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BUILDING VALUES FOR A SUSTAINABLE SOCIETY

Seven Publicações
(Organização)

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SUMMARY

SEVEN publicações acadêmicas

CHAPTER 1

SCHOOL INCLUSION AND FATPHOBIA: POSSIBILITIES FOR COPING

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ABSTRACT

Objective: To know how fatphobia is treated in municipal schools in a city on the coast of Pará and to understand how teachers see the Growing Healthy Program, which aims to combat childhood obesity. Childhood obesity and fatphobia, which consists of the aversion or repudiation of fat people, need to be understood in the school environment, due to the devastating consequences on the self-esteem, self-confidence, health and quality of life of the obese child, as well as on school and integral development. Methodology: exploratory descriptive study, carried out with teachers from municipal schools who answered an online questionnaire prepared on *Google forms,* whose link was disclosed by *email or whatsapp*. Results: 24 teachers participated voluntarily. The data were treated by means of descriptive statistics and the essay answers by content analysis. The results show that most teachers know the term fatphobia, are concerned and have already experienced the phenomenon. 79% of teachers do not know about the Healthy Growth Program and are unaware that the school where they work is part of the program. The teachers who know him emphasized the importance of some of the program's actions, such as encouraging healthy eating and improving quality of life. Conclusion: The school is an important place for coping with childhood obesity, as well as for welcoming, understanding and respecting children who have this condition. It is a primary condition that an impediment to attitudes that correspond to fatphobia is established and that the child can have his or her self-confidence and self-esteem developed in the school environment.

Keywords: Fatphobia, Childhood obesity, School.

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INTRODUCTION

Childhood and adolescent obesity is an issue of great importance, as it negatively affects the general health and psychological development of this public. The World Health Organization (WHO) considers obesity to be a global epidemic, associated with food consumption and the level of physical activity, and may also be related to environmental processes, such as political, economic, social, and cultural contexts (Dias, 2017; SBP, 2017; WHO, 2019; Weng, 2012).

According to the *World Obesity Federation*, childhood obesity is a global public health problem. In Brazil, about 3 out of 10 children aged 5 to 9 years are overweight (WHO, 2019). The World Atlas of Obesity and the WHO place Brazil in the 5th position in the ranking of countries with the highest number of obese children and adolescents in 2030 (WHO, 2019).

Data from the Ministry of Health show that 14.3% of children between 2 and 4 years old are overweight, and between 5 and 9 years old, 29.3% (Brasil, 2019). In addition to physical health problems, childhood obesity also causes profound psychological impacts. Fatphobia adds to the obesity epidemic, as weight stigma can lead to adverse physical, behavioral, and psychological health outcomes (Palad, et al, 2019).

The Interministerial Chamber of Food and Nutrition Security (Caisan, 2014) points out that overweight and obesity result from the consumption of processed and ultra-processed products. To combat these risks, UNICEF (2018) presented a manual with 10 steps for healthy eating up to 2 years old, encouraging breastfeeding and the introduction of healthy foods from 6 months.

The School Health Program (PSE), established in 2007, promotes healthy eating and the integral development of children and adolescents, offering actions to prevent and control nutritional deficiencies (Brasil, 2020). The PSE articulates education and health networks to promote health in several dimensions, including the Promotion of Adequate and Healthy Food (PAAS).

PAAS encourages the consumption of healthy foods in schools, promoting healthy spaces and restricting foods rich in sugar, fats and salt. NutriSUS, started in 2014, strengthens infant nutrition with powdered micronutrients, preventing anemia and other nutritional deficiencies (Brasil, 2021).

Growing Healthy, created in 2017, aims to tackle childhood obesity through nutritional surveillance actions and the promotion of physical activity (Brasil, 2021). The Ministry of Health Ordinance No. 2,141/2020 enables municipalities to receive incentives to implement these actions.

On the coast of Paraná, 64.13% of schools are agreed in the PSE, and can also join Crescer Saudável and NutriSUS (Tosta et al., 2023).

Ordinance GM/MS No. 1,320/2021 defined the municipalities with adherence to the PSE and Healthy Growth for the 2021/2022 cycle, enabling them to receive financial resources.

The 7 municipalities on the coast of Paraná are among the municipalities that joined the PSE and accepted the Healthy Growth Program as presented below.

Table 1 - Distribution of financial transfers to the municipalities of the coast.

Municipality	Financial transfer related to adherence to the Health at School Program in the 2021/2022 cycle	Financial transfer to Healthy Growth in the 2021/2022 cycle	Total
GUARAQUEÇABA	R$ 7.676,00	R$ 3.070,40	R$ 10.746,40
PARANAGUÁ	R$ 16.676,00	R$ 6.670,40	R$ 23.346,40
PONTAL DO PARANÁ	R$ 8.676,00	R$ 3.470,40	R$ 12.146,40
ANTONINA	R$ 7.676,00	R$ 3.070,40	R$ 10.746,40
MORRETES	R$ 6.676,00	R$ -	R$ 6.676,00
GUARATUBA	R$ 11.676,00	R$ -	R$ 11.676,00
MATINHOS	R$ 15.676,00	R$ 6.270,40	R$ 21.946,40

Source: Ordinance GM/MS No. 1,320, of June 22, 2021

METHODOLOGICAL PROCEDURES

This study is characterized as descriptive, exploratory field and documentary. Methodologically, the research was developed in three distinct phases.

In the first phase, the problem of childhood obesity was presented, along with the theoretical strands that discuss the confrontation of this problem in the school environment. Then, an updated bibliographic survey on the subject was carried out.

In the second phase, after the theoretical review and reading of pertinent studies, field research was conducted to learn about the practical reality.

The field research was carried out in 2022, in municipalities on the coast of Paraná, with the voluntary participation of teachers and education managers. All participants received and signed the Informed Consent Form (TLCE), being fully aware of the purposes of the study.

For data collection, two instruments were used: semi-structured interviews and a questionnaire prepared by the author, available via Google Forms. The link to the questionnaire was distributed among the teachers.

The answers obtained were analyzed through qualitative and quantitative approaches, providing a comprehensive understanding of the data collected.

RESULTS AND DISCUSSION

SAMPLE IDENTIFICATION DATA

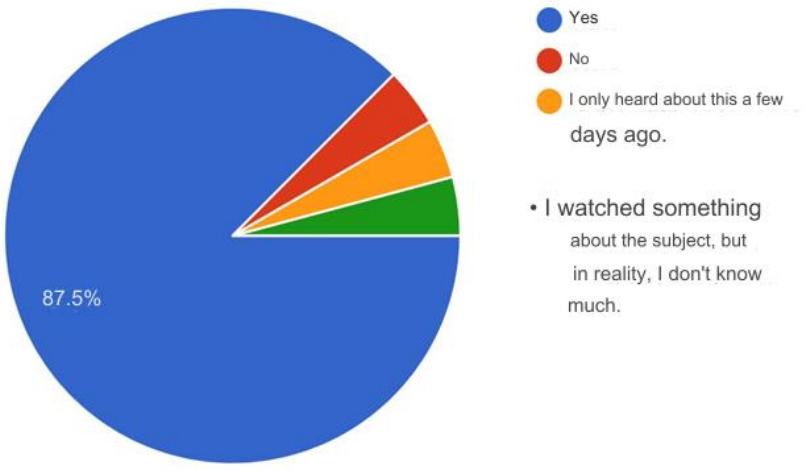
Participants were 24 teachers from the municipal school system of the coast of Paraná, 24 female and 1 male teacher, with a mean age of 41.45 years and an average length of service in teaching 17.30 years.

RESEARCH RESULTS

The understanding of how teachers about the theme of Fatphobia and the distribution of responses is presented in graph 1.

It can be observed that 87.5% (n=21) of the teachers knew about the subject, the other 12.5% (n=3) answered that they did not know or had only recently seen about the subject.

Graph 1 - Distribution of teachers' level of knowledge on the topic of fatphobia (N=24)



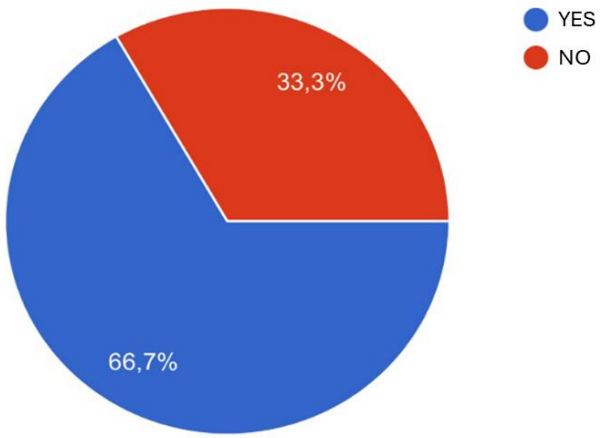
Source: the authors, 2024

The term fatphobia has been used nowadays as one of the stigmas resulting from childhood obesity. It is considered a social stigma, resulting from a cultural construction of the devaluation of the fat body, seen as abnormal, ugly, unkempt, not being within the thin body standard, required by society causes social discrimination. (Jimenez-Jimenez, 2018; Stenzel, 2022).

This prejudice can be reproduced within schools by teachers. Thus, the theme deserves care during teacher training so that they have a close look at this issue.

Regarding having already experienced or suffered Fatphobia, 66.7% (n=16) of the teachers answered yes and 33.3% (n=8) answered that they did not suffer or experienced this type of prejudice, as shown in graph 2:

Graph 2 - Distribution of answers regarding the experience of situations involving fatphobia (N=24)



Source: the authors, 2024.

The number of participants who experienced or suffered fatphobia is high, totaling 66.7% (n=16) and it should be considered that among the others, it is possible that they have experienced it, but not identified as prejudice. Therefore, the theme must be addressed in the school environment both to allow intervention work and to prevent veiled prejudice.

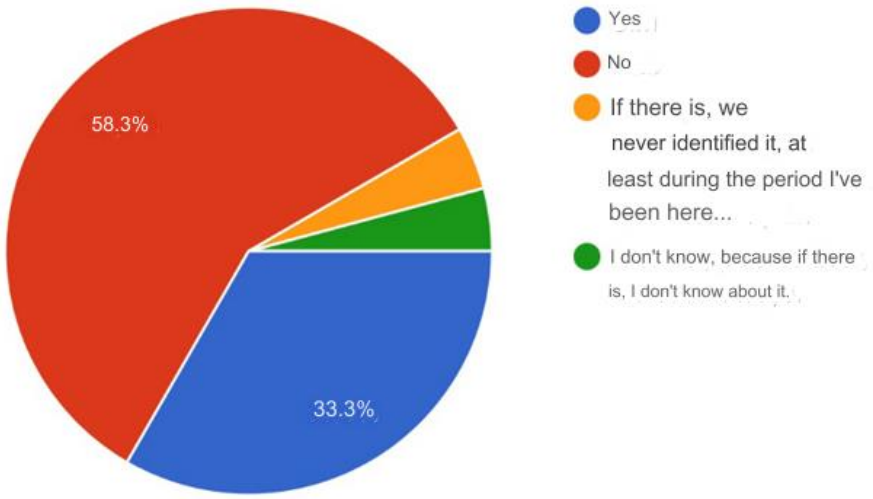
Poulain (2013) states that the stigmatization of obesity is not reduced to a simple critical look at an individual, but rather a process of interactions that devalue the subject, transforming the victim into the culprit, making the victim himself accept and internalize the devaluation.

Regarding the judgment about the severity of Fatphobia, 95.8% (n=23) of the participants recognized that it was, important data considering the consequences on fat people who were bullied at school. Many do not like to leave the house to avoid judgmental looks, do not go out to buy clothes because they feel embarrassed to ask for larger sizes, or avoid eating in public because they feel they can be judged, situations that can generate anxiety and trigger depression (Nery, 2017).

It should be noted that Silva et al (2017) point to depression as one of the worst damages caused by *bullying, causing complications in mental functions, modifying the way in which the subject explores his emotions.*

Regarding the observance of cases of fatphobia in the work environment, 33.3 (n=8) of the participants stated yes and 58.3% (n=14) answered no; 8.4% (n=2) answered that they are unaware of or did not identify cases, as shown in the graph

Graph 3 - Distribution of the existence of fatphobia in the workplace (N= 24)



Source: the authors, 2024.

It would not be an exaggeration to say that fat people suffer from Fatphobia on a daily basis, in a subtle or more noticeable way (Castells, 2019). Prejudice is present in all spheres of society, from the cursing of *fat* people to stores that have standard clothing numbers up to 46, in the cramped seats of the bus or in chairs with armrests in restaurants. The author lists seemingly harmless lines that fat people hear daily:

Saying that someone is "beautiful in face": being fat is not synonymous with being ugly. To say that someone is "beautiful in face" is to exclude the rest of their body, it is to say that the rest of their body is ugly.

Put on a little weight and say that you are "very fat, immense...": the watchword in this case is empathy. Do you know when you put on a little weight, but even so you are not even close to having the body of that friend of yours who is really fat and suffers the effects of this in various everyday situations? So, stop and think about whether grumbling that you're fat makes any sense.

The expression "make fat": being fat is not only linked to the fact of eating "fat" foods. The act of eating a hamburger combo with fries and soda is not exclusive to fat people and it may be that many of them do not even have this type of diet.

Saying that someone is thin in a tone of compliment: cast the first stone who has never said to someone "how thin!" as if they were saying "how beautiful!". Being thin is not a quality, it is a characteristic. Just as being fat is not a defect.

The expression "you're not fat, you're beautiful!": Again: why can't fat women be beautiful? A person can be fat and beautiful at the same time YES!

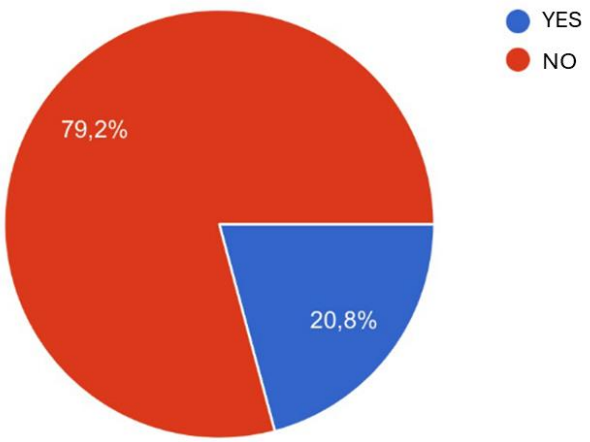
Giving diet and exercise tips without someone having asked: giving diet and exercise tips without someone asking for it is assuming that the person wants to lose weight, but they should decide this and, if they ask you, feel free to give your tips.

Use the argument of BMI and health: BMI (Body Mass Index) is an international measure that determines if your weight is ideal for your height. This index is quite controversial because it excludes any other aspect to tell if your weight is ideal, and a person can have several other health problems and in the end their weight and height are what matter the least.

Saying that certain clothes "don't look good on chubby women": stop and think about whether or not it's your right to say that some clothes look good on someone, whether it's fat or thin. It's not up to you to decide what someone else should wear.

Regarding the Growing Healthy Program, the teachers were asked if they were aware of the Program that aims to help combat childhood obesity, providing a healthy diet, encouraging and offering physical activity practices, 79.2% (n=19) answered that they do not know about the Program, and only 20.8% (n=5) said they did, as shown in graph 4:

Graph 4 - Distribution of teachers on the PCS (N=24)



Source: the authors, 2024.

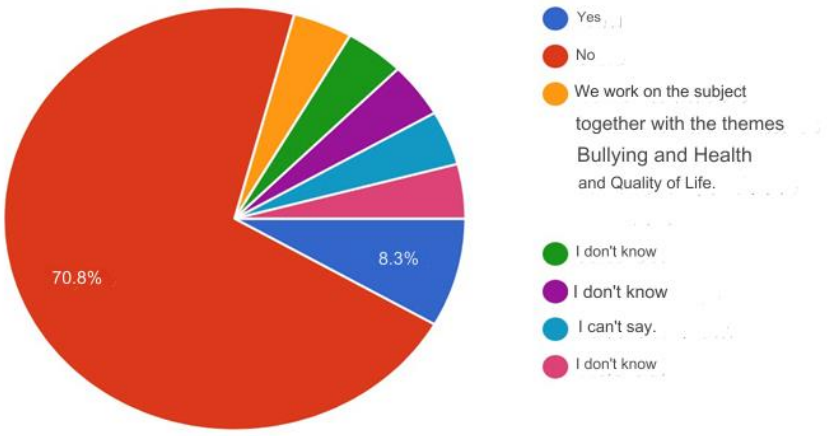
It was also asked if the school where the teachers worked was part of the PCS, with a negative answer for 70.8% (n=17) of the participants. Also, 8.3% (n=2) answered that the

school is part of the Program, and 20.9% (n=5) answered that they do not know or do not know, as shown in graph 5:

The lack of knowledge of teachers about the integration of the school into the PCS draws attention, to the extent that the lack of knowledge disfavors participation, enthusiasm for the theme and the success of the Program.

Contrin et al. (2021), in their studies on the School Health Program (PSE), states that the role of the school and its actors in the development of health actions in the school environment is not observed in a forceful way and that the opportunity to promote health in the school environment is lost. It is necessary to take advantage of the potential of the school environment and understand that the school is an important environment for the development of actions that involve and promote health. (SILVA, et al., 2014).

Graph 5 - Teachers' knowledge about the participation of the school where they work in the Healthy Growth Program (N=24**)**



Source: the authors, 2024.

Teachers whose schools participate in the Program were asked if they applied the proposed activities. Among those who answered that the school is part of the Program, 8.3% (n=2) said yes, but for 70.8% (n=7) of the interviewees, the school is not part of the PSE - Healthy Growth Program, and 20.9% (n=5) do not know, as shown in the graph.

Silva et al. (2017) highlight that during the period in which they are at school, students develop various activities, which include learning, playing, socializing and eating, so the school, due to its capillarity and scope, is an important place for the development of awareness and health promotion actions. Therefore, when 70.8% (n=17) of the teachers affirm that the school is not part of the Program, this data is a cause for alarm.

The teachers were also asked about the actions and importance of the PSC, whose answers are transcribed below:

Teacher1: "It helps in the prevention of childhood obesity and in respecting children who are overweight."

Teacher 2: "Know and change habits for healthy eating seeking to improve quality of life".

Teacher 3: "Conversations and reflections on the prevention of childhood obesity and prejudice. About full and healthy development, both physical and emotional, avoiding negative stereotypes".

Therefore, the answers corroborate the intentions of the Program, which is presented through 5 actions:

1. To assess the nutritional status of children under 10 years of age enrolled in schools participating in the PSE
2. To evaluate the food consumption markers of children under 10 years of age enrolled in schools participating in the PSE
3. Offer collective activities to promote adequate and healthy eating for children enrolled in schools participating in the PSE.
4. Offer collective activities to promote body practices and physical activities for children enrolled in schools participating in the PSE
5. Provide individual care to children under 10 years of age identified with obesity (BRASIL, 2021)

Thus, it is possible to observe that the teachers who stated that they knew the PCS have a good understanding of the actions and their importance. However, Contrin et al. (2021) recall that the actions developed in the school environment are often fragmented and without continuity, negatively interfering with the result that is intended to be achieved. The same authors, citing Soares et al (2016), recall that health education, when carried out at school, enables the authors involved to become "co-responsible" for their health and that of the collective.

FINAL CONSIDERATIONS

This work aimed to present reflections and notes on childhood obesity, fatphobia and the stigma faced by overweight individuals, in addition to exploring the possibilities of coping with obesity in schools through the Growing Healthy Program.

Childhood obesity is a reality that we face in our country, and it is extremely necessary to act to improve the quality of life of these children. One of the main objectives of this study was to address the topic in a broad way, showing that obesity not only poses

risks to physical health, but also to psychological health. As long as obesity is seen as an evil, we will continue to reproduce fatphobia in society.

Children considered overweight experience stigma and prejudice on a daily basis, internalizing these statements and believing that they are wrong or not good enough because they do not reach the standard imposed by society. This harms their self-esteem, their confidence and, consequently, their teaching-learning and development process.

The PCS, created in 2017, establishes, within the scope of the School Health Program (PSE), a set of actions to address childhood obesity. These actions are aimed at children enrolled in Early Childhood Education (daycare centers and preschools) and Elementary School I (Brasil, 2021). The program values healthy eating and encourages physical activity, but it seems to be little known by teachers in the municipal school system of Paranaguá.

It was not possible to identify whether this lack of knowledge is due to the lack of dissemination in schools or to the non-participation of schools in the program. However, it is crucial that the dissemination of these programs is promoted by the management bodies and school units so that the program is successful and the population becomes protagonists in the actions of their own health.

It was possible to identify that not all teachers knew what the word "fatphobia" meant, which leads us to reflect on the importance of continuing education of teachers. Working on diversity and valuing bodies with children is essential to combat prejudice against fat bodies.

Another important aspect is that the school, as a space of plurality, must welcome and ensure the rights of all children, prioritizing respect for diversity. The representativeness of fat people should be worked on in a positive way, highlighting their capabilities and qualities, just like any other body type. The school should promote the feeling of welcome and appreciation of the fat child, improving their self-esteem and self-confidence.

The fight against childhood obesity should be based on health and quality of life, not on any other values.

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MEDICINAL PLANTS AS A GENERATIVE THEME FOR THE STUDY OF ORGANIC FUNCTIONS AND SCIENTIFIC LITERACY IN CHEMISTRY

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ABSTRACT

Chemistry teaching requires the use of approaches that provide students with conditions so that they can critically interpret the reality in which they live. This implies the need to link the content worked with the social context in which the student is inserted. However, the practice of contextualizing is rarely addressed in the classroom, especially when it comes to teaching Organic Chemistry. Therefore, this research aimed to propose a didactic intervention based on the theme of medicinal plants as a proposal to integrate the student's daily life with the construction of knowledge about Organic Functions, in order to make the teaching and learning process more meaningful in accordance with the proposal for Scientific Literacy. The research was carried out with students from a 3rd year class of Integrated Technical High School in Computer Science for the Internet at the Federal Institute of Education Science and Technology Baiano - Campus Guanambi, in the period

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between November 2022 and May 2023 and involved six stages, with diverse activities. The use of the theme met the objectives of the study proposal, as, depending on the receptivity of the participants, it constitutes a teaching resource that brought the study of Organic Functions closer to everyday life, favoring more meaningful learning. The proposed use of the generating theme also demonstrated that it aroused the students' curiosity and interest, given their active participation in the construction of knowledge, which may have contributed to the teaching and scientific literacy processes.

Keywords: Medicinal plants. Teaching. Organic functions. Scientific literacy.

INTRODUCTION

Chemistry is the branch of science that studies the composition, structure and properties of matter, as well as the changes undergone during chemical reactions and their relationship with energy. As a science, Chemistry provides individuals with an understanding of the most varied phenomena that occur in the environment in which they are inserted, so that they can operate as a transformative agent in this environment (Zanotto; Silveira; Sauer, 2016). As transformation requires knowledge, Chassot (2018), argues that Science, a large area in which Chemistry is inserted, is a language and the scientifically literate individual is the one capable of interpreting this language and collaborating to predict and control the changes that occur. in nature.

However, Chemistry, even today, is considered a subject much feared by students, since this component is seen as difficult to understand, abstract and distant from their social context. Several factors have contributed to students' perspective on this science moving from incomprehension to lack of interest. One of them is due to the content being based on memorization and mechanized teaching, the other is due to the absence of a practical relationship between the concepts worked on in the classroom and everyday situations (Machado, 2021).

According to Vieira (2016), these difficulties become even more accentuated in the teaching and learning process of students when it comes to the area of Organic Chemistry. The author considers that such difficulties occur due to the demands of memorizing the rules of nomenclature and classification of carbon chains, subjects that are addressed in isolation in the third year of high school in a way that is decontextualized from the students' social reality. Therefore, Chemistry must be presented based on teaching strategies that can provide greater interest and provide students with concrete experiences that lead them to analyze, understand and question phenomena that occur around them (Santiago, 2019).

In this aspect, it is necessary to make use of alternatives that can minimize students' difficulties in understanding the contents listed in Organic Chemistry, as well as promoting Scientific Literacy in Science teaching. To achieve this, numerous paths have been considered, one of them is through teaching approach strategies using generating themes.

According to Braibante *et al*. (2014), the use of generating themes such as teas, in the classroom, has an important role, as it makes it possible to work on various topics in Organic Chemistry, based on the chemical structures of the active principles present in medicinal plants, such as for example: nomenclature of organic compounds and identification of functional groups, as well as supporting the promotion of the study of facts, phenomena and objects present in students' daily lives, helping them to interpret everyday

situations through scientific content involved. Still from the perspective of Scientific Literacy, the theme also allows reflection on various problems, such as the correct and conscious use of medicinal species (Silva *et al.*, 2017).

In this sense, this study focused on proposing a methodological approach based on the Medicinal Plants theme as a proposal to integrate the student's daily life with the construction of knowledge of the Organic Functions content in order to make the teaching and learning process more meaningful in accordance with the Literacy proposal Scientific.

TEACHING ORGANIC FUNCTIONS AND MEDICINAL PLANTS

Organic Chemistry is considered a part of Chemistry that studies compounds that have carbon as the main chemical element, which are classified into different organic functions, according to their structures and physical and chemical properties. These organic compounds play an essential role in the maintenance of living beings, as they are present in clothes, food, pharmaceutical products, among others, which are part of our daily lives (Silva, 2019).

Although Brazilian education has reformulated issues regarding the formal curriculum, such as the adoption of the National Curricular Parameters (PCN) and the National Common Curricular Base (BNCC), it is clear that the teaching of the contents of the Chemistry curricular component in high school, notably in the area of Organic Chemistry, is still generally transmitted in a traditional and decontextualized way from students' daily lives (Machado, 2021). According to Maia (2019, p.15):

> The development of Chemistry classes using traditional methods is considered boring and meaningless, making learning difficult, causing lack of interest and low performance. Researchers confirm that contextualized classes, worked with bibliographical research, aimed at searching for new information within the student's practice and reality, establish an interesting connection between the knowledge acquired through the students' experience and abstract concepts or concepts that are difficult to understand.

When working on the content of organic functions in the classroom, the focus is only on the direct application of the formulas and the recognition of the functional group without making practical connections with the students' daily experiences (Lima, 2017). Therefore, the way this content is explained, that is, the absence of a practical relationship between these functional groups and their respective physical, chemical or even pharmacological properties, has led the student to label Organic Chemistry as difficult to understand. learn, as well as that it has no connection with the student's experience (Silva *et al*., 2017).

One way to prevent this distorted conception of Organic Chemistry on the part of students from becoming even more accentuated, as well as promoting more attractive and

participatory classes, which can sharpen students' curiosity and interest, would be through contextualization using a theme that has a link with their daily lives (Silva *et al*., 2017). In this sense, Rockenbach *et al*. (2020) defend the use of the theme of medicinal plants to address the subject of organic functions, as this knowledge is passed on through generations, with medicinal plants being the predominant therapeutic resource throughout the development of humanity and still used to this day.

The theme can be explored in classes, since medicinal plants have compounds with molecular structures, the chain of which can present one or more functional groups, which are responsible for the therapeutic effect of the plant and are organized into different groups according to their similarity chemical. They can be classified into terpenes, triterpenes, tannins, saponins, flavonoids, alkaloids, etc. (Silva; Pinheiro, 2021).

Brito *et al*. (2019) also highlight that the theme of medicinal plants can be strategically used as a teaching resource with a view to enabling the approximation of popular culture to scientific knowledge so that, from this, students can reconcile the knowledge acquired through family life with knowledge school, therefore making learning more meaningful, as well as attributing value to local culture.

Silva *et al*. (2017) also corroborate this idea by stating that taking into account a subject that is widespread in the region and used in students' daily lives, such as medicinal plants, favors and stimulates the search for knowledge, since through this approach students are able to perceive the importance of educational content in their lives, contributing to the formation of more aware citizens capable of opting for a healthier lifestyle. The authors also emphasize that the use of the aforementioned theme also allows reflection on various problems, such as the preservation and correct use of medicinal species.

SCIENTIFIC LITERACY

The term Scientific Literacy refers to the set of knowledge constructed by the individual so that they are able to read, understand and transmit in an intelligent and critical way what they think about subjects involving science.

One of the main pillars for Scientific Literacy concerns the training of citizens with a critical stance capable of not only “reading” the world, but proposing improvements around them (Chassot, 2018). Ferino (2020) confirms this idea by stating that, for a subject active in contemporary society, it is necessary, in addition to basic survival needs, to develop skills that enable him to intervene in the environment in which he is inserted. In this sense, as Neto (2020, p. 3) points out:

> It is important to be scientifically literate to understand the conditions, meanings and even the excesses that Sciences and the developments related to them can generate in the face of the various transformations that our society has experienced. People must make decisions and participate in discussions related to various events in the world.

Therefore, for individuals to be able to construct scientific concepts and develop skills such as critical and reflective positioning on individual and collective decisions, Science teaching must be planned in such a way that the student participates in this process, since We are responsible for our actions and what we do and decide will impact, in some way, on society as a whole (Marcondes, 2018).

From this perspective, Science teaching needs to be established in order to privilege the investigation of phenomena linked to the student's daily life, so that they can be able to master and use knowledge relating to areas of their life. However, as Miranda *et al*. (2015) points out, it is necessary to pay attention to this process, since scientific literacy goes far beyond simply understanding everyday knowledge, but also in the ability to systematize knowledge in a logic, as well as assisting the construction of critical knowledge of the world that surrounds us, in such a way that we can understand the expressions through which it is reflected. According to the reflections of Chassot (2018), one of the signs of Scientific Literacy is the understanding of the transformations in the world, which does not just mean accepting them, but rather having the ability to reflect with critical thinking, thus avoiding being deceitfully led by society. Parallel to this, Machado (2021) also points out two other very relevant indicators, which are the construction of logical reasoning and the raising of hypotheses, expressed by the exposition of thought, which can occur both in the form of a statement and a question, results relationship, reorganization and search for new information by the scientist.

An interesting way to promote students' Scientific Literacy is to develop teaching based on the use of themes related to their daily lives, as they attribute importance and meaning to what is studied (Branco, 2020). In this way, as Neto (2020) highlights, the theme of medicinal plants for the promotion of Scientific Literacy is positive, given that it is part of the cultural practice of a given place and collective group.

In this sense, scientific education must present itself as honoring, in addition to scientific knowledge, dialogue with other forms of knowledge such as, for example, popular knowledge. This knowledge, called “primal knowledge", can serve as an awakening to scientific knowledge, and through the process of “rediscovering” what is known, the production of new knowledge and the differentiation between the vulgar and the real occurs (Chassot, 2018).

METHODOLOGY

METHODS AND TECHNIQUES

The present study is characterized as action research. For Thiollent (2005), this type of methodology is social research with an empirical basis, which aims to provide research subjects, participants and researchers with the means to be able to respond to the problems they experience with greater efficiency and based on a transformative action. Tripp (2005, p.445) highlights that:

> It is important to recognize action research as one of the countless types of action research, which is a generic term for any process that follows a cycle in which practice is improved through the systematic oscillation between acting in the field of practice and investigating about it. her. A change is planned, implemented, described and evaluated to improve your practice, learning more, in the process, both about the practice and the investigation itself.

Although the aforementioned authors consider action research to be a predominantly qualitative methodology, we opted for a qualitative-quantitative approach as a way of analyzing and discussing the data in this research, since, according to Souza and Kerbauy (2017), these two types of approaches complement each other and can be used together in research, as they enable a better understanding of the educational phenomena investigated, which increasingly present themselves from multiple facets.

Qualitative research has been gaining prominence in the area of education, due to its complexity and difficulties in working with variables, while quantitative research allows a more holistic view of the problems of the reality that surrounds us. In this way, quantifications can reinforce the conclusions obtained from qualitative research (Schneider; Fujill, Corazza, 2017).

SUBJECTS

The research was carried out with students from a 3rd year high school class of the Integrated Technician course in IT for the Internet at the Federal Institute of Education, Science and Technology Baiano Campus Guanambi, and was carried out with 31 students. The choice for students in the 3rd year of High School is due to the large area of Organic Chemistry being taught in the last year of the final phase of Basic Education.

PHASES OF THE INVESTIGATION

The study was carried out in the period between November 2022 and May 2023. Most of the activities were carried out during Chemistry classes, in the morning shift, however the bibliographic research activity was carried out in a non-formal environment.

The methodological development involved six stages, totaling six classes of 60 minutes each, as shown below.

(i) Presentation of the proposal to the class and application of the initial questionnaire to survey students' prior knowledge on the topic “medicinal plants”;
(ii) Presentation of the mini-course entitled “Shall we research? How to carry out scientific research on safe websites on the internet." This moment aimed to develop students' curiosity and ability with scientific research;
(iii) Bibliographical research activity on the medicinal plant described by the student in the initial questionnaire. At this point, a literature review on the use of the aforementioned medicinal plant was proposed. With this, each student created a sheet with the following information about the plant: popular and scientific name, part used, therapeutic indications and pharmacological action, major active ingredients with their respective chemical structures, contraindications, as well as illustrations that facilitate the recognition of the plant. and the copies;
(iv) Contextualized class using the generating theme “Medicinal Plants”. At this point, the basic characteristics for the recognition and differentiation between the main Organic Functions (alcohol, phenol, enol, aldehyde, ketone, carboxylic acid, ester, ether, amine and amides) were addressed, through chemical structures of active principles present in medicinal plants, so that the relationship with pharmacological properties were emphasized.
(v) Recognition of the functional groups present in the chemical structure of the majority active ingredient of the medicinal plant, for which bibliographical research was carried out in stage three.
(vi) Exhibition of the educational product, that is, the booklet, in physical and virtual form, accessible via QR Code, drawn up based on research carried out by students on medicinal plants, and assessment of the acceptability of the methodological approach using the generating theme “Plants Medicinals” and their contributions to the teaching-learning process, categorized based on a semi-structured questionnaire.

RESULTS AND DISCUSSION

ANALYSIS AND DISCUSSION OF THE INITIAL QUESTIONNAIRE

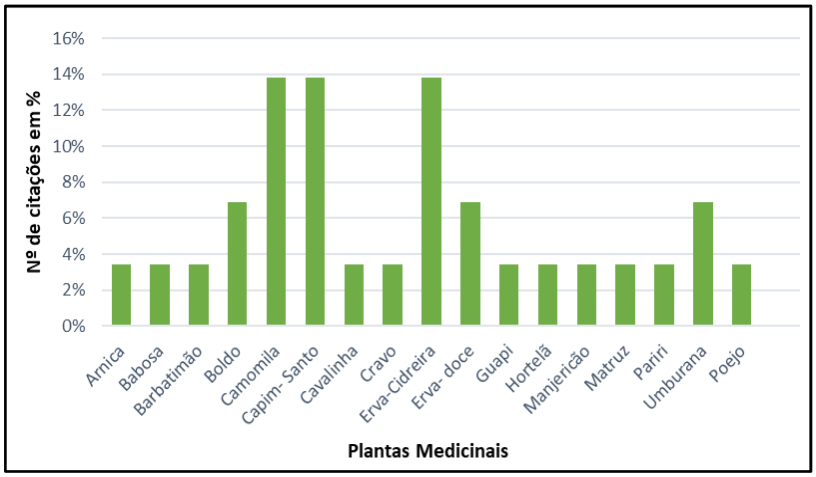
As described in the methodology, the first stage consisted of a presentation of the project and collection of information through the application of an initial questionnaire.

Therefore, it was decided to fully transcribe the subjective responses, in descriptive excerpts, while multiple-choice responses were displayed through graphics.

According to Silva *et al*. (2017), it is interesting that the teaching of Sciences such as Chemistry is worked in a contextualized way, that is, using themes that are linked to the student's daily life. Therefore, the initial questionnaire was applied with the aim of collecting information about the knowledge that students already had regarding medicinal plants and thus obtaining support to develop the topic from their perspectives. Therefore, in order to find out whether the topic was really part of the students' daily lives, they were initially questioned regarding the use of medicinal plants in their homes. Of the 29 students who responded to the questionnaire, all stated that they had already used it. The significant number of students who responded affirmatively was expected, since the use of medicinal plants is ancient, as it is characterized as a practice that has been developed since ancient times and has been preserved through generational transmission. generation, constituting what we know as popular medicine (Silva, 2012). Therefore, this quantity justified the proposed approach to the topic with the respective class.

In the following question, students were asked to name at least one medicinal plant known and consumed in their family circle. The answers to this question are illustrated in Figure 1.

Figure 1. Medicinal plants mentioned by students



Source: Prepared by the authors

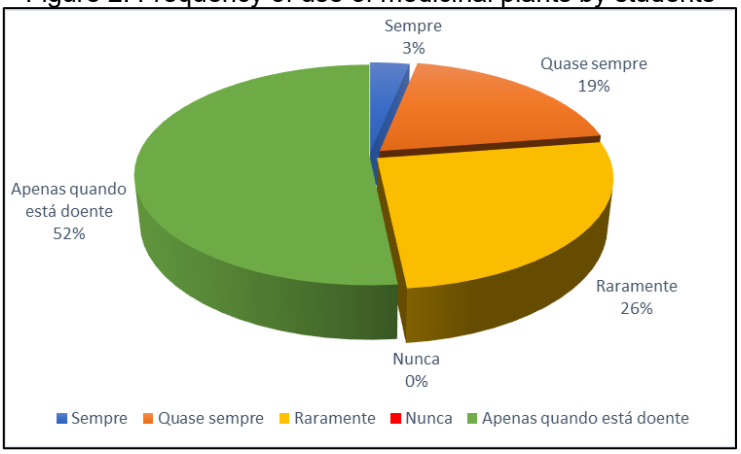
According to Figure 1, 17 species of medicinal plants were cited by the students, among these it was found that lemongrass, chamomile and lemon balm are among the most commonly used by students, whose number of citations in percentage was equal to 14%. According to Lorenzi and Matos (2002), these species are widespread in society, since they have greater ease of adaptive development and, therefore, are found in any environment.

