the use of technologies in the extension practice, as it can be intermediated by a considerable universe of communicative, educational, flexible and updated tools, available in a democratic way to the actors of the teaching-learning process. Such a reality can make university extension rich, eclectic and impactful, composed of combinations of hybrid experiences, which can involve a mix of digital and face-to-face activities interspersed with each other.

In addition, the distance education centers can be the headquarters for the realization of extension experiences that are articulated in the form of cultural and social events; exhibitions; thematic seminars that raise awareness in the local community on relevant topics; practical workshops that complement the theoretical content of the extension courses; professional workshops, which promote training and qualification aimed at the development of professional skills in the community, such as communication techniques, project management, financial management, humanized leadership; academic orientation workshops for the local community, among other subjects, which provide learning and networking opportunities for students, tutors, teachers and members of the local community.

Thus, from the engagement of students and teachers, through online and face-to-face tools, it becomes possible to generate hybrid and pragmatic extension projects, which develop students' technical and socio-emotional skills and, at the same time, contribute to the common good of the local community.

Therefore, the process of extension curricularization was an important path for the development of the academic community as a whole, both in the face-to-face modality and in distance learning, enabling a real dialogue between teaching, research, extension practice and the student's commitment to society.

However, the success of the extension process depends on the insertion of impactful activities for the academic and social community, as well as continuous evaluations that seek to improve the articulation of teaching and research, teacher qualification, student training, firm partnerships with society, all of which aim to contribute to the professional, comprehensive, ethical and humanistic training of students.

It is concluded, therefore, that, by communicating with the local, regional or national reality, the HEI will have the possibility of constantly renewing its own structure, curriculum and actions, allowing the democratization of knowledge from the various courses and areas, leading them to meet



the social, cultural and economic problems of our country. In short, transforming the country through education.



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