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AUTHORS

Adriano Rosa da Silva
Alex Salviano da Silva
Damarys Alves da Silva Barbosa
Diego da Silva Sales
Edson Osterne da Silva Santos
Fabrícia Pires Pimenta
Francisco Welton Machado
Grasiella Ribeiro Monteiro Pessanha
Gustavo Davanço Nardi
José Manoel Morais Silva
Júnior de Souza Costa
Kaique Marlen da Conceição
Kennedy José Alves da Silva
Marcela da Silva Melo
Marcia Barbosa de Moura
Marco Machado
Marcos Scarpioni
Nincia Cecilia Ribas Borges Teixeira
Noé da Silva Carvalho
Paulo Henrique Schreiber Miranda
Raimundo Lenilde de Araújo
Raimundo Wilson Pereira dos Santos
Raissa de Almeida Sousa
Ruan Gabriel Linhares Chaves

SUMMARY

SUSTAINABLE PUBLIC PROCUREMENT: THE ROLE OF THE STATE IN PROMOTING THE 2030 AGENDA

Alex Salviano da Silva[1]

ABSTRACT

Sustainable public procurement emerges as one of the most effective instruments for implementing the United Nations 2030 Agenda at the state level. This article analyzes how the Brazilian State can incorporate sustainability principles into its procurement processes, promoting sustainable development through public purchasing power. Using a qualitative and exploratory approach, supported by literature review and document analysis, the paper investigates the alignment of procurement policies with the Sustainable Development Goals (SDGs), highlighting good practices, challenges, and recommendations. It concludes that adopting social and environmental criteria in public procurement represents a crucial step in transforming public administration into an active agent of sustainability, as proposed by the 2030 Agenda.

Keywords: Sustainable Public Procurement; 2030 Agenda; Sustainable Development; SDGs; Public Administration.

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[1] Universidade de Brasília (UNB)
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INTRODUCTION

The pursuit of sustainable solutions has emerged as a pivotal challenge in the 21st century, necessitating structural transformations in management, consumption, and the interplay between the state, the market, and civil society. In this context, the United Nations 2030 Agenda, approved in 2015 by 193 member states, is noteworthy as a global action plan to eradicate poverty and promote economic, social, and environmental development in an integrated and balanced way (UN, 2015). The 17 Sustainable Development Goals (SDGs) that comprise this agenda underscore the necessity for inter-institutional coordination and cross-cutting public policies.

The state's purchasing power is one instrument that has the potential to contribute directly to the achievement of the SDGs. According to data from the Organization for Economic Cooperation and Development (OECD, 2022), public purchases account for between 10% and 20% of Gross Domestic Product (GDP) in many countries. In Brazil, this percentage is approximately 12% of GDP, thereby conferring a strategic role to government purchases in inducing sustainable behavior on the part of the productive sector and in promoting socio-environmental objectives.

The concept of Sustainable Public Procurement (SPP) entails the integration of environmental, social, and economic criteria into public sector procurement processes for goods, services, and works. This governance strategy enables the state to exert influence over production chains, stimulate green innovation, reduce inequalities, and promote a low-carbon economy (UNDP, 2021; IDB, 2022). Concurrently, this initiative aligns with the constitutional tenets of efficiency, economy, and public interest.

In Brazil, the issue has been a subject of discussion since the early 2000s. However, it was not until the enactment of Law No. 14,133/2021, the New Law on Bids and Administrative Contracts, that sustainability emerged as a prominent component of the normative frameworks for government procurement. Article 11 of this law expressly includes sustainability as one of the bidding objectives, signaling a new paradigm in the management of Brazilian public procurement.

In light of the aforementioned context, the present article seeks to analyse the role of the state in promoting sustainable public procurement as an instrument for implementing the 2030 Agenda. The analysis focuses on current Brazilian legislation, positive national and international practices, and the operational challenges faced by public managers. The hypothesis underpinning this study is that the adoption of sustainability criteria in public tenders can promote greater coherence between the state's procurement policies and the international commitments made by the country.

The article's structure is delineated as such: Section 2 presents a literature review of the 2030 Agenda, sustainable procurement, and pertinent international experiences; Section 3 describes the methodological procedures adopted; Section 4 discusses the results of the documentary and bibliographic

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analysis; finally, Section 5 presents the final considerations and recommendations for strengthening sustainable public procurement in Brazil.

LITERATURE REVIEW

THE 2030 AGENDA AND THE SDGS

The 2030 Agenda constitutes a significant international commitment, endorsed by 193 member states of the United Nations (UN) in 2015. The agenda, which comprises 17 Sustainable Development Goals (SDGs) and 169 targets, seeks to eradicate poverty, protect the planet, and ensure prosperity for all by the year 2030. The distinctive characteristic of the 2030 Agenda is its universality, indivisibility, and interconnectedness. In order to achieve the objectives of the Agenda, it is necessary to integrate public policies and to encourage the participation of various social actors, including governments, the private sector, and civil society (UN, 2015).

In the context of Brazil, the implementation of the 2030 Agenda has been orchestrated by the SDG Interinstitutional Committee, with the backing of institutions such as the Institute for Applied Economic Research (IPEA) and the Brazilian Institute of Geography and Statistics (IBGE), which are responsible for the monitoring of national indicators. The Sustainable Development Goals most directly related to sustainable public procurement include: The Sustainable Development Goals (SDGs) relevant to this discussion are as follows: 12 (Responsible Consumption and Production), 13 (Action against Global Climate Change), 9 (Industry, Innovation and Infrastructure) and 8 (Decent Work and Economic Growth).

As posited by Sachs et al. (2022), the attainment of the objectives delineated within the 2030 Agenda is contingent upon the capacity of states to effect structural changes in their methodologies for the management of resources and the provision of goods and services. From this standpoint, public procurement has evolved into a pivotal instrument for promoting sustainability, functioning as a catalyst for transitioning towards more inclusive, resilient, and low-carbon models.

The incorporation of sustainability criteria within public tenders signifies the state's acknowledgement of its role as a strategic agent in shaping market dynamics, fostering innovation, and catalysing regional development. As Costa and Almeida (2021) have demonstrated, contemporary public management must align its operational instruments with global commitments, and sustainable procurement constitutes a concrete trajectory towards this objective.

SUSTAINABLE PUBLIC PROCUREMENT

Sustainable public procurement (SPP) can be defined as the systematic incorporation of environmental, social and economic criteria into public administration procurement processes for goods,

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services and works. The central idea is to utilise the state's purchasing power as a lever to promote sustainability policies, thereby contributing to the transition to more responsible production and consumption models (UNDP, 2021).

According to the United Nations Industrial Development Organization (UNIDO, 2022), the potential exists for SPP to induce sustainable practices throughout the supply chain, thereby stimulating technological innovation, social inclusion, and reducing environmental impacts. In Brazil, the concept of sustainability in public procurement has gained legal backing through several legislative acts, beginning with Law No. 12.305/2010 (National Solid Waste Policy), followed by Decree No. 7.746/2012 and, most recently, Law No. 14.133/2021, which establishes sustainability as a bidding principle and objective (art. 11).

According to Fiorini and Ribeiro (2021), adopting SPPs requires planning, technical training, and tools to measure the socio-environmental impact of contracts. These measures include establishing sustainable selection and qualification criteria and including contractual clauses that encourage the use of recyclable materials, energy efficiency, and gender and racial equity in executing teams.

Despite regulatory progress, implementing the SPP faces practical obstacles. A 2023 study by the Institute for Applied Economic Research (IPEA) revealed that fewer than 20% of Brazilian federal entities incorporate sustainability criteria into their tenders. Pointed out obstacles include a lack of technical training, difficulty measuring positive externalities, and fear of increased costs.

INTERNATIONAL EXPERIENCES

Several countries have already institutionalized sustainable public procurement as a state policy. The European Union is a leader in this area, having incorporated mandatory environmental and social criteria into its public procurement directives. For example, Directive 2014/24/EU encourages the adoption of best value criteria rather than the lowest price, allowing aspects such as durability, energy consumption, and social inclusion to be considered (European Commission, 2020).

In Germany, the Green Procurement Program establishes guidelines for sustainable procurement at the federal and state levels, promoting extended life cycle products and services with a lower environmental impact. In France, the National Sustainable Procurement Plan mandates that contracts must include at least one environmental or social criterion (OECD, 2022).

In Portugal, the Public Contracts Code (Decree-Law no. 18/2008) establishes provisions for the consideration of environmental and social factors in government procurement. The country has also implemented the Action Plan for Ecological Public Procurement (PAPV), which aims to reduce the ecological footprint of public administration and stimulate innovation in the productive sector (APA, 2022).

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These international experiences demonstrate that institutionalizing SPP requires political will, clear regulations, technical support instruments, and monitoring and evaluation mechanisms. As the OECD (2023) notes, the success of sustainable procurement policies hinges on the involvement of public leaders and the integration of ministries, agencies, and levels of government.

The next section presents the methodology adopted in this study to investigate the state of sustainable public procurement in Brazil in light of the 2030 Agenda, based on these analyses.

METHODOLOGY

The present research adopted a qualitative, exploratory, and descriptive approach with the aim of understanding how sustainable public procurement (SPP) has been incorporated into the practice of Brazilian public administration and how this incorporation contributes to the promotion of the Sustainable Development Goals (SDGs) established in the UN's 2030 Agenda.

The choice of a qualitative approach is justified by the need to deepen the analysis of the meanings, strategies, and challenges related to implementing the SPP, which would not be possible using only quantitative methods. As Creswell (2014) indicates, qualitative research allows us to explore complex phenomena within specific contexts, particularly when interpreting ongoing social and institutional processes.

The study is exploratory because it investigates a relatively new and constantly evolving field with theoretical and practical gaps that still need to be filled. It is also descriptive, as it characterizes the current state of SPP in Brazil based on normative frameworks, institutional experiences, and secondary data.

METHODOLOGICAL PROCEDURES

The data was collected through a meticulous literature review and a thorough documentary analysis. A comprehensive review of the extant literature was conducted, encompassing scientific articles, books, reports from international organizations (OECD, UN, IDB, UNDP), national and foreign legislation, administrative rules, decrees, and technical manuals. The selection of bibliographic material prioritized publications from the last five years (2019 to 2024), in order to guarantee the timeliness and relevance of the information.

The documentary analysis focused on official sources such as:

- Law No. 14.133/2021 (Brazil's new Bidding and Administrative Contracts Law);
- Decree No. 10.936/2022 (Brazil's Regulation of the National Solid Waste Policy);
- European Union Directive 2014/24/EU on public procurement;

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- Portugal's Green Public Procurement Action Plan (PAPV);
- OECD reports (2021, 2022, 2023) on sustainable procurement;
- Reports by IPEA, Federal Court of Accounts - Brazil and the Ministry of Management and Innovation in Public Services.

ANALYSIS CRITERIA

The data was analyzed based on three main criteria:

- **Normative effectiveness:** verification of the presence and clarity of legal provisions that encourage or oblige the adoption of sustainability criteria in public tenders;
- **Institutional capacity:** evaluation of public entities' structural and organizational conditions to implement SPP, including technical training, use of digital tools, and control mechanisms.
- **Strategic alignment**: refers to the degree to which the SPP is integrated with the goals of the 2030 Agenda and Brazil's international commitments.

The data was systematized using the content analysis method proposed by Bardin (2016), which involved categorizing the information extracted from the analyzed documents by theme.

The next section will present the research results, which are organized into three parts: a diagnosis of the Brazilian scenario, an identification of the obstacles and potentialities of the SPP, and proposals to improve its effectiveness.

RESULTS AND DISCUSSION

DIAGNOSIS OF THE BRAZILIAN SCENARIO

Brazil has made significant regulatory progress in the area of sustainable public procurement (SPP), especially with the enactment of Law 14.133/2021. This law explicitly includes sustainability as one of the objectives of the bidding process (Art. 11). However, the transition from norm to practice still faces significant challenges. According to 2023 data from the Ministry of Management and Innovation in Public Services, only 19% of Brazilian municipalities claim to incorporate sustainability criteria into their procurement processes, and fewer than 10% do so systematically.

An analysis of the transparency portals of various federal entities reveals that, although public notices are in place with generic mentions of sustainability, objective and verifiable criteria for environmental impact, social responsibility, and the product's life cycle are rarely included. This finding aligns with the conclusions of IPEA's 2022 diagnosis, which identified the inadequate institutionalization of SPP, particularly at the municipal level.

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Another critical issue is the lack of technical training. Many public officials are unaware of the legal instruments available for implementing SPPs or do not know how to implement them. According to a 2021 survey by the Federal Court of Auditors (TCU), 72% of the civil servants interviewed cited a lack of technical knowledge as the main barrier to adopting sustainable criteria in tenders.

Despite these obstacles, there are positive examples in some government sectors. For instance, the Paraná State Government has implemented a State Policy for Sustainable Public Procurement with clear guidelines and ongoing training for civil servants. At the federal level, the Ministry of the Environment published a practical guide for drafting terms of reference with environmental criteria in 2020, demonstrating efforts to strengthen SPP.

OBSTACLES AND POTENTIALITIES

The obstacles to the widespread adoption of SPP in Brazil are multidimensional. In addition to the aforementioned lack of training, the following issues stand out:

- **Lack of Standardization and Clear Indicators:** The absence of agreed technical parameters to define what is sustainable in different types of procurement makes it difficult to apply the criteria objectively.

- **Fear of increased costs:** Many managers fear that including sustainable criteria will generate additional costs, which is not always true. Studies by the UNDP (2021) indicate that, when considering life cycle costs, sustainable purchases can generate savings in the medium and long term.

- **Low inter-institutional coordination:** The lack of dialogue between environmental and legal bodies and procurement sectors jeopardizes the cross-cutting nature necessary for the success of SPP.

Conversely, Brazil has the potential to spearhead sustainable purchasing initiatives in Latin America. Public procurement policies can encourage the use of ecologically responsible products, such as recycled paper, furniture made from certified wood, organic food, and green technologies. Additionally, Brazil has a robust environmental regulatory framework and experience with programs such as Comprasnet and the National Public Procurement Portal (PNCP), which allow for the standardization and monitoring of tenders.

IMPROVEMENT PROPOSALS

Given this diagnosis, the following measures are proposed to increase the effectiveness of SPP in Brazil:

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- **Create performance indicators and targets linked to the SDGs**: Incorporate progressive targets into public procurement plans, aligned with the SDGs, allowing the social and environmental impacts of contracts to be monitored.

- **Provide permanent and compulsory training for public agents:** include content on CPS in the continuous training programmes of The National School of Public Administration (ENAP), the courts of auditors, and state and municipal government schools.

- **Fostering innovation and a sustainable market:** Encourage micro and small companies to offer sustainable products and services by providing them with access to targeted public notices for tender and green credit.

- **Transparency and social control:** Create mechanisms that enable civil society to monitor the implementation of sustainable criteria in tenders, such as public performance panels or participatory audits.

- **Federative articulation:** Promote inter-municipal consortia and partnerships between the Union, states, and municipalities to facilitate the exchange of best practices and the development of SPP joint solutions.

These measures not only improve public management, but also help to build a fairer, more ethical development model committed to future generations.

FINAL REMARKS AND RECOMMENDATIONS

The analysis conducted throughout this study revealed that sustainable public procurement (SPP) is a vital tool for achieving the Sustainable Development Goals (SDGs) and fostering a more efficient, inclusive, and environmentally responsible public administration. However, despite the regulatory progress observed, particularly following the enactment of Law 14.133/2021, the implementation of SPP in Brazil remains in its early stages and continues to encounter structural, institutional, and cultural challenges.

Based on the presented diagnosis, the main obstacle appears to be the discrepancy between legal provisions and day-to-day public procurement practices. A lack of training for public agents, a scarcity of objective criteria, a fear of increased costs, and poor coordination between different public entities and bodies make it difficult to establish SPP as a structured public policy.

Conversely, the study also delineates a scenario that exhibits considerable potential. The existence of a robust regulatory framework, the development of digital procurement platforms, and the success of initiatives in certain Brazilian states and municipalities demonstrate that the state's purchasing power can be harnessed to promote sustainability. International experiences analysed in the study reinforce this

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possibility, indicating concrete ways to strengthen the governance of SPP in Brazil.

In light of this, this article makes the following recommendations:

1. The creation of a complementary regulatory framework to Law No. 14.133/2021, with national technical parameters for SPP;

2. The establishment of targets linked to the SDGs in the procurement plans of public bodies, with clear monitoring indicators;

3. The mandatory inclusion of content on SPP in training courses for public servants;

4. Strengthening federative coordination and encouraging consortia and inter-institutional partnerships to share good practices;

5. Increasing transparency and social control over the criteria used in public tenders.

Thus, sustainable public procurement ceases to be merely a normative guideline and becomes an instrument for concrete transformation. Integrating sustainability into public procurement goes beyond administrative innovation; it is an ethical commitment to future generations and to fostering fair and sustainable development.

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EDUCATION AND NEUROSCIENCES IN DEBATE: VIEWS AND REFLECTIONS ON THE CONSTRUCTION OF HUMAN KNOWLEDGE

Adriano Rosa da Silva[1]

ABSTRACT

Introduction: The central theme of the research was to highlight contributions to theoretical and scientific knowledge regarding the relationship between education and neuroscience. The objective was to analyze how the brain changes throughout life in response to experiences and environmental stimuli and how these processes impact learning and human development. Methods: A descriptive qualitative study was conducted through a literature review emphasizing the current context of scientific research related to the application of neuroscience to education and learning. To this end, the theoretical framework of Lent, Vayer, Guerra, and Relvas, among other scholars on the subject, was examined. Results: The study investigated aspects relevant to the proposed theme, raised points about learning theories, and showed how phenomena occurring in the school environment can be researched methodologically. Conclusion: The results highlight the importance of relating cognitive learning mechanisms to neurodevelopmental factors and their social applications.

Keywords: Education; Neuroscience; Knowledge.

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[1] Master in Social History from the Fluminense Federal University (UFF). Master's student in Education at the University of Lisbon (ULisboa). Degree in Pedagogy from the Federal University of the State of Rio de Janeiro (UNIRIO). Specialist in Psychopedagogy from the State University of Rio de Janeiro (UERJ) and in Neuroscience Applied to Learning from the Federal University of Rio de Janeiro (UFRJ).

INTRODUCTION

The central theme of this research is the characterization of contemporary theories about the relationship between neuroscience and education. It is imperative to understand the function of the brain during the teaching and learning process. It is evident that learning is a pivotal factor in the development of individuals. The knowledge acquired during training constitutes a fundamental aspect of an individual's growth and evolution. Therefore, the objective of this study is to analyze the learning process of the subjects from psychogenetic theories that privilege cognitivism.[2] According to Lefrançois (2008), the main interest of these theories "is in the most complex mental capacities, whose functions have to do with perception, formation of concepts, memory, language, thinking, problem solving and decision making" (P.222).

In light of this, Oliveira's (1999, p. 64) contribution is relevant. He states that learning is essential for the integral development of individuals and occurs primarily through social interaction. Thus, the learning process should start with what students already know and expand their knowledge through interaction with others. Since these interactions are with heterogeneous subjects, an individual who is more advanced in a certain aspect can contribute to the development of others. This study examines theorists' thoughts on human cognitive development[3] to conceptualize these lines of thought according to related research. It is interesting to note that psychological theories about the functioning of the mind are based on the analysis of human behavior (Amaral & Guerra, 2022, p. 40). In this case, a theory is

> a human attempt to systematize a field of study, offering a specific perspective to explain and predict observations and solve problems. A learning theory is a human construct that systematically interprets the field of learning. It represents an author's or researcher's point of view on how to interpret the learning theme and the independent, dependent, and intervening variables. Learning theories attempt to explain what learning is and why it works the way it does (Moreira, 2021, p. 12).

METHODOLOGY

Interestingly, this study is descriptive research with a qualitative approach based on a literature review. In other words, it revisits and revises existing research and discussions on the application of neuroscience to education and learning. Thus, the intention was to begin with the contributions of scientific theories related to this field of study. This approach involved seeking classic works and observing the current state of research on the subject in an interdisciplinary dialogue approach. In this

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[2] Cognitive theory, first developed by John Dewey and subsequently by Jerome Bruner, views learning as a process of problem-solving. According to Piletti (2009, p. 55), it is through solving everyday problems that individuals adjust to their environment.

[3] Based on systematic observations, Piaget, Ausubel, Vygotsky, and Wallon proposed theories that anticipated ideas about human behavior. These ideas have been supported by evidence about brain functioning and are now being rescued by neuroscience (Amaral Guerra, 2022, p. 43).

context, the decision was made to seek methodological rigor by using theoretical support through a literature review related to the presented theme. This was achieved by reading books, articles, and theses.

It is also noteworthy that the primary authors cited in this research are Lent, Ausubel, Relvas, Luria, Piaget, Vygotsky, Taille, Vayer, Guerra, and Cosenza, among other theorists in this field, whose theoretical foundations will be examined. In this perspective, it should be noted that notes were raised to characterize this research methodology in the field of neuroscience and education. In this bias, the research sought to expand the repertoire of consulted sources with the aim of reaching an understanding that the current advances in neuroscientific studies allow for dialogue between scientists and educators about the mechanisms of development of the learning process.

THEORETICAL REFERENTIAL

In light of the analytical perspective of this theoretical investigation, it is important to consider the significance of having a broad and comprehensive understanding of how the human brain learns and how this knowledge can be applied to the learning process. Regarding theories about the role of school in forming individuals, it is important to bear in mind that teaching should not only address the intellectual stages students have already reached, but also the stages they have not yet incorporated, encouraging new achievements and acquisitions, and adding new capacities and skills[4].

In this respect, the teaching and learning process should be designed based on the student's specific level of maturation and the educational objectives established by the school (Oliveira, 1999, pp. 61-62). Based on this theoretical framework, learning generally refers to changes in the connections between neurons; it is the process by which the brain reacts to external stimuli by strengthening some synapses and weakening others. It is interesting to note that

> the five senses—sight, touch, smell, taste, and hearing—pick up signals from the environment and tend to emit a response, whether consciously or not. These signals are perceived by sensory neurons, which generate an excitatory synaptic action potential. This potential then travels along the corresponding nerves toward the central nervous system and reaches central synapses. The information received may be modified by information from regions linked to perception, cognition, emotion, and attention (Lent, 2008).

As demonstrated, this understanding is relevant to education in that it leads individuals to fully develop their capacities. According to Lefrançois (2008), "The most important common characteristic of topics in cognitive psychology is that they presuppose mental representation and information processing" (p. 224). In light of this analytical basis, which encompasses sensory system modalities, specific stimuli,

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[4] There seems to be a set of systems in the human brain that are consistently dedicated to the processes of reasoning and decision-making, with a special emphasis on the personal and social domains. These systems are also involved in emotions and feelings, and they are partly dedicated to processing signals from the body (Damasio, 1996, p. 45).

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and their respective receptors, the potential contributions of different scientific disciplines to education are gradually becoming clearer[5], especially given the understanding that education involves multiple intersections and cannot be dissociated from a process affected by the senses. Ausubel's theory of meaningful learning is one of the hypotheses and concepts of neuroscience associated with education and learning that should be highlighted.

According to Ausubel's (2002) studies, meaningful learning presupposes that the individual has previous cognitive schemes that are hierarchically ordered. Ausubel calls these schemes "subsumers." New knowledge is integrated into these subsumers, which act as a kind of anchor or bridge. New knowledge is associated with and more easily integrated into what the individual already knows. Therefore, significant knowledge is the product of a cognitive psychological process involving the interaction between new and previous ideas anchored in the cognitive structure.

In this sense, it is important to point out that, in light of the highlighted theoretical basis, the individual's cognitive structure changes. It expands, diversifies, and intensifies its potential. Thus, it becomes increasingly capable of processing new information, ideas, and data. It also becomes capable of anchoring the results of this processing (Lefrançois, 2008). According to this author, a conceptual metaphor exemplifies this trajectory of conceptualization, therefore,

> the dominant metaphor in cognitive psychology is information processing, referring to how information is modified or altered. The emphasis is on perceptual and conceptual processes that enable subjects to perceive, determine how to act, and facilitate thinking, memorization, and problem solving, among other processes (Lefrançois, 2008, p. 223).

Consequently, as all individuals have the opportunity to learn, to a greater or lesser extent, it is imperative to undertake early observation and investigation of the structures that involve learning factors. This is because all individuals have the right to an education where their needs are met and where they can be stimulated in an enriching environment (Relvas, 2014, pp. 20–31). Psychomotor development is continuous, and education contributes to future learning. Therefore, it is interesting to get students to expose facts they have experienced, making a connection between the imaginary and the real. This helps them develop self-knowledge and self-confidence (Pinto, 2011).

> The acquisition of knowledge is a process that occurs through the engagement with and application of that knowledge in real-world contexts. The process of constructing knowledge is facilitated by the mobilisation of mental activities and interaction with others. Emotion, moulded and associated with reason, must be used in favour of learning, because the emotional and the rational are parts of the same reality, the development of man (Relvas, 2014, p. 39).

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[5] Neuroscience is increasingly capable of unraveling brain connectivity, the dynamics of functional interactions between the brain and environment, and the developmental pathways of the nervous system. Additionally, neuroscience is capable of unraveling the mechanisms of neuroplasticity, which enable the brain to adapt and modulate its development in response to external stimuli (LENT, 2019, p. 6).