Several works such as Rocha *et al*. (2021) reinforce this information by stating that chamomile is considered widely used in Brazil and can be easily found in supermarkets, drugstores, convenience stores, among others. Studies carried out by Sousa *et al*. (2018), which sought to verify popular knowledge about the consumption of plants for medicinal purposes in a given sample, also revealed lemongrass, chamomile and lemon balm as the most cited species.

The students were also asked about the therapeutic purpose for which they used the described medicinal plant. In view of this, chamomile and lemon balm were mentioned for calming uses, boldo for digestive problems, guapi for flu-like symptoms, among others. With these answers, it was noted that the students already had knowledge about the benefits provided by the use of these plants, information that can be proven through chemical studies carried out by the works of Do Vale *et al*. (2002), who listed that chamomile (*Matricaria chamomilla* L.) and lemon balm (*Melissa officinalis* L.) have a proven calming action, due to the presence of citral, its major constituent, and the presence of the flavonoid apigenin in its composition. Studies such as that by Czelusniak *et al*. (2012), indicate that coumarin, present mainly in the leaves of Guapi (*Mikania glomerata* spreng), is the main metabolite, which stands out for its pharmacological actions, such as anti-flu and expectorant. While boldine, an alkaloid present in boldo (*Peumus boldus* Mol.) has antioxidant and anti-inflammatory potential, which is why it can be used against gastrointestinal cramps (Zanotto; Silveira; Sauer, 2016).

Students were also asked about the frequency of use of medicinal plants. Figure 2 shows that 52%, that is, the majority of students, use medicinal plants only when they are sick, 19% claimed to use them almost always, while 26% use medicinal plants rarely.

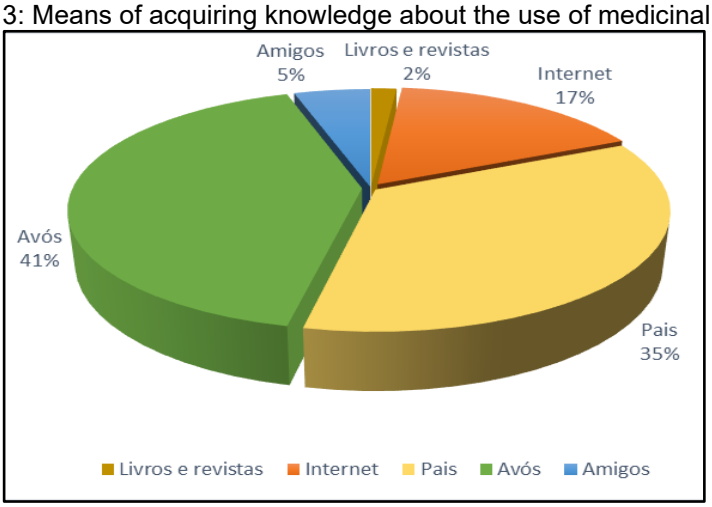
Figure 2. Frequency of use of medicinal plants by students



Source: Prepared by the authors

Carvalho (2011) emphasize that the use of medicinal plants as an alternative to promote or maintain health has been increasing over the years, due to their high healing and natural power, as well as the difficulty of access to medical care for the poorer population. According to these authors, the use of medicinal herbs is favorable to human health, provided that the user has initial knowledge of their utility, risks, and benefits. In this regard, in the following question, the students were asked how they acquired the knowledge they had about medicinal plants. As shown in Figure 3, it was observed that the majority of respondents stated that the information about the purpose of using these plants was obtained from family members, such as grandparents and parents, with percentages of 41% and 35%, respectively. This demonstrates that the culture of using medicinal plants for therapeutic purposes has been formed by popular knowledge passed down from generation to generation over the centuries, mainly recorded through so-called home remedies, primarily taught by parents and grandparents (Brizzolla, 2018; Firmo, 2011).

Figure 3: Means of acquiring knowledge about the use of medicinal plants



Source: Prepared by the authors

After the general inquiries, the students were questioned about the relationship between Organic Chemistry and medicinal plants. In this regard, 72.4% of the students responded that they believed in the existence of this association; however, only 43% were able to justify why this relationship exists, as follows:

> "Yes, since medicinal plants are composed of organic compounds, which are the subject of study in organic chemistry." (STUDENT A)
>
> "Every food, including medicinal plants, is composed of organic substances. Therefore, their properties are directly related to Organic Chemistry." (STUDENT B)
>
> "The active principles found in medicinal plants contain carbon in their composition, therefore, they constitute organic functions." (STUDENT C)

On the other hand, 27.6% claimed not to see this relationship. This demonstrates that, although more than half of the students showed that they can perceive a connection between Organic Chemistry and the pharmacological properties of medicinal plants, a significant portion of the students demonstrated difficulty in identifying that their composition contains organic substances that are responsible for providing health benefits. It can be inferred that the approach to the topic associated with Organic Chemistry was not used in the class and/or the students who demonstrated the association acquired the knowledge through other means, or the approach and learning were not significant for the 27.6% of students.

Finally, the following question was asked: "In your opinion, what makes learning Chemistry more difficult?" Below are some of the students' responses to this question:

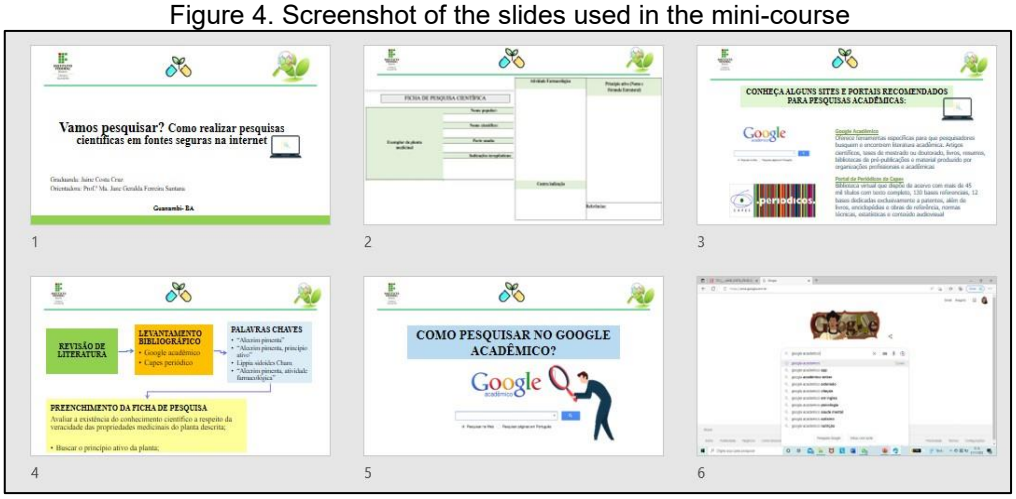
> "The complexity of the subject, without relating it to everyday life, makes it difficult to understand how chemistry really works." (Student A)
> "Because of the multitude of formulas and rules about the structure of these." (STUDENT B)

This result corroborates the arguments of Marcondes (2015), who reports that the excessive emphasis given to rules, classifications, nomenclatures, and formulations of organic compounds is one of the major problems in teaching and learning these concepts in school.

TEACHING INTERVENTION AND ITS RAMIFICATIONS

The production of scientific knowledge depends on research processes, and one of the skills that can classify individuals as scientifically literate is the ability to distinguish between scientific findings and personal opinions (Carvalho, 2011). With the phenomenon of globalization and rapid access to information facilitated by the emergence and advancement of Information and Communication Technologies (ICTs), the identification of research papers and results on various topics has been somewhat stimulated and facilitated (Jesus; Lima, 2012). With this in mind, shortly after the initial problematization of the topic, aiming to develop students' curiosity and skills in scientific research, a mini-course was conducted with the theme: "LET'S RESEARCH? How to conduct scientific research using secure internet sources," as shown in Figure 4.

Figure 4. Screenshot of the slides used in the mini-course



Source: Prepared by the authors

In this mini-course, students were introduced to some websites for searching scientific information on the internet. Among the many tools for research, the use of *Google Scholar* (GS) was demonstrated as a resource for accessing scientific information, including its functionalities and applications. As Gaudêncio, Figueiredo, and Leite (2009, p. 16) state:

> Google Scholar provides a simple way to search scholarly literature comprehensively. You can search across many disciplines and sources in one place: peer-reviewed papers, theses, books, abstracts, and articles from academic publishers, professional societies, preprint repositories, universities, and other scholarly organizations. Google Scholar helps you find the most relevant research from the academic world.

During the mini-course, all students argued that they were already familiar with the tool; however, more than half had already used it, but they reported being less familiar with its functionalities. Students' knowledge about this tool is due to the verticalization of education in Federal Institutes (IFs), which allows the integration of various technical and scientific knowledge on-site, so that the practice of scientific research is not limited to Higher Education and Post-graduation but also extends to other levels and modalities such as High School and Technical Education (Nascimento, 2021). Furthermore, these students are already in the third year of the Technical Course in Internet Computing, which justifies their acquisition of this knowledge.

All of this contributes to providing students with the opportunity to develop research, extension, and innovation activities as academic and technical-scientific productions, through the Integrative Project, one of the disciplines in the curriculum of the course, as well as benefiting from access to the institution's infrastructure and other aspects inherent to the Internet Computing Technical Course (laboratories, workshops, computer labs with various specific programs, communication equipment, among others). Another reason for the broad access can be supported by the simplicity and practicality of using Google Scholar (GS).

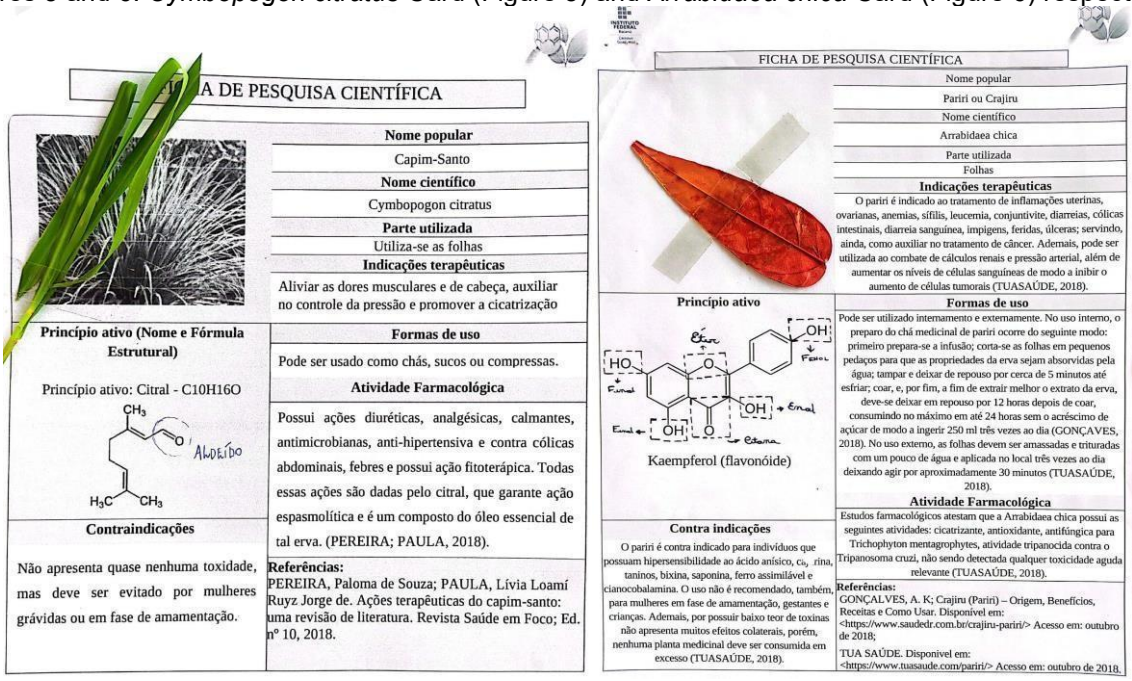
Another database explored with the students was the Capes Periodicals Portal. This is a Brazilian portal of scientific and technological information, provided by the Federal Government to the Brazilian Education System and maintained by the Coordination for the Improvement of Higher Education Personnel (CAPES), a research funding institution linked to the Ministry of Education (MEC). The choice of the Portal as a research source is due to its being a virtual library that gathers and provides internationally comprehensive scientific productions that meet the demands of academic, productive, and governmental sectors, as well as being a tool for the evaluation and regulation of postgraduate courses of great importance for promoting scientific research in Brazil. The main objective of the Portal is to enable free and open access to safe and up-to-date scientific and technological information produced worldwide (Duarte, 2010).

Regarding the use of the Capes Periodicals Portal by students, the majority argued during the mini-course that they do not use this research source, a fact that can be justified by Fernandes and Cendón (2015), such as: unawareness of the Portal's existence, use of other resources, lack of necessity to use the Portal, as well as difficulty in operation, among other factors that end up rejecting its use.

In this sense, the mini-course was important as it provided students with a better understanding of these databases, which are now of utmost importance for seeking useful, safe, and fast information, as well as enhancing the skills necessary to ensure access to and use of relevant information.

After the mini-course, a literature review activity was proposed using the databases explored in the mini-course. Each student was tasked with conducting a literature review encompassing pharmacological and chemical aspects of the medicinal plant mentioned by them in the initial questionnaire. These bibliographic searches conducted by students generated 31 cards containing information about the medicinal plant, such as its common and scientific name, parts used, indications and pharmacological action, major active principles with their respective chemical structures, contraindications, and illustrations that facilitate plant recognition. Figures 5 and 6 provide examples of the scientific cards produced by the students.

Figures 5 and 6: *Cymbopogon citratus* Card (Figure 5) and *Arrabidaea chica* Card (Figure 6) respectively.



A DE PESQUISA CIENTÍFICA

Nome popular
Capim-Santo
Nome científico
Cymbopogon citratus
Parte utilizada
Utiliza-se as folhas
Indicações terapêuticas
Aliviar as dores musculares e de cabeça, auxiliar no controle da pressão e promover a cicatrização

Princípio ativo (Nome e Fórmula Estrutural)
Princípio ativo: Citral - C10H16O
Aldeído
Formas de uso
Pode ser usado como chás, sucos ou compressas.
Atividade Farmacológica
Possui ações diuréticas, analgésicas, calmantes, antimicrobianas, anti-hipertensiva e contra cólicas abdominais, febres e possui ação fitoterápica. Todas essas ações são dadas pelo citral, que garante ação espasmolítica e é um composto do óleo essencial de tal erva. (PEREIRA; PAULA, 2018).
Contraindicações
Não apresenta quase nenhuma toxidade, mas deve ser evitado por mulheres grávidas ou em fase de amamentação.
Referências:
PEREIRA, Paloma de Souza; PAULA, Lívia Loamí Ruyz Jorge de. Ações terapêuticas do capim-santo: uma revisão de literatura. Revista Saúde em Foco; Ed. nº 10, 2018.

FICHA DE PESQUISA CIENTÍFICA

Nome popular
Pariri ou Crajiru
Nome científico
Arrabidaea chica
Parte utilizada
Folhas
Indicações terapêuticas
O pariri é indicado ao tratamento de inflamações uterinas, ovarianas, anemias, sífilis, leucemia, conjuntivite, diarreias, cólicas intestinais, diarreia sanguínea, impigens, feridas, úlceras; servindo, ainda, como auxiliar no tratamento de câncer. Ademais, pode ser utilizada ao combate de cálculos renais e pressão arterial, além de aumentar os níveis de células sanguíneas de modo a inibir o aumento de células tumorais (TUASAÚDE, 2018).

Princípio ativo
Kaempferol (flavonóide)
Formas de uso
Pode ser utilizado internamente e externamente. No uso interno, o preparo do chá medicinal de pariri ocorre do seguinte modo: primeiro prepara-se a infusão; corta-se as folhas em pequenos pedaços para que as propriedades da erva sejam absorvidas pela água; tampar e deixar de repouso por cerca de 5 minutos até esfriar; coar, e, por fim, a fim de extrair melhor o extrato da erva, deve-se deixar em repouso por 12 horas depois de coar, consumindo no máximo em até 24 horas sem o acréscimo de açúcar de modo a ingerir 250 ml três vezes ao dia (GONÇAVES, 2018). No uso externo, as folhas devem ser amassadas e trituradas com um pouco de água e aplicada no local três vezes ao dia deixando agir por aproximadamente 30 minutos (TUASAÚDE, 2018).
Atividade Farmacológica
Estudos farmacológicos atestam que a Arrabidaea chica possui as seguintes atividades: cicatrizante, antioxidante, antifúngica para Trichophyton mentagrophytes, atividade tripanocida contra o Tripanosoma cruzi, não sendo detectada qualquer toxicidade aguda relevante (TUASAÚDE, 2018).
Contra indicações
O pariri é contra indicado para indivíduos que possuam hipersensibilidade ao ácido anísico, cu, rina, taninos, bixina, saponina, ferro assimilável e cianocobalamina. O uso não é recomendado, também, para mulheres em fase de amamentação, gestantes e crianças. Ademais, por possuir baixo teor de toxinas não apresenta muitos efeitos colaterais, porém, nenhuma planta medicinal deve ser consumida em excesso (TUASAÚDE, 2018).
Referências:
GONÇALVES, A. K; Crajiru (Pariri) – Origem, Benefícios, Receitas e Como Usar. Disponível em: <https://www.saudedr.com.br/crajiru-pariri/> Acesso em: outubro de 2018;
TUA SAÚDE. Disponível em: <https://www.tuasaude.com/pariri/> Acesso em: outubro de 2018.

Source: Prepared by students C and E, respectively

During this moment, it was possible to emphasize the importance of the proper use of medicinal plants, as well as to verify the existence of studies that prove the efficiency of the respective mentioned plant and thereby elucidate the relationship between popular knowledge, which is intuitive, spontaneous, with a strong inclination for errors as it is not studied, analyzed, and proven, and scientific knowledge, which in turn aims to study and clarify hypotheses. It is worth noting, however, that both are fundamental to science, as according to Silva and Silva (2015), traditional knowledge brings the importance of life experience itself, and the combination of both benefits from different perspectives and the effort to understand.

It was noted that this activity was quite significant for the students, as they showed commitment to scientific research and the construction of the cards. During this time, a large part of the students reported that there were preparations they ingested for a certain purpose that was actually recommended for another, they also reported being unaware that medicinal plants could cause adverse reactions. According to Pedroso *et al*. (2021), the idea of harmlessness, that "natural is harmless" is a reality for many users. This fact leads to the need and importance of working on this topic in the classroom in order to properly instruct students on the correct use of plants with medicinal properties, as according to Pereira and Cunha (2015), healing through plants is a tradition that spans generations and when used properly, can provide a variety of health benefits, contributing to the cure of various diseases.

In the fourth stage, immediately after the literature review, didactic activities were followed, aimed at contributing to the construction of meaningful learning related to the study of Organic Functions. In this perspective, a contextualized class was taught with medicinal plants, listing the basic characteristics for the recognition and differentiation between the main Organic Functions (alcohol, enol, phenol, aldehyde, ketone, carboxylic acid, ester, ether, amine, and amide). For contextualization, the formulas of the active principles of different medicinal plants were used from those which the students conducted the literature review on, as after the class they would identify the organic functions present in the major active principle of the medicinal plant researched by each of them.

It should be emphasized that the identification and recognition of organic functions were carried out together with the students. In addition to working on the identification of organic functions present in the active principles described, the pharmacological activities caused by the active constituents were also listed, as well as the organoleptic characteristics often derived from these active principles, such as aromas and flavors. An example of this is ginger, which contains active principles such as gingerol and zingerone, responsible for its pungent flavor, as well as therapeutic actions against throat infections, colds, and flu (Conceição, 2013; Ferreira *et al*., 2020).

In the literature review stage, research on the chemical constituents responsible for the pharmacological actions on the medicinal plant was also conducted by the students, as mentioned earlier. Therefore, after the contextualized class, in stage five, each student analyzed their scientific card and recognized the functional groups present in the chemical structure of the major active principle of the medicinal plant, which was consulted in the literature.

It is worth noting that most students attached samples of the medicinal plant to the cards, allowing for a visual/sensory experience, such as aroma and coloration specific to each plant, which were closely associated with organic compounds. The medicinal plant commonly known as Pariri (*Arrabidaea chica*), researched by one of the students, according to Schiozer *et al*. (2012), is a source of flavonoid pigments such as carajurin and carajurone, which are responsible for giving the characteristic reddish color to the plant. Another example of the experience provided was with Capim-Santo (*Cymbopogon citratus*), which presents a citrus aroma from its leaves, which according to Santos (2021) is a result of the major organic compound, citral, an active principle that provides the plant with its calming and spasmolytic action. Therefore, during these two moments, the students showed great involvement and participation, as the research on active principles and the identification of organic functions present brought theory closer to the students' daily lives,

making them realize the presence of Chemistry in their everyday lives, as can be seen from a student's comment: "It's interesting to understand that organic functions are totally linked to the characteristics that plants present, such as their influence on aromas, for example." According to Ricardo (2003), contextualization gives meaning to what is taught to students, helping to problematize knowledge to be taught, consequently arousing students' curiosity and interest in acquiring knowledge.

The students reported difficulties in differentiating the ester, ether, and ketone functions when analyzing the chemical structures of active principles such as carquejyl acetate and coumarins found respectively in carqueja (*Baccharis trimera*) and guaco (*Mikania glomerate*), because these functional classes present a certain similarity that ends up confusing them. Students also had difficulties recognizing the occurrences of organic functions when functional groups are presented in abbreviated form. This fact demonstrates the importance of the teacher resorting to methodological strategies that result in better and more effective student learning.

The compilation of knowledge acquired through successful practices carried out by the participating students resulted in an educational product, an illustrated booklet titled "Medicinal Plants as a Generating Theme for the Study of Organic Functions and Scientific Literacy in Chemistry class." This booklet presents information on 17 medicinal plants acquired through experienced educational practices that favored scientific research and meaningful learning. The cards for each medicinal plant present the main part(s) used for consumption, forms of use, indications, pharmacological action described in the literature, major active principles with their respective chemical structures, organic functions present, contraindications, as well as illustrations containing photos that facilitate the recognition of the plants.

The intention is for this material to serve as support for spreading the correct and safe use of medicinal plants and to contribute to a contextualized and meaningful teaching of Organic Chemistry. According to Maia (2019), among the various ways to promote learning and scientific dissemination, in formal and non-formal environments, is the use of educational materials like this one. According to the author, this type of product is a methodological tool, providing students and educators with the possibility of associating scientific knowledge with popular wisdom.

The elaborated booklet was exhibited physically and digitally accessible via QR Code (FIGURE 7) in the last stage of the intervention. In addition to this, some of the plants and their respective teas were exhibited, constituting a very important moment, which represented the culmination of the activity. At this moment, the students expressed joy at

seeing the medicinal plant used by their families integrating the completed work, as well as being able to feel the aroma and characteristic flavor of some of the plants. The booklet can be accessed through this link: https://drive.google.com/u/0/uc?id=1eVNvVFZk_UoYoXVLDWIrxyQYON7n4u&export=download or by scanning the QR Code displayed in Figure 7.

Figure 7. QR Code card for access to the booklet in digital format

Source: Prepared by the authors

EVALUATING THE DIDACTIC INTERVENTION

At the end of the didactic intervention development, the final questionnaire was administered, aiming to evaluate the acceptability of the methodological approach using the generating theme "Medicinal Plants" and its contributions to the teaching and learning process. The initial question consisted of analyzing what the students found most interesting during the study using the generating theme "Medicinal Plants." From the responses obtained, it was found that the students made references to the existing connection between the theme and Organic Chemistry, as well as the importance of using medicinal plants safely and rationally to avoid adverse effects. Below are some reports from students:

> "What caught my attention the most was the fact that the active principles of the plants in question were intimately related to what we were studying. I had a certain notion that the effects were related to chemistry, but I wasn't sure exactly how that relationship worked." (STUDENT A)
>
> "What I found most important was the relationship between medicinal plants and organic functions, facilitating their study, from understanding to identification." (STUDENT B)
>
> "I learned about the correct usage and it helped me understand organic chemistry." (STUDENT F)

> "We learned about the scientific validation of what we use, as it's passed down through generations." (STUDENT M)

According to Marochio and Olguin (2013), using examples of active principles extracted from plants for the study of organic functions allows for student interaction with the content and their effective participation, valuing common sense and the importance of care regarding the abusive use of plants, as they are medicines. Furthermore, it also provides the opportunity to work on scientific literacy based on the plants used by students and their families.

Seeking to verify possible indicators of Scientific Literacy, the following question was asked again: Do you think the use of medicinal plants can cause any side effects? From the results obtained, everyone answered affirmatively. This shows a change in conception for the 43% of students who initially believed it did not cause any side effects. In parallel, when asked about the precautions that need to be taken for the safe use of these plants, various aspects were mentioned, as follows:

> "First, you need to know the plant and consume it correctly. Then, don't overdo the amount." (STUDENT A)

> "Avoid mixing various species of medicinal plants, observe the dosages of each one, and never collect them near garbage or septic tanks." (STUDENT E)

> "Do not take any medicinal plants during pregnancy, check if the plant is really the one being ingested, use it moderately, and pay attention to possible side effects." (STUDENT J)

It was observed that the students demonstrated using notions of scientific knowledge by pointing out aspects that are extremely necessary to be evaluated before consuming any type of plant for medicinal purposes. According to Colet *et al*. (2015), the safety and efficacy in the use of a medicinal plant depend on correctly identifying the plant, knowing which part should be used, the method of use, use by children, pregnant women, and the elderly, dosage and consumption time, adverse effects, and implications of association with other conventional medications, thus aggregating knowledge from consolidated popular use and evidence revealed by scientific studies.

Therefore, the theme of medicinal plants is interesting within the scope of promoting Scientific Literacy, as it allows students conditions of autonomy, critical reflection, as well as skills and competencies to act in self-care or even as disseminators of evidence-based information demonstrated by scientific research. In this way, knowledge can be socialized, contributing to dissemination for future generations (Pedroso *et al.*, 2021).

In the initial questionnaire, when asked about the existence of any relationship between medicinal plants and Organic Chemistry, 72.4% of the students responded affirmatively and 27.6% negatively. In order to observe any change in the opinion of these students after the implementation of the didactic intervention, the same question was repeated in the final questionnaire. From the results obtained, it was noticed that all students claimed to see Organic Chemistry linked to the theme studied. This result also shows a change in the students' conception who initially couldn't connect Chemistry to medicinal plants. Some phrases that demonstrate such understanding by the students are shown below.

> "Yes, given that the active principles responsible for the medicinal effects are formed by certain functional groups studied in organic chemistry." (STUDENT A)
>
> "Organic chemistry does indeed have a relationship with medicinal plants, considering that the active principle of plants includes various functional groups." (STUDENT B)
>
> "Yes, there is a strong relationship between the study of organic chemistry and medicinal plants." (STUDENT D)
>
> "Many chemical compounds found in medicinal plants are organic compounds." (STUDENT E)

Finally, they were questioned about studying organic functions using the generating theme of medicinal plants, through the following question: Did working on the identification of Organic Functions using "Medicinal Plants" as a generating theme make the content more meaningful and appealing to you? All responded affirmatively, arguing that using the theme to study the content made it more meaningful, due to the use of a theme from their everyday reality, as described in the questionnaire:

> "Yes, as we departed from the routine content of the classroom and approached the subject in a more dynamic way, where we had to research deeply about the plant and its active principle. Thus, identifying the functional groups in plants became more interesting than in the chemical compounds addressed by teachers in class, which are usually unknown and very complex to students." (STUDENT A)
>
> "Bringing things we see and/or use in our daily lives and relating them to chemistry makes learning more interesting and innovative." (STUDENT C)
>
> "It's interesting to study organic chemistry in a way that encompasses everyday life, making it easier to perceive how organic chemistry works and how it affects our lives." (STUDENT D)

According to Lima (2017), the use of methodologies that foster the relationship between what is taught and the learner's daily life, from an approach that awakens the student's perception of the interface between what they already know and what they must

learn, shows greater potential to build meaningful learning, as it generates motivation and interest in the student and attributes meaning to the content.

FINAL CONSIDERATIONS

Didactic proposals that offer the search for new information within the practice and reality of the student are relevant, as they establish an interesting connection between the knowledge acquired through the students' experiences and abstract concepts. In this sense, the more daily life is redirected to educational practices, the more promising the student's engagement with the learning process becomes. Thus, the use of medicinal plants as a generating theme for the study of organic functions and Scientific Literacy evidenced, as shown by the results, how resorting to resources based on contextualization and bibliographic research benefits the educational process.

The study showed that many students, despite having used some medicinal plants, lacked knowledge regarding preparation methods, correct prescription, and necessary precautions for use. Therefore, the activities developed using the generating theme allowed for the integration of scientific knowledge with popular knowledge, reflection on the correct usage, benefits, risks, and precautions during administration. Additionally, the didactic resources employed and the proposed activities throughout the didactic intervention demonstrated to have sparked curiosity and interest among the students, given their active participation in knowledge construction, which may have contributed to the students' processes of scientific teaching and literacy. These results reinforce the importance of addressing cross-cutting themes, such as medicinal plants and scientific literacy in basic education, through methodologies that allow students to actively participate in knowledge construction.

Regarding the study of Organic Functions, it can be observed that the proposed didactic sequence proved to be a good pedagogical tool for working on the recognition of organic functions. Through the methodology used, it was possible to give meaning to the study of organic functions based on a theme from students' daily reality, providing contextualization of teaching and the development of more meaningful learning. Furthermore, there was the creation of an educational product aimed at teaching organic functions, as one of the specific objectives to be achieved.

Therefore, although there are difficulties in further addressing the theme due to the reduction in the weekly class hours for the Chemistry subject in the 3rd year due to the implementation of the new High School system, it proves to be an interesting resource to be

further explored through experimental activities such as active principle and essential oil extraction, visits to community gardens, and stands of herbalists in municipal markets.

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EXPLORING CHALLENGES AND DISCOVERIES: EXPERIENCES AND IMPACTS OF INTERNSHIPS IN CHEMISTRY TEACHER TRAINING

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ABSTRACT

This paper deals with the contributions, challenges, and reflections experienced during the completion of Supervised Internship II, by a student of the Chemistry Teaching degree program at the Federal Institute of Bahia, Guanambi campus. This curriculum component is subdivided into a theoretical part through seminars and reflections on teaching activities, and a practical part structured in moments of observations and teaching practice, including an interview with the school director to analyze the physical structure and documents of the field school. These activities aim to provide moments of practice and reflection as a source of experience to equip and contribute to the training of future teachers. It was observed that the experiences during the internship allowed the student to reflect on the strategies used by her and the supervising teacher, as well as to analyze the actions taken in order to improve her developing teaching practice.

Keywords: Supervised internship. Teacher training. Reflections on practice.

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INTRODUCTION

Supervised internship is an essential tool for teacher training, as future educators can reflect on their future actions as teachers while immersed in the field of practice. This is because the internship brings to the classroom the various themes, theories, and concepts discussed throughout the trainee's education, allowing theory and practice to work together. By experiencing these diverse situations, students can rethink and reconfigure their classroom practice, improving it throughout their training.

Authors such as Silva (2005) argue that this is an opportunity for undergraduates to work with inquiry and doubt, equipping them for the critical exercise of the profession. This allows the student to understand the dynamics necessary to enter and remain in the job market.

Andrade (2005) considers that it is in the internship, an integral part of the curriculum, that the trainee assumes their professional identity and, by embracing the commitment to the student and the entire school community, begins to understand their social role. It is also at this moment that they can confront the various theories, interdisciplinary approaches, and problems that will be considered in the execution of their classroom action plan.

During the observation phase, when the behavior of teachers and students in the teaching-learning process is observed, it is possible to relate and analyze the factors that influence the cognitive development of learners. It is the practice used by the supervising teacher that will guide the dynamics of the intern's classroom.

Reflection on these factors is of fundamental importance for the construction of the teaching practice of future teachers because, as Santos et al. (2017) state, while observing classes and reflecting on these observations, the intern has the opportunity to learn how to use teaching methodologies and strategies that best suit the class and the content, and, furthermore, perceives ways to establish interpersonal relationships with other colleagues in the profession.

The teaching practice is the moment when the intern assumes the role of teacher and begins to act in their field, planning and selecting activities and resources suitable for the concepts and students. According to Santos and Freire (2017), the teaching practice period, by combining theory and practice, contributes to the development of skills and competencies related to the teaching process of content and fundamental personal and professional relationships for the teaching profession.

Thus, this work seeks to reflect and discuss the actions experienced by a Chemistry Teaching student during the completion of Supervised Internship II, aiming to bring contributions to teaching practice and the training of chemistry teachers.

METHODOLOGY

The research is qualitative in nature and was conducted from April to June 2022, in the Supervised Internship II course, during the sixth semester of the Chemistry Teaching degree program at the Federal Institute of Bahia, Guanambi campus.

The internship took place at José Neves Teixeira Municipal School, located in the central region of Guanambi-BA. Its physical structure comprises: a teachers' room, a sports court, a courtyard, administration offices, a library, a cafeteria, a storeroom, bathrooms, and classrooms. The school serves students from the sixth to ninth grade of secondary education, and the teachers have qualifications in their respective fields, fostering a harmonious relationship within the school community. The internship was conducted with the 9th-grade classes during both morning and afternoon shifts.

Data collection was based on the analysis and reflection of observed classes, the school's reality, and data on the school's structure obtained through an interview with the school's principal. Five hours of the total workload were allocated for this interview. Subsequently, there was an observation period, which lasted for 10 hours and aimed to perceive the student-student, student-teacher relationship, developed content, and resources used in the classroom. Finally, the Teaching Practice phase involved a total of 30 hours and was based on the experiences gained during the observation period.

RESULTS AND DISCUSSION

Based on the observations made and the teaching practice conducted in the 9th-grade classes of Secondary Education, it was possible to experience issues related to the teaching profession and reflect on practices that contribute to teacher training.

Therefore, this report was structured based on internship monitoring documents and notes taken during observation and teaching practice. Emphasis was placed on the relationship between internship and teacher training, as well as on the challenges and opportunities experienced by professionals in the field, capable of inspiring the intern to pursue a teaching career.

PERCEPTIONS REGARDING THE SUBJECT TEACHER

The subject teacher has a background in biological sciences and works at the mentioned institution with eighth and ninth-grade classes of Middle School, teaching the Science curriculum. Regarding lesson planning, it is based on the textbook adopted by the institution, but there is an effort to develop different activities that fit the students' reality and the concepts covered in the books. As for teaching resources, educational games such as

bingo, commented exercise resolution, model construction, drawings, and mind maps are used. Students seem to enjoy the teacher's didactics and her approach to the content, constantly interacting during explanations. The assessment system used is based on tests, attendance in activities, and participation in the Brazilian Astronomy Olympiad (OBA).

Concerning the teacher's relationship with the students, she demonstrates excellent control and skill, as even with very full classes, she always invites students to participate, and often they do so spontaneously. One of the biggest issues reported by her is the heat, especially in the afternoon, as even though there are air conditioning units in all rooms, they are not working due to lack of maintenance.

According to Scarpato (2000), during the act of teaching and learning, it is of utmost importance that the teacher structures contextualized classes based on dynamics that engage their class, fostering student-student and student-teacher interactions. This is corroborated by what was observed during the classes, given the teacher's proficiency with the content and teaching practice. For example, during one of the experiences, a Bingo of chemical elements was conducted, where hints about the applicability and history of the elements were given, providing context for the theme under discussion. The teacher took the opportunity to talk about the Uranium exploration in the city of Caetité, thus providing a moment of connection between the content and the daily lives of the school community. It was observed that this was a moment of relaxation where the class was focused and engaged in the activity.

The adopted textbook is the work "Natural Sciences - Learning from Everyday Life" by authors Eduardo Canto and Laura Canto from the publisher Moderna. According to the teacher, it presents very succinct texts with few information about certain subjects; she always seeks to use other resources during content explanation. However, she highlights the quality of the exercises proposed by the book.

TEACHING ACTIVITIES

Initially, the intention was to teach the contents of substances and mixtures, electronic distribution, periodic table, and chemical bonds. However, due to the fact that the subject was already in progress at the beginning of the internship, the first two topics were taught by the supervising teacher during the observation period. Thus, the teaching activities covered the topics: Periodic Table and Chemical Bonds. Initially, the intern developed lesson plans, which were evaluated by the teacher during planning sessions, and together they defined the best strategies to be applied. In the case of the Periodic Table, for example, the lesson was structured as follows: contextualized lesson, investigative activity,

and construction of a mind map; the topics covered included: history, organization, properties, and applications. The lessons were taught to 5 classes, and in two of them, the students became a bit more restless, which could be explained by the proximity to the break time and the end of the class.

During the teaching activities, the intern noticed that, due to the classes being very crowded, it was always necessary to use a louder voice than usual, which was a bit tiring. However, there were moments of great socialization with the class; the students showed a lot of interest in the lesson, asked questions, and participated whenever requested. The students were able to make comparisons during the class, responding to the proposed activity, which is consistent with the studies of Amaral and Amaral (2008), who affirm that resources that enable dynamic classroom interactions and visualization of content lead to more effective learning. At the end of the lessons, the students reported that they really enjoyed the intern's dynamic teaching style and that she could be their chemistry teacher during high school.

FINAL CONSIDERATIONS

During the internship, it was possible to make several observations, both regarding the school's structure and the practices of teachers and other staff members. It also provided an understanding of how the teaching-learning process occurs in the classroom.

The contact with the reality of the school and the classroom, as well as the issues involved, facilitated by the internship, was beneficial for teacher training, providing experiences that allowed the student teacher to reflect on the various positive and negative aspects that directly influence her still developing teaching practice.

Based on this, it is concluded that the school is better built through relationships of respect and mutual participation. Even though the creation of public policies aimed at improving teachers' working conditions is urgent, if the educational environment is grounded in this way, it will be a place of good professional and social practices.

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APPENDIX A - Lesson Plans

<table>
<tr><td colspan="3">LESSON PLAN</td></tr>
<tr><td colspan="3">IDENTIFICATION</td></tr>
<tr><td colspan="3">Teacher:
Rita de Cássia Ramos Queiroz de Freitas</td></tr>
<tr><td colspan="2">School:
Escola Municipal José Neves Teixeira</td><td>Grade Level:
Elementary School</td></tr>
<tr><td>Grade/Class:
9th Grade/A</td><td>Unit:
UNIT A</td><td>Activity duration:
50:00min</td></tr>
<tr><td colspan="3">Lesson theme:
Introduction to the Periodic Table</td></tr>
<tr><td colspan="3">Knowledge Area (BNCC):
Natural Sciences and their Technologies</td></tr>
<tr><td colspan="3">METHODOLOGICAL APPROACH</td></tr>
<tr><td colspan="3">OBJETIVES:
• To study the Periodic Table, covering its historical context and modern classification.</td></tr>
<tr><td colspan="3">CONTENT:
• Historical;
• The modern periodic classification;
• Periods, columns, groups or families;
• Identification and classification of elements as metals, non-metals, and noble gases.</td></tr>
<tr><td colspan="3">APPLIED METHODOLOGY:
1. Writing on the board with bullet points and dialogued explanation with presentation of examples;
2. Slides with theory;
3. Directed activity during explanation;
4. Notes and exercises.</td></tr>
<tr><td colspan="3">RESOURCES</td></tr>
<tr><td colspan="3">Materials, technologies, and resources used:
Whiteboard, notebook, paper, colored pencils, textbook, human resources.</td></tr>
<tr><td colspan="3">ASSESMENT PROCEDURES</td></tr>
</table>

Directed activity during explanation; Exercise resolution from the provided workbook.
Basic Bibliography: CANTO, Eduardo Leite; CANTO, Laura. Ciências naturais: aprendendo com o cotidiano. 6. ed. São Paulo: Moderna, 2018 **Complementar Material:** FONSECA, Martha Reis Marques da Química: ensino médio/ Martha Reis 2ª ed. – São Paulo: Ática, 2016

LESSON PLAN		
IDENTIFICATION		
Teacher: Rita de Cássia Ramos Queiroz de Freitas		
Grade/Class: 9th Grade/A	**Unit:** UNIT A	**Activity duration:** 1h 40 min
Lesson theme: Chemical Bonds		
Knowledge Area (BNCC): Natural Sciences and their Technologies		

METHODOLOGICAL APPROACH
Specific Objectives: 1. Identify the concept of chemical bonds and the main types (ionic, covalent, and metallic). 2. Explain why atoms bond and how chemical substances are formed. 3. Define the octet rule, explain what atom valence is, and its importance for the study of chemical bonds. 4. Recognize, describe, and characterize models of chemical bonds, how they occur, and what types of compounds they form.

CONTENT: • Chemical bonds; ✓ Ionic bonds; ✓ Covalent bonds; ✓ Metallic bonding.
Prerequisite knowledge required: • Atomic models • Periodic Table
RESOURCES
Materials, technologies, and resources used: Materials needed for the class: projector, internet, slides, textbook, notebook, pen, and human resources.
ASSESSMENT PROCEDURES
Creation of a mind map, construction of a glossary of links.
Basic Bibliography: CANTO, Eduardo Leite; CANTO, Laura. Ciências naturais: aprendendo com o cotidiano. 6. ed. São Paulo: Moderna, 2018 **Complementary material:** FONSECA, Martha Reis Marques da Química: ensino médio/ Martha Reis 2ª ed. – São Paulo: Ática, 2016

READ, CHILD! LITERARY READING AND DIVERSITY

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Nincia Cecilia Ribas Borges Teixeira[1]

ABSTRACT

The project *Leia, criança*! promoted actions and reflections that valued diversity and respect for differences through literature. Historically, the school has difficulties in dealing with diversity and in this gap social projects that prioritize literary reading can promote discussion about differences. The project discussed themes historically invisible in the school context while fighting for the promotion of full citizenship through educational practices. Their approaches positioned the school in the direct fight against gender, ethnic-racial, economic-social discrimination, recognizing that such practices represent dilemmas that need to be denaturalized and overcome in social relations, because they foster hatred, intolerance of differences and, above all, make people unequal in the school environment. The target audience was students from the 6th grade of Elementary School in the public network of the city of Guarapuava-PR.

Keywords: Literature. Literacy. Diversity. Citizenship.

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INTRODUCTION

> If, because of I don't know what excess of socialism or barbarism, all our disciplines were to be expelled from teaching, except one, it is the literary discipline that should be saved, because all the sciences are present in the literary monument.
> (BARTHES,1979, p.18 -19)

Currently, many children are moving away from the habit of reading. Factors such as the use of technology combined with the lack of incentive have contributed to the lack of interest in literary reading. It has never been more essential to read than it is today. Through reading, we can transport ourselves to unknown worlds, explore new realities, understand feelings and emotions around us, and develop a critical sense.

For Cosson (2006, p. 23):

> [...] We must understand that literary literacy is a social practice and, as such, the responsibility of the school. The question to be faced is not whether or not the school should schooling literature [...], but rather how to do this schooling without detracting from it, without transforming it into a simulacrum of itself that denies rather than confirms its power of humanization.

Therefore, according to Azevedo et al (2023,) literary reading increases the ability to understand society, since it governs our communication model. No matter where we are, we will be bombarded with information, messages that are transmitted through different linguistic channels, whether verbal or non-verbal. However, it will be up to the critical reader to know how to interpret the different literary texts and how to deal with the different contexts as well as the meanings for which they are intended. Therefore, through the reading they do, the reader develops relationships with the socio-historical and cultural context and will improve the teaching-learning process.

The project *Leia, criança*! aimed to encourage and promote actions and reflections that value diversity and respect for differences through literature. Historically, schools have faced challenges when dealing with diversity. In this context, social projects that encourage literary reading can foster discussions about differences. The school environment, considered the embryo of society, is composed of a diverse population, with varied ethnic groups, customs and beliefs. It is a space where all students should have the same opportunities, but with different learning approaches.

For Vygotsky (1989, p.16), "children are the result of their experiences and exchange with the other". To understand their development, it is necessary to consider the space in which they live and the way they construct meanings. Perrenoud (2000) argues that facing the challenge of proposing teaching that respects the culture of the community means

verifying each social and cultural reality with the concern of outlining a pedagogical project to serve everyone without exception. What is proposed is a discussion about identity between different cultures, building a reflection on man and his differences, both in terms of his individuality and his position in the social and collective sphere.

The *Read, Child! Project* discussed historically invisible themes in the school context while fighting for the promotion of full citizenship through educational practices. Their approaches position the school in the direct fight against gender, ethnic-racial, economic-social discrimination, recognizing that such practices represent dilemmas that need to be denaturalized and overcome in social relations, because they foster hatred, intolerance of differences and, above all, make people unequal in the school environment. For Brito (2014), in this way, subjects considered strangers may feel "unequal", because they do not correspond to models or standards traditionally accepted as "normal". And, because they are strangers, because they do not correspond to these standards, their proximity causes resistance and, therefore, they become dangerous, threatening, and therefore "marginal", that is, on the margins of the spaces (environments, contexts, relationships) reserved for the "normal": a qualifier that is constructed in the meanders of the networks of power (Rangel apud Brito, 2013, p. 17).

The literary text, therefore, gives rise to the possibility of educating to include, as the diversity found in this manifestation of the language opens space for socially excluded voices. For Souza and Amarilha (2006), his space is set up for real characters, with weaknesses, defects and differences, such as the mutilated soldier, the ugly duckling, the clumsy João, the envious stepmother, among other fictional characters. Such qualities reaffirm Literature as a transdisciplinary terrain that enables the knowledge of human reality and a "symbolic experience of a problematizing, political and creative character" (Amarilha, 2006, p.67).

LITERATURE REVIEW

> "Look and see: the most important and beautiful thing in the world is this: that people are not always the same, they are not finished yet, but that they are always changing. The greatest truth is what life has taught me. (Guimarães Rosa)

The project *Leia, criança* ! addressed literary literacy for human and social formation and used the literature of Rildo Cosson (2014) as a theoretical reference, as well as some notes on Reading and literacy by the authors Isabel Solé (2009); Magda Soares (2012) and Ricardo Bortoni (2012).

Reading is essential in our society, because everything we do, are, and share involves writing. From birth, when we receive a name and a record, to death, which is also documented in writing. Therefore, the act of reading and writing was and continues to be used by many peoples as a way to portray human experiences, experiences and knowledge, it is the way in which groups make the cultures that differ them from other groups remain alive.

Although reading shares the task with other social nuclei, such as the family, the community, the media, the school is the main focus of organization, systematization and transmission of knowledge. The school has no reason to be itself. It is the fruit of the environment just as the environment is the consequence of it. (Paulo Freire, 2011).

According to the National Curriculum Parameters of the Portuguese Language (1998, p.45) it is the duty of the school

> […] to make a commitment to ensure that the classroom is a space where each subject has the right to speak recognized as legitimate, and that this word finds resonance in the discourse of the other. It is about establishing a space for reflection in which the effective contact of different opinions is possible, where divergence is made explicit and conflict can emerge; A space in which no one is better or worse, but people who think differently.

According to Dallastra and Teixeira (2014), the development of the school is related to the development of society and vice versa. It is this different thinking that generates knowledge, the mastery of science and technological development, because it is from this conflict that man acquires the means to understand and transform reality and the society in which he lives, becoming able to exercise his citizenship. In this sense, there is no other way than reading that is the basis for learning in school. The student needs to read the reality that surrounds him, reflect and then transform it into something better. Reading is a complex process of searching for meaning in the text.

Reading, as Marcusch i (2008) suggests, is a complex activity that leads the reader to produce inferences from the information captured in the text, the knowledge he already has and assumptions. According to him, understanding is essentially an activity of relating knowledge, experiences and actions in an interactive movement.

The definition of text will contribute to the study that is done on reading. According to Isabel Solé (2009, p.107): "The text contains more than the meaning of the expressions of the textual surface, as it must incorporate knowledge and daily experience, attitude and intentions". With this, the meaning of the words of the text is born from the relationship that is established between the reader, permeated by the intentions and experiences of each one.

Thus, reading is a process in which the reader performs an activity of constructing the meaning of the text based on what is being sought in it, on the knowledge he already has about the subject. Thus, Solé in his book Estratégias de Leitura (2009, p.22) conceptualizes reading as: "... a process of interaction between reader and text; in this process one tries to satisfy (obtain pertinent information for) the objectives that guide its reading".

This statement has consequences, such as: it involves the presence of an active reader who processes and examines the text. It also implies that there must always be a goal to guide reading, in other words, we always read for something, to achieve a purpose.

Under these conditions, in order to read, it is necessary to skillfully handle decoding skills and to bring to the text our objectives, ideas and previous experiences.

The Curricular Guidelines for the Portuguese Language in the State of Paraná (2008, p.56) understands "reading as a dialogical, interlocutive act, which involves social, historical, political, economic, pedagogical and ideological demands of a given moment". When reading, the individual seeks his experiences, his previous knowledge, his family, religious, cultural formation.

According to Bortoni-Ricardo (2012), mediating the development of reading is to exercise the student's comprehension, transforming him from a beginner reader into an active reader. This presupposes developing your ability to read safely, decode clearly, and quickly recognize words for fluent reading. Making provisions, formulating and answering questions about the text, extracting central ideas, identifying new content and data, relating what they read to their social and particular reality, reading what underlies the text, using clues to make inferences, summarizing, being able to dialogue with other texts are skills that constitute the reading subject in formation into a proficient reader. The mediation of reading takes place in the dynamics of interaction. The mediator supports the beginner reader by helping him to mobilize previous knowledge to develop the specific skills for that task.

In view of this, Solé (2009) points out some reading strategies and actions to perform in the act of reading. They are:

- The examination and processing of the text;
- The perception of the objective to be followed in the reading;
- The confirmation of culturally acquired prior knowledge or its refutation and the use of the information obtained from reading the text.

These strategies shape the active role played by the student-reader, who must be aware that reading the text will promote a qualitative change in his or her cognition.

From the same point of view, Bortoni (2012, p.244) also suggests some strategies for the practice of teaching reading, such as:

- Definition of objectives for each reading;
- Preparation for reading: activation and updating of previous knowledge; contextualization; motivation, stimulating curiosity; formulation of predictions about the text to be read;
- During the reading process: reading aloud; encouragement with verbal nods; silent reading; rereading excerpts or the text in its entirety;
- During the questioning (an important strategy responsible for comprehension) that leads to reading comprehension, through a conduction anchored in questions: evaluation and elaboration of new predictions for the content of what was said, as a way of extrapolating the universe of the text; establishment of a relationship with other texts (intertextuality); clarification of doubts about language and content; preparation of summary; reformulation of questions; leading to self-questioning; rereading of excerpts; identification of main idea and themes.

Therefore, recognizing that the teaching of reading requires strategies and seeking the most efficient strategies for the subjects (students), will achieve more effective results in reading classes at school, which should be reflected in competent readers.

So, if reading is a social practice, it is necessary to make some considerations about literacy. Magda Soares (2012, p.72) in her book "Literacy: a theme in three genres" points out:

> … Reading is a social practice, it is what people do with reading and writing skills, in a specific context, and how these skills relate to social needs, values and practices.

For Soares (2012), the emergence of new facts and new ideas requires the use of new terminologies. The term literacy is "undoubtedly the Portuguese version of the English word literacy" (Soares, 2012, p.17). The author presents the meaning of literacy as being "the result of the action of teaching or learning to write: the state or condition that a social group or an individual acquires as a consequence of having appropriated writing" (Soares, 2012, p.18).

According to Kleiman (2002), literacy, as an individual use of writing competence, while the term literacy emerged to identify the social impact of writing. Soares (2012) proposes the term literacy taking into account its social need. In other words, literacy is

not purely and simply a set of individual skills; It is the set of social practices linked to reading and writing in which individuals engage in their social context.

Thus, literacy involves more than merely reading and writing. As Kirsch and Jungeblut apud Literacy: a theme in three genres (2012, p.66) "is the use of these skills (reading and writing) to meet social demands". Believing in the power of literacy to lead to social and individual progress, the authors define it as "the use of printed and handwritten information to function in society, to achieve one's own goals and develop one's knowledge and potentialities".

From this perspective, literacy is considered responsible for producing important results: cognitive and economic development, social mobility, professional progress, and citizenship. That is, every day, the subject can find himself surrounded by the most diverse literacy practices, and feel the need to engage in them, under penalty of not doing so, there will be damage to his social relations.

Solé (2009, p.44) defines:

> … Reading is understanding and understanding is, above all, a process of constructing meanings about the text you intend to understand. It is a process that actively involves the reader, as the understanding he achieves does not derive from the recitation of the content in question. Therefore, it is essential for the reader to find meaning in the fact of making the cognitive effort that reading presupposes, he must know what he is going to read, have resources - relevant prior knowledge, confidence, availability of necessary help, feel motivated.

Within the vast grandeur of existing textual genres, the literary text deserves special mention thanks to the enormous contribution it can bring to the formation of man. To agree with this statement, the National Curriculum Parameters of the Portuguese Language (1998, p.24) postulate:

> Genres exist in an almost unlimited number, varying according to the time (epic, cartoon), cultures (haiku, cordel) and social purposes (entertaining, informing), so that, even if the school imposed on itself the task of treating everyone, this would not be possible. Therefore, it is necessary to prioritize the genres that will deserve a more in-depth approach. Without denying the importance of texts that respond to the demands of private situations of interlocution, due to the commitments to ensure the full exercise of citizenship by the student, it is necessary that school situations of Portuguese language teaching prioritize texts that characterize the public uses of language.

The texts to be selected are those that, due to their characteristics and uses, can favor critical reflection, the exercise of more elaborate and abstract forms of thought, as well as the aesthetic enjoyment of the artistic uses of language, that is, the most vital for full participation in a literate society. And from this point of view, nothing better than the literary

text, haja vista constitutes a peculiar form of representation and style in which the creative force of the imagination and aesthetic intention predominate. (PCN-1998, p. 24-26)

In this way, literature, as a human production, is linked to social life. The understanding of what the literary product is is subject to historical modifications, for which it needs to have dialogical relations with other texts. For Candido (1972, p.123), "[...] Literature is seen as art that transforms and humanizes man and society. The author attributes three functions to literature: the psychological, the formative and the social."

The first, psychological function, allows man to escape from reality, immersing himself in a world of fantasies. For Antonio Candido, literature is one of the richest modalities. This connection between imagination and reality, for the critic, serves "to illustrate in depth the integrative and transformative function of literary creation in relation to its points of reference of reality. At the same time, it shows the fictional creations..." (Candido, 1972, p.805).

In the second, Candido states that literature by itself is part of the formation of the subject, acting as an instrument of education, by portraying realities not revealed by the dominant ideology. In this sense:

> Literature can form; far from being an appendage of moral and civic instruction; She acts with the indiscriminate impact of her own life and educates like her. Given that literature teaches to the extent that with all its range, it is artificial to want it to function as manuals of virtue and good conduct. And society can only choose what seems to it at any given moment to be adapted to its ends, for even works considered indispensable for the formation of the young man often bring what conventions would wish to ban. It is one of the means by which the young person comes into contact with realities that are intended to be hidden from him. It does not corrupt or edify, therefore; but by freely bringing within itself what we call good and what we call evil, it humanizes in a profound sense, because it makes life. (Candido, 1972, p.805-806).

Baraúna (2005, p.11) states that "humanization is a process of gradual construction, carried out through the sharing of knowledge and feelings". In this context, humanizing is having a predisposition to contribute (feeling and knowledge) to the other in an ethical, individual and independent way, recognizing the limits, yours and his, composing empathy between individuals, enabling the exchange of information, learning and respect for the other. In this way, literature enables a broadening of horizons, since it provides individuals with a critical position on the diversity experienced by the reader. And it has a nature that generates concerns. It proposes different and even daring conceptions of the world; transits through the sphere of the real – expressing and interpreting it – and of the possible, going beyond, to the plane of the imaginary.

The complexity of the literary text, which is reflected in its existential and social deepening, accepts chance, creativity and the unexpected. Literature is responsible for the emancipation of humanity from its natural, religious and social moorings. This role is directly related to the reading experience. Critical and reflective reading can free the reader from adaptations, prejudices and constraints of his practical life, forcing him to a new perception of life, of the world, of concepts.

In the exercise of literature, one can make the world comprehensible, transform it into words of colors, odors, flavors and intensely human forms, and it is this literature that needs to maintain a special place in schools. (Cosson, 2014, p.17). In this sense, the discussion and promotion of literary literacy are opportunities and, at the same time, challenges in the effective teaching and learning of literature from the perspective of humanization.

According to Candido (1972, p.249), humanization is the process that confirms in man those traits that we consider essential, such as the exercise of reflection, the acquisition of knowledge, the good disposition towards others, the refinement of emotions, the ability to penetrate the problems of life, the sense of beauty, the perception of the complexity of the world and of beings, the cultivation of humor. "Literature develops in human beings the share of humanity to the extent that it makes them understanding of their fellow human beings."

Literary literacy as a literary construction of the senses is done by asking the text who and when it says, what it says, how it says it, what it says it for and to whom it says it. Answers that can only be obtained when the details of the text are examined, a context is configured and the work is inserted in a dialogue with other texts. Such procedures inform that the objective of this way of reading involves the unveiling of the information in the text and the learning of reading strategies to reach the formation of the reader's repertoire. (Cosson, 2014, p.41).

Cosson (2014, p.23) defines literary literacy as "social practice, and as such, the responsibility of the school". He goes on to state that it is in it (school) that literary reading has the function of helping us to read better, not only because it enables the creation of the habit of reading or because it is pleasurable, but also, and above all, because it provides us, as no other type of reading does, with the necessary instruments to know and articulate with proficiency the world made of language. Literary literacy can be conceived simply as one of the social practices of writing, the one that refers to literature.

Cosson (2014) proposes that three criteria for selecting texts should be combined, making them act simultaneously in literary literacy, because when selecting a text, the teacher should not disregard the canon, since it is in it that we find the cultural heritage of

our community; Nor can it be based only on the contemporaneity of the texts, but on their topicality. In the same way, it needs to apply the principle of diversity understood beyond the simple difference between texts, such as the search for the discrepancy between the known and the unknown, the simple and the complex, in a reading process that is done through the verticalization of texts and procedures. This is how the new and the old, the trivial and the aesthetic, the simple and the complex, and all the myriad of texts that make literary reading an activity of singular pleasure and knowledge, take place in school.

In this sense, literary literacy is a methodological strategy in directing, strengthening and expanding the literary education offered to students in order to make them proficient readers and at the same time realize that literature can contribute significantly to the integral formation of the student.

Therefore, literary reading, in a literacy proposal, has the function of helping the student, and also the teacher, to better read himself, others and the world through the text-reader connections (relations with the student-reader's life experiences), text-text (intertextuality-relations with other texts) and text-world (relations established between the text read and global events).

Literary literacy is a methodological approach that aims to direct, strengthen, and expand the literary education offered to students, with the aim of making them proficient readers. In addition, it seeks to show that literature can contribute significantly to the integral formation of students. Thus, literary reading, within a literacy proposal, has the function of helping both students and teachers to better understand themselves, others and the world. This is done through the connections between text and reader (relations with the life experiences of the student-reader), text and text (intertextuality - relations with other texts) and text and world (relations between the text read and global events).

To carry out the Project, the methodology used was the Basic Sequence of literary literacy. In a simple and objective way, Rildo Cosson (2006) proposes this sequence consisting of four steps: motivation, introduction, reading and interpretation.

- Motivation consists of the student's preparation to enter the text: "The initial success of the author's encounter with the work depends on good motivation" (Cosson, 2006, p. 54). According to the author, the motivation that has close ties with the main text is the one that is usually most successful. It should involve activities involving orality, writing and reading, since the work with literature and the Portuguese language should be integrated, because one is part of the other. However, as they are three different moments, care must be taken so that the focus on literary reading does not get lost.

• The introduction is the moment of presentation of the author and the work. Although it is a simple activity, it requires some care: the information about the author must be limited to the needs related to that text; It is the time to talk about the importance of the work and justify the reason for its choice, however, one should avoid the synthesis of the story so as not to suppress the pleasure of discovery. The work should always be physically presented to the students, drawing their attention to the paratextual elements. However, this step must be done quickly, remembering that its function is only to motivate the student so that the reader receives it in a positive way. Reading must be accompanied by the teacher in order to assist the student in their difficulties.

In the breaks, other literacies will be worked on to enable dialogue between the texts. The break is very important in the literary literacy process, since: through it, the teacher will solve problems related to the vocabulary and compositional structure of the text, among other difficulties related to the decipherment [...] By following the students' reading through the breaks, the teacher will be able to help them solve or, at least, equate issues ranging from the interaction with the text, such as the mismatch of expectations that can lead to the abandonment of the book, to the reading pace, a possible consequence of both the readability conditions of the text and the student's availability to carry out the activity. (Cosson, 2006, p. 64).

• Interpretation is the moment to, based on inferences, "arrive at the construction of the meaning of the text, within a dialogue that involves author, reader and community" (COSSON, 2007, p. 64). In the process of literary literacy, interpretation must be thought of in two moments: one interior and the other exterior. The interior is the moment of the student's encounter with the text, word for word until the end, apprehending the work globally. The external is the socialization of what has been learned with colleagues. It is the moment of registration that varies according to the class, the texts chosen and the teacher's objectives. "The important thing is that the student has the opportunity to reflect on the work read and externalize this reflection in an explicit way, allowing the establishment of dialogue among the readers of the school community" (Cosson, 2006, p.68). By using this method, the teacher will be providing students with contact with other literacies, in addition to the literary, thus contributing to the formation of the competent reader, aware of his responsibility as a citizen and the school, in turn, will be fulfilling its function as the main agent in the formation of the student-reader.

The project's workshops were held at the Visconde de Guarapuava State School – Elementary, High School and Normal School in Guarapuava, PR, with students from the sixth grades of elementary school. The activities followed the didactic sequence proposed by Cosson. The literary works worked on included titles such as *The Little Black Prince* by Rodrigo França, *Blackberries by Emicida, Sulwe by Lupita Nyong'oe and It's OK to be different* by Todd Parr.

After reading the works, the students, accompanied by the project's teachers, participated in in-depth discussions on the main themes of each book. Topics discussed included prejudice, religious intolerance, fatphobia and gender equality. These discussions were conducted in a way that encouraged critical reflection and open dialogue among students.

To consolidate learning, each student was encouraged to record the topic discussed in the form of a verbal text or imagery. Some students chose to write essays or poems, while others created drawings, collages, or even small theatrical performances. These activities allowed students to express their understandings and feelings in a creative and personal way.

In addition, complementary activities were carried out, such as group debates, where students were able to share their opinions and listen to different perspectives. There was also the creation of thematic murals, where the students' works were exposed, promoting an environment of appreciation and recognition of individual productions.

About 400 students participated in the project, who had the opportunity to develop critical reading, written and artistic expression skills, in addition to expanding their understanding of relevant social issues. The active involvement of teachers was crucial in guiding and supporting students throughout the process, ensuring a collaborative and enriching learning environment.

FINAL CONSIDERATIONS

Literary reading is the key instrument to achieve the skills necessary for a quality, productive and fulfilling life. It allows the understanding of the meaning of the texts, taking into account the relations of the text in question with others on the same subject or by other national or international authors, from the same period or different times in which they were written, relating them to the present, enabling a reflective reading, but also providing the opportunity for free thought, which the reader can dream, to be moved.

Literary literacy plays a crucial role in the formation of critical and reflective readers, going beyond the simple decoding of words. The *Leia, criança* project involved the

immersion of students in literary texts that stimulated imagination, creativity and cognitive skills, providing a deeper understanding of the world and themselves, and, above all, led them to question and reflect on what they read, promoting critical thinking that is essential for active citizenship.

During the project, the students had the opportunity to identify with the characters, allowing them to develop the ability to understand and respect different points of view and reflect on their own lives and understand the lives of others. By relating literary themes to contemporary issues, students were able to develop a deeper and more critical understanding of the world around them.

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THE SCIENCE OF EDUCATION AND ITS RELEVANCE TO EDUCATIONAL RESEARCH: CONTRIBUTIONS TOWARDS A SUSTAINABLE SOCIETY

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ABSTRACT

The article "The Science of Education and its Relevance to Educational Research: Contributions Towards a Sustainable Society" explores the importance of the Science of Education in shaping pedagogical practices that promote social and environmental sustainability. In a context where education is viewed as a fundamental pillar for the development of critical and engaged citizens, educational research becomes an essential tool for understanding and implementing these practices. The study highlights how the Science of Education can integrate diverse theories and methodologies, contributing to the construction of a more conscious and responsible education. The methodology adopted followed a qualitative approach, utilizing bibliographic research to analyze relevant works and theories in the field. The general objective was to investigate the relevance of the Science of Education to educational research, emphasizing its contributions to the promotion of a sustainable society. To this end, specific objectives were established, addressing topics ranging from the analysis of the characteristics of educational research to discussions on normativity and pedagogical practice. In conclusion, the Science of

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Education proves to be an essential discipline in the search for educational solutions that promote not only knowledge but also the ethical and social values necessary to face contemporary challenges. By integrating theory and practice, this science significantly contributes to the development of individuals committed to a more sustainable future, reaffirming its central role in educational research.

Keywords: Science of Education. Educational Research. Sustainability. Pedagogical Practices.

INTRODUCTION

The Science of Education plays a fundamental role in shaping critical and aware citizens, being essential for the development of educational practices that meet contemporary demands, especially in a world increasingly concerned with sustainability.

Education, as one of the pillars of society, must be able to promote not only knowledge but also ethical and social values that contribute to the construction of a sustainable future. In this context, educational research emerges as a powerful tool to investigate and implement practices that foster this transformation.

This article adopts a qualitative methodology with the objective of exploring and interpreting the contributions of the Science of Education to educational research, especially in the context of a sustainable society. A bibliographic research approach was employed, allowing for an in-depth analysis of relevant works and theories in the field, as well as the intersections between the Science of Education and sustainable pedagogical practices.

The general objective of this study is to investigate the relevance of the Science of Education to educational research, highlighting its contributions to promoting a sustainable society through the analysis of its characteristics, methods, and relationships with pedagogical practice.

To achieve this goal, the following specific objectives were established: Analyze how the Science of Education can offer a theoretical and practical foundation that supports empirical educational research, aiming at the development of educational practices that contribute to social and environmental sustainability; Explore the definitions and characteristics of educational research within the Science of Education, emphasizing its importance for the formation of critical and aware citizens in a sustainable context; Investigate whether the Science of Education presents specific methods for knowledge acquisition and how these methods can be applied in educational research to promote an interdisciplinary approach; Examine the relevance of the concepts, theories, and perspectives that underpin the Science of Education, highlighting how these elements contribute to a deeper understanding of educational processes and their social implications; Analyze the interconnection between the Science of Education and pedagogical practice, demonstrating how this relationship can positively influence the development of sustainable educational practices; Discuss the role of normative issues in educational research, inves'tigating how the Science of Education can address these issues critically and reflectively, contributing to the ethical and responsible education of teachers and students.

The article is structured into four sections: introduction, methodology, theoretical foundation, and final considerations. This organization aims to provide a clear

understanding of the contributions of the Science of Education to educational research in the context of sustainability, highlighting its importance in preparing individuals to face the challenges of the contemporary world.

METHODOLOGY

The approach adopted in this study was qualitative, aiming to explore and interpret the contributions of the Science of Education to educational research, particularly in the context of a sustainable society. For this purpose, a bibliographic research procedure was employed, allowing for an in-depth analysis of relevant works and theories in the field.

The bibliographic research involved a review of specialized literature, focusing on authors who have significantly contributed to the understanding of the Science of Education and its implications for educational practice.

The main authors underpinning this investigation were Chizzotti (2016), Couto (2017), Mainardes (2018), Silva (2020), and Reis (2021). These authors were selected due to the relevance of their works in the discussion of the autonomy of the Science of Education, the methods used in educational research, and the importance of an interdisciplinary approach to promote practices that support sustainability.

This methodology not only enabled the identification of the main characteristics and challenges of the Science of Education but also provided an understanding of how these contributions can be applied to the formation of critical and engaged citizens, essential for the construction of a more sustainable society.

THEORETICAL FRAMEWORK

The theoretical framework of this article addresses the contribution of the Science of Education to empirical educational research, highlighting its essential role in the construction of a sustainable society. Initially, the discussion focused on how this discipline can guide educational practices that promote awareness and social responsibility, preparing critical and engaged citizens. The analysis of the interactions between theory and practice was fundamental to understanding how the Science of Education positions itself in relation to contemporary challenges.

Subsequently, the concept of educational research within the Science of Education was explored, emphasizing the diversity of methods used to obtain knowledge. This methodological plurality is crucial for adapting research to the specificities of educational contexts, allowing for a more integrated and comprehensive approach. The importance of

the concepts, theories, and perspectives that underpin this discipline was also addressed, highlighting how they contribute to a deeper understanding of educational processes.

Finally, the special relationship between the Science of Education and pedagogical practice, as well as the issue of normativity, was examined. The discussion centered on how this connection is vital to ensure that research not only reflects theories but also translates into effective actions in the classroom. By addressing these issues, the aim was to provide a comprehensive view of the contributions of the Science of Education to educational research, underscoring its relevance in shaping a more sustainable society.

THE CONTRIBUTION OF THE SCIENCE OF EDUCATION TO EMPIRICAL EDUCATIONAL RESEARCH: TOWARDS A SUSTAINABLE SOCIETY

The focus of the reflections developed in this article lies in the contribution that the Science of Education, as an autonomous scientific discipline, can offer to the interdisciplinary endeavor known as empirical educational research, with the aim of creating qualitative conditions for a sustainable society.

To this end, it is necessary to recognize that among the classical responses from the theory of knowledge regarding the criteria that define the autonomy of a discipline, the idea stands out that the uniqueness of a science is linked to its field of study and the methods used to obtain knowledge (Almeida, Graterol, & González, 2024).

Thus, the following analysis begins with a clarification of what should be understood as educational research within the Science of Education, and then seeks to substantiate the specific contribution of the Science of Education to this research, based on the uniqueness of its field and methods.

Other approaches use "local" concepts or theories, previously discussed by Herbart, or perspectives from the discipline as a starting point to determine the specificity of the educational approach within the scope of educational research (Ribas & Moura, 2006; Maia, 2020).

It should be emphasized that this theme is decisive for the maintenance of a sustainable society, as by promoting a deeper understanding of educational processes and their social interactions, the Science of Education can facilitate the development of critical and engaged citizens, capable of contributing to a more sustainable future.

Other authors highlight the intrinsic connection between the Science of Education and pedagogical practice, a relationship rooted in the tradition of the discipline, as well as the importance of normative statements in educational research (Nóvoa, 2019; Lopes, Santos, & Wirzbicki, 2023).

Similarly, the Science of Education seems to operate within a "polyphony" of methodologies and approaches, reflecting the diversity of perspectives and challenges that shape it. This approach is fundamental for promoting a sustainable society, as by integrating different voices and methods, the Science of Education can contribute to the development of pedagogical practices that not only share knowledge but also encourage critical reflection and active participation from students.

UNDERSTANDING EDUCATIONAL RESEARCH IN THE SCIENCES OF EDUCATION

Before addressing the specific contribution of the Sciences of Education to empirical educational research aimed at a sustainable society, both in terms of content and method, it is essential to clarify what is considered educational research within the context of the Sciences of Education.

A practical answer to this question can be found in the studies of Couto (2017), who addresses the key question: “What is Educational Research in the Sciences of Education?” The author explains, in general terms, that a simple answer could be: “it is the part of educational research produced by the Science of Education and its sub-disciplines and associated individuals” (Couto, 2017, p. 15).

Therefore, educational research in the Sciences of Education encompasses all contributions made by individuals institutionally affiliated with the Science of Education or one of its sub-disciplines. Although this formal definition leaves many questions unanswered—such as the determination of individuals’ affiliation to the Science of Education in contexts where fields like educational psychology or specific didactics are also linked to faculties of education—it at least allows for a quantitative assessment of the participation of the Science of Education in total contributions to educational research.

The subsequent considerations, however, focus on the contributions of the Sciences of Education to empirical educational research directed toward a sustainable society, without disregarding the relevance of theoretical or non-empirical research.

This discussion is vital for promoting a sustainable society, as clearly defining the role of the Sciences of Education in educational research enables us to develop approaches that not only enhance pedagogical practice but also encourage critical and conscious education for students. This is essential for training citizens capable of facing contemporary challenges and contributing to a more sustainable future.

Is There a Specific Field of Study in Educational Research within the Sciences of Education?

When discussing the different approaches that define the contributions of the Sciences of Education to educational research, the tradition of the theory of knowledge suggests that this specificity must be justified by a field of study unique to the discipline. However, upon analyzing relevant publications, it is observed that while there are several attempts to delineate the field of study of educational research, definitions of a specific field within the Sciences of Education are scarce.

Although the Science of Education has received special importance due to its "pedagogical orientation" (Couto, 2017), this relevance is not based on a specific object of study but rather on a particular interest in knowledge: "The special role of the Science of Education in educational research arises to the extent that its interest in improving conditions for human development and realization guides research" (Couto, 2017, p. 25).

The pursuit of justifying the specificity of the contributions of the Sciences of Education to educational research based on a unique field of study appears to be a promising approach. However, it should be clarified that there is no special position (understood as the only option...) for the Science of Education concerning educational research, confirming that educational research can be developed by other sciences such as Economics, Psychology, Sociology, etc. Nonetheless, it is worth highlighting the positioning of Mororó and Couto (2012, pp. 82-83 – emphasis by the authors) regarding the role of the teacher-researcher, especially when the studies developed by them refer to social sustainability, considering them as if they were (and indeed are...):

> The scaffolding of academic research... responsible for guidance on how to conduct reading and bibliographic surveys regarding the object of study, the choice of methodological processes, the elaboration of data collection instruments, the definition of the research field, as well as the reading and analysis of data and final considerations.