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In light of this theoretical basis, the speech under scrutiny reveals the necessity of deepening the interpersonal relationships and the communication established with students, in order to gain insight into their particularities and specific demands. This deepening of relationships is achieved through bodily availability and adjustment to the rhythm, tone and engagement of the students (Relvas, 2014). The concept of bodily availability entails the capacity to listen attentively, employ the individual's language to elucidate and comprehend, and utilise it in a symbolic manner.

It is important to note that throughout the educational process, subjects are immersed in a social and emotional context from birth, and through the numerous interactions that are established, they develop as a whole. In this regard, neurobiological assumptions posit that learning is equivalent to the formation, connection and consolidation of existing links between brain structures. Moreover, it is concomitant with the facilitation of information transmission along synapses (Cosenza and Guerra, 2001).

In this context, it is important to consider the findings of studies that suggest a direct link between learning and affectivity, desire and emotions. These studies also suggest that it is important to associate learning with emotional aspects, i.e. motivational factors. In this discursive path, the learner is unique, singular and is present in exchanges with the world and with others, when acting and interacting, collectively experiencing a plurality of experiences that constitute their own marks (Pinto, 2011, p. 102).

The value of the activity of the subjects themselves must be recognised in the teaching-learning process, since it is through this that the brain is stimulated, elaborating and recording its experiences. Its structural and functional development is closely linked to these experiences. At this point in the educational process, pedagogical activities at school are responsible for significant affective and social developments in the construction of subjectivity. These activities require a considerable amount of perceptual and cognitive effort (FERREIRA, 2015). The advent of research into the brain and the neural processes involved in thinking and learning has enabled the emergence of explanations, thus providing a more profound understanding of the science of education (RATEY, 2001).

The author's position that multidisciplinary and interdisciplinary research with scientific input is paving the way for basic educational research to be implemented in classroom practice is one with which it is essential to concur (RATEY, 2001). In this manner, one of the strategies that facilitates the planning of pedagogical practice oriented towards action is to verbalise or reflect prior to action, thereby enabling a certain degree of regulation during the task (Luria, 1981).

In this regard, it is imperative to acknowledge and respect the unique rhythm of each student, recognizing that experimentation, experiences, discoveries, and learning are pivotal factors in their holistic development (Heinsius, 2011, pp. 77–98). In this vein, Le Bouch (1982) asserts the significance of recognizing playful activity as a form of creative expression essential for the development of personality and the refinement of body image.(Le Bouch, 1982).

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Learning cannot be carried out in good time if the child has not managed to become aware of their body, lateralize themselves, situate themselves in space, master time, if they have not acquired sufficient skill and coordination of their gestures and movements (Le Bouch, 1988, p. 11).

RESULTS AND DISCUSSION

From the earliest stages of life, there is a need for action. At this juncture, preliminary exploratory activities, characterized by their subjective nature, pertain to the body itself, as previously delineated by Le Bouch (1988). It is through these initial experiences of pleasure and imagination that a series of discoveries and developments are initiated, encompassing the affective, motor, and cognitive domains. The formation of relationships with peers is also fundamental to the representation scheme, as individuals perceive others in interaction (Bee, 2011).

It is important to bear in mind that interpersonal relationships represent one of the highest levels of development from childhood onwards, where reality is apprehended in different ways. This fundamental consideration enables play to be a key component in school psychomotor practices, since play and shared affections transform the situation into unique experiences (Ferreira, 2015, p. 1). In this line of understanding, it is worth noting, in the light of Oliveira (1999), that "Vygotsky's conceptions of the functioning of the human brain are based on his idea that higher psychological functions are constructed throughout man's social history" (p. 25).

Vygotsky's rejection of the notion of fixed and immutable mental functions is well-documented. He instead embraced the concept of the brain as an open system of significant plasticity, whose structural characteristics and functional modes are shaped throughout the course of human and individual development (Oliveira, 1999, p. 25).

In light of this, the author also emphasizes that, for Vygotsky, the subject utilizes social interactions from childhood onward as a means of accessing information in the construction of their knowledge. At this particular stage, play and playfulness become a privileged moment for learning, where development can reach increasingly complex levels. This is due to the possibility of interaction in imaginary situations and by living together, since the concrete situations in which they find themselves determine their behavior (Oliveira, 1999, p. 66).

Movement enables children to explore the world through concrete experiences that lay the foundation for intellectual development. It is imperative for children to have direct exposure to concrete. Exploration is a critical component of early childhood development, facilitating an understanding of both oneself and the external world. Children undergo continuous development from the first years of life (Pinto, 2011).

In accordance with Vygotsky's theory, the development of thought can also be facilitated through social interactions. Consequently, the role of the teacher, particularly during the early years of schooling,

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is both pivotal and challenging. This educator is tasked with instructing subjects that vary widely in their developmental stage and are in the initial phase of personality formation. In this vein, Heinsius (2011) asserts that observation constitutes a fundamental tool for teachers to become acquainted with their pupils and to gain a more profound understanding of their cognitive processes, modes of communication, interpretation of the world, and actions.

Given the capacity to amass a substantial body of information through observation of the subject in a range of playful scenarios within the school environment, this method facilitates the organisation of physical spaces and scheduling, thereby enhancing pedagogical practices. It also fosters more productive interactions with students and enables the exploration of their diverse knowledge and competencies, as articulated by Ferreira (2015).

It is essential that during schooling there is a wealth of playful and motor acquisitions, which are constantly processed through pedagogical and psychomotor practices that stimulate playing, creating, recreating, discovering, and interacting. In this direction, the author proposes a reflection on play as a fundamental form in the construction of the subject. Play is a need for organization and constitutes a space of interaction for students, enabling them to imagine and experience their very specific social and family relationships through their own body and speech. Thus, play becomes an educational strategy that must be well structured (Ferreira, 2015).

Within the framework of analysis proposed by Vygotsky, development is understood as the result of individuals' experiences, thereby establishing a close link between development and learning. According to Vygotsky, individuals develop as they learn. In the context of the Vygotsky perspective, Oliveira (1999) asserts that "in their relationship with the world, mediated by culturally developed instruments and symbols, human beings create the forms of action that distinguish them from other animals" (p. 25). From this perspective, individual and collective activities are pivotal for the comprehensive development of the subject, as they stimulate imagination, leading to experiences where rules are respected and limits are transcended in a spontaneous and pleasurable manner, providing bodily manifestations that are replete with meaning.

It is important to underscore that it is precisely the rules of games and playful activities that engender the subject's more evolved behavior, especially during childhood, than is typical for their age group (Oliveira, 1999, p. 67). In this regard, social interaction characterized by playfulness is imperative for the development of motor organization, fostering body awareness, and cultivating balance, global and specific coordination, laterality, writing and reading skills, and creativity. Therefore, it is imperative to furnish educators with the necessary conditions for psychomotor education, thereby ensuring that children partake in both individual and group learning experiences that are conducive to their holistic development (Le Bouch, 1988, p. 40).

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> The child's operation of meanings is characterized by a dissociation from the objects and actions typically associated with them. It is a stage between the purely situational constraints of early childhood and adult thought, which can be totally detached from real situations (Vygotsky, 1998, pp. 129–130).

In light of these considerations, educational initiatives must prioritize the harmonization of potential and affectivity. This is because students are holistic beings, necessitating a balance of body, mind, and emotion to ensure the coherent construction of knowledge and continuous development (Vygotsky, 1998). It is important to note that the act of engaging with and upon objects offers a valuable opportunity for personal growth and development. Through these interactions, individuals engage in experimentation, discovery, innovation, and learning. Moreover, these activities foster autonomy, curiosity, and self-confidence, thereby facilitating the development of critical competencies such as language, concentration, thought, and attention (Le Bouch, 1988).

Hence, it is a moment of self-expression and self-realization, as the teaching activity can be defined or free, thereby fostering creativity and spontaneity (Bee, 2011, p. 174). In this regard, the author posits that the utilization of symbology significantly enhances students' capacity to comprehend and exert influence on their immediate environment.

In the context of Piaget's cognitivist theory, individuals are in constant interaction with their environment, resulting in perpetual imbalances and balances that contribute to the subject's adaptation to this environment. According to Piaget, "the acquisition of knowledge is a gradual developmental process made possible by the child's interaction with the environment" (Lefrançois, 2008, p. 261).

According to this theory, the environment does not produce or shape the subject; rather, the subject is constructed by adapting to the environment. In order for this balance to occur, two invariables must be present in all activity. These invariables are called assimilation and accommodation by Piaget (1977). Assimilation is defined as a cognitive process that occurs as a result of prior learning and understanding. The concept of accommodation involves a shift in perspective. This interaction leads to adaptation, which occurs when there is a balance between these invariables (Lefrançois, 2008).

Assimilation can thus be defined as the process of acquiring knowledge that has already been learned. The occurrence of the phenomenon is independent of the developmental stage, and the implementation of a change in schema is a prerequisite. The integration of a novel element into an extant schema constitutes the essence of the process. For Piaget, this process of equilibration is progressive, representing a continuous transition from a state of lower equilibrium to a state of higher equilibrium. In this theoretical framework, as posited by Fonseca (2002), the evolution of information and behaviour is identified as a pivotal catalyst for development. According to Lefrançois (2008, p. 248), when an individual interacts with their environment, certain aspects are assimilated into their cognitive structure.

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These aspects then modify or accommodate elements of the cognitive structure in relation to the environment.

> From a perspective of equilibration, it can be argued that one of the sources of progress in the development of knowledge should be sought in imbalances, because it is only through such imbalances that the subject is able to overcome their current state and seek anything in new directions (Piaget, 1977, p. 23).

From this perspective, considering the distinctions that Piaget establishes between development and learning, if learning implies the existence of prior structures and if these structures are constructed during the development process, then learning is contingent on development (Piaget, 1977). It is evident that learning is one of the factors that influence human development. In accordance with Piagetian theory, the acquisition of skills through learning is contingent on the developmental stage of the individual, with the theory proposing the learning of specific skills that can be assimilated by the structures available to the individual. As Fonseca (2002) asserts, this is intended to favour the acquisition of concrete operative structures through the process of equilibration by which they are built.

Piaget's (2008) theory posits that human development progresses through distinct stages, with each stage being characterised by specific capacities. At this point, according to Lacerda (2011, p. 172), in the pre-operative or pre-operational stage, according to Piaget's theory, the presence of symbolic games, through make-believe, is striking, where the child begins to make abstractions and internalize the situations experienced.

At this juncture, deliberate pedagogical activities present significant opportunities for development. Furthermore, it is imperative to acknowledge that the utilisation of objects serves to facilitate and enhance pedagogical practice within the school environment. In this sense, the activity constituted through action and language is expressed in a diverse way, depending on the possibilities of the subjects who educate themselves (Ferreira, 2015, p. 2).

In light of the analysis conducted by Lacerda (2011), Piaget holds the conviction that play constitutes one of the most fundamental activities in life. Firstly, there is the concept of exercise, defined as the deliberate repetition of a specific situation for the sake of pure enjoyment or to reap the beneficial effects of that situation. Around the age of four or five, symbolic play commences, whereby memories of past experiences are not only recalled but also re-enacted.

Subsequently, as social development progresses, a set of rules emerges, which, according to the prevailing social conditions, assume an increasing degree of importance. Accordingly, for Piaget, human action constitutes a condition and expression for development, given that individuals assimilate a multitude of social, motor and affective issues. Consequently, no aspect of development should be disregarded (Lacerda, 2011, p. 169).

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When environmental values are considered in relation to the body and specific bodily parts, a unique and highly personalised set of meanings, feelings and values is established (Vayer, 1984).

In this sense, it can be argued that playful experiences and stimuli are valuable resources for developing people's potential, so that activities span several stages of individual growth. The activities that motivate learners to act are fundamental and are directly linked to cognitive, social and affective factors. Motor activities have been shown to facilitate exploration and development of bodily capacities, thereby contributing to holistic development (Lacerda, 2011).

The author posits that the constructivist concept, grounded in Piaget's theoretical framework, offers a methodology for comprehending the cognitive processes underlying subject thinking and the construction of their individual learning pathways. Consequently, the fundamental structure of classroom activities is predicated upon the student as the pivotal entity in the educational process. From this standpoint, the student is conceptualised as the producer of knowledge, in the sense of protagonism (Lacerda, 2011).

In accordance with the assertions put forth by Taile (2021), Piaget's primary focus was on the distinctive aspects of thought, with a particular emphasis on the strengths and assets possessed by children rather than their perceived deficiencies. This cognitivist argument is of significance insofar as it presupposes that children's thinking differs from adult thinking. As Vygotsky (1993) asserts, "a child is not a miniature adult, just as his mind is not the mind of an adult on a smaller scale" (p. 9).

From this perspective, it can be posited that distinct periods of child development are characterised by specific cognitive and behavioural patterns. This assertion is supported by the research findings of Le Bouch (1982), Bee (2011) and Vayer (1977). In light of this, it is noteworthy that, according to Piaget's theory, the developmental stage referred to as pre-operational or intuitive intelligence is characterised by egocentrism as a fundamental aspect of child thinking. This period, typically spanning ages four and five, is characterised by the inability to comprehend perspectives that diverge from one's own.

Accordingly, an additional characteristic of the evolution of thought in childhood, from a Piagetian standpoint, is centralisation, whereby the child perceives a single aspect of an object or event, and fails to establish interrelationships between the various dimensions of a situation. With regard to animism, children attribute life to beings and assume that objects are alive. In relation to nominal realism, another characteristic of children's thinking, they hold the belief that the name constitutes an integral component of the object, perceiving it as a property of the object it represents. According to Piaget's observations, children at the age of four and five do not utilize defined criteria to perform tasks such as classifying, sorting and ordering objects, nor do they include them in a class (PIAGET, 1982).

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According to Piaget (1982), mathematics, like written language, is founded on constructivist theory. The objective of constructivist theory in mathematics education is to provide students with stimuli and resources to develop their reasoning abilities. This is achieved by proposing activities in which knowledge is gradually built up, thereby stimulating and developing independent thinking, concentration, attention, creativity, and the ability to solve problems.

In this respect, it is interesting to note that logical reasoning is about the relationship with the environment. In the construction of intelligence structures, interaction with the environment and with others plays an important role due to the conditions it offers. In Piagetian theory, this capacity is defined as the ability to consciously and competently situate oneself within the context of society. According to Taile (2021), the various stages that define the differentiated qualities of the 'social being' coincide with the stages of cognitive development (p.18).

According to the theoretical contributions of Kamii (2002), education should prioritize the construction of concepts through active student experimentation, followed by the normalization of these concepts through the language of operative signs. Active and autonomous mental participation is essential to learning, particularly in everyday classroom activities and group games. In this regard, games offer a creative, autonomous, and conscious approach to education, seeking to develop perception in physical, psychological, and social aspects. School games open a door to the social world and culture and enable student development, making students more creative, flexible, and attentive to individual differences (Kamii, 2002).

In light of the aforementioned points, it is crucial to underscore that Piaget's theory of learning addresses the issue of socialization in the construction of personality, which is predicated on intellectual exchanges between individuals. Accordingly, during the learning process, the subject selects the information he receives from the outside world, filters it, and endows it with meaning (Piaget, 1977). Consequently, the school environment assumes a pivotal role in the cultivation of logical forms of thinking[6].

In this line of interpretation, Kamii (2002) asserts that "difference is a relationship created mentally by the individual when he relates two or more objects" (P.14). This perception is also established when making intuitive arrangements, but the construction of the concept does not occur. Consequently, pedagogical practices must be thoroughly incorporated into a comprehensive education, one that is meticulously designed for the purpose of facilitating learning (Vayer, 1977, p.172). It is imperative to

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[6] Teachers provide stimuli that differentiate and shape neural circuits during learning, contributing to the structural reorganization and development of the nervous system. These stimuli are picked up by sensory receptors and converted into electrical impulses, resulting in new behaviors (Kandel, Schwartz, & Jessel, 2003).

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emphasise that this understanding can engender numerous benefits during the teaching-learning process, in the sense of contributing to the enhancement of cognitive development.

FINAL CONSIDERATIONS

Considering the issues presented, it became clear that, despite the limitations imposed on the study of human behavior, significant progress has been made, including discoveries that have enabled a more scientific approach to the teaching-learning process, as they clarify some of the mechanisms responsible for important mental functions in learning. These advances go beyond the academic sphere, as pointed out by Guerra (2011), extending to other fields of knowledge, among which, in a privileged position, is education."

In light of the research results, the understanding of brain functioning and its relationship with human behavior is not a recent task in science, given its importance, especially for education, with the aim of helping students to better deal with their potential and difficulties, as well as assisting teachers in reshaping educational practices and understanding the individual as a biopsychosocial being, that is, in a holistic way, who both affects and is affected by others. In this regard, the learning individual must have their choices respected within their social interactions, since they already make their own choices regarding socially constructed habits (Boff, 1999).

From this perspective, integrating the studies of theorists such as Ausubel, Piaget, and Vygotsky, it is evident that meaningful learning presupposes the existence of biological maturation, a social environment conducive to learning, and the preexistence of concepts anchored in the individuals' cognitive structure. In this sense, according to Moraes and Torre (2004, p. 4), when an individual interacts with others and with the environment, establishing a bridge between new learning and that already internalized in their structure, they act and develop, not only in the cognitive aspect through simple recording of observations but develop in all aspects.

Indeed, the research also revealed that people possess an extremely diverse set of different intelligences and that neuroscience can contribute significantly to learning, inspiring educational goals and strategies and developing more appropriate pedagogical mechanisms. In times of increasingly advanced technologies, it becomes necessary to rethink practices and strategies aimed at constructing meaningful learning. For all these reasons, it can be affirmed, based on Silva and Bezerra (2011), that neuroscience and its contributions to the understanding of brain functioning acquire great importance for the field of education. In summary, there is thus a perceived need for change, not only regarding school practices but also in the understanding of how learning occurs and what happens when we learn, a contribution that, as we have seen, can be provided and supported by neuroscience.

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GERMINATIVE EVALUATION OF SOYBEAN (*Glycine max*) UNDER DIFFERENT WATER LEVELS

Paulo Henrique Schreiber Miranda[1] e Júnior de Souza Costa[2]

ABSTRACT

The soybean crop (*Glycine max*) is of great global importance due to its various purposes for both human and animal food industries, as well as raw material for agribusiness. The seed germination stage is one of the crucial phases in the plant's life cycle, directly influencing productivity and crop quality. Therefore, the objective of this study was to evaluate the effect of different water levels on soybean seed germination, aiming to understand how water availability influences this fundamental process for the initial establishment of the crop. The experiment involved evaluating the influence of three water levels (50%, 75%, and 100% of the substrate's field capacity), analyzing total germination rate, germination speed index, and seedling height. For each treatment, four replicates of 50 seeds each were performed. Data collection involved daily counting of germinated seeds over eight days; the total number of germinated seeds divided by the number of days resulted in the germination speed index. Summing the germinated seeds yielded the total germination rate. Measuring the height of 10 seedlings per replicate provided the average height per treatment. Means were compared by Tukey's test at a 5% probability level. The most ideal treatment was Treatment 2, with 75% of field capacity.

Keywords: Field capacity; Germination; Soybean.

[1] Undergraduate student in Agronomy - Faculty of Applied Social Sciences of Vale do São Lourenço – Eduvale. Jaciara/MT, Brazil.
E-mail: paulo_casadasbombas@hotmail.com
[2] Faculty member at the Faculty of Applied Social Sciences of Vale do São Lourenço – Eduvale, Jaciara/MT, Brazil.
E-mail: juniorsouza@eduvalesl.edu.br

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INTRODUCTION

The soybean crop (*Glycine max*) is of great global importance due to its various applications in the human and animal food industries, as well as serving as a raw material for agribusiness. Originating from Northeast Asia, its dissemination occurred through navigation from the East to the West (Chung and Singh, 2008). According to Black (2000), the first reports of soybean in Brazil date back to 1882, initially in the state of Bahia.

According to the National Supply Company (CONAB, 2023), Brazil has consolidated itself as the world's largest soybean producer, with a 2.8% increase in sown areas and an estimated production of 162.4 million tons for the 2023/24 crop. Mato Grosso leads as the country's largest grain-producing state, accounting for 31.3% of total production according to the Brazilian Institute of Geography and Statistics (IBGE, 2023).

To achieve this, the use of seeds with proven quality is essential, ensuring an ideal plant population for a soybean crop. One of the abiotic factors with the greatest influence on seed germination is water availability in the external environment for seed hydration. As reported by Carvalho and Nakagawa (1988), the seed requires a minimum water level to initiate germination, which varies according to its chemical composition and seed coat permeability.

However, early sowing in the Mato Grosso region poses a risk due to water restrictions in the crop's initial phase, placing the plant under water stress. Nevertheless, avoiding late soybean cultivation—typically less productive—allows better utilization of farm machinery due to the broader operational schedule, better selling prices at the beginning of the harvest, and advancement of the second crop (safrinha), benefiting from higher rainfall during its production cycle (Ferrari, 2015).

According to Chagas (2019), there was a reduction in average rainfall in most parts of Brazil between 1980 and 2015, particularly in the Southeast and Cerrado regions, along with increased intervals between rainfall events (drought spells). Given this scenario, studies on the ideal amount of water available for seeds are of great importance, as water is one of the environmental factors with the greatest influence on the germination process. Therefore, this study aimed to evaluate the effect of different water levels on soybean seed germination, aiming to understand how water availability influences this fundamental process for the initial establishment of the crop.

MATERIALS AND METHODS

The research was conducted at the soil laboratory of the Faculty of Applied Social Sciences of Vale do São Lourenço (EDUVALE), in the municipality of Jaciara/MT, Brazil. The faculty is located between parallels 15°57' south latitude and 54°58' west longitude, at an altitude of 380 meters.

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Soybean seeds (*Glycine max*) of the cultivar SYN2376IPRO (untreated) were used as methodological resources. The seeds were then placed to germinate in plastic trays measuring 35x50x2.5 cm, using commercial Carolina Soil substrate, maintained under normal laboratory conditions (18 to 32°C and 65 to 85% relative humidity)..

The analyzed substrate water contents were 100%, 75%, and 50% of field capacity. According to the Federal University of Juiz de Fora (2018), determining the substrate's field capacity requires weighing 100 g of substrate, adding 100 mL of water, and waiting 2 hours for the water to percolate through the entire sample. After measuring the amount of water retained in the soil, the following formula is used:

$$\text{Field capacity (\%)} = \frac{\text{Water retained in soil (mL)} \times 100}{\text{Soil volume (mL)}}$$

Seed germination tests were conducted in 4 replicates of 50 seeds for each treatment, with counts performed on the 7th day after sowing. The result was expressed as a percentage, obtained using the following formula according to Pereira *et al. (2007):*

$$\text{Germination rate (\%)} = \frac{\text{Germinated seeds} \times 100}{\text{Total seeds}}.$$

Figure 1 - Plastic trays.

Source: Personal archive.

In the germination speed index (GSI) tests, the number of germinated seedlings (cotyledons completely above the soil) was counted daily over 8 days, with results expressed as a mean percentage

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(Maguire, 1962). Seedling height evaluations were conducted on 10 seedlings per plot, measured in centimeters from the soil to the apical meristem growth region (Pelacani et al., 2016).

The experimental design was completely randomized in a 1x3 factorial scheme with one substrate and three water content levels for substrate hydration. Results were compared by Tukey's test at a 5% probability level using the Sisvar statistical software. The steps were divided as follows:

1. Seed preparation: acquiring seeds of the same variety and batch to ensure uniformity, pre-washing seeds in running water to remove surface impurities, and drying them with clean paper towels for uniform distribution on trays with commercial substrate.

2. Substrate preparation: using 4 trays with 200 cells for seed germination, filling cells uniformly with substrate, marking, and identifying each tray according to the different water levels to be applied.

3. Treatment application: determining the different water levels to be tested, representing varying amounts of water applied to each experiment. Pipettes were used to carefully apply the specific water quantity to each cell, as per the established treatments.

4. Seed distribution: uniformly distributing seeds over the substrate-filled cells, ensuring adequate spacing to avoid competition during germination, recording the number of seeds in each tray, and properly identifying the treatments.

5. Experimental unit assembly: arranging trays in controlled humidity and temperature conditions for germination, covering trays with transparent plastic to create a humid environment conducive to germination.

6. Germination monitoring: maintaining trays in suitable conditions for germination, with constant temperature and diffused lighting, and daily monitoring of the germination process over 8 days, recording the number of germinated seeds and observing seedling development over time.

The experiment required the following items: one 9 kg bag of Carolina Soil substrate, 3 plastic trays with 200 cells each (35x50x2.5 cm), 600 untreated soybean seeds (*Glycine max*) of the SYN2376IPRO cultivar, a 5 mL graduated pipette, 21 liters of deionized water, one roll of PVC plastic wrap (0.18 x 100 m), adhesive and pen for treatment identification, a table for tray arrangement, and the soil laboratory at Eduvale.

RESULTS AND DISCUSSIONS

One of the factors most impacting seed germination is the amount of water available in the soil, as water absorption initiates this process. After seed moistening, the seed coat weakens, and the embryo and reserve tissues expand, leading to seed coat rupture, gas diffusion, and primary root emergence.