Vieira, Côco, and Ventorim (2017, p. 04), for example, define the field of educational research as:

> The conditions, processes, and outcomes of education throughout life, both within and outside educational institutions and in the social context, aimed at understanding and improving educational reality; it seeks fundamental and applied knowledge, descriptive, predictive, explanatory, and oriented toward change. Recognizing the commitment of research to articulate with the complexity of the social, political, and historical context, emphasizing the relevance of constituting the theoretical-methodological framework to guide investigations particularly related to sustainable society.

While in the 1970s the Science of Education was recognized for its special role in educational research, grounded in the interest in enhancing human development possibilities, currently, the focus on “knowledge of change”—as well as on aspects of description, prediction, and explanation—is attributed to educational research as a whole, without granting a privileged position to the Science of Education. The attempt to define the specificity of academic educational research based on a unique field of study faces considerable challenges.

The argument presented by Inéia, Ellensohn, and Turchetti (2023, p. 08), which identifies the contribution of the Science of Education to educational research in the “comprehensive view of pedagogical processes” and in the “reflexivity embedded in the questions posed by the concept of education,” suggests that the Science of Education distinguishes itself by considering “the entirety of pedagogical processes,” whereas other disciplines tend to focus only on parts of these processes. Education and research are factors that must go hand in hand, as they are fundamental to the development and strengthening of society, being responsible for driving the production of a country's intellectual wealth. In this sense, initiatives to access, expand, and qualify education should be prioritized at various levels of education. However, this perspective emphasizes a specific view of the field rather than a clear definition of an autonomous field of study.

The argument that the Science of Education does not possess a unique field of study, but rather a diverse set of perspectives and methodologies, is reinforced by scientific theory, which asserts that the objects of a discipline are not simply pre-existing data, but rather the result of a process of object constitution, strongly influenced by the methods and theoretical-conceptual approaches used. This implies that the specificity of the Science of Education may be better understood through its specific methodologies and concepts, rather than by attempting to establish an isolated field of study (Rampasso et al., 2018).

This discussion is fundamental for promoting a sustainable society, primarily because the diversity of approaches and methods within the Science of Education allows for a more comprehensive and integrated understanding of contemporary educational challenges.

It is believed that this plurality is essential for addressing complex issues related to sustainability, as education plays a crucial role in shaping critical and conscious citizens who can contribute to solving environmental and social problems.

Moreover, by recognizing that the Science of Education is not limited to a single field of study, it is possible to foster a more inclusive and adaptable education that considers the cultural, social, and environmental specificities of different contexts. This is vital for implementing pedagogical practices that promote sustainability in various areas, such as

environmental education, which seeks to raise awareness about the importance of environmental preservation and the responsible use of natural resources. The interconnection between different disciplines within the Science of Education also enables the development of innovative and collaborative solutions to the challenges faced by society. Educational research can, therefore, integrate knowledge from fields such as sociology, psychology, and environmental sciences, creating an interdisciplinary space that enriches learning and promotes a holistic view of education. Ultimately, this discussion contributes to building a culture of sustainability, where education not only transmits knowledge but also instigates behavioral changes and ethical values that are essential for ensuring a sustainable future.

Thus, the uniqueness of academic educational research may reside more in the methodological approaches and the "indigenous" concepts of the discipline than in a specific field of study that clearly distinguishes it from other areas.

DOES THE SCIENCE OF EDUCATION HAVE ITS OWN METHODS FOR KNOWLEDGE ACQUISITION?

A second classical criterion for the autonomy of a discipline is the existence of specific methods for knowledge acquisition. In the realm of empirical educational research, this criterion appears inadequate for underpinning the specificity of a science, as none of the involved disciplines can claim entirely exclusive methods.

This discussion is crucial for promoting a sustainable society, as recognizing that the uniqueness of educational research does not rest solely on a fixed set of methods, but rather on a diversity of approaches and concepts, allows us to develop more inclusive and adaptable pedagogical practices.

It is noteworthy that “quantitative and qualitative (or reconstructive) research methods have, in fact, become part of the common repertoire of various disciplines within the social sciences, making a distinction based on this hardly feasible” (Mineiro, Silva, & Ferreira, 2022, p. 05).

Recent literature on the topic indicates that an educational approach through science would ensure the attributes of social development, personal development, and the development of science itself (essentially through the advancement of scientific research). Observing these three elements necessitates contextualized teaching and can ensure applicability or functionality of knowledge objects in everyday life (Silva, 2020).

Conversely, in the methodological discussion of social and educational sciences, there is a general consensus that there are no intrinsically 'good' or 'bad' research methods;

the appropriateness of a method should always be determined based on the object and the research question (Mineiro, Silva, & Ferreira, 2022).

Thus, even for the mixed methods advocated by Creswell and Creswell (2018), it is not a 'superior' approach in itself, but must be justified based on the research question, objectives, theoretical framework, and the constitution of the object that a research project demands for a multimethod approach (Creswell & Creswell, 2018).

This discussion is essential for promoting a sustainable society, as exploring the specificities and methodologies of the Science of Education allows us to develop more effective pedagogical approaches. This not only enriches educational knowledge but also, as previously mentioned, empowers students to become critical and engaged citizens, prepared to face contemporary social and environmental challenges (Mainardes, 2018).

The most promising effort to justify the autonomy of the Science of Education in methodological terms seems to lie in the premise that educational research within the Science of Education is characterized by methodological pluralism. This contrasts with Psychology, which tends to focus predominantly on quantitative procedures or hypothesis testing, while qualitative or reconstructive methods have not been established or adopted beyond peripheral sectors (Mainardes, 2018).

On the other hand, in the Science of Education, it is evident that its contributions to empirical educational research utilize a wide range of methods, spanning from quantitative and qualitative procedures to combinations in triangulation or mixed methods, including ethnography, discourse analysis, and methods of historical educational research.

ON THE IMPORTANCE OF CONCEPTS, THEORIES, AND PERSPECTIVES

The relevance of specific concepts, theories, and perspectives in justifying an independent approach to Educational Science within educational research is primarily emphasized in contributions from the philosophy of education and pedagogy (Mota, 2017; Bergano, 2019; Gualberto & Pacífico, 2021).

A common feature of these works is the orientation towards fundamental concepts of education and formation, as well as the analysis of the relationship between the phenomena these terms represent. Education is generally understood as an intentional intervention in the development of individuals, while formation, following Bender, Bastos, and Schetinger (2024), refers to the process of interaction between humans and the world. The constitutive perspective of Educational Science on the field delineated by these concepts suggests, according to these approaches, that “education is the possibility of formation” (Amador, 2019, p. 27).

In this context, André and Martins (2020, p. 15) mention three “pedagogical causalities: an educational causality, a formative causality, and a mediating causality between the two, which must be investigated.”

This discussion is essential for maintaining a sustainable society, as by exploring and grounding the specificities of Educational Science, we can develop educational practices that promote learning beyond a merely individual understanding. Regarding the specific role of Educational Science in educational research, the main implication of the conceptual distinctions and associated perspective is the need for empirical educational research to be conducted in a way that reflects the complexity of this perspective and connects with theoretical discussions on education and formation. This particularly includes a call for empirical educational research to address aspects of the field that have been underexplored thus far.

In this context, André and Martins (2020) highlight their contributions to the modeling and evaluation of religious or ethical competencies, as well as different domains of competence, such as basic knowledge based on information, judgment capacity, and participation ability. Another approach that may facilitate the connection between empirical educational research and theoretical developments in the field of education is biographically-oriented theoretical research, which investigates biographical educational processes based on a theoretically grounded concept of education (Cruz, Paiva, & Lontra, 2021).

In summary, it should be noted that in these approaches, the specific contribution of Educational Science to educational research is seen in the provision and development of a theoretical framework based on the fundamental concepts of the discipline, such as education and teaching, as well as in relevant theoretical discussions. The function of educational and pedagogical theory in educational research can be described by André and Martins (2020) as both optimization and critique. This involves both a fundamental theoretical critique of problematic simplifications in relevant research projects and the development of empirical educational research projects that investigate specific domain competencies, including previously underexplored areas of competence.

THE SPECIAL RELATIONSHIP BETWEEN EDUCATIONAL SCIENCE AND PEDAGOGICAL PRACTICE

An additional argument that justifies the unique contribution of Educational Science to educational research is its proximity to pedagogical practice. Similar positions can be observed in the most recent discussions on the subject. Lopes, Santos, and Wirzbicki

(2023), for example, describe the special status of Educational Science as a practice-oriented discipline which, unlike "closed" disciplines such as Philosophy, History, or Psychology, depends on external demand, addressing pedagogical themes to offer practical solutions to specific problems. Its identity, according to Lopes, Santos, and Wirzbicki (2023), is shaped by the continuity of the issues it faces, rather than being based on an exclusive method or a single canon.

According to Lopes, Santos, and Wirzbicki (2023, p. 13), the uniqueness of Educational Science lies in its specialization in meeting external demands, primarily stemming from pedagogical practice or educational policy, which seek "practical solutions to problems." Similarly, Cox (2012, p. 27) characterizes Educational Science as the "reference discipline for pedagogical professions," highlighting the practical orientation of educational research.

This connection between theory and practice is vital for maintaining a sustainable society by aligning educational research with the real needs of the school environment and educational policies (Cox, 2012). Unlike basic sciences such as Psychology, Sociology, and Economics, Educational Science is a discipline oriented towards practical application, whose function is to integrate and focus the "theories developed in basic disciplines to clarify fundamental mechanisms [...] related to professional issues (and the respective social subsystem)" (Cox, 2012, p. 31). The condition for a "productive intersection between applied disciplines and basic sciences" resides in "shared central theoretical concepts and mutually recognized methods for the generation and verification of scientific knowledge" (Cox, 2012, p. 32).

Beyond Application Orientation: The Integrative Function of Educational Science

Beyond the emphasis on application, the integration of research results from other disciplines is another aspect that may justify a special position for Educational Science within educational research, reflecting its proximity to practice. Applying this reasoning to our discussion, the integrative function of Educational Science can be outlined as follows: since empirical educational research is an interdisciplinary project, there is a need for an instance that gathers, relates, and questions the practical relevance of the results from the various disciplines involved. And who better to play this role than Educational Science, with its focus on practice and application?

This argument becomes even more relevant when considering the proximity to practice and the relationship with the profession, along with the issue of training and qualification. Antonaccio et al. (2022), in their book Fundamentos e metodologia da

pesquisa educacional, describe Educational Science as the "integrative reference discipline for educational research," as its function is the scientific training and qualification of education professionals, thus playing a role of "integrating discoveries, knowledge, and methodological foundations" (Antonaccio et al., 2022, p. 51).

From this perspective, the integrative function of Educational Science consists of consolidating the research results from the various disciplines involved in educational research—not only in relation to their relevance to pedagogical practice but also concerning the needs of scientific training and qualification of active professionals, which are, ultimately, the responsibility of Educational Science (Antonaccio et al., 2022).

THE PROBLEM OF NORMATIVITY

The issue of normativity in Educational Science is closely related to its status as a practice- and application-oriented discipline. Here, the theory of value neutrality and the expectation that Educational Science should provide action-oriented knowledge seem to be in conflict (Chizzotti, 2016).

From the first perspective, educational research, like any other empirical research, should avoid making normative statements (about what should be) and restrict itself to descriptive-analytical claims (about what is). On the other hand, a complete abandonment of normative statements is deemed unfeasible, as educational research is expected to actively engage in the clarification and discussion of normative issues in a methodologically reflective manner, similar to fields such as ethics and practical philosophy (Chizzotti, 2016).

Similarly, Chizzotti (2016) argues that Educational Science should self-restrict to methodologically controlled results. She contends that this limitation is necessary due to the difference between scientific reasoning and other forms of assertion, such as "normative ideas, concrete interests, and logical demands," which inevitably compete with scientific results in public debates about education and pedagogy, as well as influence professional decisions. Research should provide the "best possible evidence for an informed public debate" (Chizzotti, 2016, p. 14).

One unresolved problem is that empirical educational research or the reception of its results often encounters normative issues, whose rational treatment frequently remains undefined. Miranda and Miranda (2018, p. 219), for instance, raise central questions that arise in the context of empirical educational research projects: “Which indicators are selected by whom (and at what time) to observe, control, and, if necessary, improve the performance of the educational system? And who decides, based on what normative premises, what is considered “‘important,’ ‘desirable,’ ‘appropriate,’ and ‘sufficient’”?

This demonstrates that normative issues cannot be entirely excluded from empirical research. In this sense, an observation from Miranda and Miranda (2018) is pertinent, as they argue that the postulate of value neutrality (as discussed by Reis, 2021) applies only to the context of justification and not to the context of discovery and application of scientific knowledge. The renunciation of normative statements, therefore, refers only to the rigorous testing of hypotheses (Reis, 2021), but not to the emergence or selection of these hypotheses, nor to the discussion of the implications of their verification.

Thus, the question becomes: how should normative aspects be discussed, and how can the rationality of this discussion or the corresponding decisions be ensured? Rather than forcing Educational Science to choose between adopting one of two opposing positions—completely renouncing normative statements or the postulate of value neutrality—a solution to this dilemma may lie in keeping the conflict between both positions open and grounding the unique contribution of Educational Science to educational research in its ambiguous position within this tension (Chizzotti, 2016; Miranda & Miranda, 2018; Reis, 2021).

Just as the singularity of Educational Science in relation to the methodological question should be viewed in the plurality of its methods, the specific position of the discipline in relation to the problem of normativity can be described as one that deviates from an "either-or" stance, avoiding taking sides and choosing instead to position itself at the boundary between the positions assigned by classical distinctions.

FINAL CONSIDERATIONS

This article addressed the relevance of Educational Science to educational research, highlighting its contributions to the promotion of a sustainable society. The research achieved each of its planned objectives by analyzing how Educational Science can provide a theoretical and practical foundation that supports empirical educational research, exploring its definitions and characteristics, investigating the specific methods used, examining the importance of concepts and theories, and discussing the relationship between Educational Science and pedagogical practice.

It is important to summarize and evaluate which of the discussed positions are most appropriate for describing the unique contribution of Educational Science to educational research with a focus on societal sustainability. Initially, it should be noted that attempting to ground the specificity of educational research in Educational Science by identifying an exclusive object of study or a distinctive method is not a promising approach. In the broad

field of educational research, no objects can be identified that are exclusively treated by Educational Science.

The special contribution of this discipline lies more in a particular perspective on the field, one that originates from its own theoretical tradition, such as the distinction between education and formation, the diversity of educational theories, and the possibility of education through formation. In this sense, a significant contribution of Educational Science to empirical educational research focused on a sustainable society is the provision of a conceptual and theoretical framework for questions and the construction of objects of study. Similarly, no exclusive method for generating knowledge can be identified as solely belonging to Educational Science.

Regarding the methodological issue, the uniqueness of this discipline can be found primarily in its plural understanding of research methods, which sets it apart from the methodological monism of other sciences, which often focus almost exclusively on quantitative paradigms and hypothesis testing.

On the other hand, it seems more promising to justify the contribution of Educational Science to educational research based on its special relationship with pedagogical practice, which results from its function as a practice-oriented and professional training discipline that aims, among other things, to foster societal sustainability. The autonomous importance of Educational Science lies, in particular, in its ability to integrate the knowledge produced by various disciplines involved in educational research, focusing on the issues and problems of pedagogical practice, as well as on the training and updating of educational professionals.

Closely linked to the connection with practice, Educational Science stands out for its polyvalent position concerning the problem of normativity, which arises from the conflict between contrasting expectations: on the one hand, conducting empirical research without value judgments, and on the other, providing practical knowledge to professionals in the field. However, this polyvalence should not be seen as a weakness; on the contrary, it can be understood as a specific potential that allows Educational Science to produce empirical findings on educational research topics and actively participate in discussions on normative issues. This occurs while maintaining rational standards of argumentation and acknowledging the difference between descriptive-analytical and normative statements. Thus, the special position of Educational Science in educational research consists of engaging in both distinct discourses and keeping the conflict between them open.

For future research, it is advisable to deepen the study of sustainable pedagogical practices that emerge from the intersection between Educational Science and other fields of knowledge. Investigations that explore how different cultural and social contexts influence

the implementation of sustainable educational practices can further enrich the field of educational research. Additionally, studies that analyze the impact of educational policies on the formation of sustainable citizens may provide valuable insights for educators and policymakers.

In conclusion, the research demonstrated that Educational Science proves to be an essential discipline in the search for educational solutions that promote not only knowledge but also the ethical and social values necessary to face contemporary challenges. By integrating theory and practice, this science significantly contributes to the formation of individuals committed to a more sustainable future, reaffirming its central role in educational research. Therefore, it is crucial to continue exploring its potential and interactions with other fields of knowledge to further strengthen its contribution to society.

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MATHEMATICS EDUCATION AND COGNITIVE NEUROSCIENCE: INTERFACES REVEALED BY RESEARCHERS FROM THE CANADIAN LABORATORY ENGRAMMETRON (EDUCATIONAL NEUROSCIENCE AND MIXED RESEARCH LABORATORY)

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ABSTRACT

This study aims to highlight the interfaces between Mathematics Education and Cognitive Neuroscience revealed by the Canadian research group of the ENGRAMMETRON laboratory (*Educational Neuroscience and mixed research laboratory*) of *Simon Fraser University* from some aspects and results achieved by the group. According to the Canadian group, Cognitive Neuroscience seeks to highlight the role of the neurophysiological mechanisms underlying cognitive functions and to identify the mind-brain mechanisms that enable us to develop new teaching and learning strategies. In this way, I seek to highlight the main ideas pointed out by the group in the context of Mathematics Education and Cognitive Neuroscience. I emphasize that the focus will be given, primarily, to the perspective of the mathematical educator and, in a second focus, to that of the neuroscientist, valuing the interdisciplinary and multidisciplinary context of teaching and learning.

Keywords: Mathematics Education. Educational Neuroscience. Cognitive Neuroscience. Mind-Brain-Behavior Relationship. ENGRAMMETRON.

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INTRODUCTION

The purpose of this study is to highlight the main aspects and results evidenced by the working group of the ENGRAMMETRON laboratory of *Simon Fraser University* coordinated by the researcher Stephen R. Campbell regarding Educational Neuroscience and, more specifically, the phenomena pertinent to Mathematics Education aligned with the perspective of Cognitive Neuroscience. The choice of this theme is justified by the proposal to deepen and extend the studies that interface Cognitive Neuroscience and Mathematics Education, the cognitive and neurobiological aspects associated with the mathematical mind of the individual.

Thus, it is part of this work to enter the multiprocessable, active and participatory system that corresponds to the human brain, in order to highlight some possible contributions of current research and relationships that are established in an interdisciplinary and multidisciplinary context between Neuroscience and Mathematics Education, in addition to pointing out what possible future perspectives are related to the theme. To this end, based on the ideas and results of research coordinated by Stephen R. Campbell, I highlight in this study the possible contributions of Cognitive Neuroscience in Mathematics Education from the perspective of the Canadian group.

Next, I present the researchers' perspective on Mathematics Education from the point of view of Cognitive Neuroscience, as well as a little of the history of the formation of the ENGRAMMETRON laboratory.

MATHEMATICS EDUCATION FROM THE POINT OF VIEW OF COGNITIVE NEUROSCIENCE AND SOME IDEAS PORTRAYED BY THE ENGRAMMETRON STUDY GROUP

According to the ideas portrayed in Campbell (2010), the phenomena pertinent to Mathematics Education have been studied from perspectives aligned with Cognitive Neuroscience, and have promoted a new era of investigation and new opportunities for educational research. In his work, the author states that the results published in his research are still suggestive, illustrative and still incipient and cannot be considered definitive or comprehensive. The term Neuroscientific Education or Educational Neuroscience becomes constant during the presentation of their work and reveals what Canadian researchers call the movement known as "brain-based education" (CAMPBELL, 2010, p. 310). As the author points out, a huge gap seems to arise between the study of physiological structures and their mechanisms related to learning, either due to lack of interest or misinformation in the areas of research that relate the processes of mathematical

cognition and learning, such as cognitive psychology, cognitive neuroscience and neurogenetics (CAMPBELL, 2010). From this context, the author points to a question that seems to be inevitable in this scenario: why bother to fill this huge gap?

In his description, the study of mental functions, brain structures, and physiological behavior has advanced as a result of the dedication of cognitive psychologists, computer scientists, neuroscientists, as well as psychophysiologists and geneticists. Also, according to Campbell (2010), interdisciplinary studies related to Cognitive Neuroscience have been fed by a growing knowledge base of studies of brain injuries and their impairment of functioning, in addition to technological advances in brain imaging that expand vision and the study of their physiological and behavioral structure. Thus, the author describes that recent advances in the study of brain-imaging have led to a greater interest on the part of researchers in knowing the role of Neuroscience linked to Education and vice versa. In addition, the researcher describes that certain imaging techniques have opened new windows for the study of the structure and behavior of the brain, correlating its anatomy, behavior, and mental function based on the identification of brain oscillations in the human cortex as a result of mathematical thinking that can range from deep *insight* to profound aversion.

Therefore, as the Canadian researcher points out, initiatives have sought to establish the relationship between the research areas, involving parts of Cognitive Psychology and Cognitive Neuroscience, in addition to Mathematics Education. The author calls this union Mathematical Educational Neuroscience and identifies in it the potential to deepen the understanding of mathematical cognition and learning, in addition to becoming an important, if not, revolutionary area of research in Mathematics Education.

It is perceived that in all the work of the Canadian group, the relevance of Neuroscience in Psychology and Education is evident and the existence of different answers to the same questions, as a result of different levels of analysis carried out on them. This becomes notorious when the answers are given from the analysis given by physicists, physiologists or psychologists on themes common to their respective areas. However, it is noticeable that researchers in education are reluctant to reduce psychological issues to physiological views, much less to views related to Biology, Chemistry or Physics. It is important to report that there are interfaces between these different levels of analysis and, especially, between Psychology and Physiology that must be interrelated in a coherent way.

Campbell (2010) describes that emotions can be perceived from anxiety that is related to the organs of the body connected to the brain from the peripheral nervous

system, such as the skin, heart and lungs. Thus, cognitive emotional responses correspond to alterations in the brain system associated with a variety of cognitive functions, such as perception, memory, creativity, reasoning, and others, making evident the embodied manifestations of human cognition from objectively observable aspects. Therefore, the fundamental assumption of Educational Neuroscience considered by Campbell (2010) is that human cognition is also incorporated into human physiological aspects.

Thus, the researcher describes that

> Every subjective sensation, memory, thought, and emotion—anything that any human being can ever experience—is, in principle, decreed in an objective manner, observable as an embodied behavior. Although all embodied behaviors are an "integral part" of the ongoing subjective flow of lived experience, in addition to the empirical study of evident behavior, a deeper view of cognition and learning ensures measurements, analyses, and interpretations of physiological changes (CAMPBELL, 2010, p. 313).

The same author emphasizes that Cognitive Neuroscience should not be solely scientifically oriented in terms of neural structures, their biological mechanisms, computational processes and their functions. On the other hand, Cognitive Neuroscience should emphasize a humanistic orientation oriented to Educational Neuroscience, as a new area that will access its methods, especially summoned for the purposes of the experiences lived by educational practices and problems.

Among the educational problems pointed out by the author are those related to the anxiety that certain students have in relation to their learning, highlighting the eminent need to study what types and to what extent positive and negative emotions promote or hinder various aspects of involvement, reasoning and performance in solving mathematical problems.

In Campbell and Patten (2011), the authors bring a compilation of the group's research that relates Educational Neuroscience to motivations, objectives, theories, methods, investigation techniques and future perspectives. The research of these same authors directs to a wide range of initiatives and questions and highlights the need to establish a common language among all areas of knowledge involved.

As the researchers explain, from a scientific point of view, greater observation of perspectives arising from the study of the brain, body and behavior can promote the creation of better opportunities in measuring, identifying and understanding new phenomena and significant factors associated with the cognitive and social development of various aspects of teaching and learning, in order to elevate and better identify our understanding of the human condition.

Also according to the research of the same authors, the fundamental assumption of Educational Neuroscience is that all human cognition, that is, all subjective sensation, memory, thought, and emotion can, in principle, be observed from the behavior of the human organism. However, they show that all physical behavior is only a part or part of the subjective flow of lived experiences that are observed, analyzed and interpreted based on physiological changes that can be visualized by appropriate methods and techniques. Consequently, physiological changes, seen and analyzed by brain imaging, can reveal fluctuations in brain state that are related to affective aspects and cognitive functions.

Campbell and Patten (2011) expound, in a positive way, that the focal point of Educational Neuroscience is in living human beings, and is not limited exclusively to the physiological and biological mechanisms underlying them and that, in general, they are evidenced in a materialistic perspective from causal effects that are manifested as objective changes in the body, brain and behavior.

The aforementioned authors add that the term mind-brain should always be considered in a single and integrated way and never separately and that the validity, reliability and relevance of theories of teaching and learning in Education research can be variably corroborated, refined, or refuted from neuroscientific studies and/or with the use of methods that test hypotheses of a particular theory.

Therefore, some specific questions observed by the same authors are appropriate: to what extent can anxiety related to mathematics prevent its understanding? And to what extent can we control such anxiety? Other more specific questions are: what types and to what extent do positive and negative emotions promote or prevent aspects of engagement, reasoning and performance in solving mathematical activities? In this way, relating emotions to physiological behavior allows the clarification, at least partial, of issues such as those previously pointed out.

Campbell and Patten (2011) state that the answers to the previous questions may take many years of study, perhaps decades, and argue that the objective of Neuroscientific Mathematics Education is to help in the investigation and establishment of these connections from the provision of evidence portrayed in methods such as, for example, pupil response, electroencephalogram, skin response and respiratory rates. In this way, aspects of perception, solution and understanding can be evidenced, allowing us to validate or refute hypotheses previously outlined can, in addition to providing a deep and better understanding of the aspects inherent to the teaching and learning of mathematics

Neuroscientific Mathematics Education corresponds, therefore, to a bridge that will make explicit the interdisciplinarity between the areas, identifying the neuro-mechanisms

underlying cognitive and behavioral functions and that comes to test and refine the more traditional models, questions, problems and studies, cultivating mathematics as the center of the problem.

Such interdisciplinary aspects reflect the life experiences that are manifested in the brain, body, and behavior in some way, and bring methodological concerns shared among physicists, engineers, mathematicians, and educators.

The aforementioned comments regarding the incorporated manifestations of lived experiences have offered a spirit that provokes change and that educational research cannot renounce such humanistic orientations.

In view of this new inherent perspective of studies, the ENGRAMMETON laboratory was born in 2005/2006, coordinated by Professor Stephen R. Campbell. Calling himself a knowledge engineer, Campbell found technological systems that defined good rules and good objects, reflecting the classic physiological problem of reconciling perception and intellect and pointing to the importance of pattern generation and recognition. Among the questions highlighted by Campbell (2007) is: but how to develop a neural network capable of dealing with both perception and logical inference? Its objective is to understand how humans are able to do and learn tasks, and to establish the relationship between perception and intellect as a result of this challenge. Still, from this perspective, Campbell (2007) is faced with another important question: how do we learn to recognize and generate patterns, that is, mathematical patterns?

In Campbell (2007), the researcher describes that mathematical perception and cognition can be evidenced in experiments described by models of cognition and learning based on brain images and their behavior. With the proposal to deepen these studies, the group of researchers envisioned the creation of the ENGRAMMETON laboratory. Below, I discuss its history and operation.

THE EDUCATIONAL NEUROSCIENCE LABORATORY - ENGRAMMETRON

Created in 2005/2006 at the Faculty of Education of *Simon Fraser University* (Canada), ENGRAMMETRON corresponds to an Educational Neuroscience laboratory developed with the support of the Canadian Foundation for Innovation (CFI) and the Knowledge Development Fund of *British Columbia* and *Simon Fraser University* (SFU).

Today, ENGRAMMETRON is an educational research unit in the analysis of behavioral, psychometric and psychophysiological data, including studies that cover the analysis of audio, vision, eye movement, brain waves, heart rate, as well as skin conductance and temperature.

The initiative in the creation of this research laboratory had the purpose of justifying this new branch of study from the exploration of its theories, methods and practices. Campbell (2007) adds that the initiative in his creation refers to his interest in studying, while still an undergraduate, about the nature of consciousness related to educational practices and that, in the future, led him to become a neuroscientist. Thus, as the researcher reports, during his studies, he was enchanted by the physiological and mathematical aspects related to the mind that led him to deeply understand mathematical models and their applications. It is possible to affirm that such models and applications allowed him to relate and discuss how seismic images associated with other brain images can be associated with social constructions of new senses of perception. The same author mentions that the evolution of computational mathematics has enabled a new sense of perception and that it has been aligned with the development of artificial intelligence (AI) and the implications of using logic to model high-level cognitive functions.

Although it has in its name the theme Mathematics Education (ENGRAM/ME – *Educational Neuroscience Group for Research in Affect and Mentation in Mathematics Education),* the laboratory is not limited only to the study of mathematics, but to other educational areas such as Psychology, Kinesiology, Biomedical Engineering, Psychometrics, Psychophysiology, Sign Analysis, Neuropedagogy and Embodied Cognition of *Simon Fraser University* together in partnership with other universities, associations, professionals and industries from Canada and other countries. Among the areas worked, Campbell (2007) describes that psychometrics allows the level of anxiety that a student has in relation to mathematics to be investigated, which is often caused by the deficiency of inductive reasoning, slow decision-making, processing of superficial depth, reduced memory and performance, and limited attention. As he points out, psychometrics is considered an arm of psychology that deals with the design of instruments, administration of experiments, interpretation of quantitative data from the measurement, identification and classification of psychological aspects related to the abilities and personality traits of students, in order to provide guidance for the interpretation and analysis of psychophysiological data.

Thus, in this laboratory, possible correlations of cognition and learning between body and mind are identified, functioning as an incubator for the exchange of experiences, knowledge and information between researchers and various institutions.

Thus, it becomes possible to identify the activities performed by the group's researchers, which correspond to: (a) evaluating and improving the human-machine interface and the instructional design for learning; (b) investigate metacognitive factors

associated with learning; (c) determine the role of sleep and fatigue in performance; (d) understand the extent and application of educational neuroscience methods and outcomes in classroom contexts.

FINAL CONSIDERATIONS

In this study, I sought to identify the main aspects and results evidenced by the working group led by Stephen R. Campbell regarding Educational Neuroscience and, more specifically, the phenomena pertinent to Mathematics Education aligned with the perspective of Cognitive Neuroscience. I emphasize that, as mathematics educators, we must emphasize the humanistic aspects aimed at understanding the real experience lived by the student, which are not limited only to neurophysiological processes. Thus, following the ideas of Campbell (2010), Educational Neuroscience prioritizes learning and seeks to identify the neural mechanisms underlying cognitive behavior. As pointed out by the Canadian group's research, there is a need for greater interaction between mathematical educators and neuroscientists, in an interdisciplinary language that relates various areas of knowledge, such as mathematical modeling, signal processing, psychological and sociological models, spectral analysis and brain structure. In this context, it is possible to say that Cognitive Neuroscience focuses on various aspects of brain behavior, aligning terms of neural structure, mechanisms, processes, and functions with humanistic aspects and the lived experiences of learners.

I show in this study that Mathematics Educational Neuroscience corresponds to a new area of research and, consequently, considers new opportunities in Mathematics Education.

I emphasize that I am still far from closing this discussion, but I leave here new possibilities and deepening studies that can guide and improve this line of research.

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CHALLENGES OF TEACHING PRACTICE IN THE POST-TRUTH ERA: REFLECTIONS ON FAKE NEWS AND EDUCATION

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ABSTRACT

This study discusses the challenges faced by education in the Post-Truth Era and fake news, where the dissemination of false information and the relativization of truth directly impact teaching practice. The concept of Post-Truth, characterized by the prevalence of personal beliefs over objective facts, challenges the traditional role of the teacher as a mediator of knowledge. Based on Edgar Morin's complexity theory and Clandinin and Connelly's Narrative Research, this study argues that the adoption of a reflective posture is essential for teachers to face the challenges imposed by misinformation. Methodologies such as Discursive Textual Analysis and Narrative Research are proposed as effective tools in the sense of developing a critical education. The text also discusses the need to reformulate teacher training and to integrate public policies that promote critical thinking and digital literacy, preparing teachers to deal with the new informational dynamics of contemporary society.

Keywords: Post-truth. Fake News. Critical Education. Reflective Teaching Practice. Teacher Training.

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INTRODUCTION

Contemporary society is going through a unique moment in which the boundaries between fact and opinion, truth and lies, are increasingly fluid. This phenomenon, known as the "Post-Truth Era", gained notoriety from the mid-2010s, driven by the rise of social networks and the massification of internet access.

In a world where emotions and personal beliefs seem to matter more than facts, challenges arise for all social spheres, but especially for education. The term "Post-Truth" was popularized during global events such as the Brexit referendum and the 2016 United States presidential election, when the spread of false or distorted information decisively shaped public opinion.

In Brazil, the influence of Post-Truth has manifested itself in an alarming way in recent decades, impacting, among other areas, education. The proliferation of so-called fake news — false information deliberately disseminated with the intention of deceiving — has brought unprecedented challenges to the educational field, where teachers are confronted with students who increasingly arrive at the classroom armed with distorted information, formed in bubbles of disinformation. How can the teacher, in this environment, play his traditional role as mediator of knowledge, when the very notion of knowledge seems to be under attack?

In this complex, dysfunctional and difficult to delimit communicational ecosystem, the concept of truth that was already being deconstructed by relativism, has a secondary role, almost non-existent.

> Reupdating Plato's thought, who saw between truth and power an irremediable conflict of interests, to the point of considering that people prefer what is popular to truth, today political rhetoric continues to maintain itself in this unstable equilibrium where the imprecision of language is at the service of persuasion and the construction of post-truths. (Figueira and Santos, 2019, p. 5)

The answer to this question requires a reformulation of pedagogical practices and a new look at teacher training. In this text, we propose a reflection on the teacher's practice in the Post-Truth Era and the Fake News Crisis, based on Edgar Morin's theory of complexity and the principles of Clandinin and Connelly's Narrative Research. From these approaches, we argue that the reflective teacher has an essential role in the construction of a critical education, capable of promoting autonomous thinking and rigorous analysis of the information that circulates inside and outside the classrooms.

THE CHALLENGE OF POST-TRUTH FOR EDUCATION

The concept of Post-Truth challenges one of the most fundamental bases of human thought and education: the search for truth and objectivity in the teaching-learning process. In educational practice, it has always been assumed that knowledge is something that can be discovered and shared in an impartial way. However, in the Post-Truth Era, this premise is questioned, and the role of the teacher as an authority figure in the field of knowledge is constantly confronted.

Post-Truth is characterized by the prevalence of emotions and personal beliefs over objective facts. Instead of basing their convictions on evidence, people, immersed in informational bubbles created by social media algorithms, tend to seek information that confirms their preexisting opinions. This dynamic generates an environment of disinformation in which rational dialogue becomes increasingly difficult, since people are not willing to reconsider their beliefs in the face of new evidence.

> Today, anyone can produce (and distribute) false information (Southwell et al., 2018; Jenkins, 2006), the result of the new paradigm of communication that marks the end of the old monopoly in which the media lived for more than a century, since we now live, in the expression of Manuel Castells, in a society of "mass self-communication". This means that an individual, without specific training in the construction of information or even reputation, can in many cases exceed the number of readers that media outlets as influential as CNN, Fox News or The New York Times reach (Figueira and Santos, 2019, p. 8).

For education, this poses a substantial challenge. As Bauman (2001) argues in his concept of "liquid modernity", we live in a time when certainties are temporary, truths are fragmented, and values are changeable. In the school context, this means that teachers must deal not only with the transmission of content, but also with the task of teaching students how to navigate a world of uncertainty and ambiguity. Critical teaching, which has always been a fundamental tool for citizenship education, becomes even more urgent in this scenario.

In addition, the phenomenon of fake news exacerbates this crisis. Fake news, often presented as reliable reports, circulates easily on social networks and ends up being incorporated into the cognitive repertoire of students. What makes this phenomenon even more pernicious is the fact that, sometimes, these news stories are constructed in a way that appeals to emotions, which makes them more likely to be shared.

Fake news spreads significantly faster and reaches a larger audience than true information. This puts the teacher in a delicate position: how to correct misinformation without alienating students who are already convinced of the veracity of the fake news they consume?

The situation is further complicated by the fact that teacher authority, traditionally recognized in the classroom, is being challenged by alternative sources of information. As Jenkins (2006) and Castells (2009) point out, the rise of "mass self-communication" has allowed any individual with access to the internet to become a content producer, challenging the information monopolies that were previously held by traditional media. In this new scenario, the figure of the teacher as the holder of knowledge is contested by digital influencers and other *online* sources that sometimes present themselves as more accessible and convincing to students.

The impact of this crisis of confidence in the teacher can be profound, in our view. On the one hand, students feel more empowered, believing that they can find all the answers they need *online*. On the other hand, this empowerment is often based on a naïve trust in the veracity of everything that is found on the internet. This creates a paradox: while students seem more informed than ever, they may actually be more vulnerable to misinformation.

THE ROLE OF THE REFLECTIVE TEACHER IN CONTEMPORARY EDUCATION

To face the challenges of the Post-Truth Era, the concept of the reflective teacher, defended by Donald Schön (1983) and expanded by authors such as Zeichner (1993) and Dewey (1933), has become essential in current times. The reflective teacher is one who, instead of mechanically applying predefined pedagogical techniques, is constantly reflecting on his or her practice, adapting it to the needs of students and the challenges imposed by the social and political context.

Schön (1983) introduced the idea that professional knowledge is not something fixed, but rather dynamic and contextual. He argues that practitioners, including teachers, learn not only by applying abstract theories but also by reflecting on their own experiences of practice, which he calls "reflection-in-action." For teachers, this means that when faced with unexpected situations in the classroom — such as the impact of fake news or students' resistance to accepting objective facts — they need to be able to quickly reflect on how best to deal with these challenges.

Dewey (1933), however, complements this perspective by arguing that reflection is a form of active, deliberate, and persistent thinking that aims to solve problems. For Dewey, education should be seen as a continuous process of reconstruction of experience. Applied to the contemporary context, this means that teachers should see confronting disinformation not as an obstacle, but as an opportunity to engage students in a deeper

reflection on what knowledge is, how it is constructed, and what its implications are for social and political life.

A central aspect of reflective practice is the teacher's commitment to continuous learning. Zeichner (1993) argues that the training of reflective teachers requires not only the development of pedagogical skills, but also a deep understanding of the social and cultural contexts in which education is inserted. In the context of the Post-Truth Era, this means that teachers need to be aware of how fake news and misinformation affect students' perception of the world, and be prepared to address these issues in a critical and dialoguing way.

Critical reflection can also be extended to the teacher's own role. As Freire (1996) argues, the educator must be an agent of social transformation, and not just a transmitter of content. For this, it would be necessary for the teacher to adopt a dialogical posture, open to listening and questioning, both by the students and by himself. The pedagogy of autonomy defended by Freire emphasizes the need to train students who are able to think critically, question the information they receive and actively participate in the construction of knowledge.

The logic of reflexive action is contrary to a routine, passive and accommodating position. In addition to the automated activity, guided by impulse, tradition or authority, it seeks to unite reason and emotion, in a linked way, to provide a broad view to perceive problems (Geraldi *et al.*, 1998).

> Teachers with reflective actions do not remain tied to a single perspective, they carefully examine the alternatives that are presented to them as viable, as well as those that seem to them to be more distant from the solution, with the same rigor, seriousness and persistence (Geraldi *et al.*, 1998, p. 191).

However, the implementation of a reflective practice requires significant changes in teacher training. This implies not only the inclusion of disciplines that address Post-Truth and fake news in undergraduate courses, for example, but also the creation of spaces for teachers in training to reflect on their own experiences and develop strategies to deal with disinformation in the classroom.

METHODOLOGIES TO UNDERSTAND TEACHING IN POST-TRUTH TIMES

In the face of the challenges imposed by disinformation and Post-Truth, the adoption of innovative methodologies is essential for us to understand teachers in the development of pedagogical practices that promote critical thinking and rigorous analysis of information. Among these methodologies, Narrative Research, Discursive Textual Analysis and

Complexity Theory stand out, proposals that offer effective tools to understand the complexities of contemporary society.

Narrative Research, as defended by Clandinin and Connelly (2011), proposes that teaching be seen as a continuous experience of telling and retelling stories, both by teachers and students. This method allows us to use the teachers' narratives as a starting point for a critical analysis of the information they bring to the classroom. By encouraging them to tell their own stories and reflect on how their beliefs were formed, we can identify the challenges of teaching in these times of great technological change.

In addition, Narrative Research allows teachers to reflect on their own practices and experiences, helping them to identify moments when they may have been influenced by misinformation or unconscious bias. This self-reflection is essential for teachers to adapt their pedagogical practices and create a teaching environment that is more open to dialogue and constructive criticism. In this way, the narrative researcher does not prescribe general uses and applications, but on the other hand offers a place for the reader to imagine his own uses and applications on the narrated phenomena.

> Educators are interested in lives. Life, to borrow John Dewey's metaphor, is Education. Educators are interested in learning and teaching and how this process occurs; They are interested in how to deal with different lives, different values, different attitudes, beliefs, social systems, institutions and structures and how they are all united to learn and teach. (Clandinin and Connelly, 2015, p. 22).

Clandinin and Connelly (2001) also point out that Dewey contributes to thinking about experience "beyond the black box", that is, beyond the notion that experience is something irreducible, which could not be investigated. Thus, they report the three-dimensional aspect from the terms they use:

> [...] our terms are personal and social (interaction); past, present and future (continuity); combined with the notion of place (situation). This set of terms creates a three-dimensional space for narrative inquiry, with temporality along the first dimension, the personal and social along the second dimension, and place along the third.
> (Clandinin e Connelly, 2011, p.85)

Discursive Textual Analysis (DTA), in turn, offers a systematic approach to the analysis of texts and discourses, which can be particularly useful in the context of Post-Truth. As Moraes and Galiazzi (2011) argue, DTA can help the development of critical thinking, since it teaches the researcher to seek evidence that corroborates or contradicts the hypotheses raised.

The Theory of Complexity, proposed by Edgar Morin (2006), also offers valuable insights for confronting disinformation. Morin argues that reality is made up of multiple

interconnected factors, and that knowledge cannot be reduced to a simplistic or fragmented view. Applied to education, Complexity Theory helps teachers to encourage students to see knowledge as an interrelated whole, instead of compartmentalizing it into isolated disciplines. This means that, when discussing fake news about science, for example, the teacher can demonstrate how this news is related to political, economic, and social factors, helping students to develop a more balanced and critical view of the world.

In addition to these methodologies, the critical incorporation of Digital Information and Communication Technologies (ICTs or TIDCs) into the school curriculum is essential for the development of digital literacy skills. This entails teaching students to identify reliable sources of information, to critically evaluate what they read, and to recognize the signs of misinformation. The use of technologies in a critical way can transform digital tools for the dissemination of fake news into allies of critical education, enabling students to safely navigate the vast universe of information on the internet.

TEACHER TRAINING AND PUBLIC EDUCATIONAL POLICIES

In order for teachers to be prepared to face the challenges of misinformation, it is necessary that public educational policies promote continuous training and the development of critical skills among teachers. In Brazil, teacher training is still marked by an excessively technical focus, with little emphasis on the development of critical and reflective thinking. This may be different.

Teacher training that prepares teachers to deal with the Post-Truth Era requires including courses that address the implications of TIDCs, fake news, and disinformation. In addition, it is necessary for teachers in training to be exposed to innovative methodologies that allow them to develop more reflective and critical pedagogical practices.

Public policies can also encourage the continuing education of teachers, focusing on the development of skills that help them deal with the new informational dynamics of contemporary society. This can be done through continuing education programs that offer courses and workshops on how to combat misinformation and promote critical thinking in the classroom.

In addition, educational policies should promote the integration of ICTs into the school curriculum in a critical and reflective manner. This means that rather than simply teaching students how to use digital tools, teachers should be encouraged to discuss the ethical and social implications of these technologies, helping students to become more critical and responsible consumers and producers of information.

CONCLUSION

We live in an era of uncertainty and complexity, in which the boundaries between truth and lies are increasingly blurred. In this scenario, the role of the teacher is extremely important. The teacher must be more than just a transmitter of knowledge; It is able to be a facilitator of critical thinking, capable of offering students a path in their journey to become informed and conscious citizens.

Reflective practice, as advocated by authors such as Dewey, Schön, and Zeichner, offers a powerful approach for teachers to address the challenges of the Post-Truth Era, especially by encouraging the adoption of a critical and reflective stance. Thus, teachers can help students navigate the sea of misinformation that permeates our society, empowering them to question, analyze, and ultimately act on reliable information.

However, for this to happen, it is necessary that public educational policies promote the continuous and critical training of teachers, enabling them to deal with the new demands of contemporary society. By combining innovative methodologies with a critical approach to education, we will be able to dream of building a more resilient educational system that is prepared to face the challenges of Post-Truth.

The questions raised by this reflection are not simple to answer, but that is exactly why they are so relevant in our historical moment. The formation of critical and informed citizens depends on our ability to confront disinformation in order to promote an education that values truth, dialogue and reflection.

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THE INTELLECTUAL AND POLITICAL PROTAGONISM OF ANTONIETA DE BARROS

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ABSTRACT

This article, whose research is of a bibliographic nature, aims to present the contributions of the professor, director and deputy Antonieta de Barros in the formation of Santa Catarina society, from the perspective of the universalization of the right to education and, through the conquest of this right, access to the set of political rights of the population, analyzed based on the reflections of historians such as Michel de Certeau (2020) and Sidney Chalhoub (2010). In a context of frank consolidation of racist, classist and sexist structures, Antonieta was formed and affirmed herself as a great intellectual; columnist, director and contributor to periodicals; competent teacher and school principal; in addition to being respected by parliament, and reformulated relevant elements of the educational legislation of this state such as the change in the contents of women's professional schools, including the contents of instruction; the creation and regulation of the positions of School Group Director and School Inspector, and also that access to these positions occurred through competitive examinations; the creation of Teacher's Day, as a school holiday; in addition to fighting for the universalization of education and secondary education. Among the main conclusions, it argues that their protagonism and example contributed to the affirmation of the right to education, intellectual production and political participation of subalternized groups; in that context, women, the black population and the poor population, in Santa Catarina and in Brazil.

Keywords: Antonieta de Barros. History of Education. Education of Black People. Democratization of Education.

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INTRODUCTION

Antonieta de Barros, the first black state deputy in Brazil and the first woman deputy in the Santa Catarina state parliament, was born on June 11, 1901 in Florianópolis, Santa Catarina and stood out as one of the greatest militants, intellectually and politically, for the universalization of public and quality education in the context of post-abolition in the South of Brazil, a context strongly marked by classist, sexist and racist structures that were strengthened. Even though she did not declare herself a feminist or anti-racist, her work, achievements and actions in education were and are emblematic in the affirmation of political, civil and human rights, especially of women, the black population and the working and impoverished classes, especially transforming the bases and functioning of education in this state.

This text, consisting of bibliographic research, aims to present the contributions of the teacher, director and deputy Antonieta de Barros in the formation of Santa Catarina society, in the perspective of the universalization of the right to education and, through the conquest of this right, access to the set of political rights of the population. It analyzes the protagonism of this emblematic intellectual based on elements of the socio-historical context configured by the first decades of the twentieth century in the state of Santa Catarina, which tried to consolidate itself materially and discursively as a state of European culture, white and conservative population.

By bringing written texts of the time, we chose to keep the original writing, as we consider it a loyal and respectful conduct. We also highlight that many of the struggles waged by Antonieta at the beginning of the twentieth century are not yet fully assured as achievements, such as free, compulsory, public and universal education and the recognition of the right and capacity for intellectual formation, as well as participation in decision-making processes for all in our society.

Antonieta de Barros

Source: ALESC's political memory

FORMATION AS STRUGGLE

As was common to the black population, in the first decades of the twentieth century, Antonieta began her education at home, and later, at the private school of Professor Maria Meira Lima. She entered public school at the age of nine, officially enrolled in the fourth year of primary school, where she studied until she completed high school, attended the first year of Complementary Education and then prepared for the entrance exam of the Normal School of Santa Catarina where she remained until she entered the Normal School and graduated in Teaching.

It is important to highlight the family's efforts and sacrifices to carry out their education. Her mother, Catharina Waltrich[3], was a freed slave, a maid and when she moved from Porto União to Florianópolis (both cities in Santa Catarina), she became a washerwoman. His father was Rodolfo de Barros; gardener, musician and foreman of the extinct Banda Recreio Josephense (Band known as Farrapos), as well as an agent of the Post Office and in 1904, Commander in the Security Corps of the Public Force (Romão, 2021, pp. 53, 54).

In the first decades of the twentieth century in Florianópolis, marked by hygienist action, Arcipreste Paiva Street, where Antonieta lived with her family, suffered "the demolition of the "tenements" from 1903 onwards, culminating in the expulsion of the poorest and blackest population from the central area of the city" (Romão, 2021, p. 45, 48). The processes of social hierarchies and the consolidations of subjectivations in this perspective were frank and aggressive. Since the previous century (XIX), the state of Santa

[3] Catharina used the surname Waltrich, from the family she worked for, and began to adopt Barros, after her union with Rodolpho de Barros, her partner and Antonieta's father.

Catarina has instituted policies of invisibility and whitening in order to serve as an example for the rest of the nation. In this sense, in addition to all the material and symbolic obstacles to the affirmation and achievement of rights for the black population, there were also discursive productions, which to this day need to be faced, affirming that it is a state of white population, whose contributions to social and historical construction are due to the European population (Gaya and Laffin 2023, Leite, 1991).

Catharina survived and supported her family at that time by working as a cook, maid and laundress. Like the other washerwomen, poor black and white women, she used the public spaces of springs in the lower part of the city. In 1914, Deputy Fulvio Aducci launched a Bill that proposed an increase in registration and enrollment fees to attend the Normal School and the Complementary Schools, under the allegation of preventing the daughters of washerwomen from becoming teachers of the children of the elites. The Bill was approved and became Law number 1,024 of December 1914. According to the Jornal Oriente of November 1 of that year, in an article entitled "For Instruction":

> The aforementioned project, today Law No. 1,024, harms the interests of the middle or poor classes, making it impossible for them to acquire the elements of secondary or complementary education, because the rates referred to are in disharmony with the scholarship of these same classes. Law 1.024 of the current law is one of those that cannot deserve public sympathies, because it directly hurts the disadvantaged classes, the only ones who will suffer the consequences of the aforementioned law. [...]
> We recognize that your Excellency. The Governor of the State, upright, enlightened and progressive spirit, needs a lot of money to carry out his "desideratum", but what we do not recognize is the usefulness of raising these rates for an increase in income, which, because it is so small, will not influence the budget balance, to make it impossible for only a large part of our population to enroll their children in the aforementioned schools. how to hinder many of the normalist acts from continuing their studies because they do not have the required amounts.
> Education, we think, should be accessible to all classes and, as my colleague rightly said, "... The people need education and the future of our country depends on it." [...]
> The State has done nothing for secondary education, so that the classes we defend can share the same instruction. And the poor, because they are poor, should not be content only with what they learned in primary schools; he has aspirations, like all other classes, to complete his preliminary knowledge, so that he can become useful to the Homeland and the Family.
> In our State, it can be said, the disadvantaged classes do not have the right to acquire the knowledge of secondary education, in view of the present Gymnasio de Santa Catharina, which the State subsidizes with the not small sum of fifteen contos annuaes, so that only half a dozen poor children can drink there the lights of secondary education. to the detriment of the majority of our population, who, because they are well-off or poor, cannot give their children that instruction, because the registration and tuition fees charged there are not within their reach.
> On the other hand, we have never asked Your Excellency. Dr. Governor to order the provision of clothes and shoes to poor children so that they could attend schools, unless this is determined by the public authorities. We ask Your Excellency. yes, so that he could make the complete complementary and secondary education, accessible to all classes, so that we do not have the displeasure of seeing, in the future, lucid intelligences that many services could provide to the State or even to the country, revealing on the road of vice and crime, simply because protective hands did not welcome them. (Jornal Oriente, 1914, p. 2).

The response to Law 1.024 of December 1914 presented in the newspaper Oriente provided significant information about the discriminatory distribution of resources for education in Santa Catarina and its implications for the reproduction of social inequalities, as well as about the price of these constructions of inequalities individually and socially. The text criticized the prohibition of education and, especially, access to Secondary Education, which should be the right of people of all socioeconomic classes, and the approval of visibly classist legislation.

A little more than a year later, on August 15, 1915, the Jornal Oriente commented on the aforementioned legislation and its consequences, informing that due to the increase in fees, enrollments fell from 35 to 20. Responding to an article entitled "The Washerwomen", he criticized the speech, made in defense of Law 1.024 of December 1914, in which "an unidentified congressman" stated: "I understand that the fees created for enrollment and exams at the Normal School should be high, because I do not want to see the daughters of a washerwoman, for example, as teachers of my daughters" (Oriente, 1915, p. 1). The text continued, arguing:

> Do the honest daughters of honest washerwomen be inferior to others, no matter what class they belong to!
> The washerwoman, who suffers sun and rain, who works honorably all day long, in order to have a daughter educated and guarantee her a dignified future with the greatest sacrifices, certainly does not deserve the contempt of those words, but the respect and consideration of all who know how to think.
> [...] Let us, therefore, allow the poor, the daughters of washerwomen, to educate, educate themselves and conquer with their honorable work a shield for their future life.
> The daughter of a washerwoman is as good and should be as respected as the daughter of any rich man. (Oriente, 2015, p. 1).

Jornal Oriente was a Masonic periodical, positioned at the time under the liberal banner, opposing the conservative wing installed in power. He advocated for the education of the popular classes, who saw in education the possibility of guaranteeing a "dignified future". Teaching training was one of the very few possibilities for social mobility, secondary schooling and (relative) participation in decision-making processes for women, and even more so for poor and black women.

The perspective assumed by the liberal wing was still welfare, as it was strengthened in the following decades. However, he acted in defense of groups that had been fighting for many decades to educate themselves and their companions, thus ensuring access and participation in the set of political and civil rights that were only possible through the appropriation of school knowledge.

INTELLECTUAL, PROFESSIONAL AND POLITICAL AFFIRMATION

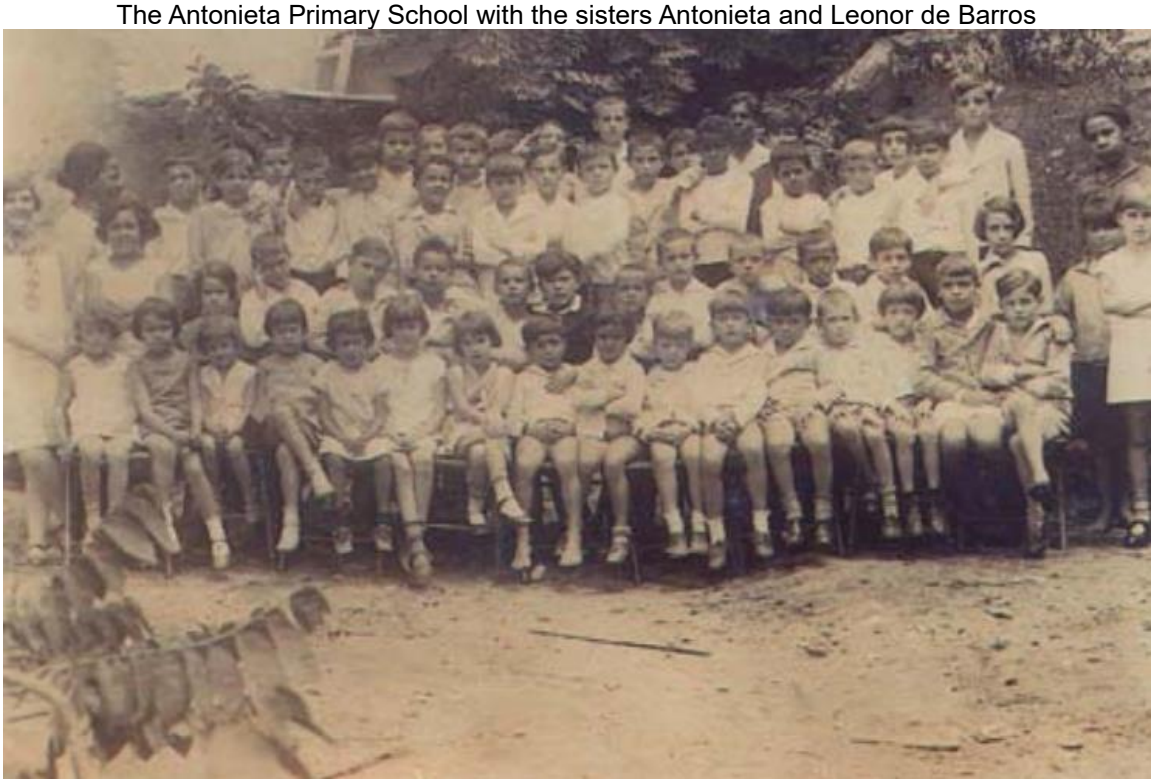
In addition to the fees, which became higher in 1915, another important filter for access to the Normal Schools was the difficulty of passing the exams. In 1918, Antonieta was approved and entered the course. His sister, Leonor de Barros, joined the following year. During the course, Antonieta directed the production of the "Buliçosa" magazine, a magazine of news of the students of that institution. She was also "co-founder and president of the first board of directors of the Civic Center of the Normalists, becoming the first black student to direct a student entity in Santa Catarina," and valedictorian of the class at the conclusion of the course in 1921 (Romão, 2021, p. 93).

Upon graduating, in 1922, she offered courses at home to prepare for the entrance exams at the Normal School and founded with her sister Leonor, the "Antonieta de Barros Primary Course". The opening of schools, extremely necessary due to the scarcity of public supply, was allowed by the State, as long as it complied with a set of legal and bureaucratic requirements, including a certificate of moral suitability of the principal, a certificate of health and hygiene, a teaching program, reports and installation in a building with the necessary hygiene conditions with free access by the education authorities and respecting the official calendar (Romão, 2021, p. 91).

The Antonieta de Barros Primary Course offered vacancies to girls and boys and trained in the four years of elementary school. It was attended by children from the wealthiest families and also by children from the working classes who attended it through scholarships. The former governor of Santa Catarina Luiz Henrique da Silveira, a former student of the school, wrote years later, in 2009, "for a newspaper in the city of Brusque, with the title "Antonieta de Barros", that classes took place from Monday to Saturday (Romão, 2021):

> [on Saturdays] literature and civics classes, when we sang the anthems of the State, Brazil and the Flag. And we learned to be citizens. It was the Primary School Professor Antonieta de Barros, directed by herself, whose teacher was her sister, Dna Leonor (or Dona Nonô as we affectionately called her). Two black women taught at that time (!), to children from the most traditional families in Florianópolis. Everything I learned later, I owe to them. So much so that on the day I passed the Law entrance exam, I went to the Fernando Machado School to give the news. Mrs. Nonô, who had that sweet and gray-haired body of a Mama Dolores, excessive in affection and tenderness, hugged me and cried her joy. (Romão, 2021, p. 97).

The Antonieta Primary School with the sisters Antonieta and Leonor de Barros



Fonte: site: ondeestadesterro.com.br/a_politica.html

In the same decade of the 1920s, newly graduated, the teacher and school principal actively participated in cultural and educational actions; together with black intellectuals such as Ildefonso Juvenal and Trajano Margarida, she taught in the evening Adult Literacy Course at the José Boiteux Civic Center, participated in the Catharinense Center of Letters, founded in 1925, at the facilities of the Beneficent and Recreational Workers' Union – UBRO, a representative cultural and intellectual space that included women and blacks, since the Catharinense Academy of Letters did not welcome these intellectuals.

The Centro Catharinense de Letras was a literary institution in which poets, politicians, journalists and teachers participated, such as Isaura Vieira de Faria, Jovita Lisboa, Maura de Senna Pereira and Beatriz de Sousa Brito and journalists such as Anfilóquio Nunes Pires, Araújo Figueiredo and Oscar Ramos. It was founded in the capital in response to the interdiction attitudes of the Catharinense Academy of Letters, which had restrictions on the fact that the poor and blacks attended it (Espindola, 2015, p. 58). The racism made explicit in the refusal to accept these members can be illustrated in the literary review by Altino Flores, director of the Catharinense Academy of Letters, entitled "In the shadow of Cruz e Sousa", published in the magazine Terra, when referring to Cruz e Sousa and Ildefonso Juvenal (Reibnitz, 2016, p. 106, 107):

> Cruz e Sousa was a good and a bad for Santa Catarina letters: it was a good because, giving us admirable verses, he made the name of our State well known among the others; it was a bad thing because, because he was black, he awakened

> in all the blacks of Santa Catarina, who follow the literary evolution of Brazil through the text of the Almanacs, the desire of poets.
> Ildefonso, for example, is one of these (...).
> Ildefonso is dull, illiterate, vain, although he covers himself with the varnish of modesty, he has not the slightest feeling of what poetic rhythm is and ignores all the conditions of artistic prose. Unaware of the technique of verse and the syntactic laws that condition the structural integrity of the period in Portuguese prose, he has not been able, therefore, to this day, to do anything worthwhile. And it will never be able to. (Terra, 1920, p. 9).

Antonieta maintained the zeal for her career in teaching, intense intellectual production and political activism throughout her life, with class, race and gender consciousness, she remained attentive to every detail of the challenges of the material and professional life of the working classes, and more especially of her work in teaching. In 1935, already elected deputy, she recalled this period of struggles and commitments to the values of dignified survival for the class of workers in education, when she began to fight for public exams as a way of access to teaching, in addition to working and career conditions that would ensure stability for such professionals. Its initial trajectory is described by the author herself in the newspaper "República" of 1935:

> In my life as a young girl, I have always been excited by a dream: to work to be able to rest my holy mother, who formed my spirit and strengthened it, by the example of a courageous combatant, within the struggle, for the conquest of daily bread, and the instruction of her children, the greatest concern of her great soul, who, less than a year ago, rests in God. (...)
> Graduated in 1921, I began my life in private teaching. I am not saying that I was not seduced, in the beginning, by public teaching. But, in the times when there was the "discretionary power of the gunman", how would I, without the intermediary of the "wedge", achieve a teacher's chair? It was necessary to face life, and I did it, with great happiness, believe me. I founded a course and started giving private lessons. And it was here, in this work of mine, that, after the popular conquests of 1930, they came to seek me, to collaborate in the Public Magisterium, as a substitute lecturer in Portuguese and literature at the Secondary Normal School, and a teacher at the Primary Normal School of the Institute of Education of the Capital. (República, 1935, p.1).

With attention to her own history and the political complexities of her time, Antonieta commented on the urgent need to work at the beginning of her career, to give her mother better living conditions, a situation read in the political panorama in which the indications for the exercise of teaching depended on the "discretionary power of the gunman". This power that foisted various forms of violence on women, from the denial of the right to work to sexual harassment to conquer it and which underwent changes through the "popular achievements" of the 1934 Constitution, as well as labor rights and the right to vote for women made possible by Decree-Law No. 21,076 of February 1932.

Her political journey began suddenly and when she was still very young, making her victorious in two legislatures, the 1st between 1935 and 1937 and the 2nd between 1947-

1951: In 1933, some women from Santa Catarina requested the right to suffrage, in a climate of tensions, negotiations and exposures on the part of the applicants, some were denied this right.

> Antonieta, one of the first to apply in the state, was granted her right to vote. The Santa Catarina Liberal Party (PLC) offered a vacancy to the female candidacy. Nominated, Antonieta accepted. Despite not having "economic and ethnic ancestry that would give her prestige in a society with such distances defined by the hierarchy of class and race", Antonieta had: a) a history of political militancy; b) suitability for their professional and social performance; c) renown and skills in written productions; c) political-party affiliation, d) proximity to the leaders of the PLC; and, finally, e) the fact that she was the only woman nominated who "demonstrated that she was ready for the challenge" (Gaya, 2022, p. 166).

As a deputy, she worked on the construction of the State Constitution of Santa Catarina in 1935; and in the construction of the Education, Culture chapters, as president of the Commission. He participated in the drafting of the Civil Service Statute. In his first known speech, reported by the Jornal República on June 23, 1935, he expressed himself in defense of education:

> There is, Mr. President, in the life of civilized peoples, a right that runs parallel to the right and duty of work – it is the right to education. And this right, which belongs to all, has been, among us, until our days, unfortunately, in general, the privilege of some, of those to whom fortune smiles, of those who have monetary happiness. (República, 1935, p. 1).

He always defended education, in addition to literacy, as "a right for all!" and criticized the fact that among the people of Santa Catarina, although education was limited to primary education, such a condition was insufficient. "It's not enough anymore! Everything evolves and primary education alone no longer satisfies popular aspirations". Thus, the state should open secondary education "to all who desire it" (República, 1935, p. 1). A month later, in an interview with the newspaper "A Gazeta", Antonieta commented:

> A few days ago, speaking in the Assembly, I stressed the need for Secondary Courses accessible to all. It is because I consider education as a right and not something to beg for, when within us, the desire to ascend is stronger than anything. Although I heard opinions contrary to the visibility of the idea, the committee approved this part of my work. I was satisfied (A Gazeta, 1935, p. 1).

Still in 1932, in relation to Decree Number 21.417 A - of May 17, 1932, which established equal pay for men and women, Antonieta wrote in her column "Farrapo de Ideias" for the newspaper A República (1932):

> The newspapers give us the new good news that the government has just signed the decree regulating women's work.
> Anyway, it was about time.

> It was necessary for idealistic Brazil to rise up in a movement of cataclysm, so that the individual woman would have, in law, the guarantee of her effort.
> We do not want to know whether this measure is part of the communist programmes, as the cables tell us.
> For us, it is within the sanest and noblest principle of equity.
> If the work is the same, why depreciate the female effort, or exploit it, paying less? (República, 1932, p. 1)

Decree Number 21,417 also ensured other rights, such as maternity leave; breastfeeding conditions; and protective measures for the physical integrity of working women (Brasil, 1932). However, it still needed (perhaps still needs) to be consolidated on the ideological level, in order to be implemented. Defending legislation accused of being "part of communist programs" possibly needed a more accurate explanation within conservative groups such as Catholics (to which Antonieta belonged), refractory to innovations and, above all, to the dissemination of practices and ideas potentially originating from the programs of communist governments.

In the first phase of the Soviet Revolution, in the 1920s, a series of women's rights were ensured, including the right to divorce, remuneration for domestic work, the encouragement of female instruction and education, and the offer of dignified and properly paid jobs, in capitalist countries and, especially in Brazil, some legislation was enacted in the 1930s in response to social demands. of the working classes (Goldman, 2014).

In addition to the Private School in which she worked with her sister Leonor, in 1933, Antonieta was appointed teacher at the Complementary School, becoming in the same year full professor of Portuguese and Literature at the same institution, a position from which she left for the electoral campaign of the following year when in 1934 she was elected state deputy.

She returned to teaching at the end of her term in 1937, being hired to teach Portuguese, Literature and Psychology at Colégio Coração de Jesus and appointed teacher of Portuguese and Literature at the State Institute of Education, both of which stand out among the largest schools in the state. In 1938, he participated in the National Education Crusade (CNE) in Santa Catarina. She was a class paranymph on several occasions: 1939, 1943 and 1945 at Colégio Coração de Jesus and 1939, 1947, 1949 and 1950 at the Institute of Education (Romão, 2021, p. 115). In 1945, the students of the State Institute of Education founded the Grêmio Professora Antonieta de Barros and, with it, the newspaper "O idealist". (Romão, 2021, p. 119).

In education, in addition to the Private School, she taught the subjects of Portuguese and Psychology at the Colégio Coração de Jesus between 1936 and 1945 and was Director of the Dias Velho Institute of Education between 1937 and 1945. He published

intensely between 1927 and 1951 for the main newspapers of the State, starting with the "Folha Acadêmica", followed by: "A Semana", A Pátria", "Correio do Estado", "O Idealista", "A República" and "O Estado", in addition to the publication of the book 'Farrapos de ideias', in 1937, a work that had the profits from sales destined to the construction of the Preventório that was intended to house the children of lepers in the Santa Tereza Colony" (Silva, 1991).

He defended the "Bill" that institutes Teacher's Day and makes it a school holiday; the creation and regulation of the positions of School Group Director and School Inspector; and even that access to these positions occurred through competitions, which took into account merit, title and experience, in addition to grades in the pedagogical and administrative knowledge tests.

He also proposed a legislative indication for the change of contents offered at the Women's Professional School, created in Florianópolis in 1935, which, despite accepting students who did not have primary education or complete literacy, did not teach the contents of primary education, focusing only on the teaching of professional practices. The proposed nomination was published by the newspaper "O Estado" on August 31, 1948 in an article entitled: "Important nomination of Prof. Antonieta de Barros - PSD - in the Legislative Assembly", in which the deputy justified:

> [...] The indication that I have the honor to justify and present. In this capital, we have a Women's Professional School whose services are invaluable, within the very limited, narrow radius of action that has been traced to it.
> In a school of female professions, in our view, domestic education courses are indispensable to train housewives; secretary; painting; and, also, of general culture, for those who do not hold diplomas. No technical and professional education will be complete and will bear the fruits that are hoped for, and could give, if it is not supported, by a cultural basis capable of facilitating that knowledge. Thus, the general culture course will serve to enhance the value of the profession. We feel, Mr. President, the need to raise the feminine cultural level. There is in our way of thinking, the certainty of the high role that Women, as educators, by nature, play in the life of collectivities. The more cultured they are, the more we will have to expect from the generations they educated.
> All humanity is the work of the heart of the Woman. It does not matter, Mr. President, that foolish prides try to deny this unmistakable truth, denying the influence and responsibility of Mothers in the psychic formation of each one of us. We feel, Mr. President, the need for a better society, where the ideals of solidarity and understanding among men are not empty and meaningless words, but tangible realities.
> And the key to this great problem lies in the education of man. And because it is Woman who is the educator, we must expand its cultural possibilities so that, consciously, and with ever greater efficiency, its great social work may be carried out. On the other hand, Mr. President, we understand that it is the duty of each creature to have his profession. Work is the best and most honorable of moral supports. Therefore, we extend the possibilities of the School, suggesting courses that aim to enable Women to conquer their daily bread when the circumstances of life require it. And all this, Mr. President, without forgetting that "man does not live by bread alone".

> These are the reasons that led us to formulate the suggestion to the Government, the content of which I will read before sending it to the Bureau for the proper purposes. (O Estado, 1948, p. 3).

In this emblematic speech, she centered on the "high role that women, as educators, by nature, play in the life of collectivities" and defended the importance of public investments to ensure the fundamental processes of primary socialization, including the expansion of "cultural possibilities" "consciously, and on whose efficiency" the realization of the "great social work" performed by women, who, educators, significantly influence the course of "the generations they educated".

It also defended the quality of the professionalization of the students of the Women's Professional School mobilized "within the very limited, narrow radius of action that was traced to it", proposing as a reformulation of contents in its Indication:

> Art. 1 - The purpose of the Women's Professional School is the training of craftsmen, through the acquisition of technical-professional knowledge, based on a propaedeutic culture capable of enabling the exact social understanding of the professions.
> Art. 2 - There will be in the Women's Professional School, with a duration of two years, the following courses:
> I TECHNICAL-PROFESSIONAL, with the sections of:
> a) Cutting and clothing;
> b) Embroidery and lace;
> c) Flowers;
> d) Hats and applied gear;
> e) Secretary (stenography, typing and business correspondence);
> f) Painting;
> g) Domestic education {culinary art and domestic arts).
> II - GENERAL CULTURE, with the following chairs:
> a) Portuguese;
> b) Arithmetic;
> c) History of Brazil;
> d) Geography of Brazil and the State;
> e) Design;
> f) Notions of Sciences.
> III - SPECIALIZED CULTURE, with the chairs of
> a) Hygiene;
> (b) Childcare;
> c) Economics and Domestic Accounting;
> d) Social Education.
> Art. 3 - The GENERAL CULTURE course will be mandatory for students who have only completed primary school.
> Art. 4 - The DOMESTIC EDUCATION course, as well as the SPECIALIZED CULTURE course will be mandatory for all students and will aim at the training of housewives.
> Art. 5 - The culinary arts shall comprise the making of savory and sweet foods and dietary food for early childhood and adults.
> Article 6 - The domestic arts comprise sewing, ironing, home arrangement, horticulture, breeding and gardening.
> Art. 7 - The technical and practical courses will be developed concomitantly with the culture courses.
> Article 8 - The number of classes of each subject and sections and their arrangement by days of the week shall be included in the respective regulation.
> Article 9 – Provisions to the contrary are hereby revoked". (O Estado, 1948, p.3).

Its legislative indication, number 66, was accepted and became Law No. 235 of December 10 , 1948, bringing significant transformations to the education of students and their families, especially the generations influenced by them.

In 1951, already hospitalized, with health problems, Antonieta expressed her protest against the act of Governor Irineu Bornhausen to annul the Competition for Admission and Removal to Teaching, writing in the newspaper "O Estado" on March 13, 1951:

> In our wonderful times of Peace and Harmony preached and concretized, I read, in one of the pages of the earth, the news of the cancellation of the Competition for Admission and Removal to the Teaching Profession. Inside me, a fog of sadness and sorrow grew, grew and thickened, until it completely dominated my entire inner world. It was the sympathy due to the teacher who has not yet died in me, to the colleagues, whose path a government decree closed. We do not discuss the right or wrong of the measure. Of the legality or illegality of the act can only speak the JUSTICE, which perhaps, because it has its eyes closed, knows human rights better.
> I do not dispute the fact, for the crudeness. What terrified and saddened me were the psychic consequences of this brutal blow of Fate in the inexperienced soul of the young teachers; He thought of the bitter moments of discouragement, the aridity of disenchantment, because a handful of young men had just passed by, when they were trying to fulfill a beautiful dream, cherished, affectionately, for seven long years. (O Estado, 1951, p. 01.).