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Consequently, reserve digestion, translocation, and assimilation occur, resulting in embryo growth (Marcos Filho, 2015).

Under favorable moisture conditions, the seed follows a triphasic water uptake pattern. Phase I, known as imbibition, involves a slight water intake due to potential differences between the substrate and the seeds. Phase II shows reduced water absorption, with equilibrium between potentials; various metabolic reactions occur before primary root emergence. In Phase III, active metabolism and formation of osmotically active substances reduce the seed's water potential, prompting slight water uptake from the medium (Bewley and Preto, 2013).

In the total germination rate evaluations (Table 1), there was no statistically significant difference between Treatments 2 and 3. Treatment 2, with 75% of field capacity, was most favorable, with 143 germinated plants, while Treatment 1 (50%) was least favorable, with 57 germinated plants. A similar result was found by Evangelista et al. (2007), where the most efficient field capacity range was 50-65%, with considerable vigor reduction beyond 70%.

According to Taylor and Kwiatkowski (2001), if seeds were coated with SB2000 polymer, the total germination rate would likely increase, as the polymer slows water penetration into the seed, reducing damage caused by imbibition in legumes.

Table 1 – Total Germination Rate

Treatments (Field Capacity)	Germination Percentage (%)
01 (50%)	28,0 B
02 (75%)	71,0 A
03 (100%)	57,0 A
Coefficient of variation (%)	20,27

Source: Miranda, 2024.

According to Jacinto *et al.* (2014), water content influences both total germination rate and germination speed index (GSI), being positively correlated with increased water in blotting paper and negatively in germitest paper. Results obtained with commercial substrate showed that GSI (Table 2) was more favorable at 75% and 100% of field capacity and unfavorable at lower water volumes. According to Sá (1987), water limitation reduces biochemical and physiological process speeds, resulting in poorer soybean seedling development.

These data corroborate the total germination rate results (Table 1) but differ from Moterle *et al.* (2011), where soybean seed germination speed ranged from 2.04 to 2.28 plants/day, depending on variety and treatment. Seeds with higher GSI are more resistant to stress and consequently exhibit better plant development and growth (Dan *et al.*, 2010).

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Table 2 – Germination Speed Index (GSI)

Treatments (Field Capacity)	Germination per day (units)
01 (50%)	9,46 B
02 (75%)	20,40 A
03 (100%)	19,12 A
Coefficient of variation (%)	21,81

Fonte: Miranda, 2024.

Regarding seedling height data (Table 3), Treatments 1 and 3 showed no statistical difference, differing from results in other variables (Tables 1 and 2) and equating with Treatment 2, which was most favorable.

Similar results were found by Pelacani *et al*. (2016), with seedling heights varying from 7.1 to 9.3 cm depending on soybean seed vigor, based on an average of 10 seedlings per treatment. According to Vazquez and Assis (2011), soybean seedlings show greater growth with increased water availability.

The most efficient osmotic potential (MPa) for soybean seedling length was 0.0 MPa, reaching 23 cm, while the least efficient was -0.9 MPa, with a length of 1 cm (Braccini *et al*., 1996).

Table 3 – Average Seedling Height

Treatments (Field Capacity)	Seedling Height (cm)
01 (50%)	3,5 B
02 (75%)	9,50 A
03 (100%)	6 B
Coefficient of variation (%)	20,38

Fonte: Miranda, 2024.

Low-moisture imbibition can lead to high pressures, even cotyledon rupture, reducing seedling emergence and field population (Obendorf and Hobbs, 1970). According to Popinigis (1985), low-vigor seeds may have a seed coat more susceptible to water passage, facilitating absorption.

Across all three analyzed variables, Treatment 2 performed best, with Treatment 3 second, differing statistically only in seedling height. Treatment 1 (50% field capacity) was the least advantageous in all variables.

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Figure 2: Germinated trays.

Tray with 50% field capacity	Tray with 75% field capacity	Tray with 100% field capacity
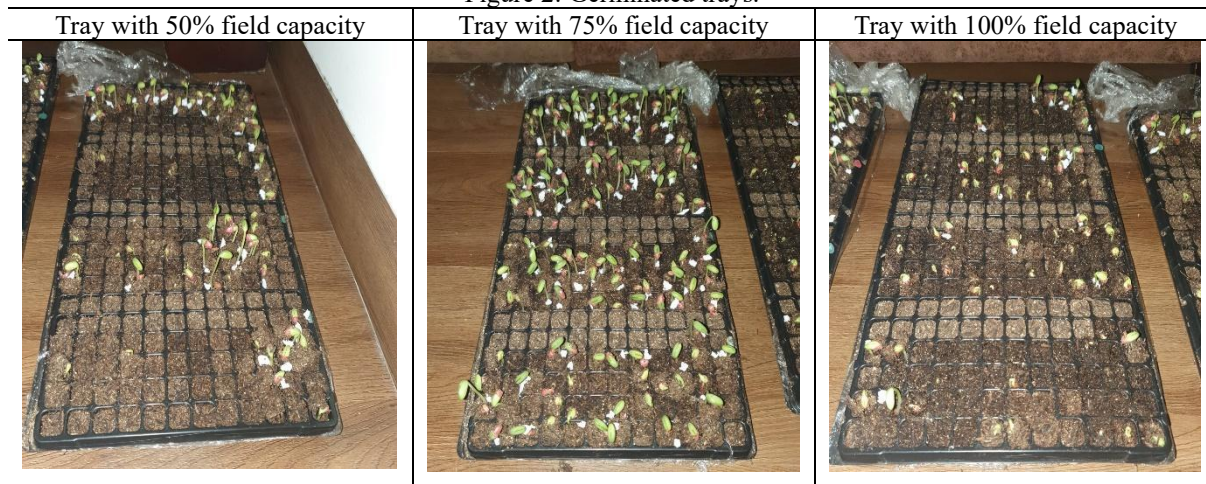
Source: Personal archive.

FINAL CONSIDERATIONS

This study allowed for an analysis of how the amount of water available in the soil is critically important for successful seed germination, influencing the final plant stand and, consequently, farm productivity in Brazil and worldwide.

Additionally, it verified the most favorable water amount in this process, with Treatment 2 (75% field capacity) showing the best results in germination rate, germination speed index, and seedling height.

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CYBERFEMINISM AS A TOOL FOR CONFRONTING GENDER INEQUALITIES: AN ANALYSIS FROM THE PERSPECTIVE OF BLACK WOMEN

Marcela da Silva Melo[1]

ABSTRACT

This study aims to conceptualize cyberfeminism as a tool for providing visibility to Black Feminism. Accordingly, we present the gender and racial issues involved, along with cyberfeminism and its potential to alter the position of Black women in the world, through the use of media by Black Feminism.

Keywords: Cyberfeminism; Intersectionality; Patriarchy.

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[1] Master's degree in Public Policy Evaluation (Federal University of Ceará - UFC, 2019), Bachelor's degree in Administration (2016). She held the position of researcher at the Public Policy Evaluation Group (GPAPP) at IFCE, Acaraú Campus.
E-mail: marcelamelo@ifce.edu.br
LATTES: http://lattes.cnpq.br/1797605417118544
DOI: https://orcid.org/0009-0003-2073-8504

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INTRODUCTION

This study aims to conceptualize cyberfeminism as a tool for providing visibility to Black Feminism. Accordingly, we present the gender and racial issues involved, along with cyberfeminism and its potential to alter the position of Black women in the world, through the use of media by Black Feminism.

It is undeniable: women suffer discrimination in Brazil (and in several other countries around the world), and this reality is exponentially aggravated when analyzed from the perspective of Black and poor women. Women receive lower wages than men for performing the same paid work; they are constantly questioned if they do not perform femininity and subservience; women are harassed daily for something as simple as walking down public streets; women repeatedly have their sexuality repressed. In short, there is a lengthy list of situations and contexts that confirm this initial assertion.

The role played by social movements in recent decades has been of significant value, expanding the range of social and political demands toward the constitution of a new citizenship and contributing to the publicization of existing social inequalities. Unfortunately, they have not yet eliminated the social distances that mark and differentiate the dichotomy and contradictions of class, nor have they promoted significant ruptures, such as those proposed by the feminist movement to transform the processes of male domination over women. Thus, the power relations that permeate gender relations still aim to subordinate and aggress women, particularly Black women (Ferreira, 2007). Since:

> "Unfortunately, the racial issue is still part of the daily life of the Black population [...] in Brazil, and whenever we are remembered, we are remembered in a subordinate or inferiorized manner. Those who feel the negative sentiment towards their skin color, features, or culture know that when someone names you by your skin color, they are racially targeting a specific ethnic group. Therefore, we understand that biologically we do not have multiple races, as Hitler defended during the Holocaust against the Jews, but culturally, Black people worldwide are racialized" (Borges; Fernandes, 2018, p.80).

The following text is divided into four parts: The gender issue and its intersections in society; The Black woman: the most excluded among the excluded; Feminism as a pathway to overcoming gender inequalities; and Cyberfeminism as a tool for visibility. The study was conducted through extensive bibliographic research.

THE GENDER ISSUE AND ITS INTERSECTIONS IN SOCIETY

For Bauman (1999, p.18), "civil liberty depends on patriarchal law." In the history of Humanity, we have the social contract as the personification of freedom, but the sexual contract, on the contrary, is configured as a history of subjugation. Thus, the original contract creates both freedom and domination—obviously, it concerns the freedom of men and the subjugation of women. Therefore, civil liberty is far

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from being universal; it is a masculine attribute, dependent on patriarchal law (Pateman, 1993). Moreover, it should be emphasized that:

> "Patriarchy ceased to be paternal a long time ago. Modern civil society is not structured around kinship and paternal power; in the modern world, women are subordinated to men as men, or as fraternity. The original contract [...] creates modern fraternal patriarchy" (Bauman, 1999, p.18).

Thus, regardless of the society, time, or space in which we are situated, over the centuries, one specific hierarchy has always been of utmost importance in all human societies: that of gender, in which "the patriarchal right of men over women is presented as a reflection of the very order of nature" (Bauman, 1999, p.35). Society develops based on the understanding that we are born with moral ideas just as we are born with our eyes, mouth, and nose. This assertive ignorance in determining our practical behavior causes us to consider as natural that which, in reality, is a human invention, a historical construction (Souza, 2018). Hence the essential need to raise awareness among the population so that they realize that:

> "None of this is merely an individual decision. Our positive or negative conception of others is permeated by social evaluations that function as the fundamental spark for any individual affection. That is why reconstructing the genealogy of the moral hierarchies that govern us is so important and fundamental for understanding an individual and their social world" (Souza, 2018, p.41).

Not by chance, over time, stereotypes about the female role have been reproduced, which are responsible for the construction of exclusionary discourses such as the one that claims politics is not for women. This contributed to keeping women in domestic spaces. Thus, intricate webs of customs continue to reproduce, responsible for weaving distinct daily experiences in the social structure as a whole (Ferreira, 2007).

Consequently, we have the social identity of women, as well as that of men, characterized by distinct role attributions expected by society. As a result, women's spheres of action are well defined, with child socialization being one of the tasks traditionally assigned to women, who may even delegate this task to another family member or someone hired for this purpose. However, even this permission is limited, as it is legitimized only when the woman needs to support herself or to supplement her husband's income. On the other hand, if the woman belongs to the dominant classes, she is exempt from the legitimization of the need to work, being allowed to enjoy an idle life, at least regarding the manual labor involved in raising children. Thus, beyond the hardships inherent in being a woman, there is also the social class variable in the constitutive elements of the female sex (Saffioti, 1987).

The analysis carried out thus far seeks to understand how the narratives of naturalizing sociocultural processes of discrimination against women and other categories end up constituting the

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shortest and easiest path to legitimizing male superiority, as well as that of whites, heterosexuals, and the wealthy, in a process defined by the naturalization of discrimination based solely on sociocultural grounds (Saffioti, 1987).

Accordingly, we recognize that women work more, regardless of whether they are Eastern or Western, homemakers or hold paid jobs. A Pakistani woman, for instance, spends 63 hours per week on domestic tasks, and even when analyzing Western homemakers with their modern appliances, they still work only six hours less. Unfortunately, this is not a reality that shows signs of equal participation between genders in the coming years, as men are unwilling to spontaneously renounce a system in which half the world's population (of which they are not part) works for free. This would mean more competition in the workplace and more work at home for these men (Wolf, 2019).

In the context of historical development, these structures of domination are not altered solely through legal changes, even while recognizing their importance. Since discrimination is legitimized by the dominant ideology, especially against women, there are situations in which even justice agents tend to render their judgments under the system of ideas that justifies the current state of affairs. In this scenario, we witness—and will continue to witness—the police, the justice system, and society as a whole transforming the female victim into the defendant, even after her death. Moreover, generally, female education is directed toward socializing the role of the victim, a masochistic component of this female education that undermines, at its core, the possibilities of being a woman and inculcates the acceptance of suffering as the destiny of her existence (Saffioti, 1987).

When we analyze the Brazilian scenario, until recently, we had as the nation's highest representative none other than a consummate executor of necropolitics[2], Jair Messias Bolsonaro. He was not in power by chance; he corresponded to the expectations of social strata afflicted by the changes implemented by the Workers' Party tenures. A segment of the population sought to restore gender hierarchy, the dominance of heterosexual marriage, religious moral conduct, and education founded on authority. Thus, although the Workers' Party tenures opened important spaces for the feminist agenda, part of the country seeks the comfort of being under essentially male ministries, signaling that the "bye, darling" was not uttered frivolously. The key point is to realize that this rhetoric is not conservative, but reactionary (Abranches et al., 2019).

Civil society, by adhering to patriarchal prescription, aims to subordinate women to men not only in the private sphere but also in the public. Consequently, we see current assaults on women's rights, clear instances of political violence against them. This violence permeates the censorship of gender debates in

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[2] The origin of the term comes from the work of the Cameroonian philosopher, political theorist, historian, and intellectual Achille Mbembe. The term "necropolitics" emerges as a question of whether the State does or does not have a "license to kill" in the name of a discourse of order. Available at: https://www.politize.com.br/necropolitica-o-que-e/. Accessed: 05/12/2025.

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schools and the exclusion of gender perspectives from public policies, a situation that indicates the complicity of the State in perpetuating the inequalities and violence that mark women's daily lives in Brazilian society (Biroli, 2016b). These situations denote women's exclusion from public life, indicating that it is men who hold the instruments capable of giving meaning, weight, and importance to women's experiences in the public sphere (Biroli, 2016a).

BLACK WOMEN: THE MOST EXCLUDED AMONG THE EXCLUDED

When analyzed broadly, male supremacy permeates all social classes, also manifesting itself in the field of racial discrimination. Thus, at the bottom of the "pecking order" is the woman, and in Brazilian society, it must be emphasized that the lowest position is occupied by poor Black women. Therefore, all forms of discrimination foster greater exploitation, not only regarding gender issues but also concerning racial discrimination (Saffioti, 1987).

Mbembe (2014) expresses that race is more than a concept; it was and continues to be a colonial project aimed at dividing the highly melanated African population into non-humans to transform them into slaves. However, even with the abolition of slavery in the 19th century, the perpetuation of processes of economic, social, and cultural extermination is still identified, carried out through a necropolitical project at the core of the countries that were colonized.

This situation is perceptible when analyzing the existence of a "let-die" policy, materialized by the number of unemployed Black individuals or those working in so-called sub-jobs, or even by the absence of hospitals or health centers in the peripheries of major cities, where the Black population is the majority. It can also be observed in the state's neglect of Black youth, who lack access to leisure, culture, or the arts (Borges; Fernandes, 2018). That said, this division by race, created by Europe, transformed Black men and women into subhumans, as "that (or even that thing which) is seen when nothing is seen, when nothing is understood, and especially when nothing is desired to be understood" (Mbembe, 2014, p.10). And, should they aspire to ascend to the position of human, they must do so by abandoning their culture, language, and even their origins, in order to absorb white culture, which is characterized as human culture (Borges; Fernandes, 2018).

Undeniably, the base of the social pyramid is composed of poor Black women in this nation, which already indicates a certain level of advantage for better-positioned women who can count on their labor—even if poorly paid—to navigate the sexual division of labor (Biroli, 2016b):

> "Black women [...] have been the ones who care for white families. This structural advantage in the relationship between Black and white women allowed the latter to acquire education and seek career opportunities, which they otherwise could not have achieved, within the context of a conventional heterosexual relationship, where women are expected to take care of the home and family" (Hanchard, 2001, p. 155).

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For these reasons, feminist political theorists and activists bring forth the political critique of social exclusion, arising from a clear problem of selectivity within political democracies, which privilege men not only due to their male condition but also because of their position in class and race relations, condemning Black women to the stratum of the most excluded among the excluded (Biroli, 2016a).

FEMINISM AS A PATHWAY TO OVERCOMING GENDER INEQUALITIES

The narrative that has guided us thus far serves as the foundation for understanding that the common basis of social movements' struggles—particularly the feminist movement—is the denial of women's right to participate in political life and the impediment to their full exercise of citizenship. These circumstances deny women the possibility of being seen and heard, which contributes to the limitations of the private life to which they have been compelled (Ferreira, 2007).

In response to this dehumanization to which women are subjected, an ideology of struggle emerges in search of ways to alter this secular reality—feminism manifests itself. Here, it will be interpreted as a social, philosophical, political, and ideological movement that seeks to liberate from oppressive patriarchal patterns through female empowerment (Melo, 2020).

> "Empowerment stems from the traditional shift in superiority regarding life choices, goods, and opinions of one individual over another, leading to disempowerment in the effort to dismantle the privileged position that a subject enjoys in relation to another subject" (Campos, 2014, p. 108).

To that end, let us keep in mind that we feminists are made, not born. Therefore, a woman must choose to adhere to feminist politics. The first time women organized in groups to address issues related to sexism and male domination, they were clear in identifying that women were as socialized to believe in sexist thoughts and values as men. The only difference was that they did not benefit from this situation. Thus, it would not be possible to change the foundations of patriarchy without first working hard to change themselves; it was necessary to create consciousness (Hooks, 2019).

Thus, feminism, as a process of learning to be a woman, acted both in awakening these women to their potential and in breaking with the historical situation of subjugation. The coexistence among these women and the exchange of experiences allowed them to identify with one another, as well as to realize that oppression affected them daily, whether in public or private spaces (Ferreira, 2007).

> "Feminism and being a feminist are associated with ruptures in the social structures that have barred women from their right to citizenship. Being a feminist implies being committed to the historical struggle of women, adopting postures of indignation and contributing to questioning conservative practices that exclude women from decision-making processes and deny their contribution to the construction of democracy"(Ferreira, 2007, p.71)

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However, from the outset, it is evident that privileged white reformist women sought the power and freedom they perceived men of their class enjoyed. The resistance to patriarchal domination in their homes allowed them a connection through which they could unite across classes with other women also saturated by male domination. However, only privileged women enjoyed the luxury of imagining that working outside the home would be sufficient to provide them with enough income to become economically self-sufficient, whereas working-class women already knew the reality in which their wages were insufficient to liberate them (Hooks, 2019).

> "These women, who joined feminist groups composed of diverse classes, were among the first to recognize that the vision of a politically based sisterhood, in which all women would unite to fight against patriarchy, could not emerge until the class issue was confronted" (Hooks, 2019, p.68).

And it was this insertion of class into the feminist agenda that brought to light the intersections of class and race. At the core of this institutionalized social system of race, sex, and class, Black women occupied the base of the pyramid. Initially, feminist movements were mostly composed of white women with high educational levels and working-class origins, but the voice of experience belonged to Black women, for they knew the costs of resisting domination by race, class, and gender. They understood the meaning of fighting to change someone's economic situation (Hooks, 2019).

> "By drawing attention to the need for transformation in both men and women, feminism proposes to society a collective re-discussion about its life project and political project. By acknowledging that women's problems have deeply rooted social and cultural foundations, feminists point to new horizons. "[...] it is not enough to change the law [...] if there are no efforts to modify behaviors toward women" (Ferreira, 2007, p. 57).

Throughout the 1990s, Latin American feminisms expanded their field of action, involving new cultural, political, and social arenas. Movements intersected, and organizations of Black, Indigenous, and rural women grew significantly, broadening the parameters of the movement's agenda. This proliferation of feminist perspectives has generated positive outcomes in public policies and, gradually, has been instilled in the popular imagination and culture, leading to the erosion of ideological resistances that persist in relation to feminism by more progressive sectors of Brazilian society. Unfortunately, however, it has also sparked considerable backlash from more conservative sectors (Lima, 2019).

In this context, we recognize Black Feminism as a movement of women who operate both in the sphere of gender discussion and in the anti-racist struggle. It is, therefore, a movement of theoretical construction by Black women, through political and intellectual analysis, focused on social change and acting within the ideological field in which they are inserted. It means Blackening feminism so that Black women engaged in Brazilian feminism can truly feel represented, in both fact and law, since feminism with a white and Western identity is insufficient, in both theory and practice, to integrate the different

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expressions necessary for constructing a multiracial and multicultural feminism. To this end, the insertion of Black women in universities influenced not only the birth of Black Feminism but also fostered reflections and engagement in political activities (Lima, 2019).

CYBERFEMINISM AS A TOOL FOR VISIBILITY

A relevant factor in the analysis undertaken here concerns the media, which serve as perpetrators of stereotypes of Black female representation. Starting from the assumption that the media not only present the social representations already embedded in the social imaginary but also act as agents that operate, construct, and reconstruct at the core of the logic of production within systems of representation—due to their central role in crystallizing images and meanings about Black women (Lima, 2019): "The right to a positive image has been one of the battle lines of Black feminism since its inception. [...] It treats stereotypical image or representation as a form of violence comparable to domestic and sexual violence." (Lima, 2019, p. 55).

Currently, within the context of feminism's dissemination, we observe the expansion of the use of Information and Communication Technologies (ICTs) as strategic and indispensable tools for the activities of contemporary feminisms, which are characterized by horizontal discourses, with plural and heterogeneous practices, articulated with various civil sectors (Lima, 2019).

As a result, this reality of technological innovations stemming from the globalization process of capitalist relations has enabled the widespread use of electronic devices, social networks, among other tools, for the dissemination of knowledge, thereby allowing facilitated access to diverse content. This is a turning point in history, as it enabled the transition from passive communication/information—where individuals were merely recipients of information with no means to express their critiques and reflections—to the communication/interaction found in digital social network interfaces such as Facebook, Twitter, YouTube, and Instagram (Borges; Fernandes, 2018).

It is along this trajectory that the discussion of cyberfeminism gains prominence as a means of providing visibility to Black Feminism. For this study, we interpret cyberfeminism as a heterogeneous, multifaceted, and active philosophy that seeks female empowerment and the rupture with patriarchal structures through feminist network practices. This is an important movement because: "Digital social networks allow the multiplicity of voices to echo, expanding reflections and debate, as well as serving as a means to deconstruct the singular discourse present in the mass media" (Borges; Fernandes, 2018, p. 76).

These new technologies and other communication tools offer feminisms the opportunity to create and expand narratives that contest the previously dominant discourse. These narratives enable the emergence of diverse and infinite subjectivities, as means of reinventing identities (Lima, 2019).

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Although initially "the blog was the primary tool for discussion utilized by feminisms operating on the web" (Lima, 2019, p.59), it is now common to access digital social networks and encounter forms of interaction and collaboration regarding global events. We now have a space for co-creation and active participation, developing what can be termed a culture of sharing and participation. Thus, networked digital engagement assumes that people always have something to contribute; they are engaged and experience the movement not as mere spectators but as authors (Borges; Fernandes, 2018).

> "This generation, present in schools and digital social networks, consists of individuals whose life stories are interconnected through their daily online and offline relationships. They are students with a cultural conception of gender, race, politics, and religiosity constructed in the space-time of their lives both inside and outside of school" (Borges; Fernandes, 2018, p. 76).

Social networks, blogs, and the decentralization of content production enabled by the internet have opened avenues to contest epistemic racism and the lack of positive representation of Black individuals in the media. For a long time, the discourse restricted to mainstream media fueled the negation of the Black population either through absence or through pejorative representations, impacting the subjectivities and self-esteem of these citizens through the dissemination of stereotypes and discourses that distort and negatively mark women, Black people, bodies, and sexualities (Lima, 2019). That is, these networks represent a path to overcome:

> "Cultural domination (being subjected to interpretive and communicative standards associated with another culture, alien and/or hostile to one's own); concealment (becoming invisible through the communicative, interpretative, and representational practices authorized by one's own culture); and disrespect (being routinely defamed or disqualified in public cultural representations through stereotypes and/or everyday interactions)" (Fraser, 2006, p. 232).

Thus, by mobilizing reflections on issues related to racism and sexism, based on personal experiences, daily situations, and media cases, Black women have the opportunity to use internet tools as a means to engage in the development of productions that confront the epistemological foundations of ethnocentric orientation, constituting counter-hegemonic discourses in the quest to give visibility and voice to Black and female experiences. These self-produced narratives have achieved immeasurable reach, forming a genuine network of information and sharing (Lima, 2019).