The sensitive evaluation expressed bitterness and indignation about the "closed paths" to young teachers due to a "government decree" that would bring "bitter moments of discouragement", "aridity of disenchantment" to workers, who, because they had no political indication, could be left without work; despite training, willingness and need to work. Political actions were read from a human perspective.

However, standing in defense of the criticized governor, "the doctor, journalist, historian and at the time state deputy, Oswaldo Rodrigues Cabral, accused the teacher, in the plenary of the Legislative Assembly, of, through the newspapers, "making cheap intrigue from slave quarters"" (O Estado, May 6, 1951), to which Antonieta replied:

> Cheap senzala intrigue
> (words of Deputy Oswaldo R. Cabral, commenting on our editorial last Sunday, in the Legislative Assembly)
> [...] We do not know, in the intrigue, the speech with which the irritated and noble deputy of the position punished us for the incredible audacity of finding unfair the concepts with which the Government points the Magisterium to the State and the country.
> [...] And, thinking far away, we asked our friends: But where was this? In Hitler's Germany, or in the United States?
> Disagreeing with our considerations is the right of everyone and, especially, of those who militate in the situation, although there are certain facts, whose crystallinity and transparency impose silence, to prevent them from being more focused. This is the case of the desolate situation of public education, which the Message deals with. Why does the Deputy come down to pick up our tattered ideas? What was our crime? That of having said in the press what is said in a small mouth? Were we, by any chance, the ones who created that shocking statement that the situation of public education is bleak? No.

> [...] Where does the intrigue go? It didn't exist. This type of behavior is not in our style. We are loyal. Loyal and grateful. We always have been. And it is one of the characteristics of blacks.
> We made the Magisterium our path, and we always acted respecting the teacher who has not died in us, yet, thank God. How, then, can we descend into intrigue? [...] We understand that the delicate sensitivity of the noble Deputy has not suffered in the face of that sentence. His Excellency, for the happiness of all those who are Aryans – despite holding a Diploma of Journalism – does not militate in public education. We say happiness because, to his Excellency, he lacks one of the qualities of a teacher: not distinguishing races, castes, or classes (O Estado, May 6, 1951).

With assertiveness and elegance, Antonieta frankly defined her class position and her banners of struggle. She positioned herself as black, affirming loyalty and gratitude as characteristics of black people; and as a teacher, stating that she "does not distinguish races, or classes, unlike the Aryans, or spokespersons for "Hitler's Germany, or the United States"; it positioned itself as a people by expressing itself as a subject of rights among those who comment "in small mouths" and dare to "find unfair the concepts with which the Government points the Magisterium to the State and the country"; Finally, he signed as a militant of public education.

CONCLUSIONS

The position of Antonieta de Barros as a protagonist in the magisterium, in parliament and in the main instruments of the press of Santa Catarina in the first half of the twentieth century was emblematic, in the struggle for representativeness and rights of hierarchical social groups in this context. He defended with objectivity and class consciousness the universalization of education and the political and intellectual participation, especially of those who did not have them; the poor, the blacks, the women.

While the racist, classist and sexist structure in the state was consolidated, agents like Antonieta articulated education, schooling and intellectual expression with the intention of circumventing institutional barriers and situating women and men, poor and blacks as producers (not just consumers) of ideologies, of viable novelties and of radical transformations in society. Certeau (2020, p. 204), defines writing as a "concrete activity that consists, on a space of its own, the page, in constructing a text that has power over the exteriority from which it was previously isolated". "This practice, in the process of Eurocentric expansion, was a powerful instrument of modernity to erase the histories, epistemologies, and worldviews of colonized peoples, treated as a blank page" (Gaya, 2022, p. 143).

Fluency in writing and oratory was also an instrument of class division in Brazil and in Santa Catarina. Aware of this condition, the elites not only interdicted, prohibited and

stopped offering vacancies to subalternized groups, but also defined this social division to the maximum by prohibiting the votes of the illiterate population, through Decree No. 3,029, of January 9, 1881, known as the Saraiva Law. This legislation, approved on the eve of the abolition of slavery, managed to deprive the black population of political rights, which had been waiting for decades for the right to education and, from the abolition of the right to citizenship (Chalhoub, 2010, p. 42). The struggle for quality, universal, public and compulsory education was a struggle for survival, for rights, for citizenship and for dignity. This was an expensive and constant struggle embraced by Antonieta de Barros and transformed the history of education in Santa Catarina.

Finally, it is worth considering that some of the principles defended by Antonieta and that were her banners of struggle, although currently contained in the Federal Constitution of 1988 regarding the provision of formal education, are still threatened, as is the case of the mandatory provision of free, public, secular basic education with the objective of training in the ontological perspective, citizen and participation for work. The universalization of Brazilian basic education, promoted in the 1990s by international organizations such as the World Bank and UNESCO, occurred concomitantly with the intensification of neoliberal policies that made the conditions of public basic school provision precarious. Since then, intellectual training and citizenship as functions of the school have been undervalued and attacked, with training for work being in a perspective of adaptation to the needs of the market, unlike omnilateral training, initially designed for legislation.

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THE CHALLENGES AND CONSEQUENCES OF THE (IN)VISIBILITY OF THE HOMOSEXUAL TEACHER IN THE ACADEMIC CONTEXT

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ABSTRACT

In the current context of education, the (in)visibility of the homosexual teacher continues to be a complex and often neglected issue. The general objective of this study is to survey the representations of teachers of Professional Education from a renowned institution in the State of São Paulo about the homosexuality of teachers within the academic environment. The design of this research was carried out through a bibliographic research. This is a qualitative and descriptive research. A questionnaire was used as an instrument for data collection, consisting of 03 open questions, applied through the Microsoft Forms form to teachers, structured in line with the theoretical framework and the objectives outlined for this investigation. To this end, 80 professionals working in professional education participated in this research, as follows: 80 teachers (called P01 to P80) in different hierarchical positions of 15 State Technical Schools contemplating two Regional Centers of the State of São Paulo. The first question asked to the participants was whether or not it is possible to identify a homosexual teacher who is not self-declared. For 36 (45%) of the participants, it is possible to identify a homosexual person, 23 (29%) say they cannot, 20 (25%) point out that they may be able to identify it, and only 1 (1%) say they do not know how to answer. The second question refers to the participants' representations of self-declared homosexual teachers in the school environment, in this sense, 58 participants defend that self-declared homosexual teachers are equal to heterosexual teachers in all senses, including deserving respect like any human being. The teacher's professional competence is considered the most important factor for nine people. When asked about the fact that a teacher is openly homosexual may cause some kind of discomfort, we found that the majority 67 (84%) say they do not cause any discomfort, 5 (6%) say they do, and 8 (10%) report that they maybe. In short, the main challenges and consequences of the (in)visibility of homosexual teachers in the academic context include veiled or explicit discrimination and prejudice on the part of colleagues, students, and even academic management, which can affect their emotional and professional well-being. In addition, invisibility can limit opportunities for career advancement for homosexual teachers, such as access to leadership positions, research funding, and academic recognition.

Keywords: Professional Education. Impersonation. (In)visibility. Homosexual teacher.

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INTRODUCTION

In the academic sphere, visibility and representation are crucial aspects for the promotion of diversity and equality. However, even in environments that value the plurality of ideas and identities, the (in)visibility of the homosexual teacher remains a complex and often neglected issue. This research aims to address how the sexual orientation of homosexual teachers affects their visibility, perception and experience within the academic environment.

It should be noted that homosexuality, historically, has been a sensitive topic in many social contexts, including academia, where cultural norms and expectations can profoundly influence the way LGBTQIA+ individuals (Lesbian, Gay, Bisexual, Transvestite/Transsexual, Queer, Intersex, and Asexual+) are perceived and treated. While academic institutions often declare their commitment to diversity and inclusion, the reality experienced by gay teachers can diverge significantly from stated policies (Costa, 2021).

(In)visibility can manifest itself in many ways, from representation in institutional materials to interpersonal dynamics in the workplace. Issues such as characteristics and stereotypes, veiled discrimination, opportunities for promotion, and even self-censorship are phenomena that can affect the performance of homosexual teachers.

The representation of homosexual teachers in educational curricula is often neglected, even in societies that advance the acceptance of sexual diversity. This scenario raises crucial questions about visibility and acceptance within educational institutions, as well as addressing how these professionals deal with implicit and explicit biases.

In view of the above, this study has as its general objective to survey the representations of teachers of Professional Education from a renowned institution in the State of São Paulo about the homosexuality of teachers within the academic environment. In order to achieve this intention, the specific objectives are: 1) to identify the perceptions of the participants regarding the possibility of identifying a homosexual teacher in the school environment; 2) to verify what the participants think about the presence of self-declared homosexual teachers in the school; and 3) to understand whether or not the existence of a homosexual professor can cause any discomfort to the academic community.

In view of this, it aims to present significant suggestions on how institutional policies and organizational culture can be adjusted to better support the inclusion of all members of the academic community. Through the representations provided by the participants, this research aims to contribute to a greater understanding of the complex dynamics of power, identity, and representation in the contemporary academic environment, as well as to a notion of the intersections between sexual identity and professionalism, encouraging

reflections on inclusive practices and promoting a more welcoming and diverse work environment for all educators.

TEACHER HOMOSEXUALITY AND ITS (IN)VISIBILITY IN THE ACADEMIC CONTEXT

The study of teacher homosexuality and its (in)visibility in the academic context is part of an interdisciplinary field that combines sociological theories, gender and sexuality studies, and organizational analysis. For example, Queer Theory offers a critical lens for analyzing the gender and sexuality norms that structure academic institutions. It challenges the idea of fixed and normative identities, emphasizing the fluidity and multiplicity of sexual and gender experiences (Cooling, 2013). In the context of teacher homosexuality, this theory questions how heteronormative norms shape the visibility and acceptance of teachers who identify as LGBTQIA+. In addition to problematizing the institutional policies and daily practices that can marginalize or make these teachers invisible.

Another theoretical bias is Gender and Sexuality Studies, which offer a solid conceptual basis for understanding how sexual identities are socially constructed and how these constructions impact the professional and personal lives of teachers (Louro, 2019). The critical analysis of these studies allows us to investigate the ways in which LGBTQIA+ identities are perceived, represented, and valued within the academic environment, including examining the intersectionality of race, class, and gender in the experience of LGBTQIA+ teachers.

The theoretical framework on teacher homosexuality and its (in)visibility in the academic context reveals the complexity of the interactions between identity, institutions and society (Miskolci, 2007). To this end, integrating these different theoretical approaches allows for a more comprehensive understanding of the challenges faced by LGBTQIA+ teachers and the potential strategies to promote a more inclusive and egalitarian academic environment. Thus, the bibliographic survey presented in this work seeks to explore the main theoretical and conceptual approaches relevant to understand this theme.

In view of this, the phenomenon of homosexuality is clearly outlined in the teaching profession, because when teachers go beyond the boundaries of sexuality and gender imposed by society, such factors can provoke, alienate, generate conflict, tension, rediscovery, restructuring and challenges in school environments. Thus, according to Louro (2014) it is possible to observe in the educational environment a professional, affective and social relationship based on insecurity, often interfering with the self-esteem of the homosexual teacher, since many prefer silence to confronting prejudice. But, in the face of so many challenges, the teacher finds in his or her profession the pleasure of sharing, which

is allowed to him/her, thus assuming the role of mediator, developing an integral sensitivity within the environment in which he/she works.

Corroborating this same line of reasoning, that many homosexual teachers silence their sexual orientation, both in the family and professional spheres, commonly called "closet". This concept, according to Seidman (2002) was coined after the Second World War, a time when Americans preached moral hygiene. The term "closet" is a metaphor that centers the dual tension in the social relationships of these people, becoming part of the collective imaginary about homosexuality. This conception instrumentalizes popular and scientific knowledge, because the lives of many homosexual people are organized in a dichotomous dynamic, of secrets and revelations, lies and truths, visibilities and concealments. The author also argues that the closet is central in the constitution of the subjectivity of homosexual individuals, directly influencing their socialization processes, as it establishes a state of isolation due to feelings, such as: fear and shame.

Also in this context, Miskolci (2014) warns about this problem, arguing that the process of *coming out* of homosexual people in the United States of America (USA) is different from Brazil. Because, "coming out" as homosexual in the US is part of a social configuration, which presupposes distancing from family ties in adult life, and these people tend to territorially centralize their experiences. And this does not happen in Brazil, although in large Brazilian cities there are 'ghettos', the LGBTQIA+ community is widely influenced and impacted by violence and discrimination in public spaces. Miskolci (2014) also makes a criticism directed at Sedgwick's (2007) conception of "closet", according to him, to live in the closet is to lead life in a condition of secrecy, as the subject is always in the imminence of threat and unwanted exposure. Therefore, the "closet" represents a regime that determines 'how', 'when' and 'what' homosexuality is enunciated and, above all, how 'who' can do it, configuring the negotiations for the (re)veiled existence of homosexual people, called 'visibility' by Miskolci (2014).

From this perspective, the study by Franco (2015) problematizes the aspects of the identity constitution of homosexual teachers, claiming that their presence in school raises questions regarding the restrictions to discuss sexual and gender diversity. In this study, it was understood what the participating teachers inferred in relation to the possible visibility of the sexuality of homosexual teachers in the school environment, generating significant reflections in various aspects that involve the field of sexuality, gender, in addition to the historical, social, political and cultural construction of the teaching profession. Based on this, according to Louro (2019), as the school institution became a privileged training space at the beginning of modern times, not only children and young people were the focus of

observation and discipline, but also teachers. Thus, the figure of the teacher, the religious, the masculine, gains representativeness in relation to the gender of teaching, and the teachers strictly followed religious instructions, in addition to being integrally molded under rules and behaviors that regulated their gestures, their way of walking, speaking and looking.

It is noteworthy that the second half of the nineteenth century is the beginning of the process of feminization of teaching. This process consolidates, in addition to teaching, the values of marriage and motherhood historically and socially established as fundamentally feminine tasks. In this way, the exercise of teaching is adequately expressed to women. In this regard, Louro (2013) highlights that it was orphaned women, widows and, especially, single women who initially exercised the teaching profession. Therefore, the personal life of the teachers should be impeccable, in addition to presenting a discreet and reserved behavior. Thus, according to Louro (2013), the image of the spinster teacher, of the sexually demure woman, awakens, establishing the belief that teachers are devoid of sexuality, so as not to influence the relationships with the students.

In a way, these representations and cultural meanings constructed throughout history remain in force to this day, as they structure the roles to be socially exercised by men and women in teaching. In other words, the image of the teacher, as a Jesuit, is directly related to authority and knowledge, while that of the teacher refers to submission, care, motherhood and teaching and learning, especially of children. In view of this, it is important to highlight that the homosexual teacher, when exercising the teaching profession, does not detach himself or herself from the marks of sexuality and gender inscribed on his or her body, for this and other reasons, that conflicts related to sexuality and gender are triggered in the school environment.

In this way of thinking, Britzman (1996) presents three myths about the relationship between homosexuality and heterosexuality. The first myth is related to the fear expressed by heterosexuals, in which openly homosexual people could encourage or influence young people to adopt this homosexual identity. The second myth, on the other hand, refers to the social belief that adolescents are too young to identify as homosexuals. And finally, the third myth is the belief in the separation and privatization of sexual identities, assuming that our behaviors in private life interfere little in our public life. Regarding the third myth, it is important to clarify that the forms and strategies used by schools in the mediation between private and public discourses encourage the invisibility and concealment of (homo)sexuality. And these myths are representations of the universe of common sense, adopted as truths.

The author also adds that this attitude of the school, referring to the third myth, imposes a strong barrier to the expansion of knowledge about sexuality, as it feeds the belief that sexuality should be confined to the private sphere. Such a belief can be identified in the investigation by Franco (2015) when the participants vehemently claimed that the homosexual teacher should not reveal his homosexuality with his students, arguing that the teacher should know how to separate his professional life from his sexual life, otherwise, he gives permission and freedom to students to make jokes of a prejudiced nature, losing respect for teachers. In this same reasoning, Lopes (2008) exposes some reflections based on the invisibility of the homosexual teacher, the author defends a homosexual posture based on subtlety and silence as a possibility of a peaceful and harmonious coexistence between heterosexuals and homosexuals.

On the other hand, opposing this invisibility, Vieira and Lage (2017) clarify that visibility is a key tool for the reconstruction of homosexuality as an identity as legitimate as any other, therefore, it has the right to be expressed. The authors emphasize the urgent need for society to break with the belief that being homosexual is synonymous with inferiority and add that the social exclusion of non-heteronormative identities is supported by the way they are seen in different spheres, such as the legal sphere, which punish them by curtailing their rights. Education through school has the arduous, but necessary task of promoting debates and discussions on this crucial theme, improving thinking and practices that can elevate our condition as human beings, in social, individual and collective spheres (Costa, 2021).

Similarly, Rofes (2007) contextualizes that it is essential for homosexual teachers to assume their identity in the school space and in their daily lives. Because in this environment dialogues are established. The study by França (2016) problematizes the ways in which teachers constitute themselves as homosexual teachers and promotes a discussion of how this teacher establishes relationships with others and, above all, how he or she relates to the school institution, because assuming oneself as a homosexual teacher requires negotiation with oneself and with the other.

In França's research (2016) it was found that one of the participants, a self-declared homosexual, emphasizes that the fact of expressing his homosexuality in the school environment does not mean that he does not take his work seriously, revealing that knowledge about the school and the teaching profession as places of seriousness and responsibilities and, at the same time, Their lifestyle is built during teaching, that is, the constitution of themselves also passes through the school environment, because it is in school that they create, socialize and produce themselves. Thus, this teacher assumes the

junction of homosexual identity with teacher identity, stating that there is no such separation between the two identities, while highlighting society's stereotyped view of homosexuality.

Still with regard to teacher homosexuality in the school environment, Carvalho (2018) discusses the conditions of visibility of lesbian teachers in schools in the education network of the State of São Paulo, as well as how these professionals negotiate their position as deviants of heterosexuality in the relationships they establish with their teaching colleagues and students. Such homosexual teachers seek visibility through pedagogical activities, that is, they must make more effort, pedagogically, than other teachers, to prove themselves competent, in order to guarantee legitimacy in lesbian existence. In this sense, these teachers seek, based on their own existences in schools, to deconstruct diverse notions already crystallized about gender, sexuality, lesbianism and sexual diversity.

In this sense, Santos (2017) addresses the hierarchy between bodies and teaching practices of transvestites and transsexuals (trans), in addition to investigating the conditions of possibilities for the common narrative that to be a teacher of Basic Education, the trans teacher must assume herself as a transsexual, because there is a belief that transvestite is only intended for prostitution, the streets, the clues and the scandals. Such a narrative, according to the author, produces a generalized representation of the teaching experiences of these trans teachers.

In view of the above, it can be seen that in parallel to all the problems related to homosexuality, there is another one that has been more complex, which is the homosexuality of teachers. Thus, professors who declare themselves homosexual in their work environment, that is, in the academic environment, are likely to suffer some type of prejudice, stereotype and social stigma. Due to this, many teachers who flee from heteronormativity live in an intense dilemma between the choice to express themselves or to hide in school spaces, with some choosing to cloister themselves in the "closet", reinforcing their invisibility as human beings and professionals, and others choose to "assume" their homosexual identity (Costa, 2021). Such a dilemma occurs at all levels of education, from Kindergarten to Higher Education and is experienced by teachers belonging to the LGBTQIA+ community.

METHODOLOGY

The design of this research was carried out through a bibliographic search in databases recognized by the academic and scientific universe, such as the Capes and Scielo journal portal. This is a qualitative and descriptive research. To this end, 80 teachers

(called P01 to P80) in different hierarchical positions of 15 State Technical Schools contemplating two Regional Centers of the State of São Paulo participated in this research.

INSTRUMENT, DATA COLLECTION AND ANALYSIS PROCEDURES

A questionnaire was used as an instrument for data collection, consisting of 03 open questions, applied through the *Microsoft Forms* form to teachers, structured in line with the theoretical framework and the objectives outlined for this investigation. For Gil (2008), the questionnaire is an investigation technique composed of a set of questions that are submitted to people with the purpose of obtaining information about knowledge, beliefs, feelings, values, interests, expectations, aspirations, fears, present or past behavior.

It is noteworthy that the present work followed scientific and ethical rigor, in accordance with Resolution 510/16, so it was directed to the Ethics Committee for Research on Human Beings (CEP) of the Institute of Biosciences - Unesp/Rio Claro Campus, with approval according to opinion number 3.255.918. Participants who expressed spontaneous agreement to participate in the research signed the Informed Consent Form (ICF). And then, the data were treated and analyzed using the content analysis technique proposed by Bardin (2016).

RESULTS AND DISCUSSIONS

REPRESENTATIONS OF THE CHARACTERISTICS THAT IDENTIFY A HOMOSEXUAL TEACHER

Here are presented the representations of 80 teachers about teacher homosexuality in the environment of State Technical Schools.

The first question asked to the participants was whether or not it is possible to identify a homosexual teacher who is not self-declared. For 36 (45%) of the participants, it is possible to identify a homosexual person, 23 (29%) say they cannot, 20 (25%) point out that they may be able to identify it, and only 1 (1%) say they do not know how to answer. The reasons that lead the participants to say that it is possible to identify a homosexual teacher without being self-declared are exposed in Chart 01:

Chart 01: Characteristics that identify a homosexual teacher

Times mentioned Characteristics	Testimonials from participants
19 Gestures, attitudes, posture and behavior in everyday life.	"Yes with gestures and attitudes" (P01) "Through the teacher's posture" (P27) "Through Gestures, attitudes and the person's posture" (P28) "I can identify it by the person's behavior on a day-to-day basis" (P34)
08 Tone of voice, way of speaking and effeminate or masculinized mannerisms.	"Yes, because of the mannerisms of an effeminate homosexual or macho" (P14) "I understand it because of the mannerisms" (P58) "Yes for the thin voice, and the effeminate mannerisms" (P62) "I believe that the identification of a homosexual is by his mannerism" (P64**)**
03 Way of dressing.	"Yes, they are easily identified by the way they dress" (P13) "I identify by their clothes and style of dress, they usually dress very well" (P59)
02 Posts and followers on social networks.	"I identify through social networks" (P03) "By the posts and virtual friends that follow the person" (P39)
01 They do not marry and have no children.	"Homosexuals don't marry, they don't have children" (P24)
01 Through dissatisfaction and low esteem.	"Through the personal dissatisfaction and low esteem that homosexuals have due to society's prejudice" (P35)
01 They are reserved.	"Yes, I can identify it, because homosexuals are always very reserved in the environment school" (P42)
01 A cultural issue.	"It is a cultural issue, because homosexuals they always have the same taste for music, etc." (P48)
08 different features	**36 (participants)**

Source: Research Data – Prepared by the authors.

In Chart 01, eight main characteristics were identified, we highlight the three main ones that lead people to be able to identify a homosexual teacher. For nineteen participants, identification occurs through gestures, attitudes, posture and behavior in the school routine. Eight people believe that they are by the tone of voice, way of speaking and effeminate or masculinized mannerisms and three people declare that they identify a homosexual by the way he dresses. Thus, it is verified that it is perpetuated in the social imaginary that the more effeminate the man, and the more masculinized the woman, the greater the probability

of these subjects suffering acts of intolerance and homophobia. Precisely because they subvert the crystallized and naturalized structure of being a man and a woman. In this way, it is the body, through gestures, voice, nuances that will give indications of the supposed homosexuality and how this person experiences his masculinity or femininity.

It can be seen that the mechanisms of heteronormativity guide the arguments, because if a teacher's voice is considered thin, or a teacher's voice is thick, does this characterize them as homosexual? Of course not, because we cannot determine or restrict a person's sexual orientation simply by the timbre of voice (whether high or low). Thus, we cannot say that sexuality is determined only by the bodily expression, gesture or even the way an individual dresses, known as gender expression.

In this sense, we know that homosexuals have characteristics considered peculiar, especially those mentioned above, but such characteristics alone are not enough to affirm whether or not they are homosexuals. Heteronormatization has mistakenly instilled in people's minds that the homosexual man, over time, will start to dress and behave like a woman, and the homosexual woman will do the same, cross-dressing as a man. Thus, we share with Louro's (2019) thought that it is necessary to be careful when demonstrating that it is not personal and sexual characteristics, but rather how these characteristics are represented by society, because what is said and what is thought about them will constitute what it is to be feminine or masculine.

Another aspect pointed out by the participants is the behavior of the homosexual individual. In this sense, for Moscovici (2005), social representations are dynamic sets and their characteristic is the production of behaviors and relationships with the social environment. If such behavior is considered deviant, that is, outside the normal standards imposed by heteronormativity, it is homosexual behavior. In turn, we again share the same feeling as Louro (2019), when he states that such behavior involves any and all acts of an erotic and/or sexual nature, genital or not, performed by people of the same biological sex, although, in their subjectivities, the actors involved in these situations may treat such occurrence, such acts and conducts, in different and varied ways, and even, at the limit, not to consider, for any reason, such behavior as homosexual behavior.

With regard to social networks, we understand that the availability, exchange and sharing of information over the internet have opened up our privacy in every way, because at all times we show our circles of contacts what our tastes are and express our opinions, even people who are outside social networks have no guarantee that they will not have their lives exposed and searched. In this context, this justification is related to the study undertaken by Garcia (2017) regarding the fact that people tend to connect with those who

are similar to them. Therefore, according to the author, if an individual has ten homosexual friends and one heterosexual, people inserted in the cybernetic world can infer that such a person is also homosexual.

Garcia (2017) also noted that homosexuals tend to connect with users of the same sexual orientation. Thus, although we believe that social interaction and the integration of data in the digital society can affect the control that individuals have over their privacy, including their sexual orientation, we cannot say that an individual is or is not homosexual based only on his circle of friends, especially digital contacts, as suggested by P03 and P39.

In relation to marital ties, it made us reflect on the following questions: is same-sex marriage a reality or not? A heterosexual couple who love each other can get married, and such a marriage does not generate controversy, why can't a homosexual couple, who also loves each other, get married? And when they get married, do they generate perplexity in heteronormative society? Such questions contradict the way of thinking of P24, because the popular denomination "gay marriage" has been authorized since 2013, that is, all civil registry offices in the Brazilian territory can celebrate civil marriage and convert the homoaffective stable union into marriage.

Such reflections can be ratified according to an article published in the online magazine "Isto é" in early 2020, which reports that 9,520 same-sex marriages were registered in 2019. Although this number in absolute terms is not high, it represents a significant growth of 61.7% in just one year. Such a considerable increase was possibly due to the fear of a setback in the civil rights of homosexuals due to the electoral victory of the president of the republic, Jair Messias Bolsonaro (term: 2019 to 2022). However, a homosexual individual can marry, as well as have children, through traditional ways, artificial insemination or adoption.

Another representation, which we consider curious, to say the least, refers to the position of P35 and P42, in which the first reports that homosexual people have the characteristics of personal dissatisfaction and low esteem due to the prejudice they suffer daily in society and the second says that homosexuals are reserved. Thus, we realize that there are several explanations for homosexuality and, in some way, such reasons come from the prejudiced construction suffered over the centuries, including taxing homosexuals as: unhappy, lonely and suffering, because they do not find space in heterosexual normality. We think oppositely, homosexual individuals can be cheerful, outgoing, secure people and have high esteem, even in the face of common discrimination, characteristics that we also identify in any heterosexual people.

With regard to musical style, it is known that the homosexual population, as well as the heterosexual population, appreciates a diversity of styles, and evidently, we cannot generalize, because musical genre is something very particular and subjective. However, there are some hits that are usually chosen in the most played playslists in gay clubs around the world. In fact, the LGBTQIA+ audience greatly honors its pop music "divas", among them: Madonna, Cher, Britney Spears, Lady Gaga, among others.

The artistic trajectory of the singer Madonna made her be considered the queen of *"gays",* as the artist has always acted strongly in favor of homosexual causes throughout her career, and many of her songs symbolically refer to the representation of homosexuality, for example the song "Vogue". Through her musical lyrics, the singer has always promoted the visibility and appreciation of *gay* culture. That said, and making a parallel, the representation of P48 shows that the *gay* population, although it has a very peculiar culture in all aspects, not only in terms of musical styles, however, we cannot consider that all homosexual individuals strictly follow such culture.

The participants who affirm that they cannot and/or may not be able to identify a homosexual teacher add up to 43 (54%), and the possible reasons for this occurrence are shown in Chart 02.

Chart 02: Possible reasons for not and/or perhaps being able to identify a homosexual teacher

Times mentioned	Reasons	Testimonials from participants
15	It is not possible to identify.	"I can't identify it" (P14) "It is not possible to identify it, unless it is transsexual" (P21) "It is not possible to identify, although some have mannerisms, but that does not mean that they are" (P70) "I don't identify, because everyone has their own way" (P80)
15	Nor always is possible to identify.	"We are not always able to identify, because each one behaves in a peculiar way" (P02) "Not always, since not all homosexuals have the stereotype of the effeminate or the macho" (P23) "This identification is not always possible, since the discreet way of being increasingly prevails" (P41) "We don't always identify it, but the coexistence of years and years, it may be that something flourishes and understand" (P51)

05 In some cases yes, but in most cases no.	"Maybe yes, but in some cases no. But I believe that it does not influence the quality of their work at school at all" (P04)
	"Maybe in some cases, because some details are very strong and because you have a little experience you get easier to understand" (P06)
04 It is not necessary for the homosexual to come out socially.	"I don't believe that homosexuals need to come out, because heterosexuals don't come out either" (P36) "There is no need to come out, because sexuality only concerns the person himself" (P44)
03 Stereotypes do not define homosexuality.	"Since there are no rules for classifying people, we cannot rely on stereotypes to determine a person's sexual orientation, this is too risky" (P38) "We cannot identify a person homosexual only because of their stereotypes" (P40)
01 It is not necessary to identify homosexuality in the workplace.	"We do not need to identify homosexuality, because I believe that this does not concern work activities, because in the work environment what matters is the professionalism of the person and not their sexual orientation" (P45)
06 different motifs	**43 (participants)**

Source: Research Data – Prepared by the authors.

Chart 02 reveals that 15 participants are unable to identify homosexual teachers, 15 point out that it is not always possible to make such identification, 5 say that in some cases yes, but in most cases they do not, 4 justify that there is no need to make this identification, while 3 participants state that the stereotype of a person cannot define their sexuality and one elucidates that it is not necessary to identify homosexuality in the workplace.

We know that there is confusion, in Brazil and in the world, regarding the understanding and interpretation of the various nomenclatures used to represent the LGBTQIA+ community. Such difficulty even occurs within the LGBTQIA+ population itself, as "each one" adopts an acronym to refer to this public. Therefore, we have commonly come across an alphabet soup, and we never know which term or acronym is more appropriate. Consequently, according to the representation of P21, it has been created in the popular imagination that when a man dresses as a woman, he is transsexual or a transvestite, adopting this stereotype to differentiate himself from *homosexual gays* .

Two other representations that deserve to be highlighted refer to the perceptions of P36 and P45, the first believes that homosexuals do not need to come out socially, and the

second elucidates that it is not necessary to identify homosexual people in the workplace. The results of Franco's (2015) research are similar to the first representation, in which the homosexual teacher should not reveal his homosexuality with his or her students, justifying that they should know how to separate their professional life from their sexual life, otherwise it gives permission and freedom to students to make prejudiced jokes. In relation to the second representation, we share this way of thinking, because in the work environment, that is, at school, the homosexual teacher should not be labeled as a result of his or her sexual orientation. We also agree with França (2014) that coming out as a homosexual teacher in the school environment can generate a continuous process of negotiation with the other and with oneself.

Still with regard to the visibility of homosexual teachers in the workplace, we believe that it is an intimate decision, because coming out as homosexual at school, or in any other living space, is not an easy decision. This way of thinking is similar to the positions of Lasser, Ryser and Price (2010), because revealing one's sexual identity in the workplace is a particular issue, considering that this decision may bring negative consequences such as: homophobia, social stigma and stereotypes. As we have already discussed, we live in a society regulated by compulsory heterosexuality, resulting from the interaction of representations of medical, legal, criminological, religious, and moral discourses. Thus, people who disagree with such "evidence", almost naturalized, are in doubt to expose themselves publicly, that is, to assume their "deviation" and their unfamiliarity as an imposed standard, and this implies bearing the bonuses and difficulties of their decision.

As already described, the stereotypes peculiar to homosexuals are not always enough to affirm an individual's homosexuality. Nor can we generalize these characteristics and associate them with all homosexuals. This means that a teacher may have some homosexual mannerisms, but not be, and on the other hand, a teacher considered discreet, may experience his or her sexual orientation outside the walls of the school.

Thus, for Moscovici (2010) we cannot affirm that we know and understand an individual, but we can point out that there was an attempt at recognition. That said, anchoring on an object, person or phenomenon occurs through two forms: generalization or particularization. The first form, generalization, is considered simpler, because we only categorize, for example, the characteristics of homosexuals. Thus, the characteristics of people are generalized, as if they were all exactly the same, and notoriously they are not. The second form, particularization, is the attempt to discover the characteristics, motivation or attitude that make people distinct.

Still in this direction, in relation to what managers think about teacher homosexuality, both present favorable positions. Thus, P80 reflects that it is a positive advance to have a team of teachers in the school, who experience sexual diversity on a daily basis. In view of this, it is important for teachers and students to understand the relevance of equality between sexual orientations. This participant also adds that any of us can be an excellent professional, successful, happy, being heterosexual or homosexual.

In this context, in P79's view, when a person declares himself or not homosexual in the professional environment is a private choice, as it is part of the regular exercise of personal and subjective rights. Therefore, he believes that when the teacher declares himself homosexual at school, it is because he or she already has a good perception of himself/herself, that is, he or she has good self-knowledge. And, with that, she has already acquired confidence and strength to come out before her family and the work environment. This position is similar to Rofes (2007) when he contextualizes that it is essential for homosexual teachers to assume their homo (sexuality) in the school space and in their daily lives.

According to Louro (2014), the school is committed to ensuring that boys and girls become men and women within the hegemonic norms of masculinity and femininity. Based on this, we agree with the author when she states that school is one of the most difficult environments for subjects to assume their sexual orientation. This difficulty lies in the prejudice present in institutionalized discourses, which authorize and subsidize exclusion. These exclusions, in Louro's (2014) view, can be reflected in playful activities such as the formation of queues, specific for boys and girls, with this, the school produces and reproduces the differences between the subjects, including those of gender.

Another relevant aspect, externalized by P35, is that every homosexual plays multiple roles in society, such as: professional, child, husband/wife, neighbor, father/mother, co-worker and sexual partner. In this way, when he has this perception of the integral human being that he is, and recognizes himself as homosexual, he knows how to deal with sexual discrimination in a more balanced way. Regarding the roles played by human beings, we believe that it does not depend on sexual orientation, as both homosexuals and heterosexuals assume different roles.

This statement is supported by the studies of Goffman (2009), clarifying that, when an individual plays a role, he implicitly requires his observers to represent his performance. In this author's perception, the term representation refers to all the activity of an individual that takes place in a period characterized by his continuous presence in front of a particular group of observers, and that has some influence on them. Such a concept fits perfectly, for

example, when a teacher does not assume his or her homosexual orientation, thus, at this moment, he or she is exercising the role of teacher. And not assuming oneself publicly, that is, "living in the closet", is called by Goffman (2009) "façade", which refers to the individual's form of expression, whether intentional or unintentional, generating several representations, which often do not match the individual's reality, but at that moment it is part of their performance.

Thus, with regard to such homosexual visibility, we agree in part with Miskolci (2014) who reveals the importance of the person assuming their homosexuality in all spectrums of their life. Therefore, we believe it is essential to mature the process of self-acceptance, so that there are no doubts about the legitimacy of their feelings, nor any guilt when it comes to assuming homosexuality to the family, to colleagues in the work environment and to society in general, but this is a decision of the individual.

Also, according to Miskolci (2014), this regime of visibility has been associated with a new sexual economy in which the desire for recognition is shaped by values based on the regime of heterosexual representation and its cult of binary and intransitive genderification. Even with some changes, the dominance of heterosexual masculinity tends to be preserved in symbolic, political, and economic terms.

WHAT PARTICIPANTS THINK ABOUT SELF-DECLARED HOMOSEXUAL TEACHERS

Chart 03 presents, in a grouped way, the participants' representations about self-declared homosexual teachers in the school environment.

Chart 03: What the participants think about self-declared homosexual teachers

Times mentioned Ways of thinking	Testimonials from participants
58 Homosexual teachers are equal to heterosexuals, who deserve respect:	"They are teachers just like all of us" (P04) "I think they are just like me, and deserve all my respect" (P10) "For me they are normal individuals and equal to all of us" (P65) "I can't see them as different from the others, for me they are all the same" (P71) "They are people who deserve equal respect to everyone else" (P72)
09 What matters is professional competence.	"I don't see anything but professional competence, private life doesn't interest me" (P8) "The important thing is the teacher's professional competence, what he is or is not does not interfere with anything" (P28) "They are competent professionals" (P59)
05 They are wonderful people and friends.	"They are wonderful people and friends, and their presence at school is very pleasant" (P06) "Wonderful human beings who contribute a lot to respect for those who are different" (P07) "I think they are wonderful human beings and friends, who strive daily to conquer their space in the school environment" (P74)
04 They are co-workers.	"They are co-workers" (P01) "They are co-workers, who leave the work environment healthy" (P09) "They are good professional companions" (P13)
03 They are brave people, due to prejudice.	"They are brave because of the prejudice they suffer daily" (P27) "They are representatives of a very vulnerable group in the Brazilian context, and inside and outside schools they suffer a lot of prejudice from of students and teachers" (P33)
01 Healthy people than can cause conflicts at school.	"They are people who can cause conflicts at school due to their sexual orientation" (P62)
06 Different Ways of Thinking	**80 (participants)**
06 Different Ways of Thinking	**80 (participants)**

Source: Research Data – Prepared by the authors.