The strength that digital social networks constitute is akin to the weavings made by weavers—so intricately intertwined that we witness, for example, the case of Brazilian doctor and influencer Victor Sorrentino, who was arrested in Egypt accused of harassing a salesperson. He posted a video of the incident on his social media. The case gained notoriety when the initiative "Fala UP," a collective focused on feminist issues in Egypt, provided details of the event. A hashtag, which can be translated as #HoldTheBrazilianHarasserAccountable, became one of the most commented topics on the country's

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Twitter (now X) (CNN Brasil, 2021). On that occasion, more than 2,000 activists in Brazil and Egypt joined forces to denounce the video posted by the doctor (Globo G1, 2021).

Under the banner of cyberfeminism, we see feminist collectives mobilizing strategies that seek to articulate aesthetics, politics, and communication through digital technologies as means for women's emancipation and empowerment. These Black feminist women are not merely seeking a space for sharing and exchanges, but fundamentally a space that provides forms of participation and intervention in the political agendas of society. That is, a space for participation and visibility of these minorities that is not possible through traditional avenues (Lima, 2019).

(NON-)CONCLUSIVE LINES

In our reality, while official history was being taught, a significant part of the Brazilian population was simply unaware of the real history, marked by persecutions, torture, and murders—that is, filled with acts of cruelty perpetrated against those who rose against the regime. The fact is that social life cannot be reduced to the decisions made by the powerful; it is also constituted through personal actions and, above all, through collective decisions practiced in everyday life. What has become clear is that real history is forged by anonymous men and women through daily struggle, while only official history is made by 'great' men—a history that does not portray the daily political-social struggles (Saffioti, 1987).

Therefore, as long as Brazilian society does not embrace the racial issue in its entirety—reflecting, evaluating, and developing ways to raise public awareness about the deeply rooted racial discrimination in this country—Brazil will hardly achieve full democracy. It is urgent to rethink our nation-building, which, throughout its history, has destined the Black population to the worst quality-of-life indicators while grounding itself in the concept of racial democracy. It is hoped, therefore, that workplace discrimination, domestic violence, low political representation, among other issues, can be reviewed through public policies aimed at eliminating this structural racism (Lemos, 2015).

> Here, we leave for discussion the thesis that true democracy can only be established when the trio of patriarchy-racism-capitalism is dismantled. As long as patriarchy and racism are considered merely as ideologies—and not as the power relations they actually are—it will be impossible to achieve racial and sexual democracy. In the same way that patriarchy and racism merged with capitalism, they can also survive it (Saffioti, 1987, p.94).

In this dimension, cyberfeminism significantly contributes by going beyond the mere practice of sharing for sharing's sake on digital social networks, as the circulated information surpasses the function of informing about what is happening in the world—it seeks to affect and generate modes of feeling for those involved in the shared events. Thus, the gender, race, and class issues shared within these networks affect individuals who identify with them, and these affectations can cause commotions, indignations,

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and, most often, generate virtual mobilizations that activate multiple voices materialized in the offline world (Borges; Fernandes, 2018). Not by chance:

> "Feminism has never been so deeply embedded in Brazilian society and has never been so present in the streets. Women, especially the younger ones, seem increasingly aware that their place is anywhere and that occupying spaces in politics is fundamental to making their experiences count and to giving political meaning to their needs and interests" (Biroli, 2016a[3])

There is no doubt that the 21st century will be feminine. For now, there are still indications that patriarchy, segregation, and inequality prevail. It is certainly true that we are witnessing multiple crises: social, economic, political, ethical, environmental, cultural, crises of identity, of belonging, of choice, and of lack of choice. But these crises and their interactions will not paralyze us. Diverse approaches will be necessary to confront these issues, but each advance is a victory. The most important thing is knowing that the key to achieving the desired victory is the coordination of efforts and struggles, so that victories do not cancel each other out (Wapichana, 2019). And these individuals who, on their own, already recognize the relevance of content creation, of the perception that the media is each of us—all these singularities to which we have access and with whom we can interact—constitute the anthropological mutation we need (Borges; Fernandes, 2018).

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[3] Online article without pagination.

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TRUTHS IN RUINS: ETHICAL-EDUCATIONAL CHALLENGES IN TIMES OF INFORMATIONAL DISORDER

Marco Machado[1]

ABSTRACT

Informational disorder, characterized by the proliferation of fake news, hate speech, and algorithmic manipulation, constitutes a profound threat to the democratic construction of knowledge and the critical formation of subjects. This chapter analyzes the impacts of this phenomenon on education, articulating philosophical and pedagogical reflections on truth, ethics, and autonomy. Through bibliographic research, it discusses the challenges faced by educators and students in a scenario where the boundaries between fact and opinion become blurred. It concludes that critical education, grounded in the ethics of dialogue and the valorization of autonomous thinking, is an essential path to resist the erosion of truth and foster emancipatory pedagogical practices.

Keywords: Disinformation; Critical Education; Ethics; Autonomy; Post-truth.

[1] PhD (AIU-USA)

Fundação Universitária de Itaperuna - FUNITA

Itaperuna, RJ, Brazil

E-mail: marcomachado1@gmail.com

LATTES: http://lattes.cnpq.br/6549675665082560

ORCID: https://orcid.org/0000-0001-6364-6798

INTRODUCTION

Technological transformations in contemporary society impose a series of social and political changes that challenge the foundations of modern thought. Among all phenomena, perhaps the most concerning is the growing devaluation of truth in public discourse. The so-called "post-truth era" not only threatens the domains of communication and politics but also calls into question the formative role of education and the very possibility of constructing a rational and democratic public sphere.

This chapter starts from the diagnosis that we are experiencing a collapse of public trust in truth as a criterion for validating discourse, generating profound impacts on the ethical, political, and educational life of contemporary societies. Disinformation, as a structuring phenomenon of this process, will be analyzed here not as an occasional deviation but as a symptom of a broader epistemological and existential crisis in society.

The aim is to identify, through reflections from authors such as Hannah Arendt, Gert Biesta, Michel Foucault, and Lee McIntyre, the consequences of informational disorder on the formation of subjects, teaching practice, and educational institutions. Subsequently, the chapter defends the proposition that critical education can construct a privileged space for resistance to the erosion of truth and institutions.

THEORETICAL FRAMEWORK

INFORMATIONAL DISORDER AS A CRISIS OF TRUTH

The expression "informational disorder," used by Wardle and Derakhshan (2017), describes the collapse of boundaries between legitimate information, disinformation, and deliberate content manipulation. This collapse reflects a deeper crisis: that of the very notion of truth as a public value. It is not merely the proliferation of fake news, but the substitution of reason by emotions and identities as criteria for validating discourse.

Arendt (1994), in her classic essay "Truth and Politics," anticipated this logic by demonstrating that authoritarian regimes do not merely lie but construct a parallel reality where facts become secondary to ideological coherence. Although Arendt did not witness the rise of the internet and social media, the symbolic operation she identified is today amplified by algorithms that personalize informational experiences, creating epistemic bubbles (Nguyen, 2019) highly resistant to alterity and dialogue.

McIntyre (2018) argues that "post-truth" represents an epistemic regression in which generalized skepticism transforms into cynicism, undermining the foundations of shared knowledge. Trust in knowledge-producing institutions — such as science, journalism, and education — is corroded by a conspiratorial logic that relativizes everything except its own beliefs. These findings are corroborated by

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Machado (2024), who reinforces the precariousness of trust in institutions as a factor in the emergence and proliferation of denialism.

This crisis of truth is not merely epistemological: it has ethical and political implications. Without a minimum of collectively recognized facts, without tolerance for dialogue, and without critical sense, democratic deliberation becomes impossible, and the public sphere fragments into micro-spheres of certainties immune to contestation (Machado, 2025).

DISINFORMATION AND EDUCATION: IMPACTS AND CHALLENGES

Disinformation not only distorts facts but interferes with the formation of subjectivity. Education, as a process of constructing autonomous judgment, is deeply affected by this new scenario. The impacts of disinformation on educational contexts are multiple and interdependent, requiring complex analyses and systematic responses. Below, we examine four main impacts and challenges of disinformation in education.

Weakening of the Epistemic Authority of Educators

The authority of the teacher, traditionally sustained by mastery of content, critical mediation of knowledge, and ethical commitment to truth, is today profoundly strained. In a scenario dominated by the massive and rapid circulation of information — much of it false, decontextualized, or deliberately manipulated — teachers' knowledge competes with a myriad of "informative" sources operating outside scientific and pedagogical criteria. Unverified websites, conspiratorial channels, social networks, and digital influencers gain credibility not for their rigor or reliability, but through the aesthetics of proximity, emotional language, and identity appeal.

This new informational ecology alters students' perception of the value of school knowledge. Instead of being challenged to argue, problematize, and interpret critically, many are attracted to simplified, polarized narratives filled with instant certainties. The result is growing distrust toward teachers' discourse, often accused of being "ideological" when confronting worldviews anchored in digital bubbles. The pedagogical bond, which depends on building mutual trust and recognizing the educator's legitimacy as a mediator of knowledge, becomes fragile and vulnerable to external attacks.

Moreover, teachers are frequently placed in the uncomfortable position of having to "compete" for truth in the classroom — not as a critical exercise but as a defensive reaction to the spread of disinformation. This not only emotionally burdens educators but compromises the educational space as an environment for civic formation and collective meaning-making. In this context, schools cease to be seen as places of cultural mediation and become, for some, a threat to the stability of personal beliefs nurtured by algorithms and hate speech.

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Reduction of Critical Judgment Capacity

Critical thinking, an essential foundation of contemporary critical pedagogies such as those of Gert Biesta and Henry Giroux, is severely impacted by continuous, unregulated exposure to disinformative discourses that flood the digital everyday. The flood of content, often disconnected, contradictory, or deliberately manipulated, generates cognitive overload that directly affects individuals' reflective capacity. The so-called "informational saturation"—marked not just by excess data but by the lack of clear criteria to rank, analyze, and understand them — provokes a kind of numbing of critical consciousness. Rather than fostering autonomy of thought, this informational avalanche tends to produce apathy, conformity, and vulnerability to ready-made discourses.

Attention fatigue, fueled by the logic of speed and hyperexposure, hinders active listening, rational argumentation, and the time necessary for elaborating complex ideas. As a result, information consumption becomes superficial, fragmented, and guided by affective impulses — compromising students' capacity to compare arguments, verify sources, and support positions based on ethical and epistemological criteria. Critical thinking, instead of developing as a daily practice of freedom, risks being replaced by automatic, polarized reactions anchored in fabricated truths.

This scenario represents a serious challenge for critical pedagogy, faced with the task of forming subjects capable not only of identifying fallacies or debunking fake news but of reconstructing an active, conscious relationship with language, meaning-making processes, and the world. For education to remain a space of liberation—and not a reproduction of alienation—it is necessary to profoundly rethink pedagogical practices, revaluing the time for thought, dialogue as method, and curiosity as the engine of critical learning.

Affectivity as a Criterion of Truth

Disinformation often operates through affective triggers that escape rational vigilance and function at the most instinctive level of human emotions. Moving images, catchy phrases with strong emotional appeal, and simplified narratives offering easy explanations for complex phenomena are recurrent resources in the production of disinformative content. These elements not only capture attention but shape perceptions, generate instant empathy, and reinforce pre-existing beliefs, creating a closed circuit of meaning resistant to logical argumentation. In this environment, truth ceases to be a dialogical construction and comes to be perceived as an obstacle to the subject's affective identity, especially when it confronts their worldview.

This dynamic is particularly dangerous because it shifts the criterion of veracity to the field of emotional resonance: what "touches," "moves," or "outrages" tends to be automatically validated as true. The result is the proliferation of denialism — not only as the refusal of empirical facts but as an emotional

defense against the cognitive discomfort of revising opinions and admitting contradictions. The strength of disinformation, therefore, lies not only in a well-told lie but in its capacity to root itself in affections, offer belonging, and confirm identities in times of uncertainty.

For educators, this scenario imposes a complex challenge: mediating conflicts between reason and belief, fact and opinion, without resorting to cognitive authoritarianism, which would only reinforce existing resistances. It involves cultivating a pedagogy of care and dialogue, capable of welcoming affections without yielding to anti-intellectualism; of valuing listening without relativizing the importance of scientific knowledge; of building bridges between the emotional and the rational, recognizing that critical thinking does not dispense with emotions — but must traverse them to avoid being captured by them. Educating, in this context, also means teaching how to feel ethically, critically, and collectively.

Crisis of Institutional Trust

The discourse of distrust, skillfully fueled by disinformation strategies, affects not only individual teachers but corrodes the legitimacy of the school as a public institution committed to critical and civic formation. The rhetoric of "ideological indoctrination," often used vaguely and accusatorily, transforms the educational space into a field of symbolic and political-cultural dispute, where pedagogical work is monitored, interpreted with suspicion, and often disqualified by sectors of society that see the school not as a place of dialogue and collective knowledge construction, but as an ideological enemy.

This atmosphere of constant surveillance, amplified by social networks, populist discourses, and anti-scientific movements, undermines democratic pedagogical projects by weakening the principles of pedagogical autonomy and freedom of thought. Academic freedom, the constitutional principle that ensures the teacher's possibility to teach based on the accumulated knowledge of their field and their critical conscience, becomes systematically questioned, if not directly attacked. Teachers are compelled to self-censorship, fearing administrative, legal, or even personal retaliation in virtual or physical environments.

Fear becomes the dominant affect in the school's daily life, replacing the trust that should sustain the bond between school, community, and educational project. Instead of promoting free thought, plural debate, and coexistence with difference, the school is pressured to adopt a "neutral" stance — which, in practice, means abdicating the commitment to human rights, social justice, and the complexity of knowledge. In this context, education ceases to be a space of social transformation and becomes conditioned by interests aimed at controlling discourses and reproducing authoritarian values.

Rescuing the school's legitimacy and educators' ethical authority thus requires more than public policies: it demands a cultural confrontation against the narratives that criminalize critical thinking. It is necessary to reconstruct, in the public space, the understanding that teaching is a political act — not in the

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partisan sense, but in the profound sense of intervening in the world, forming subjects capable of understanding and transforming their reality. Defending the school, in this scenario, is defending democracy itself.

ETHICS, POLITICS, AND THE FORMATION OF AUTONOMY

> "An education that forms only efficient workers and not reflective citizens puts democracy itself at risk." (Nussbaum, 2015)

The formation of intellectual autonomy is not a spontaneous occurrence but an ethical and political process that requires specific institutional, methodological, and relational conditions. The crisis of truth highlights the urgency of revaluing education as a space for cultivating discursive responsibility and democratic coexistence.

As proposed by Biesta (2011) and Giroux (2019), education can be conceived as a practice of freedom, where dialogue and ethical responsibility constitute fundamental principles. The educator, in this model, is not a transmitter of absolute truths but a mediator of meanings who recognizes the other as a legitimate interlocutor. In this process, the commitment to truth is not dogmatic but ethical: it is the recognition that discourses have consequences and that knowledge implies responsibility.

Foucault (2008), reflecting on the "care of the self," offers another powerful pathway: critical formation involves practices of subjectivation that allow the individual to become the author of their own existence, resisting forms of subjection. This requires pedagogical practices in schools that encourage problematization, doubt, displacement, and active listening.

It is at the intersection of ethics and politics that education can reconstruct the bonds between truth, freedom, and solidarity. The task is not to "return" to truth as imposition but to reconstitute it as a common horizon, shared by subjects who mutually recognize each other as seekers of meaning.

METHODOLOGY

This chapter is based on bibliographic research of a qualitative and interpretive nature, whose methodological strategy is anchored in the critical analysis and articulation of relevant theoretical productions in the fields of Philosophy, Education, Epistemology, and Communication. According to Gil (2008), bibliographic research seeks to examine, through published works, the accumulated production on a given topic, aiming to understand, problematize, or reinterpret concepts and phenomena.

The selected authors — including Hannah Arendt, Michel Foucault, Gert Biesta, and Lee McIntyre — were chosen for their relevance in the debate on truth, power, education, and discourse. The analysis of these primary sources is complemented by recent scientific articles addressing the impact of

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disinformation on formative processes. The approach adopted is critical, seeking not only to describe phenomena but to propose pathways for their overcoming within the educational context.

FINAL CONSIDERATIONS

"Education is a process of life and not a preparation for future life." (Dewey, 1979)

Informational disorder represents more than a technical challenge of fact-checking or data correction: it is, above all, a symptom of a broader epistemic and political crisis, in which the foundations of democratic coexistence, shared knowledge, and ethical commitment to truth are being eroded by invisible yet profoundly effective dynamics of power. The proliferation of false narratives, the extreme personalization of informational content, and the logic of emotional engagement over argumentative rationality configure a scenario in which the very notion of truth disintegrates — not due to the absence of facts, but because of the deliberate relativization of what can be recognized as legitimate in the public space.

In this context, education assumes a role that transcends the mere transmission of content or training of cognitive skills. It presents itself as the last bastion of resistance against the fabrication of docile, uncritical subjectivities vulnerable to manipulation. At the same time, it faces a paradox: it is called upon to promote autonomy in an environment where autonomy itself is threatened by forces operating in subterranean, algorithmic, and emotional ways. It is not just about teaching how to identify fake news or how to check sources — though this is necessary — but about forming subjects capable of desiring the truth, even when it contradicts their beliefs or affections.

To educate for autonomy, therefore, is to educate for discomfort, for constant questioning, for openness to the other, and for methodical doubt. It implies rehabilitating listening as an ethical practice, restoring the value of rational argumentation in times of digital hysteria, and sustaining the belief in language as a bridge rather than a wall. And this is not achieved solely through active methodologies or innovative technological resources, but through an ethical-political commitment that restores education's transformative dimension.

Ultimately, this chapter proposes that resisting informational disorder is not an exclusive task for fact-checking platforms or public policies on digital regulation — although both are important. It is, above all, a pedagogical mission, in the broadest and deepest sense of the term: to educate for truth as an ethical and shared practice, as collective construction, and as a common horizon. In dark times, insisting on the possibility of truth is also insisting on the possibility of the common, of democracy, and of hope.

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BODY WRITINGS IN CONCEIÇÃO EVARISTO AND HELOISA MARQUES: TEXTILE ART AND WRITING AS AN INSURGENCY OF THE FEMININE

Nincia Cecilia Ribas Borges Teixeira[1]

ABSTRACT

The research proposes a dialogue between the poetics of Conceição Evaristo and the textile art of Heloisa Marques, based on the symbolic relationship between body, memory and resistance. Starting from the image embroidered with the phrase "As the birds know, I know: I am a woman in the open air", we reflect on how both artists inscribe a narrative of affirmation, freedom and ancestry on the female body, through aesthetic strategies that break with the historical invisibility of women, especially black women. The theoretical framework adopted is based on cultural studies, with an emphasis on authors who deal with issues of gender, body and identity.

Keywords: Female body; Aesthetic resistance; Ancestry.

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[1] PhD in Literature from the State University of São Paulo (UNESP), Post-doctorate in the Science of Literature (UFRJ). Professor in the Graduate Program in Literature at Unicentro (PR) and Unioeste (PR).
ORCID: https://orcid.org/0000-0002-5719-7364.
E-mail: nincia@unicentro.br

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INTRODUCTION

THE BODY AS LANGUAGE

> "The body is an effect, not a cause, a discursive effect. What we call 'the matter of the body' is already a cultural signification."
> — Judith Butler (2003)

The visual art of Heloisa Marques—especially that produced through textile techniques such as embroidery—and the poetry of Conceição Evaristo intersect within a symbolic field where the female body serves as the central axis of expression. Both artists construct a language in which material—whether fabric or word—becomes a territory for inscribing lived experience. The embroidered phrase in Marques's work, "As the birds know, I know: I am a woman in the open air," synthesizes an existential stance that resonates deeply with the notion of escrevivência (life-writing) proposed by Evaristo.

This study is situated within the field of cultural studies, understanding culture as a space of symbolic dispute (Hall, 2003). It adopts an intersectional perspective that considers the experiences of Black women, their corporealities, and their ways of narrating the world. The concept of escrevivência, formulated by Conceição Evaristo, is articulated with the idea of culture as an identity performance in constant negotiation.

The methodology employed in this research is qualitative, exploratory, and interpretative in nature. We adopt a cultural and symbolic analysis of images and texts, emphasizing critical reading procedures and intertextuality, in accordance with the principles of cultural studies. The image by Heloisa Marques is analyzed as a visual object bearing meanings inscribed within specific historical and social contexts. In parallel, we selected the poem "Presente" by Conceição Evaristo as a textual basis to construct a dialogue between the meanings produced by visual art and written poetics. The analysis considers both visual signs (embroidery, colors, forms, bodily symbols) and verbal signs (embroidered phrase, poetic language), seeking intersections that reveal layers of meaning about the female body and its memory. From a Kantian perspective, the generation of a new being is not limited to the act of procreation but extends to the care owed to it, grounded in the humanity inherent to it.

BODY, MEMORY, AND ESCREVIVÊNCIA

> "The female body is earth and sky, shelter and horizon. It holds the memories of the world and bears the scars of time."
> — Gloria Anzaldúa (1987)

Conceição Evaristo is a writer, essayist, and professor, born in Belo Horizonte, Minas Gerais. She holds a PhD in Comparative Literature from the Fluminense Federal University (UFF) and is one of the

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foremost voices in contemporary Afro-Brazilian literature. Her work is marked by themes of memory, ancestry, the condition of Black women, and social inequalities. As the creator of the concept of escrevivência (a type of writing that emerges from the life experience and condition of black women in society), she articulates writing and lived experience as a form of resistance and identity affirmation. Among her most notable publications are Ponciá Vicêncio (2003), Insubmissas lágrimas de mulheres (2011), and Olhos d'água (2014).

The critical reception of Evaristo's work has expanded significantly in recent decades, establishing her as one of the most important figures in contemporary Brazilian literature. Her writings have been the subject of analysis across various academic fields, particularly in comparative literature, cultural studies, gender studies, and ethnic-racial relations. One of the most discussed aspects is the concept of escrevivência, developed by the author herself. According to Evaristo, "escrevivência is not reducible to autobiography. It is a writing of the self that carries the collective experience of the Black Brazilian population, especially that of women" (2011, p. 25).

This concept has been explored by scholars such as Eduardo de Assis Duarte (2014), who argues that escrevivência breaks with Eurocentric writing by placing Black life at the center and origin of literary creation. The notion of escrevivência articulates experience and language, memory and subjectivity, establishing a unique mode of narrating the world in opposition to dominant narrative structures.

Critics also emphasize the central role of orality, memory, and ancestry in Evaristo's work. For Regina Dalcastagnè (2012), Evaristo's writing recovers a tradition of silenced voices, making the word a territory of struggle and permanence.

In this sense, Evaristo's literature is perceived as a space of identity reinscription, where characters—especially Black women—gain voice. The bodies of her characters, often marked by exclusion, are portrayed as bearers of knowledge and histories that resist social and historical erasure.

Moreover, the representation of the Black female body as a political territory is a recurring theme in critical discourse. Influenced by authors such as bell hooks and Audre Lorde, feminist criticism has recognized in Evaristo's work a fertile ground for discussing Black subjectivities and intersectionality. As bell hooks states, "the Black body is a site of resistance, of rewriting, and of reappropriation of identity" (1995, p. 240).

The growing institutional recognition of Evaristo—through the inclusion of her works in university entrance exams, literary awards such as the Jabuti (2015), and her candidacy for the Brazilian Academy of Letters (2018)—has also become a subject of study. According to Duarte (2014), "Evaristo's recognition in institutional spaces marks a rupture with the traditional canon and an opening to plural voices in Brazilian literature."

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Thus, the critical reception of Conceição Evaristo's work extends beyond the analysis of her texts, integrating a broader discussion about the role of literature in constructing identities and contesting narratives in the public sphere.

When Evaristo (2011) conceptualizes the term escrevivência, she elaborates a unique epistemology of textual production anchored in the everyday experiences of Black women, considering their life trajectories, affective memories, and ancestral ties. This is a form of writing that transcends the limits of individual autobiography and configures itself as a collective gesture of narrative insurgency, grounded in orality, memory, and Afro-Brazilian ancestry.

In this context, the poem "Presente" exemplifies this conception by inscribing the body as a symbolic locus of resistance and historical preservation. This is a free translation of the original poem:

Presente
My body,
living history,
tattooed
by fire,
pain,
love,
pleasure and struggle.

My body,
sacred text
of an entire life.
My body is the present.

In the poem "Presente," Conceição Evaristo constructs a poetics of the body in which the subjectivity of the Black woman is inscribed as a territory of resistance, memory, and existential affirmation—"My body, living history." The author mobilizes a symbolic language in which the body is presented as both subject and object of experience—not merely as physical matter, but as a bearer of historicity. This history is not neutral: it is "tattooed by fire," an expression that evokes the pain and violence inscribed on the Black female body in a racist, sexist, and unequal society—"My body, living history, tattooed by fire, pain, love, pleasure and struggle."

In the verse "pain, love, pleasure and struggle," the complexities of Black female experience are synthesized: there is no idealization, but rather a recognition that the body is a site of suffering and joy, of affection and resistance. Here, Evaristo rejects simplistic readings of the Black woman as merely a victim or a warrior, presenting instead a plural and contradictory subjectivity.

By calling the body a "sacred text of an entire life," Evaristo brings the corporeal matter closer to the written word, making the flesh itself a narrative. This is a powerful metaphorical device that fuses biography and literature, aligning with her concept of escrevivência: writing as a form of bearing witness to oneself and one's people. The poet thus elevates the body to the status of the sacred. The term "sacred"

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displaces the Black female body from a place of objectification—an inheritance of slavery and historical hypersexualization—to a space of reverence and dignity. It is a gesture of symbolic and political reinscription.

The verse "My body is the present" concludes the poem with a powerful affirmation of identity. The word "present" here carries a dual meaning: it refers to the current moment, the here-and-now, but also to a gift. The Black female body does not belong solely to the past of slavery or to a utopian future—it exists in the present, with value, power, and presence. This is a declaration of full existence.

"Presente" is a poem that encapsulates the strength of Evaristo's poetics: conciseness, lyricism, and political potency. By thematizing the body as archive, text, and present, Evaristo inscribes the Black woman as a historical and literary subject, transforming marginalized experience into language, and language into an affirmation of life.

In Evaristo's poetics, the Black female body is not merely a theme but an agent of enunciation, memory, and resistance. It emerges as a sacred text, traversed by social tensions, affections, and historical processes that become material for literary creation. By claiming writing as a field for inscribing Black female subjectivity, escrevivência displaces the literary canon and breaks with the historical invisibility of Black narratives, especially those led by women. Thus, the body—both biological and symbolic—becomes an instrument for confronting structures of oppression and a fertile ground for the production of situated knowledge.

This narrative body finds a visual translation in Heloisa's embroidered figure: raised arms, exposed belly with red embroidery, attentive eyes, and natural elements composing the scene. The embroidered woman is also living history—exposed, torn, celebrated.

TEXTILE ART AS A GESTURE OF INSURGENCY: EMBROIDERY AS POLITICAL ART

> "Woman must write her body, must invent woman in her singularity, inscribe her in language, liberate the possibilities of desire."
> — Hélène Cixous (1975)

Heloisa Marques is a visual artist, researcher, and embroiderer whose work centers on textile art, collage, and the performance of femininity. Her artistic production weaves together embroidery, photography, and organic materials such as seeds, shells, and threads, exploring themes such as the body, ancestry, freedom, and memory. She employs embroidery as both a poetic and political language, re-signifying practices traditionally associated with the domestic sphere and feminine labor.

Marques visually investigates the possibilities of narrating the female body as a territory of creation and resistance. She is recognized for works that intertwine words and images in symbolic

compositions, such as the piece "As the birds know, I know: I am a woman in the open air." Her work engages with intersectional feminism, decolonial studies, and ancestral knowledge.

Laura Machado, writing for Revista O Grito!, describes Heloisa's production as a form of visual poetry that unites embroidery and collage. Machado notes that the artist revisits childhood collaging—initially a hobby—and transforms it into a reflective, sensitive, and political artistic practice, where the prominence of letters led her to incorporate phrases and embroidery into her compositions.

In an article for Nordestesse, Vanessa Fonseca highlights that Heloisa Marques transitioned from collage to textile canvases, using embroidery—composed of phrases, drawings, and embellishments—as a synthesis of political art grounded in dialogue with themes of gender, music, and literature. On the ARTE!Brasileiros platform, her textile work is described as a gesture of self-expression, struggle, and care.

Fonseca (2023) emphasizes that Heloisa's canvases create true ecosystems, in which writing guides the poetic and symbolic flow. The artist draws analogies between past and present, family memory and popular knowledge, evoking a nostalgia imbued with political weight.

Studies on political textiles, such as the dossier Threads that Weave Resistance, situate Heloisa's work within an insurgent aesthetic that breaks with the domesticating character of textile techniques, combining delicacy and toughness, nostalgia and resistance.

Figure 1 – As the birds know, I know: I am a woman in the open air (Heloisa Marques)

Source: https://www.instagram.com/p/CXCOVPxLmRv/

In the embroidery "As the birds know, I know: I am a woman in the open air," the body is marked as a territory of power and freedom. The image depicts it upright, nude, arms raised, merging with the landscape and the cosmos. It is both source and channel of expression, revealing itself as a sacred and political space, where freedom is not only physical but also symbolic and ancestral.

The red triangle embroidered in the pelvic region alludes to sexuality, but also to fertility and uterine strength—not as submission to the male gaze, but as a self-assertion. From a semiotic perspective, this visual sign functions as a culturally charged symbol evoking desire, potency, and feminine ancestry. As a *representamen*, its iconic form refers to the female sex, but the interpretant reconfigures it as a sign of resistance and emancipation. The red color, far from being mere ornament, is inscribed as a bodily language that demands to be read not through the lens of external desire, but through the strength of the one who inhabits it.

The gesture of open arms, when performed by female bodies in performative, artistic, or everyday contexts, transcends mere physical movement. It connects the body to the sky, symbolically breaking the boundaries between the earthly and the spiritual. Under the lens of body semiotics, this gesture can be understood as a sign that refers to ancestral practices of invocation, openness, and receptivity. It is rooted in non-hegemonic knowledge, often transmitted through non-discursive means such as gesture, silence, the body, and ritual.

Just as birds fly by instinct, guided by an innate knowledge integrated with nature, the gesture of the woman with open arms evokes an intuitive and ancestral knowledge that operates outside Western rational frameworks. It is a knowledge that emerges from the body and through the body—a body-territory, as Grada Kilomba (2019) affirms when she states, "the body is our first territory; it is through it that we inhabit the world." Kilomba emphasizes that racialized and gendered bodies carry memories, pain, and resistance, and are also spaces of rewriting and insurgency against colonial structures of power and domination.

The woman is faceless, which may be interpreted as an erasure of individual identity, but also as an aesthetic strategy to represent the female body as a collective archetype. The absence of a face invites the viewer to explore the body as a symbolic space, where embroidery replaces skin as language. Lines, textures, and layers create a stitched memory—between trauma and strength. Thus, the work inscribes itself within the tradition of escrevivência, in which the female body becomes a site of writing and resistance, especially for racialized and marginalized women.

The use of natural elements (shells, stones) and forms that evoke landscapes reinforces the idea of the body as an extension of nature. According to Martins (2021), the woman's body is a territory of knowledge and flows, where myths, cycles, and powers reside—elements that modern rationality has sought to deny. In this way, the fusion of the feminine with the natural recovers ancestral epistemologies

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often erased by Western culture. The open sky becomes a metaphor for the body that opens itself to experience, creation, and spirituality—in dialogue with feminine mythologies and origin cosmogonies.

The choice of embroidery—traditionally associated with domestic femininity—subverts the private sphere by transforming it into a political and poetic language. Stitching becomes a gesture of denunciation, reconstruction, and symbolic writing upon the body. According to bell hooks (2000), what is at the margin can become the center. The act of embroidery is also the act of writing, of recording, of permanence. The work affirms manual labor as part of women's identity and insurgency.

BY WAY OF CONCLUSION: DIALOGUE BETWEEN EMBROIDERY AND POETRY

When comparing the embroidered image "I am a woman in the open air" and the poem "Presente" by Conceição Evaristo, we observe that they form a powerful dialogue between body, art, and ancestry. These works overflow with meanings that emerge from corporeality as a space of symbolic, affective, and political inscription. Both the embroidery and the poem construct an aesthetic of resistance in which the female body occupies a central position—not merely as a theme, but as an active subject of enunciation.

These works challenge traditional dichotomies between reason and emotion, between art and politics, between writing and image, proposing instead an insurgent ontology. From this perspective, the female body emerges not as a passive object of representation, but as a symbolic territory of knowledge, memories, and affections.

A reading in light of decolonial studies, particularly through the lens of Grada Kilomba, deepens the understanding of these aesthetic-political practices. In their works, the artists point to the urgency of decentering the Eurocentric epistemic matrix, which has historically delegitimized knowledge produced by racialized and feminine bodies. In this context, the body ceases to be merely a biological category or a literary metaphor: it becomes an agent of resistance, a space of enunciation and re-existence. Kilomba (2019) proposes writing as an act of epistemological disobedience, in which the word is inscribed on the body, and the body speaks.

In this sense, the embroidered image and the poem not only share themes and symbolisms but also mutually enhance one another as forms of aesthetic insurgency. Both produce meanings that destabilize the boundaries between "legitimate" and "subalternized" knowledge, between text and textile. Embroidery, traditionally associated with the domestic and feminine sphere, is re-signified as a gesture of insurgency, while the poem, by inscribing the body as a "sacred text" and "present," expands the possibilities for reading and interpreting the feminine as a living, creative, and political force.

These works, therefore, invite us to rethink the ways in which we represent, feel, and interpret bodies in art and in life. By placing the female body at the center of a poetics and politics of resistance, the artists open pathways to other forms of existence and expression, rooted in memory, spirituality, and

collectivity. These are practices that embroider words and poetize threads, in a weaving of meanings that affirms: to resist is also to create, to remember is also to live, and the body—especially the female body—is a living book of stories yet to be told.

The woman represented in both works is more than an image or lyrical subject: she is the performance of ancestral knowledge, a "woman in the open air," open to the world—not vulnerable, but rather rooted, winged, and powerful.

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INSTITUTIONAL REPOSITORIES OF BRAZILIAN EDUCATION AND RESEARCH INSTITUTIONS: MANAGEMENT, COPYRIGHT, AND DIGITIZATION OF PRINTED ACADEMIC WORKS

Grasiella Ribeiro Monteiro Pessanha[1], Diego da Silva Sales[2] and Fabrícia Pires Pimenta[3]

ABSTRACT

Institutional Repositories (IRs) play a fundamental role in preserving and disseminating scientific knowledge, ensuring that scholarly output is accessible to the public. In Brazil, numerous educational and research institutions have adopted these platforms, yet they continue to face significant challenges, particularly regarding copyright policies and the digitization of printed academic works in their collections. This study analyzed the perceptions of IR representatives concerning these difficulties. It is a qualitative-quantitative, exploratory, descriptive, bibliographic, and documentary study. Data were collected through an online questionnaire answered by 40 IR representatives during the II Meeting of the Brazilian Network of Digital Repositories. The results indicate progress in the implementation of these platforms, but also highlight considerable challenges, such as the lack of well-defined institutional policies, resistance from some authors to deposit their works, and difficulties in digitizing printed academic works. Furthermore, most respondents assessed authors' knowledge of copyright as ranging from moderate to very low, which may hinder adherence to repositories. In conclusion, it is essential for educational and research institutions to enhance their institutional policies, train managers and researchers, and establish clearer guidelines for IR management.

Keywords: Institutional Repository; Copyright; Policy; Printed Academic Work.

[1] Master's degree in Intellectual Property and Technology Transfer for Innovation
Institution: Instituto Federal Fluminense Campus Campos Guarus
E-mail: grasiella@gmail.com
ORCID: https://orcid.org/0009-0007-9658-8775
[2] PhD in Materials science and engineering
Institution: Instituto Federal Fluminense Campus Campos Guarus
E-mail: dsales@iff.edu.br
ORCID: https://orcid.org/0000-0002-4462-7150
[3] PhD in Medical Sciences
Institution: Instituto Carlos Chagas - Fundação Oswaldo Cruz, Fiocruz Paraná
E-mail: fabricia.pimenta@fiocruz.br
ORCID: http://orcid.org/0000-0002-2315-1974

INTRODUCTION

The advancement of information and communication technologies, combined with the open access movement, has fostered the creation of tools and opportunities that have expanded the dissemination of scientific knowledge, making it accessible to the broader community. With the onset of this movement, Institutional Repositories (IRs) emerged as a tool capable of fulfilling this objective (Almeida; Oliveira; Rosa, 2019; Kyprianos; Lygnou, 2022; Pimenta et al., 2015).

The purpose of repositories is to store, preserve, and disseminate the scientific, artistic, and cultural output of institutions, guided by institutional policies that ensure their organization and operation. IRs are integrated into research exchange networks that are significant within the Brazilian context and contribute to increasing the visibility of the institution, its faculty, and the work produced (Almeida; Oliveira; Rosa, 2019; Trindade; Silva, 2017).

The implementation of repositories in institutions aimed to enhance institutional visibility and recognition, ensure the preservation of physical and digital collections, and enable global access to locally developed research. However, the implementation and management of these repositories still face obstacles, such as the absence of clear copyright policies, resistance from authors, and difficulties in digitizing and making printed academic works available (Kyprianos; Lygnou, 2022; Roy; Biswas; Mukhopadhyay, 2023).

> "[...] the process of managing an IR involves, in addition to the use of electronic technologies for building databases and search mechanisms, the establishment of policies that define guidelines regarding the agents and tasks involved in the data entry process, as well as issues related to information organization" (Trindade; Silva, 2017, p. 2).

Given this context, this study seeks to answer the following research question: How are Brazilian educational and research institutions addressing the challenges of implementing and managing institutional repositories, considering copyright policies, and the digitization and availability of printed academic works? To this end, the objective of this study is to analyze the perceptions of IR representatives from these institutions regarding the implementation and management of these platforms, with a focus on the challenges related to copyright policies and the digitization and availability of printed academic collections.

METHODOLOGY

This research can be classified as exploratory, descriptive, bibliographic, and documentary, with a qualitative-quantitative approach. It aims to provide greater familiarity with the topic, investigate the characteristics of a specific population by relating variables, and is based on published materials such as articles, books, reports, legislation, and regulations. Additionally, it seeks to employ statistical methods to

quantify all that is possible, while also highlighting meanings and attitudes that cannot be reduced to variable operations (Gil, 2002; Minayo, 2002; Prodanov; Freitas, 2013).

The data collection instrument used was an online questionnaire composed of 14 questions (nine objective and five open-ended), presented in Table 1. This questionnaire was applied through a public opinion survey on the perception of institutional repository (IR) representatives from Brazilian educational and research institutions regarding copyright policies, and the digitization and availability of printed academic works. To ensure the clarity and effectiveness of the questionnaire, a preliminary test was conducted with a limited sample.

Table 1 – Questionnaire Applied to IR Representative

1	How long has your university's institutional repository been in operation? *	8	If there is a copyright policy for printed academic works: Could you share the link? **
2	How do you evaluate the implementation of copyright policies in your university's repository? *	9	If they were digitized and made available on the intranet: Why were the academic works made available only on the intranet and not deposited in the repository? **
3	Before the implementation of the repository, were printed academic works archived in your university's library? *	10	In your opinion, what are the main challenges in implementing copyright policies in the repository? *
4	Were the printed academic works at your university digitized and deposited in the repository? *	11	How would you classify the authors' level of knowledge about copyright policies in the repository? *
5	If they were digitized and deposited in the repository: How were printed academic works, prior to the repository's implementation, deposited without violating copyright? **	12	In your opinion, what is the general perception of authors regarding their academic works deposited in the repository?
6	If they were digitized and deposited in the repository: Did the authors of the printed academic works authorize the deposit in the repository? *	13	Could you share the link to your university's repository copyright policy? **
7	If they were digitized and deposited in the repository: Does the repository have a specific copyright policy for digitized printed academic works? *	14	Would you like to make any additional comments about copyright policies in the institutional repository or the handling of printed academic works? **

* Objective question / ** Open-ended question
Source: Authors.

The interviews were conducted during the II Meeting of the Brazilian Network of Digital Repositories, held in Rio de Janeiro from August 1 to 2, 2024, in a hybrid format (online and in-person), with the participation of researchers, students, and repository representatives (Fiocruz, 2024). It is important to note that only IR representatives were interviewed. Since it was not possible to determine the exact number of these professionals, a sample of 40 unidentified and randomly selected participants was considered. Some respondents requested to complete the questionnaire later, and therefore responses were accepted until August 31, 2024.

The research was conducted in accordance with the ethical guidelines established by Resolution No. 510, of April 7, 2016, of the National Health Council. According to Articles 1 and 2 of this resolution, public opinion surveys that do not involve participant identification are exempt from registration or evaluation by the Research Ethics Committee (CEP) or the National Research Ethics Commission (CONEP) (Brazil, 2016).

> Art. 1 This Resolution establishes the norms applicable to research in the Human and Social Sciences whose methodological procedures involve the use of data directly obtained from participants or identifiable information, or that may pose greater risks than those encountered in daily life, as defined in this Resolution.
> Sole Paragraph. The following shall not be registered or evaluated by the CEP/CONEP system:
> I – public opinion research with unidentified participants; [...]
> Art. 2 For the purposes of this Resolution, the following terms and definitions are adopted: [...]
> XIV – public opinion research: a verbal or written consultation of a specific nature, conducted through a specific methodology, in which the participant is invited to express their preference, evaluation, or the meaning they attribute to topics, the performance of individuals and organizations, or to products and services; without the possibility of identifying the participant; [...]

RESULTS AND DISCUSSION

This study interviewed 40 representatives of Institutional Repositories (IRs) from Brazilian educational and research institutions to understand how these professionals perceive the implementation of copyright policies. Data were collected through a public opinion survey, with participants remaining anonymous, and were randomly selected during the II Meeting of the Brazilian Network of Digital Repositories, held in Rio de Janeiro on August 1–2, 2024 (Fiocruz, 2024).

The Brazilian Network of Digital Repositories, established in 2021, brings together the Regional Networks of Digital Repositories from the North, Northeast, Central-West, Southeast, and South regions, under the guidance of the Brazilian Institute of Information in Science and Technology (IBICT). In addition to disseminating the scientific output of its member institutions, the network aims to foster knowledge sharing among its members. Thus, the event proved to be a qualified venue for this research, as it gathered IR managers from public and private educational and research institutions across Brazil (Fiocruz, 2024).

Regarding the operational duration of the IRs, results showed that 37.5% of respondents indicated their repositories had been in operation for over 10 years. Another 32.5% reported a period between 7 and 10 years, 17.5% between 4 and 6 years, 7.5% less than one year, and 5% between 1 and 3 years. This indicates that the majority of institutions (70%) have maintained their repositories for more than seven years.

Graph 1: How long the university's IR has been in operation.
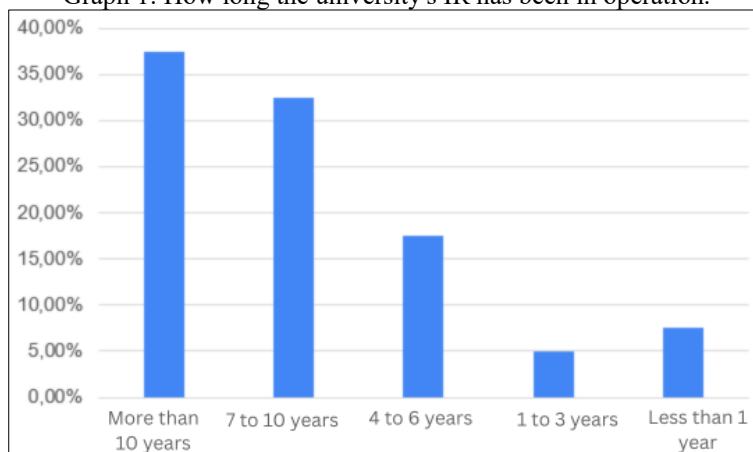
Source: Authors.

The presence of 7.5% of IRs created within the past year suggests that, although the adoption of these platforms is well-established in many Brazilian institutions, new initiatives continue to emerge. In other countries, this process has been slower. For example, a study by Oberhiri-Orumah and Baro (2023) in Nigeria analyzed 170 universities and found that only 25 had IRs. The authors highlighted challenges such as lack of resources, absence of clear policies, and difficulties related to copyright and digital preservation.

When asked to evaluate the implementation of copyright policies in their IRs, 35% of respondents rated it as very efficient, 32.5% as efficient, 20% as average, and 12.5% as inefficient or very inefficient. Thus, a positive perception predominates (67.5%).

Graph 2: Evaluation of the implementation of copyright policies in IR.
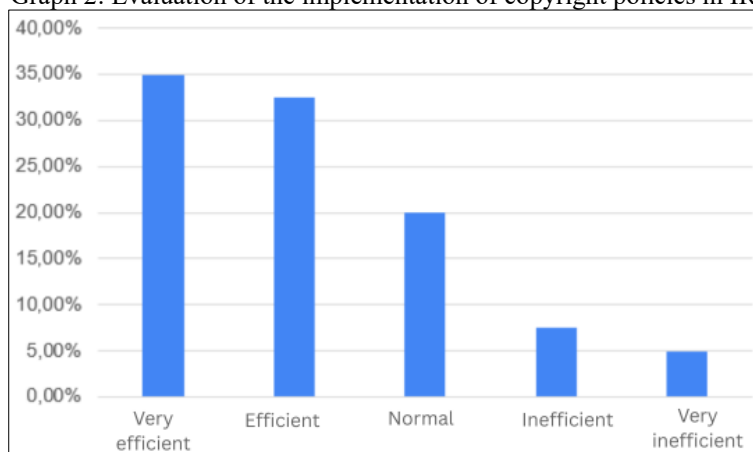
Source: Authors.

This positive assessment suggests that the policies adopted by institutions are well-structured—an essential factor for the success of repositories. According to Imoro and Saurombe (2024), clear policies ensure the preservation of knowledge and public access to scientific data. However, Roy, Biswas, and

Mukhopadhyay (2023), in their analysis of 66 repositories listed in OpenDOAR, ROAR, and ROARMAP, emphasized that the lack of guidelines on content submission, access, and licensing can hinder researcher engagement.

When asked about the fate of printed academic works prior to the implementation of the repositories, 92.5% of respondents stated that these documents were archived in the university library, while 7.5% reported that there was no specific storage location. Regarding the digitization and deposit of these works, 65% indicated they had not digitized them, 25% had digitized and deposited them in the repository, and 10% had only digitized them.

According to Baro and Nwabueze-Echedom (2023), the lack of financial resources and technological instability hinders the conversion of physical collections to digital formats, especially in developing countries. Furthermore, Baro, Godfrey, and Eze (2014) emphasize that many students are concerned about the misuse of their works when made available online. Nevertheless, digitization offers advantages such as space savings, long-term preservation, and greater accessibility to scientific output.

Among the respondents who had digitized and deposited printed academic works in IRs (25%), half reported that they requested the signing of an authorization form. Others adopted different strategies, including:

- "Works without permission for open access were made available with restricted access notes."
- "The academic works were considered university property; therefore, students ceded rights to the library."
- "A process was created with support from the institutional legal office to support the decision."
- "Loopholes were identified in the interpretation of the Copyright Law (Law No. 9610/1998, Art. 7 § 3)," which protects only the literary and artistic form, not the technical and scientific content (Brazil, 1998).

Additionally, one respondent cited Ordinance No. 360/2022 from the Ministry of Education (MEC), which mandates the digital availability of academic collections (Brazil, 2022). The respondent also explained that authors may request an embargo if the work contains confidential data or is subject to a patent application..

Regarding the authorization of authors for the deposit of printed academic works in the repository, 30% of respondents stated that authors authorized the deposit without restrictions, another 30% with restrictions, and 10% did not authorize it. Additionally, 30% selected the "Other" option, reporting:

- "Since the works are old, they were left in the library with a declaration of authorization."
- "Some works were deposited with restrictions, so they are embargoed, but most were authorized."

Gráfico 3: Did the authors of the printed academic works authorize the deposit in the repository?
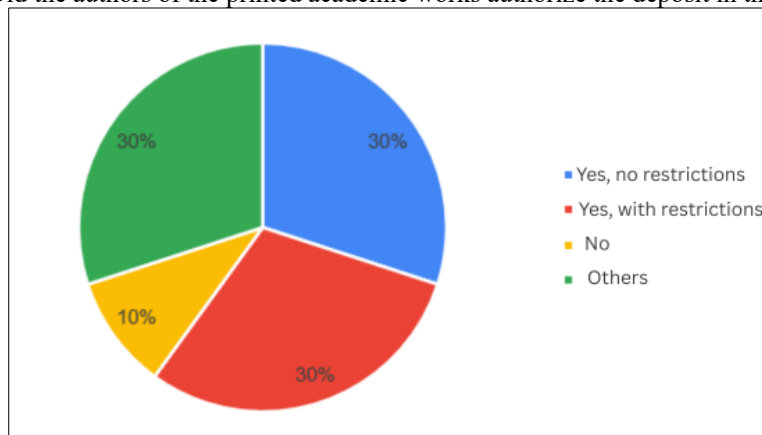
Source: Authors.

As for the existence of specific copyright policies for digitized printed academic works in IRs, only 25% of respondents answered this question. Of these, 50% stated that no specific policy exists, 30% were unsure, and 20% indicated that a dedicated policy was in place.

Graph 4: Does the repository have a copyright policy for digitized printed academic works?
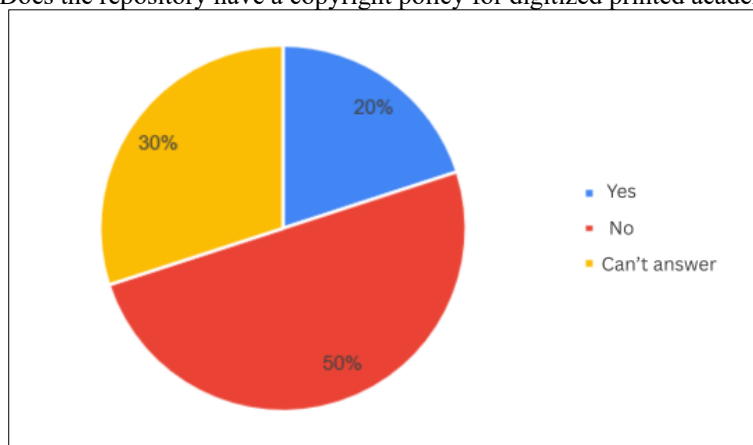
Source: Authors.