According to Table 03, 58 participants defend that self-declared homosexual teachers are equal to heterosexual teachers in all senses, including deserving respect like any human being. The teacher's professional competence is considered the most important factor for nine people. While five consider that homosexual teachers are wonderful people and friends. And four say they are good co-workers.

It is important to highlight that three participants emphasize that homosexual teachers are courageous people due to the prejudice experienced in daily life outside and inside the school. The mere fact that a teacher has a homosexual orientation expresses various representations of gender and sexuality. This statement is in line with the study by Rabelo (2013) who elucidates that there is a possibility of these representations being maintained or modified by teachers, mainly because they exercise a profession that produces representations from a know-how that is codified and transmitted, conferring a certain authority to those who have it. Thus, when representations are shared and produced, there is also the possibility of rebelling against the stagnations of power through the questioning of certain representations that he/she carries. According to the author, silence and prejudiced representations of gender and sexuality have been much more present in schools.

In addition, one participant states that self-declared homosexual teachers can cause conflicts at school. Such a statement subliminally implies that an individual's sexual orientation alone can cause discomfort. Although participant P62 did not specify the nature of the conflict, we believe that it is another representation of homosexuality indirectly anchored in the subtle prejudice that this public has suffered over time.

REPRESENTATIONS ABOUT WHETHER THE PRESENCE OF THE TEACHER CAN CAUSE DISCOMFORT IN THE SCHOOL COMMUNITY

When asked about the fact that a teacher is openly homosexual may cause some kind of discomfort, we found that the majority 67 (84%) say they do not cause any discomfort, 5 (6%) say they do, and 8 (10%) report that they maybe.

The 13 (16%) participants who answered yes or maybe, were asked to contextualize how such discomfort would be, according to Chart 04. Thus, we found that seven participants argue that it depends a lot on the ethical attitude of the teacher in living with co-workers, four point out that the homosexual teacher necessarily needs to be discreet. In this sense, we understand that if the teacher does not have such discretion, it may cause discomfort in people. And, two participants revealed that they are self-declared homosexuals in the school environment, and both affirm that when they get closer, both

students and teachers, they realize that the subject is finished, implying that the homosexual teacher was the "reason" for the conversation.

Chart 21 - Justifications of the participants who said yes or perhaps in relation to the discomfort caused by a teacher being homosexual

Times mentioned	Justifications	Testimonials from participants
07	It depends on the ethical attitude of the teacher.	"It depends on the person's ethical attitude in living with other teachers" (P01) "I consider it important for the homosexual teacher to present good ethical behavior, so that not cause discomfort" (P26)
04	The teacher has to be discreet.	"Discretion is fundamental for homosexual teachers" (P11) "It depends on whether the teacher is gay and not discreet, it will cause discomfort" (P21)
02	As a homosexual teacher, I identify that some students and teachers change the subject when I get close.	"I experience this discomfort in practice, especially when I approach students and teachers, and the subject ends right away" (P24) "I feel it on my skin every day, while they are making homophobic jokes, both in the classroom class and in the teachers' room" (P20)
3 different justifications		**13 (participants)**

Source: Research Data – Prepared by the authors.

In view of the justifications exposed, we found that the word "depends" appears in the participants' quotes, implying that such discomfort will only materialize if the homosexual teacher is exclusively the cause, for example, if the teacher is ethical it will not cause discomfort, as if the same situation did not occur with a heterosexual teacher. Another example is if the teacher is homosexual and is not discreet, it will certainly cause discomfort, such conduct leads us to the idea of abnormality, that is, if he is *gay*, but has a posture within the standards required by heteronormity, it is accepted, otherwise, it is not. In this way, once again blaming the homosexual individual for such discomfort and repressing his visibility before society, in this case the school community (Costa, 2021). Which is unacceptable, as such thinking and attitude are considered discrimination based on sexual orientation.

FINAL CONSIDERATIONS

The visibility and acceptance of homosexual teachers in the academic context are crucial issues for the promotion of diversity and inclusion in educational institutions. In view of this, we found that some participants in this research identify homosexual teachers through some characteristics, such as: gestures, behavior, tone of voice, way of speaking,

effeminate or masculinized mannerisms and way of dressing. Regarding these representations, we infer that corporeality, that is, body language, is still impregnated with prejudiced remnants. Such discriminations were constructed and culturally determined through the signs and meanings imposed by society. We know that the body is delimited and regulated based on knowledge instituted by power, we consider it important to evoke Foucault (1998) to highlight that there is the establishment of the body when there is an exercise of knowledge-power in relation to other bodies.

In this case, the body is compared to an object on which repressions, punishments and punishments are exercised, for example, when we compare heterosexual subjects with homosexuals. Therefore, it makes us reflect in the sense that through bodies we can relate to people, in different social environments, including schools.

Another development of Foucault's (1998) knowledge-power is the process of docilization of bodies in/by society. In relation to this, we believe that this docilization of bodies needs to be avoided and fought, as it notably consists of a behavior and attitude that we consider prejudiced, as the body that "performs" according to the standards required by society will be considered adequate, for example, the existence of specific games for boys (soccer, stroller) and for girls (doll and house), and possibly, such games silence bodies that have sexuality considered deviant to heteronormative standards. Still on corporeality, we infer that sensations, emotions and feelings are connected and integrated into the body of human beings, so we consider that cultural factors influence the representations of the body, for example, the pleasure that people feel through body "touch", regardless of whether they are homosexual or heterosexual, because physical contact involves biological dimensions, psychological and social aspects.

It is salutary to present a pertinent reflection on the difficulties and challenges that homosexual teachers face daily to exercise the teaching profession. Initially, it is crucial to mention the professional's choice of whether or not to assume homosexuality in the school environment, because if such a professional brings aspects of his sexuality to the classroom, it can generate problems of a social, political and pedagogical nature. In view of this, a dilemma that frequently occurs with homosexual people is regarding self-declaration as homosexual in the various spectrums of life: social, family and professional. Thus, we consider that homosexual visibility or choosing to live in the "closet" is an intimate choice. We understand that one of the reasons that leads homosexual teachers not to come out in schools is the fear of reprisal, prejudice, discrimination, stigma and social exclusion due to their sexual orientation, leading them to imprison themselves in the "closet", enhancing their

invisibility as a human being and professional. Therefore, these teachers need to constantly negotiate their relationships, discourses and behaviors.

To further hinder the "acceptability" of homosexuality in contemporary times, specifically in Brazil, the recurrent discourse of the previous Bolsonaro government, with a notorious aversion to homosexuals, in our understanding, such a "denialist ideology" has been arousing the hatred of people who already silently presented a predisposition to homophobia and among other prejudices and discriminations, but who now feel represented by a "voice of command" that strengthens them and encourage them to take a stand against the legitimacy, hard-won, of the LGBTQIA+ population. In addition, several political actions have been carried out to make LGBTQIA+ achievements invisible in the educational context, such as suppressing the terms gender and sexual orientation from the National Common Curriculum Base (BNCC) and other bills presented in the Legislative Chambers and the National Congress, in order to exclude the topic completely from the school universe, movements that go against human diversity.

Throughout the research, we identified that the (in)visibility of these teachers can result in veiled discrimination, emotional difficulties and even limitations in the progression of their careers. The lack of adequate representation can also negatively impact LGBTQIA+ students, who often seek role models and mentors who share their experiences and identities.

On the other hand, we highlight that inclusive institutional policies, awareness programs, and mutual support among colleagues can create a more welcoming and just environment for homosexual teachers. Visibility not only validates their identities but also enriches the diversity of perspectives within the academic environment, fostering a more inclusive and creative space for all involved.

The main challenges and consequences of the (in)visibility of homosexual teachers in the academic context include veiled or explicit discrimination and prejudice by colleagues, students, and even academic management, which can affect their emotional and professional well-being. In addition, invisibility can limit opportunities for career advancement for homosexual teachers, such as access to leadership positions, research funding, and academic recognition. Finally, the absence of inclusive institutional policies and specific support programs can perpetuate the marginalization of homosexual teachers and create barriers to their full participation and contribution in the academic environment.

In this context, it is imperative that academic institutions recognize and value sexual diversity among their members, promoting an environment where all professors can teach and research freely, without fear of discrimination or marginalization due to their sexual

orientation. Addressing these challenges requires an institutional commitment to diversity and inclusion, clear policies against discrimination and stigmatization, and the promotion of an environment that values and respects the sexual diversity of all members of the academic community.

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THE CHALLENGES OF EDUCATION: EXPERIENCES THAT WORKED

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ABSTRACT

This article intends to present the psychopedagogical work adopted by the Center for Guidance and Psychopedagogical Care - NOAP PUC-Rio, through some reports of sessions carried out by volunteer psychopedagogues. This Center has been working with children and adolescents, students from public schools, for more than 40 years, with the challenge of rescuing the desire to be in school, providing a healthier development. During the pandemic, the team sought alternatives and methodologies so as not to interrupt the flow of care, which guaranteed, for many children and adolescents, the only learning space. NOAP also works with schools and teachers.

In this article, we focused on showing how NOAP seeks to continue this service through alternative methodologies.

Keywords: Education. Psychopedagogy. Alternative Methodologies. Pandemic.

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INTRODUCTION

The Brazilian educational system presents a challenging scenario. Despite having a normative document, the BNCC (National Common Curricular Base), its implementation still encounters many obstacles, especially in public institutions. The COVID-19 pandemic has revealed the weaknesses of Education and enhanced the existing problems. Among these problems, the failure of learning, the increase in school dropout, the setback in social skills and the worsening of inequality in access to education stand out. During this period, many schools were unable to offer remote learning due to the lack of adequate infrastructure, that is, there was no preparation to integrate technology into teaching. There was also no structure to train teachers for the new distance learning.

The result was the stoppage of classes, causing significant losses in the orientation and construction of the competencies foreseen at each stage of education. At the same time, many families did not get the necessary support for homeschooling, increasing learning gaps and lack of interest on the part of students. Research shows that the index that measures the quality of education in Brazil, IDEB, showed punctual improvements in the early years of elementary school in 2023 compared to the result of 2021. However, they are still insufficient to achieve the goals established by the Ministry of Education (MEC). These results, however, were hampered considering two aspects: the automatic approval in the pandemic, resulting in a higher IDEB, and the low percentage of students who took the assessment, suggesting unreliable data.

In Rio de Janeiro, this scenario is proven by the fact that it is frequently mentioned as one of the states with a high rate of delayed graduation in Brazil. This survey informs that 23.5% of students in the final years of elementary school are at least 2 years behind, which suggests the existence of problems in literacy and in the early years of elementary school. The public schools located in Gávea, a neighborhood in the south zone of the city of Rio de Janeiro around PUC-Rio, which mainly serve the largest favela in the state and the second largest in the country, Rocinha, reflect this problem, when, unfortunately, there are students who reach the 3rd year of elementary school without being literate.

Precisely because we know that this problem, unfortunately, is the harsh reality of Rio de Janeiro is not new, the Psychopedagogical Care Center (NOAP) of the Pontifical Catholic University of Rio de Janeiro (PUC-Rio) was founded more than 40 years ago, faithful to the university's mission of opening up to the community around it, looking for alternatives to social and educational challenges.

NOAP develops a psychopedagogical action with children and adolescents who, as students, are unable to follow the school's proposal and remain on the margins of their

groups, often giving up studying and with a great chance of later becoming involved with drugs or prostitution.

> "Psychopedagogy emerges in Brazil as one of the answers to the great problem of school failure and evolves according to the nature of its object and its objectives. [...] Thus, psychopedagogy enters a new phase, in which it is possible to say that its object becomes the learning process, and its objective, to remedy or redo this process in all its aspects." [1] (SILVA, Maria Cecília Almeida, 1998 p.(Luke 25-26)

The NOAP is based on the assumptions of Psychopedagogy: development and learning occur in the subject that is multidimensional (with physical and psychomotor, operative and cognitive structures and emotional structure), permeated by interpersonal interactions and cultural influence. On this point, we agree with Mamede-Neves and Pain (2023), that Psychopedagogy is a praxis and, as such, needs a specific type of research, appropriate to its field.

Our mission, as members of NOAP, has been to rescue in children and adolescents, public school students, low-income families and low cultural and educational level, the fluency of development, the pleasure of building new knowledge and the alternatives of living in a group. Therefore, our challenge has been to achieve greater contact with these children and adolescents, rescuing the desire to be in school, providing a healthier development, adopting, therefore, group care and seeking to create situations and environments that favor curiosity and expression.

Since its foundation in 1982, about 2000 children/adolescents have passed through NOAP. They are brought by referral from schools and health professionals such as psychologists and neurologists. Upon receiving the application, the NOAP team screens them and distributes them in small groups, with a coordinator for each group. The sessions are weekly and each group has an intern/observer, doing his internship in psychopedagogy and learning from the coordinator the psychopedagogical practice.

At the same time, once every quarter or semester, meetings are held with families and schools, to seek a partnership in the lines of action of the work.

We can say that 80% of our patients have gains not only in the school area but also in the emotional and relational area.

The purpose of this article is, therefore, to show, through some reports of care situations, the psychopedagogical work adopted at NOAP, certain that many other places in Brazil, and even in other countries, will benefit from this report.

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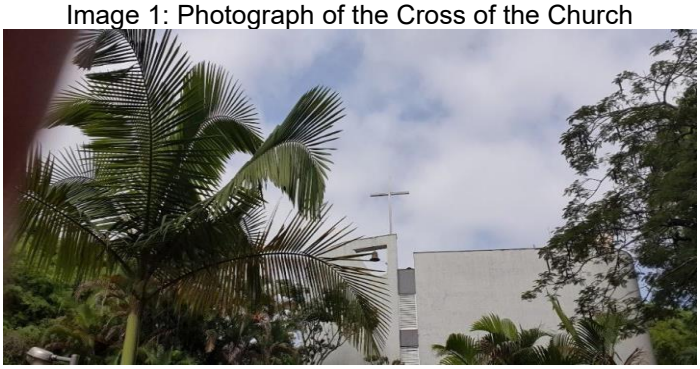
Sá, Thamires Souza Siqueira, and Viviane Candiota, the team of educational psychologists from NOAP who made their sessions available to be part of this article. All the accounts were interesting, but we took care to select those that could showcase the diversity of NOAP's work.

REPORT: WALK AROUND NOAP

"Taking a walk around NOAP, inside PUC, the idea was to explore the University's space, talking about what they saw and felt when looking at something. Some powers appeared to the group at this time of less directed work. The children were able to express themselves freely and demonstrate their knowledge of the world, their experiences with their families and friends. With this, our psychopedagogical intervention was to value each piece of information and exchange between peers because we understand that they do not have these opportunities for interaction and the space offered by the session is privileged, because it has peers of the same age, which makes the activity more recognized and more credible by the group.

A child said that a certain building was a church, because it had a cross in front.

Image 1: Photograph of the Cross of the Church



Source: author's collection, 2024

Another child said the name of the tree and the fruit, which she likes to eat at her grandmother's house.

Image 2: Photograph of the children around PUC-Rio

Source: author's collection, 2024

Another child talked about the bees that appeared and that they make honey and would sting if they were frightened.

Image 3: Photograph of the children around PUC-Rio

Source: author's collection, 2024

This group of 5 children between 8 and 11 years old is coordinated by Psychopedagogue Paula Sá. The coordinator's report speaks of an activity outside the room where children are normally attended. The objective of this session was to encourage the authorship of thought, that is, to lead children to express their discoveries and knowledge."

Images 4 and 5: Photographs of the children around PUC-Rio

Source: author's collection, 2024

Images 6: Photograph of the children around PUC-Rio

Source: author's collection, 2024

This one we observe how important the expansion of space is for these children who usually live in cramped spaces, often in areas of high risk due to violence and cannot go out, explore, observe. It brings the differentiated answers of each child and the coordinator, through the psychopedagogical intervention, valued each piece of information and the exchange between peers. This attitude of expressing and listening is very rare in the reality of these children, who, in general, have parents who work a lot and have little time or internal availability to listen to them. When the child gives the name of the tree and says that he likes to eat the fruit at his grandmother's house, he is bringing his internal world, his experiences that legitimize his learning and his expression.

The author Alicia Fernández (2001) says that psychopedagogical intervention should simultaneously direct its gaze to six instances.

- To the learning subject, who sustains each student;
- To the teaching subject, who inhabits and nourishes each student;
- The particular relationship of the coordinator with his group and with his students;

- The teacher's learning modality and, consequently, his teaching modality;
- To the real and imaginary peer group;
- To the educational system as a whole.

REPORT: PABLO PICASSO: AUTORRETRATO

Image 7: Picasso at 18, 25 and 90 years old

Source[2]

"The group was made up of 7 children aged between 8 and 11 years. The goal was to work on self-image and identity with the drawing of the self-portrait to strengthen the bond with oneself. Self-image directly influences self-esteem and the process of identity construction, especially during childhood and adolescence. The way the subject perceives himself impacts learning, social interactions, and personal decisions throughout life.

The activity was divided into three stages:

- Photographing the faces: we did a draw to see who would take the photo of whom. The intention was for each one to look at the other, finding the best angle to take the photo and checking if it was clear.
- Contextualization: Picasso's self-portraits were used in three different eras. It had the purpose of broadening the gaze using a famous artist. The 90-year-old self-portrait caused a lot of strangeness and everyone wanted to know why he had drawn himself that way. The children's questions were returned to them so that each one could think of a possibility. The intention was also to reflect on the concept of beautiful and ugly; there was an appreciation of artistic drawing and the freedom to create.

[2] https://www.facebook.com/photo/?fbid=1544626332389455&set=a.701658176686279&locale=de_DE accessed in October/2023.

- Starting the self-portrait: the photographs printed in black and white were distributed and the materials that could be used in the activity were presented. The black and white images had the symbolism of a rite of passage in which they were all "painted" the same color, and then differentiated themselves by showing their uniqueness by placing their colors and other elements:

There were those who included a landscape in the self-portrait; the one who did not want to draw their eyes, mouth and nose; the one who wanted to do exactly the same as the printed photograph and therefore erased countless times; the one who drew her hair as she wanted it to be and not as it was; the one who wanted to test the pencil of skin tones on her own arm to make sure she chose her tone; and the one who preferred to look at herself in the mirror."

Images 8, 9 and 10: Start of the activity; landscape in the self-portrait; Self-portrait without eyes, mouth and nose

Source: author's collection, 2023

Images 11, 12 and 13: using the mirror to draw oneself; choosing your skin tone; Attention to your details

Source: author's collection, 2023

These activities reported by coordinator Andrea Michel, in which she works with self-portraits of Pablo Picasso at different moments of his life, are of great importance for the

construction of a person's self. Making the self-portrait means looking at oneself, an unusual activity for the children and adolescents assisted at NOAP. Here the work seeks singularity; the self-portrait is only the starting point; and it allows each member of the group to look at himself.

Jean Piaget (1976) presents operative stages of knowledge, showing that in a constructive and interactive way, experiences provide the development of operative structures that will allow the action and modification of reality by the subject.

In the proposal, we see different moments of Pablo Picasso showing the sequence of photos (younger, mature, older), which NOAP believes that, through a playful activity like this, the child can establish a positive bond with learning because it allows children, in the operative thinking stage, to deal with sequencing, an important structure in school content and such as the Portuguese language and mathematics. It is also essential to form the self, in the terms proposed by Erickson (1968), a crucial moment for child development.

As Mamede Neves (1993) pointed out in the work "School failure and the search for alternative solutions – The experience of NOAP", here too, the coordinator seeks to make free activity feasible by acting in a semi-directed way. "We also observed that predominantly school situations in which "duty" stifles the capacity for expression and desire were avoided. We felt that there was an intention on the part of the coordinator to value the ludic activity as an enabler of learning (and not only leisure), providing the establishment of a link between ludic and school learning.

REPORT: EXPLORATION OF THE PUC-RIO CAMPUS

"The activity refers to a group of four children, aged between 8 and 12 years, who are part of my psychopedagogical care group at NOAP, at 9 am. In this group I had an intern, Lourdes.

I often realize that children and families have a very strong reference for PUC. For this reason, I also decided to take the children to explore the space outside the NOAP room, so that they could better situate themselves in the wider space in which they were inserted and what this external space had to offer them in terms of richness to be explored and known. I directed them to try to observe everything that caught their attention.

One of the boys, Vinícius, is very curious, and explored the place where we were walking a lot. During his exploration he stopped in a garden with some red plants, observed them carefully. He continued walking and found an almond leaf, also observing it carefully.

Images 14, 15 and 16: Vinícius' curiosities

Source: author's collection, 2024

We also discovered a water bottle and Vinícius came to wash his hands with me. While Vinícius walked more alone, the two girls went in pairs. Although Vinícius tried, in some way, to be close to me. Vinícius likes to be praised in the things he does.

Next to the Church there is a garden with biblical plants and the three children, together, went to this place, trying to read the signs with the names of the plants. It was a very rich moment of spontaneous reading.

Images 17, 18 and 19: The girls walking in pairs; reading the signs; next to the Baptismal Font

Source: author's collection, 2024

The girls also did this exercise of reading the plant plates. Then they became interested in entering the Church. The girls found the Baptismal Font curious and interesting, and I took the opportunity to explain the meaning to them. They showed interest and were attentive. Vinícius sat in one of the pews of the Church and watched the altar.

Image 20: Vinícius observing the altar of the Church

Source: author's collection, 2024

I perceive in Vinícius an attitude of observation, which, in my opinion, corroborates his curiosity."

In the coordinator's evaluation, as well as ours, this activity was of great richness, since the children had the opportunity to experience the experience of getting to know better part of the place where they pass until they reach NOAP, by the integration between them in an outdoor activity, by the discoveries made by them, by the realization of spontaneous readings, by the exercise of walking and contemplating and the group being together with the psychopedagogue and intern, guiding them, adding values and providing the opportunity to unveil a space rich in nature that, it seems to me that in a way, is little seen by them, perhaps because when we perform a conditioned action, we are not appreciating or observing the details. NOAP is very faced with stereotyped behaviors, repetition of pre-established patterns and a tendency to reproduce models offered by adults, institutions or the media.

For this very reason, it adopts the contributions of the Gestalt school, so important for the understanding of the act of learning, which points out this phenomenon very well, through one of its exponents: Kurt Lewin (1965/1951), accompanied by the contributions of Visca (1985): what is of interest in the description and contextual explanation is to detect the subtle interrelations of intraoperability both in terms of structural aspects, [...] as well as the energetic aspects. [...]

The context is formed by both the psychosocial, the socio-dynamic, and the institutional – to use the vocabulary of Bleger (1984) – what can simply be called: people, groups, agendas.

It is interesting to note that, according to the report, another child feels stimulated to talk about bees and to say that they make honey and sting if they are frightened, thus

showing learned knowledge. In this session we see that there is an appreciation of individual expression, which reinforces self-esteem and leads the child to be more active and positioned at school and in the family. (Erickson, 1968)

A similar activity was reported by coordinator Maria Christina Catão, with a group of four children between 8 and 12 years old.

According to the report, one of the boys, Vinícius, stopped in a garden with red plants. When he felt approved by the coordinator, he ended up taking his colleagues to the signs that had the name of the plants.

This moment is extremely significant, because in this age group it is the moment when we are able to make a classification, that is, we are able to group reality, according to criteria. This achievement generates more security and reference internally in the child.

On the other hand, the name is what defines the object. From the emotional point of view, when naming oneself, it is the moment of identity construction (Erickson, 1968), a very important issue for these children and adolescents, in general, coming from large families, in which the whole is much stronger than the each one.

It is interesting to see how, after reading the plaques with the names of the plants, they are interested in entering the church and hearing new information from the coordinator about the PIA BATISMAL.

This difficulty in focusing attention and dispersing is a very common complaint of schools. In this report, we see how interest and an organized environment increase the curiosity of children and adolescents and broaden the focus of attention.

NOAP CHALLENGE 2020/2021

The COVID-19 pandemic has brought many challenges to education. The closure of schools has had a significant impact not only on learning, but also on the social development of children and adolescents. Educational institutions needed, in a short time, to create strategies to adapt to the new modality of distance learning. This transition from face-to-face to remote teaching exposed existing inequalities and at the same time created new opportunities to rethink methodologies, enabling innovation in teaching.

NOAP's psychopedagogues adapted to the new reality by exploring technological tools and thinking carefully about the dynamics of activities. The first challenge was to maintain the motivation of children and adolescents to participate in the sessions at a distance. And to ensure the continuity of services, the team held remote meetings with parents and schools, reaffirming the importance of the partnership with NOAP.

Most did not have a computer and used the cell phones of their guardians to participate in the sessions. Other challenges faced by the team were the difficulty of connecting to the internet, the size of the cell phone screen limiting the children's vision, the dispersion of the group due to the lack of a place at home where they could have privacy at the time of the session.

REPORT: ONLINE GROUP CONSULTATIONS

"To continue the services during the pandemic, I contacted all those responsible for my group individually to explain what the proposal of the online service was and what we needed for the sessions to take place in the best possible way.

The importance of privacy in care and the child having a good connection was talked about, of course within the possibilities. The space needed to be prepared, that is, it was advised that at the time of the service the child was fully dedicated to that moment, without any other parallel task and that there were no other people in the environment. All this because it was not an online game, but a service that needed to follow the frames.

The sessions were always planned with the contingencies of technology in mind. Usually the children organized themselves in advance and separated the requested materials such as scrap, pencil and paper. Nothing fancy. I remember the day we built a scrap top and it was a shared joy at a time of so much uncertainty and insecurity.

Every time there was a problem with the care of a child, the guardian was contacted with a request for help. Many times at the time of the service, a child was on the street and the parents did not know. Another who at the time of care was taking care of her younger sister.

It was always explained about the importance of the time of service. That the service needed this commitment to really take place and that NOAP counted on the family to help.

Group of 5 children, between 11 and 13 years old, studying between the 5th and 8th grade.

- Guiding axis of the group: CONNECTION - with the task, with the coordinators, with the service, among them (connection, bond, meaning)
- Main challenges:
  - Maintain the frame
  - Seek proposals that bring continuity between meetings
  - Instigate the group to develop its own proposals

Image 21: The group in the virtual "little windows"

Source: author's collection, 2020

The preparation for the sessions began with the making of 2 boxes each containing various materials. Each child should assemble their work boxes as follows:

- BOX OF MATERIALS – CONSTRUCTION OF A SPACE OF ITS OWN – intention to bring materiality and organization to the frame of the session, both of available materials and of a place to store the productions.
- OBJECT BOX – various objects, to be used in games and dynamics in the services. Intention to bring their personality to the session. Suggestion: 10 objects, very varied. Example: book, clothespin, dried flower, sharpener, shell, satin ribbon, miniature animal, stone, coin.

The workboxes were used throughout the year in response to the planning of activities, as shown in the workflow below.

Figure 22: Workflow over the years 2020/2021

Source: author of the report, 2021

The activities were planned in advance so that each child separated the necessary materials, placing them in their work boxes. The games were customized for remote

service, such as the STOP Game. The coordinator shared the screen and each child wrote his word in the indicated column.

The dominoes, memory and board games were manufactured with materials from the workboxes. For the computer game, SCRATCH, it was necessary to access a website made by the session coordinator who controlled the assembly of the drawing. The children chose the pictures and indicated the place on the canvas where they should be. It was a drawing put together together.

'STOP' GAME

'STOP' Game – It is a game that involves evoking words starting with a certain letter into words from different categories. Each player has a double-entry matrix, in which the letter of the turn is drawn and everyone must write on their papers the words of different categories (name, animals, objects, food...). Whoever finishes first says "stop" and everyone must suspend the writing and start counting the points.

The game works with the operative functioning of classification as well as the evocative memory of elements of subjectivity itself. Sara Pain in "The Function of Ignorance" says: "The operations that determine the coherence of the reading of experience and the construction of a real objectivity are classification and seriation. They make it possible to systematically organize all schemes into hierarchies that allow calculating, measuring, predicting. To classify is not simply to group things that have common characteristics, but it also presupposes distinguishing them from others with which they can at the same time share a broader class. It is also necessary to be able to differentiate them from those that can share an extensive class with them, so that the notion defined or recognized by its similarity to an archetype fulfills the conditions of the definition of the concept: to be determined by its belonging to a higher class and by its specific difference in relation to the complementary classes. Thus, a concept can always be defined by other concepts, in a closed body. These concepts are submitted to new classifications based on various criteria, with an ever-increasing mobility. An organization of the real objective is then established, taking into account no conjunctural trait, even if in the transformations we will find certain symbolic references that still preserve the traces of lived experience.

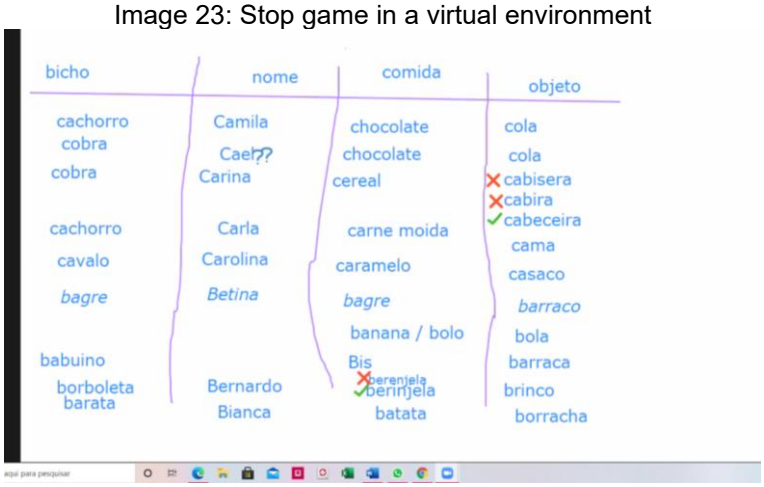
What are categories? Is it a way to classify words?

Proposal evolving from a random choice of words with one letter to a systematization in different classes.

Skills:

- Memory
- Directory
- Grammar

Image 23: Stop game in a virtual environment



Source: author's collection, 2020

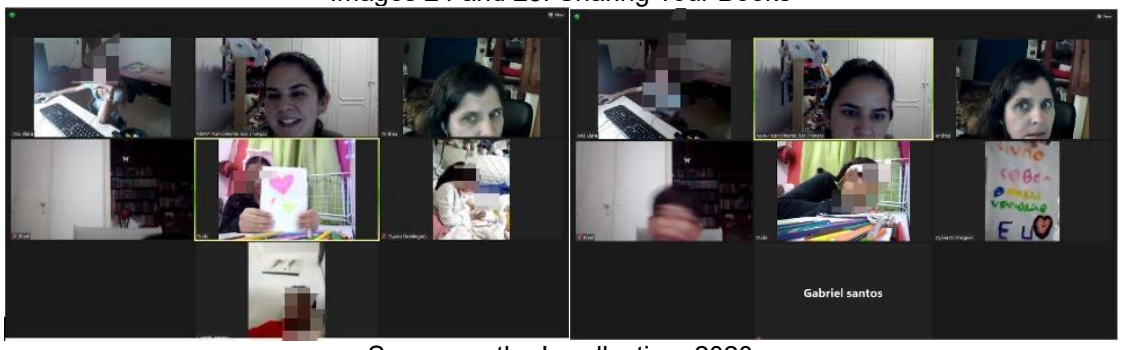
BOOK 'IF I WERE...'

Symbolic association of objects with themselves. A playful way to talk about yourself.

Steps:

- Choice of categories
- Think about what would be in each one
- Create the book (folding, tying, drawings)
- Presentation: show the book and talk about your choices

Images 24 and 25: Sharing Your Books



Source: author's collection, 2020

MANUFACTURED GAME: DOMINOES, MEMORY GAME, BOARD, COMPUTER GAME (PROGRAMMING – SCRATCH)

Dominoes is an eminently figurative game, in which observation and term-to-term correspondence are worked on. In it, each child or adolescent must find the piece

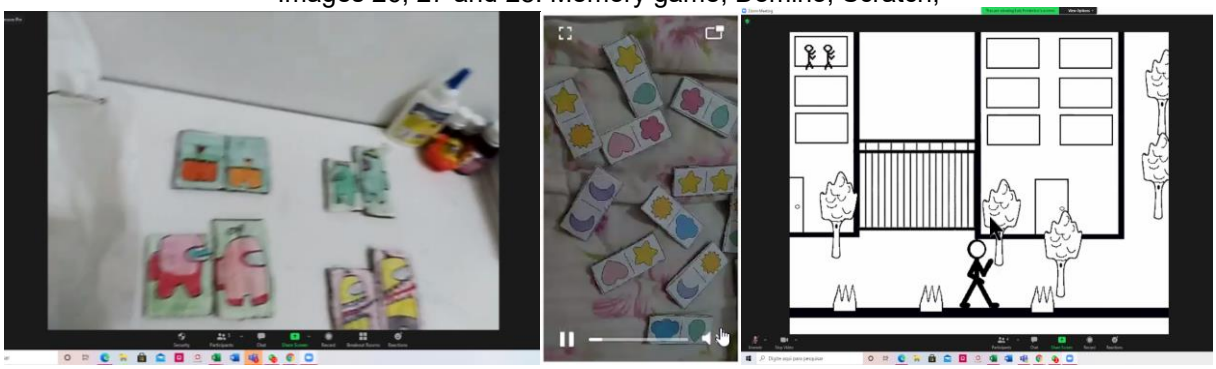
corresponding to the one on the table. Attention, observation, as well as the similarity of numbers, words, or objects are worked on.

Memory game consists of spatially organizing figures that must be memorized and then remembered. Players must choose the pictures in order to form pairs. The game works on spatial memory, attention and perceptual discrimination since many figures are similar. These structures will be fundamental for the acquisition of reading and writing.

The board game usually has a trail with a starting point and an ending point. It may present obstacles in the way and the order obeys the luck of the dice. Generally, in these disputes we are faced with situations of frustration that imply that the child/adolescent has perseverance to achieve his goal. Usually it is a more competitive game, in which the coordinator must be attentive to maintain a circulating tension, that is, sometimes one is at an advantage and sometimes others.

The computer game (SCRATCH) is a programming game that from blocks you create animations, games and interactive stories. It allows imagination, the entry into different conversations and the projection of feelings that are part of the subjects or the group. As it is a computer game, it exerts greater attraction for children and adolescents.

Images 26, 27 and 28: Memory game; Domino; Scratch;



Source: author's collection, 2020/2021

SCRAP TOY

Images 29 and 30: Sharing the toys

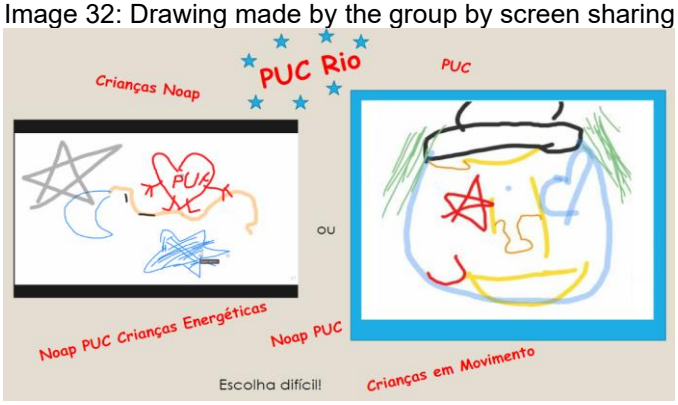
Source: author's collection, 2021

Image 31: Scrap train

Source: author's collection, 2021

SYMBOL AND GROUP NAME

Image 32: Drawing made by the group by screen sharing



Source: author's collection, 2021

KEY GAINS:

- Communication
- Commitment

MAIN CHALLENGES:

- Ability to complete tasks
- Keeping attention when the colleague occupies a lot of time"

It is very interesting to observe the flow of activities (Image 22) that this group of children between 11 and 13 years old studying from the 5th to the 8th grade go through. They are varied activities, quite diverse, like the group itself.

Maintaining the CONNECTION with the task, the coordinators and the group is an important part of a psychopedagogical work, one of the fundamental issues was to maintain the framework that gives reference and security, necessary to the process of knowledge construction.

The coordinator's task was to align the meaning between these activities, although they were very different. This point is reflected in the alignment of the group that, within the heterogeneity of its members, maintains the homogeneity of its proposal. We see many

expressions, and different expressions of the members of the group and high creativity, that is, singular and own expressions of each one.

We can assess that in a pandemic period, when people were held back and incommunicado, and when paralysis and fear dominated, achieving these results was, in fact, very rewarding and reinforced the role of psychopedagogical work for the team.

The coordinator's task was to align the sequence of these games, according to a guiding axis that means a line of work that obeys a logic for a group of children from 8 to 12 years old (within the period of concrete operations). The objective of each game aligns and complements each other with that of the other, while the differences between the members of the group allow for a heterogeneity, a circulation and an exchange that promote change.