Among those who indicated having a policy, only one shared an access link, corresponding to Resolution CEPE nº 90/2015 of the Federal University of Lavras (UFLA), which in its article 1 authorizes the availability of the existing collection of theses and dissertations in RIUFLA without the need for prior authorization from the authors (UFLA, 2015, p. 2):

> Authorize the availability of the retrospective collection of theses and dissertations in digital format and online access, in the Institutional Repository of UFLA (RIUFLA), without prior consent from the authors..

However, the Resolution also provides for restrictions at the request of authors or advisors, as stated in the sole paragraph of article 4 (UFLA, 2015, p. 2):

Art. 4 The application of the provisions in this Resolution must observe the requirements imposed by Laws nº 9.610/98, 10.973/04, 9.456/97, 9.609/98, and 9.279/96, as well as other relevant legal norms.

Sole Paragraph. It is the responsibility of the author or advisor to request restrictions regarding the dissemination of theses and dissertations that are subject to patent applications or any similar embargo.

Regarding the main challenges in implementing copyright policies in Institutional Repositories (IRs), the most frequently cited issues were: lack of clarity in guidelines (42.5%), resistance from authors (40%), limited financial resources (27.5%), technical problems (17.5%).These findings are illustrated in Graph 5.

Graph 5: Major challenges in implementing copyright policies in IRs.
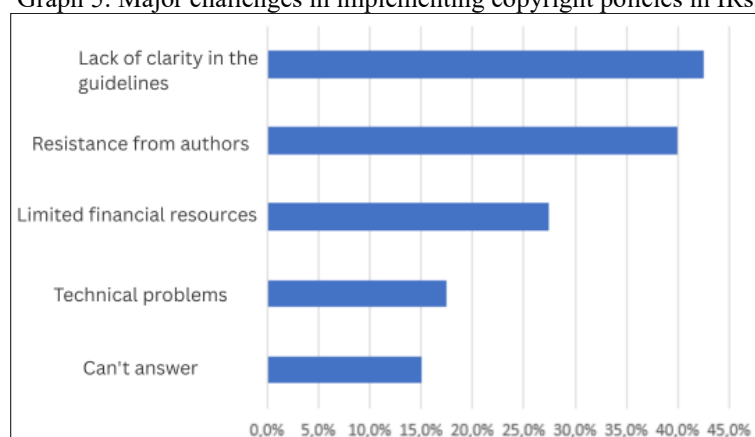
Source: Authors.

In addition to these, respondents mentioned other difficulties, such as:

- "Lack of discussion within the academic community on the topic."
- "Lack of training for the team to carry out the activities."
- "Lack of a team knowledgeable in copyright to draft the policy."
- "Lack of knowledge of the law."
- "The Copyright Law is too restrictive."
- "A period is needed to engage the academic community and raise awareness of the benefits."
- "Lack of understanding of what constitutes public goods."

These challenges align with findings from Baro and Nwabueze-Echedom (2023) and Oberhiri-Orumah and Baro (2023), who identified barriers such as lack of funding, internet instability, shortage of qualified personnel, and faculty resistance to making their work available in IRs.

As for the authors' knowledge of copyright policies, 37.5% of respondents rated it as moderate, 25% as low, 20% as high, and 17.5% as very low. Notably, no respondent rated it as very high, which may negatively impact the sustainability of repositories.
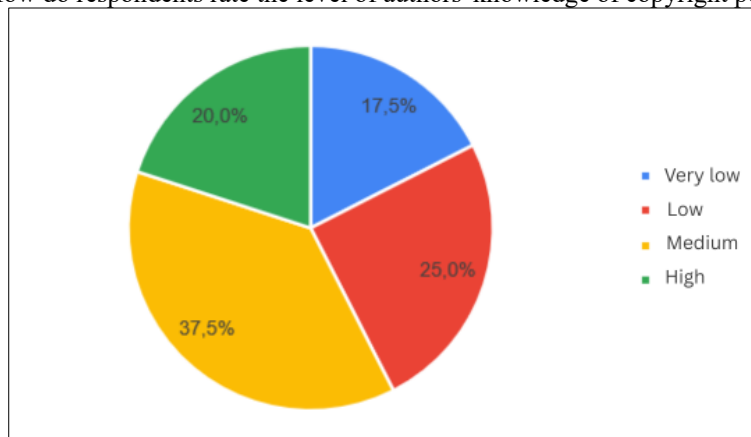
Source: Authors.

These results support the conclusions of Baro and Nwabueze-Echedom (2023), Oberhiri-Orumah and Baro (2023), and Posigha and Osievo (2022), who noted that faculty resistance to depositing their work in IRs often stems from a lack of information about repository policies.

Regarding the authors' overall perception of having their work deposited in IRs, 42.5% of respondents said authors viewed it positively, 30% as neutral, and 22.5% as very positive. This indicates that 65% of authors have a favorable view of the availability of their work in repositories.

Gráfico 7: Qual é a percepção geral dos autores sobre seus trabalhos depositados no RI?
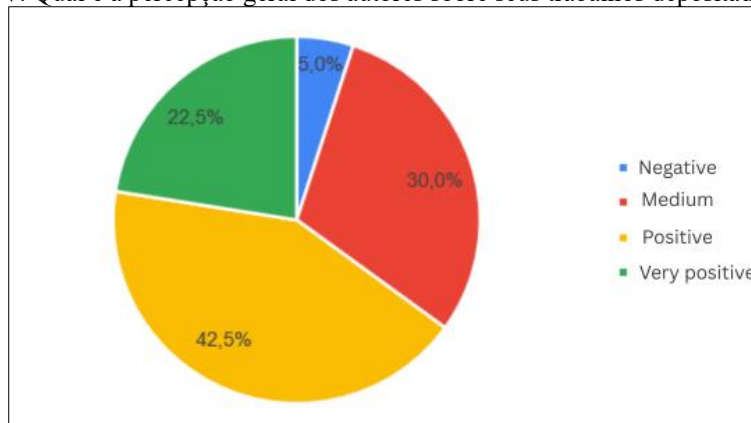
Source: Authors.

Another point investigated was the availability of the copyright policy link of the IR by the institutions. Only 28% of respondents provided links, as listed in Table 2. However, when analyzing these links individually, it was found that only 13% actually corresponded to repository policies, while the remaining 15% referred only to authorization terms.

Table 2: Links to repositories and authorization terms.

Links	Tipo
https://ufape.edu.br/deposito-trabalhos-academicos-artigos-dissertacoes-eso-monografias	Authorization term
https://repositorio.ufra.edu.br/jspui/Termo_Autorizacao_RIUFRA-2023.pdf	Authorization term
http://ufvjm.edu.br/biblioteca/repositorioinstitucional.html	Authorization term
https://repositorio.utfpr.edu.br/jspui/sobre/Termo_Autorizacao_Publicacao_Externa.pdf	Authorization term
https://www2.ifal.edu.br/o-ifal/pesquisa-pos-graduacao-e-inovacao/repositorio-institucional/politica-do-repositorio	Authorization term
https://www.repositorio.ufop.br/server/documents/termo_autorizacao_autor.docx	Authorization term
https://ri.ufrb.edu.br/regulamentacao.jsp	Repository policy and authorization term
https://pantheon.ufrj.br/terms/terms.jsp	Repository policy
https://docs.uft.edu.br/share/s/GNW8QdQ7SKKCM4VAN05wSQ	Repository policy
https://bibliotecas.ufs.br/uploads/page_attach/path/18972/ResolucaoCONEPE162023.pdf	Repository policy
https://portal.fiocruz.br/sites/portal.fiocruz.br/files/documentos/portaria_-_politica_de_acesso_aberto_ao_conhecimento_na_fiocruz.pdf	Repository policy

Source: Authors.

The analysis revealed that 72% of respondents stated that their institutions still do not have a formalized copyright policy for IRs. The reports highlighted different approaches adopted by the institutions:

- "We do not have a specific policy established for copyright. Although authorization terms are collected by the libraries, in the case of mediated deposits, and at the time of self-deposit of some types directly into the repository."
- "We have a deposit authorization form for the authors of the work, but not a specific policy."
- "The Copyright Law and the non-exclusive distribution license are adopted as the basis for publication."
- "The document is not ready; for now, there is only a form that authorizes or not the disclosure of the dissertation/thesis by the student."
- "The RIIFPE's copyright policy will be developed. Currently, it is based only on the Creative Commons license and the Copyright Law."
- "We do not have a link. Upon completion of the work, the student receives a document to fill out, assigning the rights and determining from which date the object will be accessible."
- "There is still no institutionalized copyright policy; it is under development. We adopt legal guidelines and the Creative Commons License.
- "We do not have a policy; we have a publication authorization form for the RI and we provide the link to the Creative Commons licenses in the RI."

- "The information about copyright is in the Acknowledgment and Authorization Form."

These statements indicate that several institutions still use only authorization terms instead of structured policies, which may create gaps in copyright protection and in the regulation of the use of works. Some institutions are in the process of drafting their policies, while others adopt the Creative Commons License and the Copyright Law as the basis for their guidelines.

The formalization of clear copyright policies in IRs is essential to ensure the preservation and dissemination of scientific knowledge in a sustainable manner. Studies such as those by Baro and Nwabueze-Echedom (2023), Imoro and Saurombe (2024), and Roy, Biswas and Mukhopadhyay (2023) highlight that well-defined guidelines strengthen repositories, ensuring compliance with legislation and encouraging researcher engagement.

The participants of the research had the opportunity to leave additional comments about the copyright policies in the IR and about the printed academic works. Although not all of them expressed themselves, the following statements summarize important perceptions:

- "Institutional repositories play an important role in promoting academic integrity and preventing plagiarism. They are digital platforms where institutions store and make available the intellectual output of their members, such as theses, dissertations, articles, and other academic works. By complying with copyright legislation, these repositories help ensure that works are properly credited and protected."

- "We will still act on this process in the future, sending the authorization form to students and requesting that they send it back to us, in case they want it to be made available in the RI/UFVJM."

- "We are drafting the copyright policy of our IR. Before RIUFAL, there was the BDTD (created in 2006), and all BDTD publications were migrated to the repository. Works prior to that date (2006) were not required to be on a digital platform and are on the library shelves. We are studying the best destination for the printed works, whether it would be better to make a public call to the authors so we can digitize them. Everything is being discussed and evaluated in the copyright policy."

- "I believe that publication in the Repository is an additional guarantee that the author has of their textual production. Once the work is left only on the shelf, it becomes very difficult to identify plagiarism in case of misuse by another researcher. Many refuse or request embargoes on their research, but do not realize the increased risk they run with this stance."

- "The digitization of the retrospective collection of theses/dissertations is done on demand, and then we request the author's authorization."

- "With the implementation of the repository, it was decided that no library should, under any circumstances, store printed undergraduate and specialization final papers. The libraries and academic offices that stored these productions were given the option of final destination – digitization and hosting only in the repository or disposal. After Ordinance 360/2022, not even dissertations and theses are stored in printed form, and we are already digitizing the entire printed collection so that it can be hosted in the repository."

These statements show that institutions face significant challenges in digitizing and making available printed academic works that were produced before the implementation of the IRs. Among the main obstacles cited are the need for author authorization, the adaptation of institutional policies, and decisions about the destination of physical documents.

Furthermore, MEC Ordinance nº 360/2022, mentioned by one of the respondents, has been a determining factor for these changes. As of August 1, 2022, Higher Education Institutions (HEIs) belonging to the federal education system can no longer require the submission of physical documents.

Thus, the results show that, although the implementation of IRs has advanced, there are still challenges to be overcome, especially in defining copyright policies and raising awareness within the academic community about the benefits of making academic works available online.

CONCLUSION

This study analyzed the perceptions of representatives of institutional repositories (IRs) from Brazilian educational and research institutions regarding the implementation and management of these platforms. The results indicate that, despite progress in the implementation of these repositories, significant challenges remain, such as the absence of well-defined copyright policies, resistance from some authors to deposit their works, and issues related to the need for author authorization to make printed academic works available.

The level of knowledge among authors regarding copyright policies ranged from moderate to very low, standing out as a point of concern, as it may directly affect adherence to IRs and the preservation of scientific output. Furthermore, the resistance of authors to deposit their works in repositories may be related to a lack of clear information and concerns about copyright violations.

Given this scenario, it is essential that educational and research institutions improve their policies, promote training on copyright, and establish clearer guidelines for the sustainable implementation and management of repositories. Ordinance MEC No. 360/2022 represents a regulatory milestone for federal network higher education institutions, promoting digitization and demanding new strategies for IR managemen

Finally, for future work, it is recommended to investigate the impacts of these policies on researchers' adherence to repositories. Additionally, analyzing best practices adopted by institutions with more consolidated policies may contribute to the development of a more efficient and sustainable model for IR management in Brazil.

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DIGITIZATION AND AVAILABILITY OF PRINTED ACADEMIC WORKS: PROPOSAL FOR UPDATING THE INSTITUTIONAL REPOSITORY POLICY OF THE FLUMINENSE FEDERAL UNIVERSITY

Grasiella Ribeiro Monteiro Pessanha[1], Diego da Silva Sales[2] and Fabrícia Pires Pimenta[3]

ABSTRACT

Prior to the establishment of the Institutional Repository of the Fluminense Federal University (RIUFF), printed academic works such as undergraduate theses (TCCs), dissertations, and doctoral theses were accessible exclusively in physical format, which limited their visibility. The implementation of RIUFF expanded remote access; however, academic works produced before its creation were not integrated into the digital platform due to legal and copyright concerns. This study aims to propose improvements to overcome these limitations, including the addition of new chapters to RIUFF's policy addressing copyright and the digitization and availability of printed academic works. It also proposes the creation of instruments such as a Model Authorization Term and a Document Withdrawal Form, with the goal of ensuring a balance between open access, digital preservation, and copyright protection. Furthermore, the study suggests best practices for repository management, aiming to facilitate the digitization process, increase faculty and student participation, and promote the preservation and dissemination of UFF's scientific and academic knowledge. With the implementation of these proposals, UFF will be able to strengthen its institutional repository policy and consolidate its position as a reference in academic knowledge management and preservation.

Keywords: Institutional repository; Printed academic works; Digitization; Availability; Copyright.

[1] Master's degree in Intellectual Property and Technology Transfer for Innovation
Institution: Instituto Federal Fluminense Campus Campos Guarus
Address: Av. Souza Mota, 350, Parque Fundão, Campos dos Goytacazes - RJ, Brazil
E-mail: grasiella@gmail.com
ORCID: https://orcid.org/0009-0007-9658-8775
[2] PhD in Materials science and engineering
Institution: Instituto Federal Fluminense Campus Campos Guarus
Address: Av. Souza Mota, 350, Parque Fundão, Campos dos Goytacazes - RJ, Brazil
E-mail: dsales@iff.edu.br
ORCID: https://orcid.org/0000-0002-4462-7150
[3] PhD in Medical Sciences
Institution: Instituto Carlos Chagas - Fundação Oswaldo Cruz, Fiocruz Paraná
Address: Av. Rua Prof. Algacyr Munhoz Mader, 3775, CIC, Curitiba - PR, Brazil
E-mail: fabricia.pimenta@fiocruz.br
ORCID: http://orcid.org/0000-0002-2315-1974

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INTRODUCTION

The Fluminense Federal University (UFF) holds a vast collection of printed academic works, such as undergraduate theses (TCCs), dissertations, and doctoral theses, which for a long time were available solely in the institution's libraries. Prior to the establishment of UFF's Institutional Repository (RIUFF), these documents could only be accessed in physical format.

With the implementation of RIUFF, remote access to the university's academic works was significantly expanded, facilitating preservation, dissemination of scientific knowledge, and the strengthening of institutional memory. However, academic works produced before the repository's creation could not be integrated into the digital platform due to legal issues and institutional guidelines related to copyright. As a result, access to this collection remained limited to in-person consultations, which reduced its visibility, while digital documents became much more easily accessible.

In light of this scenario, the objective of this study is to analyze the strategies adopted by Brazilian universities to enable the digitization of printed academic works in their institutional repositories. To this end, a survey was conducted of the regulations and guidelines available on the websites of federal university repositories.

Based on this research, the study seeks to provide support for the development of institutional policies and guidelines that can balance open access to knowledge, digital preservation, and copyright protection, thereby allowing printed academic works to also be integrated into RIUFF.

METHODOLOGY
REGULATIONS AND GUIDELINES OF INSTITUTIONAL REPOSITORIES

To understand how Brazilian federal universities regulate the digitization and availability of printed academic works in their institutional repositories, a survey was conducted of the regulations and guidelines available on the websites of each federal university's repository. Initially, federal universities were identified using information from the Ministry of Education (MEC) website, resulting in a total of 63 institutions (Brazil, 2025).

Subsequently, the websites of each university were accessed to locate the pages of their libraries and institutional repositories. On these pages, detailed searches were carried out to verify which universities have active repositories and whether there are specific regulations regarding the digitization and deposit of printed works, as listed in Appendix A.

After identifying the repositories, individual consultations were conducted on each site to search for regulations and/or guidelines addressing:

• The digitization of printed academic works;
• The availability of these works in institutional repositories;

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- Institutional guidelines concerning the Copyright Law (Law No. 9.610/1998).

UPDATE OF THE INSTITUTIONAL REPOSITORY POLICY

The proposed update to the policy of the Fluminense Federal University's Institutional Repository (RIUFF) includes the creation of two new chapters:

- One addressing copyright within the RIUFF policy;
- Another concerning the digitization and availability of printed academic works in RIUFF.

Additionally, the implementation of new instruments was proposed to support the latter chapter:

- A Model Authorization Term for Publication in the Institutional Repository of UFF (Appendix B);
- A Model Request Form for Document Withdrawal from the Institutional Repository of UFF (Appendix C).

Both the chapters and the instruments were developed based on the regulations and guidelines of institutional repositories from other Brazilian federal universities.

GUIDELINES AND/OR REGULATIONS OF INSTITUTIONAL REPOSITORIES ON PRINTED ACADEMIC WORKS AND COPYRIGHT IN FEDERAL UNIVERSITIES

Among Brazilian federal universities, seven (Table 1) mentioned some form of guidance regarding the issue of digitizing and depositing printed academic works in their repositories. However, only three of them have specific guidelines and/or regulations.

Table 1: Federal universities that addressed the digitization and deposit of printed academic works in their repositories

University Name	Acronym
Federal University of Mato Grosso	UFTG
Federal University of Santa Catarina	UFSC
Federal University of Alagoas	UFAL
Federal Rural University of the Amazon	UFRA
Federal University of Ceará	UFC
Federal University of Uberlândia	UFU
Federal University of Lavras	UFLA

Source: Authors.

Before presenting the guidelines and/or regulations regarding the digitization and availability of printed academic works from these three universities, it is worth highlighting that some of the main arguments used to justify this process are based on the Ministry of Education (MEC) Ordinances No. 360/2022 and No. 613/2022 (Brazil, 2022a, 2022b).

Ordinance No. 360, dated May 18, 2022, addresses the conversion of academic collections to digital format, as stated in Article 4 (Brazil, 2022a, p. 1):

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> Art. 4 – The general procedures for conversion and preservation of documents shall be regulated in a specific act..

In addition to providing for the regulation of general procedures, the ordinance also prohibits the production of academic documents in physical format as of August 1, 2022, as per Article 2 (Brazil, 2022a, p. 1):

> Art. 2 – The production of new documents that are part of the academic collection in physical format is prohibited as of August 1, 2022.

Ordinance No. 613, dated August 18, 2022, regulates Article 4 of MEC Ordinance No. 360/2022, establishing specific guidelines for the digitization and preservation of academic documents.

However, upon analyzing these regulations, it becomes evident that none of them address copyright guidelines or mention the need for author authorization for the publication of digitized documents in institutional repositories.

In light of this, the following section presents the three universities that have implemented solutions for the digitization and availability of printed academic works in their institutional repositories.

FEDERAL UNIVERSITY OF CEARÁ (UFC)

The Federal University of Ceará (UFC) issued Ordinance No. 348, dated December 8, 2022, to regulate the digitization and availability of retrospective undergraduate theses (TCCs), dissertations, and theses within the scope of the University Library (UFC, 2022).

This document was developed based on key regulations, including:

- MEC Ordinances No. 360/2022 and No. 613/2022, which address the conversion of academic collections to digital format and the regulation of general procedures for the conversion and preservation of digital academic documents in Higher Education Institutions (HEIs);
- Legal Opinion No. 00078/2022/NUPLES/PFUFC/PGF/AGU, issued by the Federal Prosecutor's Office at UFC.

Ordinance No. 348/2022 authorizes the digitization and availability of academic works produced before the implementation of the institutional repository, without requiring prior authorization from the authors, as stated in Article 1 (UFC, 2022, p. 1):

> Art. 1 – Authorize the digitization and availability of the retrospective collection of theses and dissertations in digital format and online access in the UFC Institutional Repository, without the need for prior consent from the authors.

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Article 2 appoints a Management Committee for the Institutional Repository, responsible for establishing the criteria for digitizing printed academic works held in the university libraries (UFC, 2022, p. 1):

> Art. 2 – Appoint the Management Committee of the Institutional Repository as responsible for establishing criteria for the digitization of retrospective undergraduate theses (TCCs), dissertations, and theses held in the collections of the University Library System.

Article 4 provides that authors may request access restrictions or the removal of their work from the repository, provided they submit supporting documentation (UFC, 2022, p. 1):

> Art. 4 – In cases of works with patent applications and/or embargoes, it is the sole responsibility of the author to request access restriction or removal of their work from the Institutional Repository, by submitting supporting documentation to the Library System management.

FEDERAL UNIVERSITY OF LAVRAS (UFLA)

The Institutional Repository of the Federal University of Lavras (RIUFLA) includes Resolution CEPE No. 090, dated March 24, 2015, which regulates the availability of the retrospective collection of theses and dissertations in the repository without requiring prior authorization from the authors (UFLA, 2015).

This resolution is based on several legal opinions, including Opinion No. 00033/2015/GAB/PF/UFLA/PGF/AGU, issued by the Federal Prosecutor's Office at UFLA.

The document justifies the availability of academic works as a form of accountability to society for the public funding of education, as highlighted in the following excerpt: "Considering that dissertations and theses result from work funded with public resources and that society deserves a return on its investment" (UFLA, 2015, p. 2).

Within this context, Article 1 of Resolution No. 090/2015 authorizes the availability of the retrospective collection of theses and dissertations in RIUFLA without the need for prior consent from the authors:

> Art. 1 – Authorize the availability of the retrospective collection of theses and dissertations in digital format and online access in the Institutional Repository of UFLA (RIUFLA), without prior consent from the authors.

Article 5 of the same document also establishes the possibility of removing works from the repository, provided the author submits a formal request to the Technical Committee of the University Library:

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Art. 5 – A work deposited in RIUFLA that contains copyrights held by parties external to the Federal University of Lavras may be removed upon written request, exclusively by the author, submitted to the Technical Committee of the University Library.

FEDERAL UNIVERSITY OF UBERLÂNDIA (UFU)

On the UFU Institutional Repository website, a presentation document outlines the policy for including academic works. According to this document, dissertations and theses defended before the publication of Ordinance PROPP No. 0002, dated September 15, 2005, are being gradually digitized and included in the repository (UFU, 2005, p. 2):

> The implementation of the Digital Library of Theses and Dissertations, currently the RI UFU, began with the publication of PROPP Ordinance No. 0002 of September 15, 2005, which makes it compulsory to deposit dissertations and theses in digital format. The inclusion of dissertations and theses defended in the years prior to the date of the ordinance in the RI UFU has been carried out gradually, by means of digitization of the printed versions by SISBI/UFU collaborators.

This directive was formalized in Ordinance No. 20, dated August 22, 2017, issued by the UFU Pro-Rectory of Research and Graduate Studies. Article 1 authorizes the availability of retrospective academic works in the repository without requiring prior authorization from the authors (UFU, 2017, p.1):

> Art. 1 – Authorize the availability of the retrospective collection of theses and dissertations in digital format and online access in the UFU Institutional Repository (RIUFU), without prior authorization from the authors.

Article 5, sole paragraph, of the same ordinance allows authors to request the removal of their works from the repository, provided they present a justified reason (UFU, 2017, p. 2):

> Sole Paragraph – At any time, the author may request the removal of their thesis or dissertation from RIUFU, with justification to protect patents, copyrights, or other rights related to their work.

The ordinance is based on Legal Opinion No. 00065/2014/GAB/PF/PROGE/UFU.

In 2022, UFU's rectorate issued Ordinance No. 312, dated March 28, 2022, which established the Information Policy of the UFU Institutional Repository (RIUFU). Article 10 reinforces that digitization and submission of works delivered to the library before the repository's implementation do not require author consent (UFU, 2022, p. 2):

> Art. 10 – The deposit of content in RIUFU shall be the responsibility of the authors or the person in charge of each collection (self-archiving), except for theses and dissertations defended before the implementation of RIUFU, which will be digitized and submitted by the repository's responsible sector.

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APPROACHES TO THE DIGITIZATION AND AVAILABILITY OF PRINTED ACADEMIC WORKS

The Federal University of Ceará (UFC), the Federal University of Uberlândia (UFU), and the Federal University of Lavras (UFLA) have adopted specific guidelines to enable the digitization and availability of printed academic works produced before the implementation of their institutional repositories.

All three universities followed a similar model, which allows for the preservation and public access to retrospective collections without requiring prior consent from the authors. However, they also established mechanisms for restricting or removing works from the repositories, ensuring a balance between open access to academic content, digital preservation, and respect for copyright and intellectual property rights.

PROPOSAL TO UPDATE UFF'S INSTITUTIONAL REPOSITORY POLICY REGARDING COPYRIGHT AND PRINTED WORKS

The Fluminense Federal University (UFF) issued, in July 2024, Ordinance UFF No. 68.698 of July 2, 2024, and Normative Instruction SDC/UFF No. 8 of July 5, 2024. Ordinance No. 68.698/2024 establishes the Policy of the Institutional Repository of the Fluminense Federal University (RIUFF), revoking Service Standard No. 655/2017, which regulated the deposit of technical-scientific production in the institutional repository (UFF, 2024b). Normative Instruction SDC/UFF No. 8/2024 addresses the technical-scientific production deposited in RIUFF (UFF, 2024a).

However, upon analyzing these regulations, it was found that no specific guidelines were established regarding copyright, nor was the digitization and publication of printed academic works addressed. In light of this gap, this draft proposes:

- The inclusion of a chapter on copyright in the RIUFF policy;
- The inclusion of a chapter regarding the digitization and availability of printed academic works in RIUFF;
- The implementation of two new instruments:
  o Authorization Term Model for Publication in the Institutional Repository of UFF (Appendix B);
  o Request Form Model for Document Removal from the Institutional Repository of UFF (Appendix C).

By proposing the inclusion of a chapter dedicated to the digitization and availability of printed academic works in RIUFF, it is essential to emphasize that, unlike what was proposed by other universities, the draft presented here suggests that the institution first carry out a public call. This

initiative aims to inform both society and the authors of the works about the measures the university intends to adopt. The purpose of this public call is to provide greater legal security to UFF.

ON COPYRIGHT

Art. 1 – The copyright policy of the UFF Institutional Repository (RIUFF) shall comply with current legislation, especially: Law No. 9.610/1998 (Copyright Law), Law No. 9.609/1998 (Software Law), Law No. 9.279/1996 (Industrial Property Law).

Art. 2 – The copyrights of academic works deposited in RIUFF belong exclusively to their authors.

Art. 3 – Authors hold the copyright over the deposited documents. Commercial use of any work available in RIUFF is prohibited without prior authorization from the author.

Sole Paragraph – The use of intellectual works available in RIUFF requires mandatory citation of the author(s) and complete bibliographic data of the work.

Art. 4 – Authors retain their moral and commercial exploitation rights over their works, respecting any defined embargo period. After this period, the deposited material may be made openly accessible.

Art. 5 – Documents available in RIUFF are the sole property and responsibility of the authors.

Sole Paragraph – UFF, through the Superintendency of Documentation, is not responsible for plagiarism, moral offenses, or copyright violations, nor for any total or partial copies made by third parties of the deposited content.

Art. 6 – In the self-deposit model, authors are responsible for the content submitted, including decisions about which data may be published.

Sole Paragraph: – Data entered by authors must be verified by the Superintendency of Documentation, through UFF libraries, for formatting and standardization.

Art. 7 – Authors of documents deposited in RIUFF expressly grant UFF, free of charge and for an indefinite period, the right to archive, distribute, and preserve the deposited material, accepting the conditions established in the Authorization Term for Publication in RIUFF.

Art. 8 – Depositing documents in RIUFF requires prior authorization from the copyright holders, in accordance with Law No. 9.610/1998, through the signing of the Authorization Term approved by the RIUFF Management Committee.

Art. 9 – Documents containing research results subject to patenting are exempt from mandatory deposit in RIUFF.

Art. 10 – UFF libraries shall not make any changes to the content of materials available in RIUFF. Authors are solely responsible for the integrity of the deposited material.

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Art. 11 – Authors may request the removal of their works from RIUFF at any time by completing and signing the Request Form for Document Removal, to be submitted to the RIUFF Management Committee.

Sole Paragraph – Removal may be requested for reasons including:

I – Subject matter under patent review by UFF's Innovation Office;

II – Work designated as confidential by UFF's Innovation Office;

III – Licensing or assignment for commercial publication;

IV – Identification of copyright infringement.

DIGITIZATION AND AVAILABILITY OF PRINTED ACADEMIC WORKS

CONSIDERING, the need to preserve and disseminate the intellectual and institutional memory of the University;

CONSIDERING, the importance of permanently gathering all technical-scientific and institutional production in a unified virtual environment;

CONSIDERING, the need to expand and facilitate public access to UFF's technical-scientific and institutional production, since theses, dissertations, and undergraduate final papers (TCCs) are the result of research funded with public resources;

CONSIDERING, MEC Ordinances No. 360/2022 and No. 613/2022;

CONSIDERING, Law No. 9.610/1998, which protects copyright;

The Federal Fluminense University (UFF) will carry out a public call, published on its official website and institutional social media, listing the names of authors and titles of printed academic works. Authors will have 30 days to express their position regarding the digitization and availability of their works in the UFF Institutional Repository (RIUFF). If no response is received within the established period,

RESOLVES

Art. 1 – Authorize the digitization and availability of the retrospective collection of TCCs, dissertations, and theses in digital format and public access in RIUFF, regardless of prior consent from the authors.

Art. 2 – Designate the RIUFF Management Committee as responsible for establishing criteria for the digitization and availability of retrospective TCCs, dissertations, and theses held in UFF library collections.

Art. 3 – Authors may, at any time, request access restriction or removal of their TCC, dissertation, and/or thesis from RIUFF, provided they submit documented justification to safeguard patent rights,

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copyrights, or other rights related to the work. The request must be submitted to the RIUFF Management Committee.

Art. 4 – In cases where deposited works contain third-party copyrights, removal may be requested exclusively by the author, through a formal request to the RIUFF Management Committee.

Art. 5 – Content deposit in RIUFF will be the responsibility of the authors themselves (self-deposit) or the person in charge of each collection. However, for TCCs, dissertations, and theses defended before the implementation of RIUFF, whose digitization is carried out later, submission will be handled by the repository's responsible sector.

FINAL CONSIDERATIONS

The implementation of clear policies for the digitization and availability of printed academic works in the Institutional Repository of UFF (RIUFF) is essential to ensure broad and democratic access to the knowledge generated by the institution. Among the proposed guidelines, the inclusion of chapters on copyright and the digitization of printed academic works aims to achieve a balance between digital preservation, respect for copyright, and open access to academic and scientific production.

The analysis of regulations and best practices from Brazilian federal universities, such as UFC, UFU, and UFLA, provides a model to be followed to overcome legal and institutional limitations, allowing the integration of printed academic works into the repository. The proposal to update the RIUFF policy, with the standardization and creation of instruments such as the Authorization Term and the Withdrawal Form, complements these guidelines, ensuring that the university continues to promote the dissemination of knowledge and the preservation of institutional memory.

Thus, the proposal to update the RIUFF policy represents an advance in the valorization of UFF's academic production, by integrating printed collections into the digital environment in a responsible and legally secure manner. It is hoped that by adopting the measures suggested here, the university will increase the visibility of its scientific production, strengthen institutional memory and promote greater access to knowledge for society. In addition, UFF's experience can serve as a reference for other institutions seeking balanced solutions between open access and respect for copyright, contributing to the continuous improvement of institutional repository policies in the country.

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APPENDIX A – Brazilian Federal Universities with Institutional Repositories

University	Repository Website
Universidade da Integração Internacional da Lusofonia Afro-Brasileira	https://repositorio.unilab.edu.br/jspui/
Universidade de Brasília	https://repositorio.unb.br/jspui/
Universidade Federal da Bahia	https://repositorio.ufba.br/
Universidade Federal da Fronteira do Sul	https://rd.uffs.edu.br/
Universidade Federal da Integração Latino-Americana	https://dspace.unila.edu.br/home
Universidade Federal da Paraíba	https://repositorio.ufpb.br/jspui/
Universidade Federal de Alagoas	https://www.repositorio.ufal.br/
Universidade Federal de Goiás	https://repositorio.bc.ufg.br/home
Universidade Federal de Itajubá	https://repositorio.unifei.edu.br/jspui /
Universidade Federal de Jataí	https://sophia.ufj.edu.br/TerminalWebRI
Universidade Federal de Juiz de Fora	https://repositorio.ufjf.br/jspui/
Universidade Federal de Lavras	http://repositorio.ufla.br/
Universidade Federal de Minas Gerais	https://repositorio.ufmg.br/
Universidade Federal de Ouro Preto	https://www.repositorio.ufop.br/home
Universidade Federal de Pelotas	https://guaiaca.ufpel.edu.br/
Universidade Federal de Pernambuco	https://repositorio.ufpe.br/
Universidade Federal de Rondônia	https://ri.unir.br/jspui/
Universidade Federal de Roraima	https://repositorio.ufrr.br:8080/jspui/
Universidade Federal de Santa Catarina	https://repositorio.ufsc.br/
Universidade Federal de Santa Maria	https://repositorio.ufsm.br/
Universidade Federal de São Carlos	https://repositorio.ufscar.br/
Universidade Federal de São Paulo	https://repositorio.unifesp.br/home
Universidade Federal de Sergipe	https://ri.ufs.br/
Universidade Federal de Tocantins	https://repositorio.uft.edu.br/
Universidade Federal de Uberlândia	https://repositorio.ufu.br/
Universidade Federal de Viçosa	https://locus.ufv.br/home
Universidade Federal do Acre	https://roar.eprints.org/3704/
Universidade Federal do Agreste de Pernambuco	https://logos.ufape.edu.br/home
Universidade Federal do Amapá	http://repositorio.unifap.br/
Universidade Federal do Amazonas	https://riu.ufam.edu.br/
Universidade Federal do Catalão	https://repositorio.ufcat.edu.br/home
Universidade Federal do Ceará	https://repositorio.ufc.br/
Universidade Federal do Delta do Parnaíba	https://repositorioinstitucional.ufdpar.edu.br/
Universidade Federal do Espírito Santo	https://repositorio.ufes.br/home
Universidade Federal do Estado do Rio de Janeiro	https://repositorio-bc.unirio.br:8080/xmlui/
Universidade Federal do Maranhão	http://www.repositorio.ufma.br/
Universidade Federal do Mato Grosso	https://ri.ufmt.br/
Universidade Federal do Mato Grosso do Sul	https://repositorio.ufms.br/

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Universidade Federal do Norte do Tocantins	https://solaris.ufnt.edu.br/home
Universidade Federal do Oeste da Bahia	:https://repositorio.ufob.edu.br/home
Universidade Federal do Oeste do Pará	https://repositorio.ufopa.edu.br/jspui/
Universidade Federal do Pará	https://repositorio.ufpa.br/
Universidade Federal do Paraná	https://bdc.c3sl.ufpr.br/
Universidade Federal do Piauí	https://repositorio.ufpi.br/
Universidade Federal do Recôncavo da Bahia	https://repositorio.ufra.edu.br/jspui/
Universidade Federal do Rio de Janeiro	https://pantheon.ufrj.br/
Universidade Federal do Rio Grande do Norte	https://repositorio.ufrn.br/
Universidade Federal do Rio Grande do Sul	https://lume.ufrgs.br/
Universidade Federal do Sul e Sudeste do Pará	https://repositorio.unifesspa.edu.br/
Universidade Federal dos Vales do Jequitinhonha e Mucuri	https://repositorio.ufvjm.edu.br/home
Universidade Federal Fluminense	https://app.uff.br/riuff/
Universidade Federal Rural da Amazônia	https://repositorio.ufra.edu.br/jspui/
Universidade Federal Rural de Pernambuco	https://repository.ufrpe.br/
Universidade Federal Rural do Rio de Janeiro	https://rima.ufrrj.br/jspui/
Universidade Federal Rural do Semi-Árido	https://repositorio.ufersa.edu.br/home
Universidade Tecnológica Federal do Paraná	https://repositorio.utfpr.edu.br/jspui/

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APPENDIX C – Model Request Form for Document Removal from the Institutional Repository of Universidade Federal Fluminense (original document in Portuguese)

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"ENVIRONMENTAL AUDIT" AT THE CAUS AMBIENTALIS INSTITUTE: A LEARNING PROCESS FOCUSED ON CERTIFICATION

Marcos Scarpioni[1]

ABSTRACT

Our research is an action-research project aimed at equipping, raising awareness, and preparing the members of the Caus Ambientalis Institute regarding the importance of transparency in institutional activities through a simulation of an environmental audit for certification purposes. The methodological procedures included:a) Presentation of the proposal for approval;b) Preliminary diagnosis of the institute's situation;c) Development of an action plan and activity schedule;d) Training and equipping of members;e) Definition of audit criteria and team;f) Simulated Environmental Audit.

As a result, we obtained a set of inventories developed after the training sessions, an awakening of members' awareness to develop and maintain control mechanisms that previously did not exist, and improvements in the organizational climate with greater interaction across decision-making levels.

We conclude that the simulated environmental audit is a relevant tool for third-sector institutions seeking to implement self-declaratory systems of transparency in their actions, assets, and services within their areas of operation, which are provided to society. These audits allow institutions to align their actions with norms, programs, and socio-environmental policies under development in our society. However, it remains evident that continuous improvement in good practices of internal and external controls is necessary—not only within the institute but in any third-sector organization that aims to continue operating and/or striving for excellence in organizational sustainability.

Keywords: Environmental Audit; Third Sector; Control; Transparency; Effectiveness.

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[1] MBA in Environmental Management and Sustainable Development; Specialist in Environmental Law; Specialist in Environmental Auditing and Expertise; Specialist in Human and Social Sciences; Master in Religious Studies.
E-mail: scarpionim@gmail.com

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INTRODUCTION

In this work, we present a synthesis of an innovation process carried out at the Caus Ambientalis Institute, located in the city of Rio Grande da Serra, in the Greater ABC region of São Paulo. After all, we asked: through an independent and simulated environmental audit, would it be possible to equip and broaden the managerial perspective on environmental education and management among the members of this institution?

As is already widely known, the third sector comprises various segments and areas of activity that increasingly require transparency in their actions before the public. In this context, environmental auditing becomes necessary for such institutions and/or non-profit entities as one of the legal instruments for ensuring transparency and effectiveness.

Therefore, the theme addressed in this work is environmental auditing in the third sector (TS), specifically focusing on internal control of actions, activities, and other environmental care initiatives promoted by the Caus Ambientalis Institute. Since socio-environmental issues are prominently featured in media networks, they can serve as a strategic factor for the operations of Non-Governmental Organizations (NGOs) and other types of Civil Society Organizations (CSOs) (OTS, 2021), which must be subject to oversight and provide clarification regarding their socio-economic activities, service provision, etc.

After all, even non-profit organizations need clients if they wish to survive and thrive (ROBBINS, DeCENZO & WOLTER, 2012), as our traditional models of thinking and acting are being transformed daily, renewed, and consequently influencing different segments of our lives.

In light of this period of constant change and innovation in which we live, it is necessary to observe environmental, social, and economic issues that influence, drive, and lead institutions to reflect in order to better adapt to other public and private sectors.

Thus, we can see that the raison d'être of an organization lies in its clients and their demands, which must be identified and incorporated into the generation of products in a way that adds the necessary value to attract and retain them. Consequently, managing and properly handling human, material, technological, and financial resources (STADLER & MAIOLI, 2012), even in the TS, becomes essential.

Although TS institutions do not directly aim for profit, they do possess assets for the development and expansion of their objectives, goals, and core activities. These institutions seek to operate where public and private sectors fail to meet social demands (PEREIRA, 2013). Hence, there is a need for them to have their own systems of control and resource management.

Therefore, due to their corporate social responsibility—defined as "the extent to which an [institution] accepts obligations to society beyond those established by legal requirements"

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(MARCOUSÉ, SURRIDGE & GILLESPIE, 2013, p. 182)—organizations can and must generate transparency in their activities through inspections, surveys, and audits conducted periodically.

Notably, strategic management processes (CAMPOS, 2016), environmental management systems (BARBIERI, 2007), and environmental audits and assessments (SALES, 2001; PHILLIPI JR. & AGUIAR, 2004; VILELA JR., 2006; CUNHA & GUERRA, 2012; CAZUMBÁ, 2017) allow for quantitative and qualitative verification of whether the TS (especially NGOs) has effectively contributed to a society where, according to Ioschpe (2005):

> the impacts of a State that is increasingly reducing its social action and a society with ever-growing needs are accelerating, [in which also] there is a growing awareness among individuals—both physical and legal—that it is necessary to proactively position oneself in the public space if sustainable social development is desired (IOSCHPE, 2005, p. I, emphasis added)..

These situations are currently exacerbated by the influence of a neoliberal model and a minimal State. For this reason, we chose the Caus Ambientalis Institute as the subject of our research, as it is a "Non-Governmental Organization" (ONGSBRASIL, 2021), and thus a Civil Society Organization that operates on social and environmental issues, and also engages in advocacy[2] for socio-environmental causes in Rio Grande da Serra, one of the seven cities in the Greater ABC region of São Paulo.

General Objective: To promote an internal (first-party and independent) audit (MORAES & PUGLIESI, 2014), in a simulated manner, at the Caus Ambientalis Institute, aiming to contribute to the technical training of its managers and collaborators. The focus is on understanding the relationships within internal and external control mechanisms, thereby enabling continuous improvement in procedures, resource management, and processes, with the medium- and long-term perspective of conducting future audits[3] at appropriate intervals to obtain environmental certifications.

Specific Objectives: a) To carefully examine the documents[4], records, and activities carried out by the Institute over the past five years; b) To analyze how (or whether) records of programs, actions, procedures, and internal and external processes (controls and communications) are maintained; c) To understand the institution's needs for alignment with socio-environmental policies in order to pursue environmental certifications in the future.

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[2] It is the identification, defense, and promotion of a cause, involving engagement in the proposal and implementation of public policies aimed at solving well-defined social, economic, and environmental problems. These efforts seek to include, raise awareness, involve, and engage various social groups through actions, activities, and action plans focused on reducing the negative impacts present in the demands arising from society as a whole.
[3] (Second- and third-party audits)
[4] Statute, meeting minutes, and financial statements dating from 2018, when the institute officially began operations, although informal processes and procedures have been unfolding since its founding in 2002.

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Our interest in this subject stems from information indicating that the Caus Ambientalis Institute is a Non-Governmental Organization,[5] an environmentalist and public utility entity as described in its bylaws and publicly recognized through a state decree and municipal law no. 2.242/2017, respectively. Therefore, we chose to examine its actions through the training of its members and a simulated environmental audit.

Moreover, this institution drew our interest for having already conducted research-based evaluations of its activities using managerial tools such as the "SWOT Analysis" and the "PDCA Cycle" (SHOJI & MANTONI, 2018, pp. 10 and 28).

Thus, we propose to deepen other analyses at the level of various internal and external controls to identify further opportunities for improvement and, consequently, to expand its operational horizons through the attainment of future environmental quality certifications.

It is also worth noting that we are in the final decade of implementing the 2030 Agenda (UN, 2016), which outlines the Sustainable Development Goals (SDGs). Among them, we highlight SDG 4, which addresses education in its multiple dimensions; SDG 8, which broadly addresses employment opportunities; SDG 16, which advocates for peace among organizations; and finally, SDG 17, which promotes partnerships. In this regard, we believe the Institute has much to contribute to the implementation of the 2030 Agenda in the region, which will indeed lead to greater precision in the socio-environmental actions it offers.

In this context, we structured our research with the aim of identifying new opportunities for improvement through the training and preparation of members, instructing them on the scope of current socio-environmental responsibility and environmental audits. As Silva (2021) states, "increasingly, medium and large companies[6] need to rely on audit reports."

As Knapik (2011) also argues, to improve interpersonal interaction, organizational climate, and workplace safety—engaging the "various levels of decision-making (strategic, tactical, and operational)" (CAMPOS, 2016; SILVA, 2021)—a new process of technical instruction and member training is always necessary, which can be achieved through the practice of environmental auditing.

Ultimately, it was expected that this teaching-learning process would significantly contribute to the execution of the simulated internal environmental audit and, consequently, to the improvement of results through the members' immersion in this environment of verification, inspection, and control aimed at future environmental certifications.

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[5] This terminology and legal personality do not exist in the legal system. What does exist are non-profit associations, as provided for in the Regulatory Framework for Civil Society Organizations, which incorporates articles from the Civil Code that define what social associations are.

[6] Emphasis by the author.

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THE THIRD SECTOR – DEFINITIONS, ACTIONS, AND SOCIAL INTERVENTIONS

Defining the Third Sector (TS) is no easy task, as it is a broad and complex field due to the myriad of interpretations it encompasses. However, we begin with definitions and types of associations described by the Third Sector Observatory (OTS). Thus, the TS is defined as a field of activity composed of private, non-profit organizations of public interest, known as civil society organizations (CSOs) (OTS, 2020).

One of the branches of the TS includes the so-called Non-Governmental Organizations (NGOs).

> The term is believed to have been first used in 1950 at the UN, referring to civil society institutions not linked to any government. In Brazil, NGOs are said to have emerged in the 1960s during the military regime, engaging in the struggle for the country's redemocratization.
> Following the political reopening in the early 1990s, they gained greater visibility due to the ECO 92 conference and the 1993 Movement for Ethics in Politics, which led to the Citizenship Action Against Hunger, Misery, and for Life, spearheaded by sociologist Herbert de Souza, known as Betinho (OTS, 2020, emphasis added).

Although they do not aim for profit, the TS moves billions and generates economic impact in Brazil and worldwide (ISFTSR, 2023). It is notable how NGOs are linked to causes such as human rights, the environment, health, popular education, etc., and operate in networks, maximizing the social actions to which they are dedicated. They work in partnership with governments, international or multilateral institutions, and private companies.

Currently, NGOs are referred to as "private non-profit entities" with a public purpose. However, the term NGO is not defined in Brazilian legislation, existing only in the form of associations or foundations. Nevertheless, the term NGO cannot be applied to all associations and foundations, even if they are private non-profit organizations, according to the new regulatory framework for civil society organizations (MROSC) (Law No. 13.019/2014) (PLATAFORMA MROSC, 2015). Thus, these organizations are distinguished from one another, as each type of social organization receives different designations under the MROSC.

Therefore, the current definition of NGO aligns with what Ioschpe (2005, p. 11) describes, recalling the thoughts of Ruth Cardoso, who stated that the [...] [TS] would be a space for participation and experimentation of new ways of thinking and acting on social reality. It is the emergence of a non-state public sphere and private initiatives with a public purpose. However, the [...] [TS] does not refer to a mass of homogeneous institutions (IOSCHPE, 2005).

According to Lacruz (2014), the role of the [...] [TS] is to represent the diverse interests of civil society, without replacing the role of public administration (both direct and indirect), nor inhibiting market entrepreneurship, aiming not at profit, but at direct and indirect results that benefit society.

In this way, the Caus Ambientalis Institute fits within these definitions.

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ENVIRONMENTAL AUDITS – FOCUSING ON SOCIO-ENVIRONMENTAL ISSUES

The word "audit" originates from the Latin audire, meaning "to hear" (CAZUMBÁ, 201?). Another interpretation suggests that the term derives from the Latin auditus, meaning "hearing" (ENAP, 2019). According to the National School of Public Administration, when we mention the term, it is important to recall its origins in the auditing tasks of Uruk in Mesopotamia around 3500 B.C., since:

> its emergence is likely related to changes in the way commercial activities were managed due to the growth at the time, the advent of urban life, and the emergence of writing, through which historians found evidence of ticks and other verification marks alongside numerical transaction records (ENAP, 2019, pp. 5–6, emphasis added).

This highlights how ancient the auditing process is and how it has evolved over the centuries, becoming highly relevant today. In the Dictionnaire Environnement (ACTU ENVIRONNEMENT, 2019), environmental auditing is defined as:

> Audit environnemental[7]
> L'audit environnemental désigne un instrument de gestion comprenant une évaluation systématique, documentée, périodique et objective de l'efficacité de l'organisation, du système de gestion et des procédures destinées à la protection de l'environnement.
> On distingue deux types d'audits: - Audits externes réalisés par des entités externes à l'entreprise auditée, à la demande ou pas de ladite entreprise, en appliquant ses propres critères quant à la portée, l'organisation et la réalisation de l'audit ou, au moins, quant aux deux derniers aspects. Audits internes réalisés par le personnel de l'entreprise ou par des entités externes à l'entreprise auditée, à la demande de ladite entreprise, et en appliquant des critères propres en ce qui concerne la portée, l'organisation et la réalisation de l'audit. (ACTU ENVIRONNEMENT, 2019).

According to authors such as DIAS (2020); FAVENI (2020); TAMARTHI (2019); ANTONOVZ (2014); SILVA & PRZYBYSZ (2014); MORAES & PUGLIESI (2014); MAZZAROTTO & BERTÉ (2013); PHILIPPI JR. & AGUIAR (2004); and SALES (2001), environmental auditing is understood as a management tool for process verification, control assessment, and organizational improvement. Furthermore, Barbieri (2007) defines it as a "multi-purpose instrument" to meet social demands from the public, government, and market.