RELATO: ORIGAMIS

"The activity with origami was carried out with adolescents aged 12/13 from NOAP, in the online modality. The proposal was, in each session, for a teenager to teach the others a fold. They were taught: dog face, boat, flower and airplane.

Origami is the technique of paper folding, in which many skills are worked, such as motor coordination, attention, concentration, memory, patience, imagination and mathematical concepts (spatial, geometric).

During the process, we observed that a boy had difficulty folding the paper. Immediately, another explained to him how to do it and helped him fold it properly. We also observed in some members of the group a certain difficulty in the use of vocabulary and spatial notion. We work together, then, notions of right, left, up, down, forward, backward, etc. One boy, very quickly, was impatient to wait for another to do his folding. We discussed in the group the pace of each one and the importance of waiting for the other to finish their product. We found great creative capacity in the group as a whole. For example, each one chose the name of their dog, wrote/drew that name on the zoom screen (e.g., Todi and Lobo), and together they all created a story about the dogs and wrote it. The teenager who initially showed difficulty in motor coordination realized that the boat taught by his classmate only had a hull on one side. He concluded that it was necessary to make the hull on the other side, so that the boat would not capsize. With this, he was able to show his knowledge of the world, moving from fantasy to reality. It is in the group's event, in this space of trust that is created during the meetings, that each child and adolescent has the opportunity to show their knowledge and deal with their non-knowledge, sometimes teaching what they know, sometimes learning from the other.

As Pichon-Rivière says in 'Group Process': "The dialogue with reality is re-established and its dynamism is twofold; it comes from the spontaneity of thought that is capable of ratifying or rectifying, of feeding itself and others (feedback).

The operation of dialogue implies that communication has become possible or has been reestablished, that is, that communication networks can be reestablished. It is a maieutic – dialogue – Socratic method, which consists of a cooperation that tends to return and resolve antinomies (syntheses) within a system of contradictions, with a degree of continuous and optimal alterity, in a situation of coming and going between the concrete and the abstract.

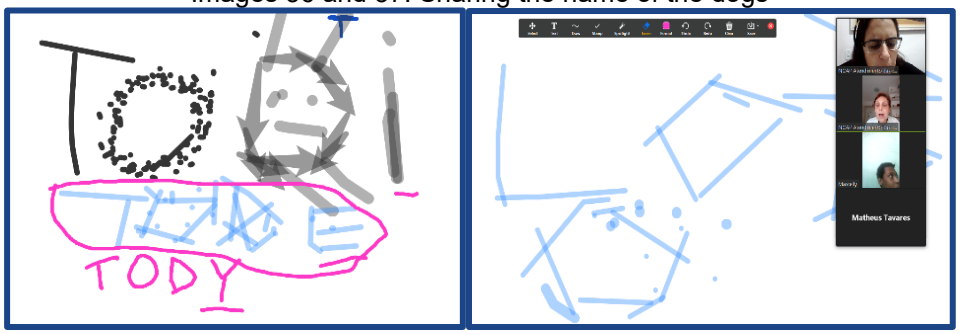
PUPPY FACES

Images 33, 34 and 35: Photographs of the dog faces

Source: author's collection, 2020

NAMES OF THE DOGS

Images 36 and 37: Sharing the name of the dogs



Source: author's collection, 2020

HISTORY ABOUT DOGS

Once upon a time, there was a lone wolf, who hunted everything in front of him. Then he walked, walked, walked and then, when he arrived in a city, the city was for dogs. There

was Tom, Mike, Tita and Todi. Then they ran up a mountain and hid in a cave. Then they spent the day in the cave. There was a day when the wolf went for a walk. The dogs took advantage and left. By the time they came out of the cave, they found a tree full of fruit. The wolf tried to kill them. Over time, they became friends."

The activity reported by Christina Catão and Luciana Moraes takes place at a very challenging time: how to work with 12/13-year-old adolescents in a post-pandemic moment, when there was no possibility of face-to-face meetings.

The coordinator's contact with the families so that, through partnership, the members of the group could have the computer or cell phone at the time of the session. This investment was fundamental for not only the adolescents, but also the families to feel that NOAP was not giving up on them, on the contrary, investing in trying to reconcile time to have the whole group together.

As the coordinator herself reports, it is in this space of trust that each child/adolescent has the opportunity to show their knowledge and deal with their non-knowledge, exchanging knowledge with their group colleagues. This solidarity is not common in a fast-paced, short-sighted society, where each one seeks their own interests.

The final story produced by the group reveals loneliness, threat, fear and search for security. The strength of the group that remains united and that attracts the threatening element, transforming it into a friend, is important.

Schools and families bring behaviors of greater autonomy, initiative and responsibility on the part of children and adolescents. The actions of the group coordinators are playful actions, but they connect with the real needs of children and adolescents. And that is its great value!! Therefore , the answer is seen, from the improvement in school performance, in the interest in reading and discoveries and by greater confidence in themselves."

One of the most fundamental points of this work, both in the pandemic and outside of it, is the consistency of a theoretical framework that sustains us in the belief that development and learning are the result of a gradual construction in interaction with many factors in the environment.

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BREAKING DISCIPLINARY BOUNDARIES: INTERDISCIPLINARITY FROM SCIENCE TO THE CLASSROOM

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ABSTRACT

The concept of interdisciplinarity has become essential in contemporary education, particularly in a world where social, economic, and environmental issues are increasingly complex and interconnected. There is a clear need for a strategy that integrates diverse fields of knowledge, as many challenges cannot be understood or solved from a single discipline alone. Conventional education, often compartmentalized, may restrict students' ability to think critically and solve problems effectively. Therefore, encouraging interdisciplinary practices in the classroom is crucial to equip students for a dynamic and multifaceted future. This study employed a qualitative methodology and utilized a literature review as a research method, which was vital for fostering dialogue with researchers specialized in the same topic discussed herein. The general objective of this research was to explore and examine the relevance of interdisciplinarity in contemporary education, highlighting how the integration of various fields of knowledge can enhance the teaching-learning process and prepare students to address the challenges of an ever-changing world. The study underscored the importance of uniting multiple areas of knowledge to

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cultivate critical, creative citizens ready to collaborate in an increasingly complex global context. Therefore, it is imperative that educators and educational institutions adopt interdisciplinary practices, promoting a more cohesive and relevant education for all students.

Keywords: Interdisciplinarity. Education. Integration. Knowledge.

INTRODUCTION

Interdisciplinarity has become a central concept in contemporary education, especially in a world characterized by rapid social, technological, and scientific transformations. The need to break disciplinary boundaries is evident, as many complex problems faced today cannot be understood or solved from a single perspective. In this context, the integration of different fields of knowledge emerges as an effective strategy to enrich the teaching-learning process, promoting a more holistic education that is adapted to the demands of the 21st century.

The methodology employed in this study followed a qualitative approach and utilized a literature review as a research procedure, which was essential for fostering dialogue with researchers specializing in the addressed theme. This review allowed for the identification of practices and theories that support the importance of interdisciplinarity in education, while also providing a solid foundation for analyzing the reported experiences.

The general objective of this study is to investigate and analyze the significance of interdisciplinarity in contemporary education, emphasizing how the integration of different fields of knowledge can enhance the teaching-learning process and prepare students to face the challenges of an ever-changing world.

The specific objectives planned are: to examine examples of pedagogical practices that implement interdisciplinarity in classrooms, identifying effective strategies that promote collaboration between disciplines and student engagement; to analyze how professional training can be improved through the integration of knowledge, highlighting the need for a curriculum that prepares students to act articulately in diverse contexts; and to investigate the relationship between scientific interdisciplinarity and educational practices, emphasizing how the inclusion of scientific knowledge in pedagogical approaches can foster a critical and investigative mindset among students.

Finally, the article is organized into four sections: introduction, methodology, theoretical framework, and final considerations.

METHODOLOGY

The methodology employed in this study followed a qualitative approach and utilized a literature review as a research procedure, which was essential for fostering dialogue with researchers specializing in the same theme addressed herein.

Regarding the qualitative approach, González (2020, p. 02) states that:

> The qualitative approach refers to a wide range of perspectives, modalities, approaches, methodologies, designs, and techniques used in the planning, execution, and evaluation of studies, inquiries, or investigations interested in

> describing, interpreting, understanding, or overcoming social or educational situations considered problematic by the social actors who are their protagonists or who, for some reason, have an interest in addressing such situations in an investigative sense.

In the opinion of Lunetta and Guerra (2023, p. 03):

> Bibliographic research is an approach based on existing materials such as books and scientific articles. It is common in various studies to find research that focuses exclusively on bibliographic sources. Often, exploratory studies fall into this category. Additionally, research aimed at analyzing ideologies and different perspectives on a problem is frequently developed solely based on bibliographic sources.

The main authors who contributed to the foundation of this research were as follows: Fazenda (2011); Martins et al. (2017); Mendes (2020); and Sousa (2024).

THEORETICAL FRAMEWORK

Interdisciplinarity emerges as a fundamental pedagogical approach in contemporary education, reflecting the need for learning that transcends traditional disciplinary boundaries. In an increasingly complex and interconnected world, the ability to integrate diverse knowledge becomes essential for the development of critical and creative individuals. This foundation aims to explore interdisciplinarity from various perspectives, beginning with its practical application in classrooms, where collaboration between disciplines can enrich the educational process and promote more meaningful learning.

Subsequently, the importance of professionalization and knowledge integration in contemporary education will be discussed. In this context, education must prepare students not only for mastery of specific content but also for articulating across different fields of knowledge, equipping them to face the challenges of the job market and societal life. This integration is vital for developing competencies that enable students to operate effectively in multifaceted scenarios.

Finally, we will address scientific and educational interdisciplinarity, emphasizing how this approach can transform educational practices and contribute to a more dynamic and collaborative learning environment. The intersection of science and education is crucial for fostering an investigative mindset among students, allowing them to become active agents in the construction of knowledge. Thus, this theoretical foundation seeks to establish the basis for a deeper understanding of interdisciplinarity and its implications for current educational formation.

PRACTICAL INTERDISCIPLINARITY

Practical interdisciplinarity is related to practical, technical, or procedural knowledge applied in daily life, as well as to the expertise of those who engage in professions involving interpersonal relationships, such as nurses, doctors, teachers, and social workers. This form of interdisciplinarity clearly differs from other fields of interdisciplinary application, as it is primarily grounded in the experience accumulated or acquired by individuals (empirical knowledge) in various areas or everyday situations. It is also characterized by its instrumental nature aimed at solving problems and addressing emerging situations in daily life. Interdisciplinarity is a central feature of everyday life, manifesting in various activities that require the combination of knowledge from multiple fields.

The following are five examples that illustrate this interaction in common situations:

1. Gardener and Botany: A gardener caring for a garden needs to understand not only how to plant and water the plants but also the basic principles of botany. Knowledge about the specific needs of each species, such as light, water, and nutrients, is essential for successful cultivation. Although the gardener does not need to be a botanist, their practical experience leads them to apply scientific concepts to ensure that the plants grow healthy and thrive.

Neves, Bündchen, and Lisboa (2019, p. 06) argue:

> Whether through the use of various technologies, different didactic resources, interdisciplinary approaches, or informal environments, contextualized practical experiences grounded in the conceptions and realities of individuals are recurrent in many of the strategies described and published. The role of the teacher is highlighted as essential in this process, also related to the need for initial and ongoing training that recognizes the relevance of plants in daily life.

2. Teacher and Psychology: A teacher managing a diverse classroom should have a basic understanding of psychology to handle different learning styles and student behaviors. By applying psychological techniques such as motivation and conflict management, the educator can create a more effective learning environment. Thus, pedagogical practice is enriched with knowledge from psychology, promoting a more inclusive education tailored to students' needs.

Novikoff, Brito, and Oliveira (2023, p. 03) state:

> Dialogical scientific thinking develops at the intersection between Psychology and Teacher Education. It introduces contemporary research concepts and methods that expand these areas while encouraging educational reflections focused on human growth while addressing challenges and proposing effective approaches.

3. Nurse and Public Health: The work of a nurse extends beyond direct patient care; it also involves understanding principles of public health. When conducting vaccination campaigns or promoting healthy habits within the community, the nurse utilizes knowledge about epidemiology and health policies. This integration allows the professional to operate not only in individual treatment but also in promoting collective health.

Ferraz et al. (2022, p. 07) comprehend that:

> The process of Continuing Education in Health, from an interdisciplinary perspective, enables responses to demands in health management and public health. This is because interdisciplinarity presents itself as an alternative to mitigating the complexity involved in managing a health system. It is emphasized that the term interdisciplinarity refers to the integration of knowledge while interprofessionalism refers to the integration of practices through intentional and collaborative articulation among different professions.

4. Architect and Sustainability: An architect designing sustainable buildings must consider aspects of engineering, environmental design, and even urban legislation. By integrating sustainability principles into their projects—such as efficient use of natural resources and implementation of green technologies—the architect applies multidisciplinary knowledge to create spaces that respect the environment while meeting societal needs.

Nunes, Carreira, and Rodrigues (2009, p. 06) opine that:

> Sustainable architecture, also known as green architecture or ecological architecture or eco-architecture, consists of an interdisciplinary stance within the professional practice of civil construction that values human perceptions regarding the environment while also considering the new social trend towards sustainability. This way of producing space consists of having the community execute and consume its technologies while sustainably utilizing available renewable resources.

5. Chef and Nutrition: A chef who creates healthy menus must have basic knowledge of nutrition to offer balanced dishes to customers. Understanding the nutritional benefits of ingredients and how to combine them appropriately is essential for creating flavorful and healthy meals. Thus, culinary arts intertwine with nutrition, resulting in food that promotes well-being.

Lima et al. (2017, p. 02) state: "Interdisciplinarity enables the ongoing construction of effective processes for acquiring knowledge among nutritionists in training that can be transposed into professional practice across various future settings."

These examples demonstrate how interdisciplinarity permeates various professions and daily activities. The ability to integrate knowledge from different fields not only enriches professional practices but also contributes to more effective and innovative solutions in our everyday lives.

Interdisciplinary Integration in the Professions

In various service-oriented professions, such as doctors, engineers, lawyers, and educators, as well as social workers and human resources managers, professional training and its application are embedded (or should be) in a complex and interconnected relationship with both scientific and empirical knowledge. Professional interdisciplinarity refers to the merging of approaches and knowledge (both scientific and practical) and the development of the necessary competencies for each profession. This interdisciplinary approach requires an evolution from the classical conception of interdisciplinarity, which, in its narrowest sense, refers to effective interactions between two or more disciplines, encompassing their concepts, methodologies, and techniques (Teixeira et al., 2021).

Thus, interdisciplinarity is not compatible with a cumulative perspective—one that merely adds knowledge—but rather with the need for real interactions between disciplines. Furthermore, this integration is based on a set of principles that include disciplinary complexity, equality among knowledge areas, complementarity of approaches, the need for mutual collaboration, and relationality among the professionals involved.

For example, in the field of agriculture, engineers, animal scientists, and agricultural technicians must work together, utilizing their different expertise to provide more comprehensive service to the client. Therefore, professional interdisciplinarity not only enriches professional practice but also contributes to more effective and innovative solutions in various contexts.

PROFESSIONALIZATION AND KNOWLEDGE INTEGRATION IN CONTEMPORARY EDUCATION

The process of professionalization, both in initial and ongoing training, differs from the traditional interdisciplinary approach by the goals it seeks to achieve. This distinction manifests in several aspects: the focus is on a logic of action rather than a purely disciplinary and cognitive logic; the aim is to promote an integrative perspective that involves the implementation of competencies through the practical mobilization of different approaches and knowledge; furthermore, this approach differs from strict interdisciplinarity by including intervention practices based on practical application as an essential component of the formative process (Rufino, 2018).

Rufino and Sousa Neto (2022, p. 06) emphasize that:

> The relationship between knowledge and teachers' experiences is central to understanding the action of interdisciplinarity, whose prominence has been significantly highlighted in recent years, particularly from the idea of profession and

> professionalization of the teaching craft, which resonates intensely in both training contexts and everyday educational practices in higher education institutions.

The primary purpose of training is, therefore, mastery in professional practice. It is not sufficient merely to establish connections between scientific disciplines. For example, a chemical engineer must not only understand engineering principles but also integrate knowledge from chemistry, biochemistry, and public policies when developing projects that respect nature as a whole. It is important to note that the process of professional training cannot be restricted to an interdisciplinary level characterized by the interrelation of knowledge.

It requires the incorporation of knowledge that can be considered "adisciplinary," meaning social reference practices that are detached from specific professional acts (which may derive from a professional framework), interacting dynamically, non-linearly, and non-hierarchically with theoretical knowledge to effectively realize professional action. For instance, a psychiatrist does not merely apply medical techniques; they must also understand the social and psychological aspects of patients to provide comprehensive care. This adisciplinary approach enables professionals to develop a holistic and integrated view of their field of action, empowering them to confront complex challenges in the workplace (Almeida et al., 2023).

Thus, contemporary professional training should be viewed as a continuous and adaptable process where the integration of different knowledge and practices is fundamental for developing the competencies necessary for effective performance in the market. The mobilization of this diverse knowledge not only enriches professional practice but also contributes to innovation and continuous improvement across various fields (Almeida et al., 2023).

SCIENTIFIC AND EDUCATIONAL INTERDISCIPLINARITY

Now, we will consider both scientific and educational interdisciplinarities in parallel to clearly highlight their distinctive elements, taking into account their purposes, reference systems, objects of study, and modalities of application. We will conclude by addressing the epistemological consequences that arise from this analysis.

Martins et al. (2017, p. 91) present the following understanding of scientific and educational interdisciplinarities:

> The former aims at the production of new knowledge in response to social demands; its object consists of scientific disciplines, its application is related to research, and its reference system comprises the disciplines as sciences (knowledge as wisdom), the consequence of which is the production of new disciplines (biophysics,

biochemistry, etc.). On the other hand, educational interdisciplinarity aims at the dissemination of knowledge through the integration of learning and knowledge; its object consists of school subjects, its application occurs through teaching, that is, the relationship established between the learner and knowledge; its reference system comprises disciplines as school subjects (school knowledge), and the consequence is the establishment of complementary relationships between school subjects, such as Physics complementing Chemistry, which is complemented by Mathematics.

Therefore, resorting to interdisciplinarity in the educational context requires significant adjustments compared to scientific interdisciplinarity. Many previous attempts were mere direct transplants from the scientific domain to the educational one.

As is often the case with many mobile concepts, migration to other domains of application provokes reinterpretations of meaning and modifications in content and scope that must be considered when addressing interdisciplinarity. Thus, just as it is necessary to distinguish between school discipline and scientific discipline, it is equally important to differentiate scientific interdisciplinarity from educational interdisciplinarity (Mozena & Ostermann, 2014).

Purposes

Two major currents prevail when discussing the purposes of the interdisciplinary approach, both in scientific and educational contexts: one promotes the establishment of a super-science that would replace a universalizing paradigm with the specific scientific paradigms of each disciplinary field (the operational disciplinary matrices); the other proposes the implementation of multidisciplinary negotiations in response to problematic situations related to social issues.

Researchers such as Fazenda (2011, p. 90) express the following view regarding interdisciplinarity and super-science: "Interdisciplinarity fundamentally presupposes intersubjectivity; it does not aim to construct a super-science but rather to change attitudes toward the problem of knowledge, replacing the fragmented conception with a unified one of the human being."

For instance, in environmental sciences, specifically in environmental education, the integration of knowledge from natural, social, and human sciences is essential for addressing complex issues such as sustainability.

Similarly, in projects involving public health, collaboration among professionals from medicine, sociology, and psychology can result in more effective solutions for social problems. These examples illustrate how interdisciplinarity can enrich both scientific knowledge and educational practices, promoting a more holistic and contextualized understanding of the phenomena studied (Rufino, 2018).

Thus, when considering the purposes of interdisciplinarity, it is crucial to recognize its capacity to foster dialogues among different areas of knowledge and contribute to the formation of professionals better prepared to face contemporary challenges. However, these two currents manifest distinctly within sciences and education. Furthermore, regardless of the conception adopted, interdisciplinarity should be understood as a means rather than an end in itself, as discussed below.

In this dialogical journey, on one side we have a reflective and critical interdisciplinarity that seeks epistemic meaning—where the relationship with knowledge is omnipresent—provoked by a more or less unifying interdisciplinary structuring that may ultimately lead to the pursuit of a metatheory or a metadiscipline (Martins et al., 2017).

On the other hand, an instrumental interdisciplinarity has developed, particularly in the United States, oriented towards projects and focused on functional searches for operational responses (how to do) to issues raised within society.

These different approaches to interdisciplinarity reflect not only the particularities of the academic and social contexts in which they are embedded but also the specific needs and challenges faced by each area. Understanding these distinctions is fundamental for promoting effective interdisciplinary practices that meet contemporary demands in both sciences and education (Martins et al., 2017).

Thus, interdisciplinarity has been called upon in scientific realms both by an epistemic demand—the production of new knowledge—and by a social demand—the response to societal needs. On one hand, its rationale lies in addressing the cognitive gap observed between two or more scientific disciplines, resulting in the emergence of new scientific disciplines.

Sousa (2024, p. 06) confirms:

> Interdisciplinarity tends toward internal and reciprocal action among the contents of two or more disciplines, approaching the unity of science and knowledge—a philosophy that underlies the interdisciplinary approach. The theme of interdisciplinarity arose from recognizing that approaching the world through a specific discipline was biased and generally too limited. Thus, it has increasingly been acknowledged that multiple approaches are necessary to study a particular issue in everyday life.

Furthermore, Jantsch and Bianchetti (2010, p. 35) align with Fazenda (2011) by considering that interdisciplinarity presents two attitudes:

> The first is to construct a new representation of the problem that is much more adequate regardless of any particular criterion. It is expected that biology will be associated with sociology, psychology, among others. A more convenient, objective, and universal interdisciplinary health science could emerge because it would examine many other aspects of the problem. It is assumed that this super-science

> will not carry the biases of each particular approach. However, such an interdisciplinary approach does not create a more objective super-science than others; it merely produces a new particular approach. The second attitude does not aim to create a new discourse that transcends singular disciplines but rather seeks to be considered a specific practice for addressing everyday existence problems.

Thus, in many recently established disciplines, two or more parent disciplines are called upon to establish the domain of these new forms of knowledge. Conversely, these new disciplines arose from the need to respond to practical societal problems (Fazenda, 2011).

Traditional disciplines lack—or no longer possess—the means necessary to confront such challenges in isolation or simply do not address socially relevant new issues as their objects of study; this has resulted in the establishment of new disciplines aimed at filling observed "gaps."

For illustrative purposes, ecology, social psychology, environmental sciences, environmental engineering, cultural anthropology, social psychology, geophysics, nuclear physics, endocrinology, and sociolinguistics are examples of disciplines with a clearly interdisciplinary character.

However, all scientific disciplines are interdisciplinary at their inception. This initial characteristic highlights the interconnection between knowledge areas and emphasizes the importance of collaboration among different fields to address complex contemporary issues (Mines Júnior, 2014; Santhi et al., 2022; Silva et al., 2023).

In the table below, Sousa (2024) outlines the challenges of applying interdisciplinarity in educational institutions.

Table 1: Barriers to the Application of Interdisciplinarity

Barriers	Description
Rigid academic systems	Structures that hinder the flexibility necessary for the integration of different disciplines.
Asymmetry between areas of knowledge	Inequality in the valuation and recognition of various fields of knowledge within institutions.
Lengthy approval processes for new study plans	Significant delays in the implementation of curricula that incorporate new concepts of integration.

Source: Sousa (2024)

Interdisciplinarity in the context of school education also faces the tension between two major social challenges: on one hand, the quest for meaning, epistemic reflection, and understanding; on the other, empirical social issues, functionality, and instrumental activity. However, a fundamental difference compared to the scientific perspective lies in the

pursued purpose, which is not to produce new knowledge or respond to social needs but to disseminate knowledge and train social agents by establishing the most appropriate conditions to foster and support the development of integrative processes and the appropriation of knowledge as cognitive products by students (Perin & Malavasi, 2020).

Regarding the scientific perspective, Perin and Malavasi (2020, p. 07) consider that:

> Interdisciplinary work in education, at this historical moment marked by significant changes primarily related to the global political and economic landscape, reveals that in order to avoid an 'alienation' or estrangement that deprives us of reality and understanding of the 'whole,' our intellectual foundation must be grounded in theories supported by scientific perspectives that enable us to think about the relationships present in contemporary social contexts.

It is evident that a restructuring of school knowledge is necessary within curricular, didactic, and pedagogical realms. Consequently, educational interdisciplinarity aims to enhance students' cognitive understanding through the interaction of knowledge from different disciplines and/or promote a better grasp of the functional utility of the knowledge to be acquired (Jesus et al., 2024).

Jesus et al. (2024, p. 07) explain that:

> Interdisciplinarity aims to broaden students' perspectives by promoting the development of essential skills such as creativity, observation, integration, and critical thinking. This approach contributes to the formation of informed and empathetic citizens, encouraging students' autonomy in seeking innovative solutions to presented challenges. By breaking away from traditional fragmentation of knowledge, interdisciplinarity fosters deeper critical analyses and integration across different fields of knowledge, reinforcing the importance of active methodologies at various educational levels.

The rationale for educational interdisciplinarity lies, therefore, in integrating learning processes (the learning approaches) and in integrating the resulting knowledge. Its objective is to promote the mobilization of cognitive processes and knowledge to ensure action and its success; that is, to facilitate students' integration of learning processes (the integrating processes) and knowledge (the integrated knowledge), as well as their mobilization and application in real-life situations (Lunetta, Guerra, & Rozendo, 2023).

This distinction between meaning and functionality is fundamental as it crystallizes two trends that constitute the poles of a continuum connected to two orientations: one focused on seeking a conceptual synthesis and the other on an instrumental approach. These two views, which may initially seem antithetical, should be preserved and maintained; it is essential to utilize them complementarily since "they are not mutually exclusive."

According to Santos, Rosa, & Engler (2020, p. 269), "The significant meaning of interdisciplinarity lies in the fact that it should be considered beyond a method or didactic technique. Interdisciplinarity involves a necessity as well as a problem situated within a historical-cultural and epistemological context."

The replacement of pluridisciplinarity with interdisciplinarity is a topic that merits careful analysis considering the nuances and implications of each approach within the educational context. Pluridisciplinarity involves multiple disciplines addressing the same topic while each maintains its own methodology and objectives without necessarily interacting deeply. In contrast, interdisciplinarity seeks to integrate knowledge from different areas, promoting more meaningful dialogue among them. This integration allows students to better understand the complexity of studied phenomena since many contemporary problems cannot be resolved within the rigid boundaries of a single discipline. Authors such as Thiesen (2008) and Mendes (2020) advocate for the importance of interdisciplinarity as a means to overcome the limitations of pluridisciplinarity.

Mendes (2020) argues that interdisciplinarity should not be viewed as a mere overlay of disciplines but rather as an approach that promotes a more organic and integrated construction of knowledge. He emphasizes that this integration is fundamental for forming individuals capable of confronting complex challenges in today's society.

Thiesen (2008), for his part, highlights that interdisciplinarity allows students to develop critical and creative skills essential for problem-solving in real contexts. However, it is important to consider that transitioning from pluridisciplinarity to interdisciplinarity is not straightforward and may present significant challenges.

The effective implementation of interdisciplinarity requires adequate teacher training, careful planning, and a school environment that fosters collaboration among different fields of knowledge. Additionally, it is crucial to respect each discipline's particularities while ensuring that students not only integrate knowledge but also achieve a deep understanding of each area.

In summary, while pluridisciplinarity has its value in offering multiple perspectives on a topic, interdisciplinarity proves more advisable for promoting a more integrated and meaningful education. The adoption of interdisciplinarity can enrich the teaching-learning process, better preparing students for contemporary challenges (Thiesen, 2008; Mendes, 2020).

FINAL CONSIDERATIONS

The study conducted fully achieved all established objectives, confirming the importance of interdisciplinarity in contemporary education. The evaluation of pedagogical practices that apply interdisciplinarity in the classroom revealed effective strategies that encourage cooperation among disciplines and active student participation. Furthermore, the investigation into professional training highlighted the significance of knowledge integration to empower students to act cohesively in various scenarios.

The connection between interdisciplinarity in science and pedagogical practices also emphasized that incorporating scientific knowledge into teaching methodologies can stimulate a critical and investigative attitude, which is crucial for enhancing competencies in the 21st century.

Future studies are recommended to delve deeper into the necessary conditions for the effective application of interdisciplinarity across various educational levels and cultural contexts. Additionally, it would be relevant to explore the impact of interdisciplinarity on enhancing students' socio-emotional skills, as well as its effects on motivation and academic performance across different subjects. The evaluation of digital platforms and technological tools that can simplify interdisciplinary practice also emerges as a promising area for new research.

In summary, this text emphasizes that transcending disciplinary boundaries through interdisciplinarity not only enhances the teaching-learning process but also equips students to address the challenges of an ever-changing world. It is essential to integrate diverse fields of knowledge to cultivate critical, creative citizens capable of collaborating in an increasingly intricate global landscape. Therefore, it is imperative that educators and educational institutions implement interdisciplinary practices, fostering a more unified and relevant education for all students.

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THE USE OF MUSIC AS AN EDUCATIONAL ELEMENT IN EARLY CHILDHOOD EDUCATION

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ABSTRACT

This article has as its theme The Use of Music as an Educational Element in Early Childhood Education, the present work is developed from the theme of music, where in the course of my research, I verified that music plays a significant and pleasurable role in children's learning. The general objective of this is to present how music can be used in pedagogical activities in early childhood education. This research is carried out through bibliographic research.

Keywords: Music. Teaching. Early Childhood Education.

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INTRODUCTION

Music is composed of sound and silence, being present in the life of the human being from an early age and is seen as a language that communicates sensations and senses including affectivity, cognition and aesthetics. The world of children carries perceptible and harmonic sound elements and these sound elements are manifested in very diverse ways and means through music, songs, sounds existing in urban environments, in nature that can be perceived during the course of their lives. The sounds and music existing in nature are very present in the lives of children, and it is common to hear songs whose lyrics talk about spiders, frogs, cats, live fish, associating life and the environment (BRASIL, RCNEI, 1998).

Currently, there are many cases of students with difficulties related to the teaching and learning process: some related to children and others, to the teacher. And this makes us turn our gaze to the issue of learning and the related processes that help in the understanding of concepts and appropriation of contents, and music comes to be an instrument that can contribute to this process.

Musical training helps in the psychic and emotional development of children and young people, music when used in the classroom, must be well thought out how it will be used for better use of the syllabus.

Teaching through music became mandatory from Federal Law No. 11. 769, of August 18, 2008. Since then, music has become mandatory content of the curricular component of Basic Education.

After this obligation, institutions had to adapt the curriculum so that it could be inserted in the educational context. The curriculum serves as a guide for the development of a project, an instrument of orientation of pedagogical practice that helps its responsible and executor: the teacher. "To this end, the curriculum provides concrete information about what to teach, when to teach, how to teach and what, how and when to evaluate" (COLL IN PILETTI, 2004, p.2).

Loureiro says that "The importance of teaching music in school lies, then, in the possibility of awakening skills and behaviors in the child, leading him to feel sensitized by music using creation and free expression" (LOUREIRO, 2003, p.127).

The use of music as an educational element can provide the child with a differentiated learning. It is up to the institution that provides the child with a more joyful and favorable environment for learning, in order to improve the performance of students in various areas of knowledge.

Therefore, the use of music helps in the development and construction of all human skills, bringing the development of artistic expression, promoting taste and musical teaching, allowing the child to improve their auditory perception and attention, as well as allowing the child to expose their feelings, thoughts and emotions.

DEVELOPMENT

THE USE OF MUSIC IN EARLY CHILDHOOD EDUCATION

According to Gainza (1988), musical activities at school can have preventive objectives, in the following aspects: Physical: offering activities capable of promoting the relief of tensions due to emotional instability and fatigue; Psychic: promoting processes of expression, communication and emotional discharge through musical and sound stimulus; Mental: providing situations that can contribute to stimulate and develop the sense of order, harmony, organization and understanding.

Music contributes to the process of childhood development, it is extremely relevant because it awakens playfulness, refining knowledge, socialization, intelligence, literacy, thus, collaborating in the development of memorization, imitation of sounds and gestures, reasoning, visual motor coordination, attention and perception, body expression and language.

Second Good,

> There are several ways to work with music at school, for example, in a playful and collective way, using games, circle games and making instruments. Imagination is a great ally in this regard, remembering that musicality is within each person (BUENO, 2011, p.231).

The educational potential favors the cognitive, psychomotor, emotional, affective, socializing development and the construction of personal values in children.

With music, the child lets go, interacts, becomes more spontaneous, giving him the freedom to be able to reconcile the real world and the world of imagination, since when the child learns by playing, there is a greater ease of assimilation of knowledge. This is noticeable in the documents of the Curricular Reference for Early Childhood Education (RCNEI):

> Music is the language that translates into sound forms capable of expressing and communicating sensations, feelings and thoughts, through the organization and expressive relationship between sound and silence. Music is present in all cultures, in the most diverse situations: festivals and celebrations, religious rituals, civic and political manifestations, etc. (BRASIL, 1998, p. 45).

This concept understands music as a language and area of knowledge, considering that it has its own structures and characteristics, and should be considered with the objectives of production, appreciation and reflection, guidelines to be worked on by teachers.

The Early Childhood Education teacher, who has knowledge in music education, understands, more clearly, the objectives of music education in the classroom space, breaking with traditional, fragmented practices, which are sustained, above all, in the adornment of school routines.

Swanwick (1988, p. 89) confirms that "music can be used for non-musical proposals".

> […] broadening the worldview, providing opportunities and discussing experiences that involve different symbolic systems built by civilization, each of the arts needs to be treated consistently in school and in education in general.
> (Figueiredo,2009)

The use of music can occur in a traditional way, with a music teacher and a more specific knowledge on the subject, it can also be applied by other teachers from other areas of education, with the use of equipment such as radios, stereos and lyrics with interpretation or it can also be worked with the use of digital technology. The use of software for music teaching is already a reality in the world and can be applied in the construction of knowledge combining pleasure with technology.

PEDAGOGICAL ACTIVITIES WITH THE USE OF MUSIC:

Musical activities in schools should start from what children already know in this way, it develops within the working conditions and possibilities of each teacher. FARIA (2001, p. 4), "Music conveys a message and reveals the noblest form of life, which humanity aspires to, it demonstrates emotion, not only occurring in the unconscious, but takes care of the child, involving them, bringing lucidity to consciousness".

Through music it is possible to exercise the entire structure of early childhood education, in addition to being playful and pleasurable, children manifest themselves through songs, nursery rhymes, dances, theater, etc. Musical activities at school can have preventive objectives, in the following aspects:

- **Physical:** offering activities capable of promoting the relief of tensions due to emotional instability and fatigue;
- **Psychic:** promoting processes of expression, communication and emotional discharge through musical and sound stimulus;

- **Mental:** providing situations that can contribute to stimulate and develop the sense of order, harmony, organization and understanding.

Let's see some activities that can be done with music:

- Using a drum, the children will sing a song. When varying the intensity of the drum, from pianissimo to strong, the children should follow the intensity of the voice. Singing pianissimo to weak, and increasing the "volume" of the voice to strong.
- Accompanying a song on the radio, music is, known to the child. She will clap her hands, when the volume of the device is on the strong sound (strong clapping), when she is on the weak sound, clap her hands weakly.
- To the sound of a song on the radio, already known to the child, he will make variations by waving his arms, imitating a conductor, wide movements for a strong sound, small movements for weak sounds.
- Use two cards of different colors, for example: red and black. Red for the weak sound, and black for the loud sound: the child should point or lift the card when hearing the faint or loud sound. A radio or musical instruments can be used to produce the sounds.

We can see how much music can influence the child's development, in a playful way these activities arouse, but the child's interest and he learns a lot, but playing. The way to favor sensitivity, creativity, rhythmic sense, musical ear, the pleasure of listening to music, imagination, memory, concentration, attention, self-discipline, respect for others, psychological development, socialization and affectivity, in addition to giving rise to effective body awareness and movement. According to Koellreutter (2001) it is necessary to learn to learn what to teach

CONCLUSION

The work aimed to reflect on Music as a pedagogical resource, where the research was carried out with a focus on early childhood education.

Music is present in our lives from birth, all the sounds of the environment are music for babies. Music is also present in the culture of peoples, in beliefs, dances and also in games. It helps the baby develop movements, language, sociability, in addition to bringing calm. This should be used in children's schools, to help children develop faster and more effectively.

The development of the playful aspect facilitates learning, personal, social and cultural development, contributes to good mental health, prepares for a fertile inner state,

facilitates the processes of socialization, communication and knowledge construction. We observe that music is a very significant form of communication that goes beyond the expression of nature and human feelings.

For all these reasons, music should be used to contribute to the child's development, both intellectually and physically. Music with rhythms that is easy to follow with clapping, gestures and body expressions should be used, so that the child can develop his or her abilities.

We must remember that children in early childhood education are in constant development and learning, so we must stimulate in a positive way and facilitate their learning. Through music, we can shorten the path and facilitate the development of children, in addition to socializing more easily, helping to respect others who live with it.

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