Technically, the Brazilian National Environmental Council (Conama) Resolution No. 306/2002 defines Environmental Audit as:

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[7] Environmental Audit
An environmental audit is defined as a management tool that comprises a systematic, documented, periodic, and objective evaluation of the effectiveness of the organization, the management system, and the procedures intended for environmental protection.
There are two types of audits: external audits conducted by entities external to the audited company, whether requested by the company or not, applying their own criteria regarding the scope, organization, and execution of the audit—at least in terms of the latter two aspects. Internal audits are carried out by the company's personnel or by entities external to the audited company [contracted consultancies], at the company's request, and applying their own criteria regarding the scope, organization, and execution of the audit.

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> a systematic and documented verification process, carried out to obtain and objectively evaluate evidence to determine whether specified activities, events, management systems, and environmental conditions—or related information—are in compliance with the audit criteria established in this Resolution, and to communicate the results of this process (Conama, 2002, emphasis added).

According to the Brazilian Association of Technical Standards (ABNT), NBR 14010 outlines the criteria for auditing an organization, including the verification of: policies, practices, procedures, or requirements against which the auditor compares the evidence collected about the audit subject. Evidence is understood as verifiable information, records, or statements (ABNT, 1996).

However, it is important to note that this standard has become obsolete due to its incorporation into NBR 19011/2002, which has since been revised and updated in 2015 (ABNT, 2002; ABNT, 2015) and by the International Standard (ISO, 2018).

According to the International Organization for Standardization (2018), an audit is defined as:

> audit[8]
> systematic, independent and documented process for obtaining objective evidence […] and evaluating it objectively to determine the extent to which the audit criteria […] are fulfilled.
> Note 1 to entry: Internal audits, sometimes called first party audits, are conducted by, or on behalf of, the organization itself.
> Note 2 to entry: External audits include those generally called second and third party audits. Second party audits are conducted by parties having an interest in the organization, such as customers, or by other individuals on their behalf. Third party audits are conducted by independent auditing organizations, such as those providing certification/registration of conformity or governmental agencies (ISO, 2018).

Thus, audits are pragmatic methods that value practice over theory, seeking truth in concrete facts rather than in declared objectives expressed by organizations. In this way, audits are indispensable tools for managing third-sector organizations (DIAS, 2020; CAZUMBÁ, 201?).

METHODOLOGY

According to Thiollent & Silva (2007, p. 94), the "socio-environmental perspective presents and requires a systemic approach, not limited to the analysis of isolated variables, but rather one capable of grasping the whole and its parts in their relationships with the whole, recognizing the complexity that results from the interaction between the parts."

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[8] [It is a] systematic, independent, and documented process for obtaining objective evidence […] and evaluating it objectively to determine the extent to which the audit criteria […] are fulfilled.
Note 1: Internal audits, sometimes called first-party audits, are conducted by the organization itself or on its behalf. Note 2: External audits include those generally referred to as second- and third-party audits. Second-party audits are conducted by parties with an interest in the organization, such as clients, or by other individuals on their behalf. Third-party audits are conducted by independent auditing organizations, such as those that provide certification/registration of conformity or governmental agencies (ISO, 2018).

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Thus, our research was developed through field investigation, bibliographic surveys, and, consequently, the involvement and interaction with other social actors, such as members. It is characterized as an action-research project[9] (THIOLLENT & SILVA, 2007). It is considered applied in nature, aiming to analyze documentation (minutes, bylaws), records, internal controls (budgetary, financial, and asset balance sheets), external controls, institutional policy, etc., to support a simulation of an environmental audit as a teaching and learning process for the institute's leadership participants.

Our research was developed in at least four distinct and complementary phases:

a) <u>Bibliographic survey</u> in major databases such as Scielo, Capes Journals, and internet sites; b) <u>Visit to the institution, presentation, and reception of the proposal</u> in an extraordinary meeting, as well as a diagnosis and preliminary verification of documents, procedures, etc.; c) <u>Diagnosis of the level of technical knowledge about environmental auditing</u> possessed by the institute's leadership participants, through the application of a questionnaire with open and closed questions; d) <u>Conduct of in-person training</u> (using texts on the main topic—environmental auditing in the third sector—sourced from media networks, scientific articles, and short videos for discussion, debate, and expansion of knowledge on the importance of environmental auditing for non-profit associations); e) <u>Preparation and execution of a simulated environmental audit.</u> Finally, complementing this phase, the final audit report was prepared.

To this end, we consulted the main technical standards on environmental auditing, environmental legislation, and complementary manuals addressing environmental audit issues—specifically those focused on socio-environmental matters and applicable to the third sector.

All these phases were carried out between August 20, 2021, and May 30, 2022. However, while we were writing this article, the institute itself was undergoing internal transformations.

PROPOSALS AND INTERVENTIONS AT THE INSTITUTE

An initial survey was conducted to identify the level of knowledge that the institute's participating members had regarding environmental auditing. It was immediately evident that there were problems in both internal and external communications.

Faced with this situation, we developed and presented an audit proposal to the institute during a meeting. Once approved by the members, we proceeded to develop the information-gathering instruments

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[9] Action-research is a methodology that encompasses a broad set of research, teaching, outreach, evaluation, management, and planning methods and techniques, whose common denominator is the principle of participation, in various forms and degrees of intensity, by all actors involved in the problems they aim to solve. Thus, the research is conducted within a space of dialogue where the involved actors participate in identifying and solving the problems, each contributing with different types of knowledge. The proposal of a participatory methodology is not merely instrumental. It is based on a critique of unilateral methodology, a social critique of conventional scientific practices and their aspects of domination, ignorance, exploitation, or appropriation of popular or native knowledge.
(THIOLLENT & SILVA, 2007, p. 94)

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(questionnaire)[10] (THIOLLENT & SILVA, 2007), which were applied to participants from upper management, middle management, and operational levels. Only after this step did we advance to the subsequent phases.

Figure 1. Excerpt from the Questionnaire used for preliminary information gathering

This questionnaire is an important part of carrying out a research project that requires your contribution. Therefore, please answer the questions very carefully and with the utmost transparency, which will ensure the final quality of the work carried out and, consequently, will benefit the non-governmental institution Instituto Caus Ambientalis.

QUESTIONNAIRE 1 – APPLICATION TO PARTICIPANTS AND MEMBERS OF THE INSTITUTE (PLANNING PHASE)

1) Are you aware that the institution has a detailed organizational chart of the members' functions?
YES ( ) NO ( )

2) If there is an organizational chart, is it available and easily accessible to the general public?
YES ( ) NO ( )

3) Are you aware of a well-defined institutional environmental policy?
YES ( ) NO ( )

4) Are you aware if the institution's environmental policy is in line with public socio-environmental policies at the federal, state, and municipal levels?
YES ( ) NO ( )

5) If it is in line, which one(s) are you aware of? Briefly describe at least one of them.

_____
_____
_____

6) Are you aware if the institutional environmental policy is available for viewing by all types of audiences, such as visitors, collaborators, suppliers, consumers, stakeholders? Where? Describe.

Source: Author, 2021

Based on the analysis of the responses and exploration of the institution's website, we reviewed the programs and activities offered by the institute. This allowed for a more precise diagnosis of the current and actual state of its processes, procedures, and controls. With this information, we moved forward with the next phases of the research.

We then developed a schedule with practical actions in a motivational process (KNAPIK, 2011). For training purposes, we selected a series of texts[11] on consultancy and advisory services related to

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[10]A total of 11 questionnaires were administered among the 11 members, but only 81.2% of the members responded within the stipulated deadline for final submission.

Subsequently, with the diagnosis completed, we proceeded to analyze the responses and developed an activity framework to be carried out during the simulated audit. We then sought to reflect on the audit scope in accordance with the technical standards outlined in NBR 19011.

[11] A total of 17 technical and scientific articles were used, which explained what environmental auditing is and its level of importance for third-sector institutions, in addition to the technical standards that guide the environmental audit process, such as NBR ABNT 19011/2018 and CONAMA Resolution No. 306/2002.

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environmental auditing. These materials were sourced from commercial circuits, websites, and social media, and were distributed to members to support the educational process.

Due to the COVID-19 pandemic, a virtual meeting was held to facilitate debates, discussions, and clarifications on key points regarding what environmental auditing is, its purpose, importance, and why the institute should undergo such procedures. This enabled all members to acquire preliminary knowledge about environmental auditing, which was followed by a previously scheduled in-person training[12] session.

Grounded in andragogy[13] and the results-based learning approach proposed by Knowles, Holton III & Swanson (2005), the first in-person training session revisited the concepts of environmental auditing. Discussions reaffirmed the importance of implementing an audit process at the institute, based on prior knowledge acquired through guided readings. Additionally, the video "o que é auditoria ambiental?" [What is Environmental Auditing?][14] was presented to reinforce the content and concepts for all participants.

For this session, instructional material was prepared and distributed to participants, based on Bloom's taxonomy[15] which posits that individual learning spans cognitive, affective, and psychomotor domains through which information is absorbed (LOBO, 2021; SAE DIGITAL, 2023).

Members were then guided to carry out pre-established actions for verifying internal and external controls and to begin developing inventories that had previously been found to be nonexistent, as indicated by the questionnaire responses.

Subsequently, inspections of the institute's assets, products, and services were initiated to assess quantity and quality, and inventories were created to ensure awareness among all members. The library and books were reviewed, along with the quantity and types of donated materials and electronic equipment, educational and consumable materials available for classes and other activities. Fixed assets were also recorded, such as audiovisual equipment, tools for plant and green area maintenance, vehicles, etc., as well as the planting of seedlings and species typology—elements that comprise the institute's entire patrimony.

Thus, surveys were conducted and inventories were structured for: Real estate (infrastructure and buildings); Furniture (audiovisual equipment – computers, projectors, speakers, etc.); Donations (quantity

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[12] Two sessions were held, one in December 2021 and the other in January 2022, in accordance with the established schedule, though only partially adhering to it. Due to year-end events and other commitments previously scheduled by the auditee—but not officially communicated—the initial training dates had to be adjusted, rescheduled, and consequently the work was carried out at later times, which in fact affected the report delivery deadline.

[13] It is a set of adult learning principles that apply to all adult learning situations. The goals and purposes for which the learning is offered are a separate matter.

[14] Available at: https://m.youtube.com/watch?v=A-FgOkC6bGM

[15] Bloom's Taxonomy is a classification of educational objectives developed by Benjamin S. Bloom, which divides learning into three categories. Each level is more complex and specific than the previous one, beginning with the cognitive domain of information, followed by the affective domain, which involves understanding, and finally the psychomotor domain, which is the application of what was actually learned. (LOBO, 2021)

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and quality, including those resulting from sales); Products developed, produced, and sold by the institute (accessories, objects, pens, mugs, t-shirts, etc.).

Additionally, an inventory of Atlantic Forest and exotic plants (seedlings and plants in early and advanced stages of development—comprising a highly relevant biological asset)[16] was created. This inventory is particularly important, as environmental impacts may occur in loco due to adopted (or neglected) procedures, requiring monitoring and evaluation (GARCIA, 2014). Finally, an inventory of services provided to the public (actions, activities, and programs conducted by ICA) was compiled.

During the second training session, discussions on the importance of auditing were resumed, and procedures initiated by participants in the previous session were revisited. New members who had not attended the first session were engaged in the process. Two additional videos were watched: "What are active environmental assets?" and "What is environmental accounting?"[17], which complemented the first video and deepened reflection on the importance and functionality of environmental auditing for the institute.

These educational procedures were necessary because the institute reproduces Atlantic Forest vegetation in the region. These are biological assets that must be partially accounted for through environmental accounting (ANTONOVZ, 2014), which should also be directly linked to the institute's financial and asset accounting.

Next, we developed an activity framework for the simulated environmental audit. This was based on a preliminary set of documents submitted by upper management, which could define the audit's scope, objectives, and purpose, as outlined in NBR 19011/2015 and ISO 19011:2018. With the digitized documents in hand and after a preliminary analysis (MORAES & PUGLIESI, 2014, p. 119), we began formulating the audit scope according to the needs of the auditee.

After informing the auditee about the types of controls and verifiable information to be reviewed, we selected the items that would comprise the scope of the simulated environmental audit. A total of seven items were chosen, including basic accounting and inventories of furniture, plants and seedlings, audiovisual equipment, among others.

We then developed the audit scope and plan based on NBR ABNT 19011/2018, using a checklist model (MORAES & PUGLIESI, 2014; BISWAS, 2020; KLASTON MANAGEMENT, 2022). A team was formed to carry out the verification of the items to be audited.

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[16] These assets are part of environmental accounting (ANTONOVZ, 2014), which must ensure the recording of sales, income generation, and profits that should be accounted for and returned to the institute, being reinvested throughout the entire chain of goods, services, and other products.
[17] Available at: https://youtu.be/1pVo6Br2o0k and https://youtu.be/i8D3NGsjMDs respectively.

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AUDITED	INSTITUTO CAUS AMBIENTALIS [CAUS AMBIENTALIS INSTITUTE]
"AUDITOR"	MARCOS SCARPIONI
"AUDIT TEAM"	MARCOS SCARPIONI;
TYPE OF AUDIT	FIRST PARTY (INTERNAL/INDEPENDENT)
SCOPE OF THE ENVIRONMENTAL AUDIT	The first-party audit (internal and independent) aims to investigate, verify, and identify the control mechanisms existing in the institution, so that both legally and in practice there is transparency, efficiency, effectiveness, and efficacy in its actions, activities, programs, products, goods, and services provided to the public community, both in the city of Rio Grande da Serra and in the Greater ABC Paulista Region.
OBJECTIVES OF THE ENVIRONMENTAL AUDIT	This audit aims to present to the members of the institute how the procedures of an environmental audit take place, what procedures are adopted, and which items are inspected as internal and external controls, thus enabling the members' instrumentalization, interacting with the various inventories, thereby contributing to the improvement of the institution's procedures, processes, goods, and services.
ELEMENTS TO BE AUDITED	Verification of basic accounting (budget, financial statements, etc.) Verification of the inventory of plants and seedlings Verification of the inventory of donations Verification of the inventory of furniture Verification of the inventory of real estate Verification of the financial control inventory Verification of environmental liabilities

Source: Author, 2022.

Figure 3. Brief excerpt from the Checklist used in the Independent Environmental Audit

Source: Adapted from Klaston Management (2022) and prepared for this research by the author, 2022

It is true that other inventories—such as those of products developed, produced, and sold by the institute (accessories, objects, pens, mugs, t-shirts), and services provided to the public (actions, activities, and programs)—were not verified. These are still in the process of being developed and may provide equally valuable information on how the institute manages its various resources to deliver services and meet social demands..

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RESULTS AND DISCUSSION

As a result of the research, we observed that although previous studies had referenced the use of process control methodologies such as the PDCA cycle and SWOT analysis, these were not being applied in the institute's current operations. The procedures had not been maintained.

However, the project led to the creation of nine new internal control systems (inventories). Although the institute already had accounting control (financial balance sheets), which were presented to members by an external accounting firm as a form of compliance, the new actions increased awareness among members regarding their responsibility for accountability and transparency—both internally and in communication with stakeholders.

After conducting the environmental audit, a final environmental audit report was prepared and presented to the auditee for analysis and decision-making regarding the correction, control, and improvement of identified nonconformities (MORAES & PUGLIESI, 2014; SILVA, 2021).

This feedback provided the institution with findings, evidence, conformities, and nonconformities, offering its managers what Silva (2021) calls a "snapshot" of how operational processes are occurring, enabling adjustments and improvements in preparation for future inspections aimed at obtaining environmental quality certifications.

It was noted that internal control procedures are still very incipient, with many nonconformities. The evidence collected and recorded during the simulated environmental audit clearly shows that numerous actions will be necessary to improve procedures and processes.

Therefore, it is evident that this NGO needs to organize itself to generate transparency and promote greater credibility. In fact, regarding active transparency, there is a glaring lack of document presentation to fulfill legal obligations (Rodrigues, Seara & Teixeira, 2021), a reality observed in many other institutes—not just this one.

CONCLUSIONS

After completing the entire process of conducting an environmental audit, it can be concluded that the in-person training of participants resulted in an effective and successful experience at the institute. There was a noticeable concern among members with learning more about records, control mechanisms, and inventories. Indeed, members were surprised by the number of items, assets, products, and services that needed to be cataloged and inventoried to enable the verification of asset, financial, and budgetary balances directly related to them.

It was also evident from participants' comments and discussions that the proposed environmental audit (even though simulated) already provides significant benefits in understanding specific legislation related to the third sector, environmental law, and the environmental assets held by the institute—assets

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that, until then, were not fully understood, particularly in terms of environmental accounting for environmental assets.

During the simulated environmental audit, numerous nonconformities were observed and recorded. The most prominent of these was the absence of an institutional environmental policy directed at the general public. This is a major nonconformity. The institution needs—and is obligated—to present its vision, values, and mission to its members, collaborators, donors, and volunteers (stakeholders) through an environmental policy. This policy should be visibly displayed, preferably at the entrance of the institute, on bulletin boards, or on signage, as described in technical standards. It should also be disseminated through any means that allows visitors and participants to quickly and accessibly understand what the institution offers or proposes to those who require its goods, products, and services.

However, despite the success in conducting diagnostics, structuring documentation and inventories, and executing the environmental audit, weaknesses in the process were still observed. Even with coordination among the organization's operational levels, upper management remains the primary driver of actions. It was noted that within the collective mindset of this group, only upper management is perceived as having the authority to make decisions regarding internal and external control actions.

Therefore, it is necessary to increasingly foster understanding of leadership, good practices in proactive, participatory, and democratic management, and clarify that the third sector follows a different managerial logic—one that is more egalitarian. For upper management, it will be essential to conduct many more future and ongoing training sessions to achieve the goal of environmental certification.

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APPROACH TO PRESUPPOSITIONS AND IMPLICIT MEANINGS IN THE PORTUGUESE LANGUAGE EXAM OF ENEM 2019

Damarys Alves da Silva Barbosa[1] and Marcia Barbosa de Moura[2]

ABSTRACT

This article aims to analyze questions from the Portuguese Language section of the 2019 edition of the National High School Exam (ENEM) in order to understand how inferences, through presuppositions and implied meanings, are explored in the exam. The focus is on analyzing how inferences present in questions based on the poem genre are employed in the test. The research is bibliographic in nature, descriptive in approach, and is based on the works of authors such as Koch (2011), Grice (1982), Ducrot (1987) and Marcuschi (2010). The results indicate that inferences play an important role in the construction of poetic texts, as there is information that does not need to be explicitly stated, given that readers are expected to identify it through their world or cognitive knowledge. The exam requires students to have reading skills, as the questions are always presented in a contextualized manner. It is emphasized that, to understand questions related to the poem genre, students must grasp the inferential processes that underlie reading skills in poetic texts.

Keywords: Inferences; Portuguese Language; ENEM.

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[1] Master's student in Language Studies
UFPI
E-mail: profadamarys@gmail.com
[2] Master's student in Language Studies
UFPI
E-mail: marciaportugues4@gmail.com

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INTRODUCTION

The National High School Exam (hereafter, ENEM) is a means of assessing the academic performance of students in the final years of Basic Education. The exam is conducted annually by the National Institute for Educational Studies and Research Anísio Teixeira (Inep), a federal agency linked to the Ministry of Education (MEC). The score obtained in this exam allows students to enter higher education institutions through programs such as the Unified Selection System (SiSU), the University for All Program (ProUni), and the Student Financing Fund (Fies). Additionally, the results serve as important educational indicators.

This article aims to analyze questions from the Portuguese Language section of ENEM 2019, with the intent of identifying the pragmatic perspectives under which presuppositions and implied meanings are explored in the exam. It seeks to understand how ENEM incorporates presuppositions and implied meanings in the statements of questions involving the poem genre, with the purpose of evaluating candidates' comprehension in the Portuguese Language test.

The study is grounded in Pragmatics, a branch of Linguistics that emerged from the concern to understand language interaction in use, or more precisely, the science dedicated to investigating language beyond what is literally and explicitly expressed in utterances (DUCROT, 1987).

Pragmatics plays a fundamental role among linguistic theories in understanding the conversational rules proposed by Paul Grice (1982), who reflected on how speakers manage to convey more than what they literally express. For this interaction to occur efficiently, language users must follow certain usage rules.

In this study, two types of pragmatic implicatures — presuppositions and implied meanings — will be analyzed in the statements of ENEM 2019, specifically in questions involving the poem genre. Presuppositions, according to Ducrot (1987, 1988), constitute a form of discursive construction that employs narrative strategies to persuade the interlocutor about content not explicitly stated, using polyphonic resources. Thus, the utterance presents not only a literal meaning but also an implicit one. Implied meanings, in turn, correspond to pragmatic inferences, configured as indirect speech acts.

The research is bibliographic in nature and, in terms of approach, is descriptive. The theoretical foundation is based on Grice (1982), Ducrot (1987), Koch and Elias (2011), among others. Analyses are conducted on questions involving the poem genre, aiming to promote reflection on the pragmatic aspects — presuppositions and implied meanings — present in these texts in ENEM 2019.

The relevance of this research lies in its contribution to studies on inferences in the Portuguese Language, potentially expanding knowledge about the pragmatic mechanisms used in language. Furthermore, considering that ENEM candidates must be adequately prepared to understand

contextualized questions, it is essential that they comprehend how the exam mobilizes presuppositions and implied meanings in its statements.

READING AND PRAGMATICS IN THE TEXT

It is well known that education in Brazil requires improvements, especially regarding access to schooling. According to the 2018 Continuous National Household Sample Survey (PNAD Contínua), the illiteracy rate among individuals aged 15 and older was estimated at 6.8% (11 million illiterate people). In 2019, this rate dropped to 6.5%, representing a reduction of only 0.2 percentage points, which corresponds to just over 200,000 fewer illiterate individuals. Thus, although the number of "non-literate" people has decreased, there remains a long path to ensuring that formal education is a right accessible to all citizens.

Santos and Mendonça (2007), when discussing literacy and reading proficiency, emphasize that the study of the linguistic system continues to be essential for the development of reading skills.

> It is understood that, for the formation of competent readers and writers, interaction with various textual genres based on diverse communication contexts is crucial. It is the school's responsibility to facilitate this interaction by creating activities that prompt students to read and produce different types of texts. On the other hand, it is imperative that students develop autonomy in reading and writing their own texts. Therefore, schools must ensure, from an early age, that children acquire the alphabetic writing system. This acquisition does not occur spontaneously for most individuals, even with exposure to various texts. A systematic approach to reflecting on the characteristics of our alphabetic writing system is necessary (SANTOS; MENDONÇA, 2007, p. 19).

Reading is a complex activity that demands attention. To become a reader, individuals must master the alphabetic writing system and, additionally, develop the linguistic system in a reflective manner. However, it is important that reading practices are introduced to exercise this activity, which, as is known, does not always occur spontaneously.

To effectively read a text, specific skills are required, as explained by Koch and Elias (2006, p. 11):

> [...] a highly complex interactive activity of meaning-making, which is evidently based on the linguistic elements present on the textual surface and its organizational form, but also requires the mobilization of a vast array of knowledge within the communicative event.

Reading is not a simple activity and, for this reason, is not efficiently practiced by many Brazilians. It is important to highlight that studying the linguistic system, as well as its reflective developments, helps readers understand and utilize linguistic strategies to their advantage. Thus, knowledge of language studies is fundamental.

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According to Marcondes (2005), these studies go beyond understanding word meanings, syntactic structure, and the truth value of sentences. In this regard, Pragmatics encompasses more than what is explicitly stated and is concerned with enabling the analysis of language through speech acts. As Austin (1962) asserts, speech acts are elementary units in the constitution of language use and comprehension. Therefore, pragmatic studies are necessary to aid in the understanding of various utterances.

Dascal (1982) suggests two contexts for the emergence of Pragmatics. The first is that the term "pragmatics" is closely linked to the linguistic branch of "semiotics" or "semiology," a science shaped by the studies of Saussure (1916) and Charles Peirce (1931–1958). The second origin, as noted by Dascal, refers to Saussure's recognition of langue as the object of linguistic study, which allowed parole to be examined by other sciences, such as Pragmatics, which aims to investigate language in use by its interlocutors. It is in this context that Peirce establishes the user as an interlocutor.

In this framework, Pragmatics is considered a stage of linguistic analysis, focusing on the relationship between the sign, what it represents, and for whom it represents. Over the years, Pragmatics has continued to be studied, and its theories have been applied to understanding language use, which was initially overlooked in early linguistic studies, including those of Saussure and his predecessors.

Pragmatic studies encompass important means of understanding language, as Pragmatics proposes a linguistic analysis of utterances that may communicate more than what is literally stated, as declared by researcher Paul Grice (1982 [1967]), who questioned how utterances can convey more than their literal meaning.

According to Grice (1982 [1967]), for utterances to communicate beyond their literal meaning, speakers must follow certain rules so that listeners can understand the additional information presented in the interaction. From this idea arises the "cooperative principle" in pragmatic studies, developed by Grice, who established four categories with maxims and submaxims:

1. Quantity: related to the amount of information;
2. Quality: related to truthful information;
3. Relation: which must be relevant;
4. Manner: which must be clear.

All these must occur for effective and successful interaction. According to the author, the violation of any maxim generates conversational implicatures, which are specific pragmatic implicatures.

Regarding implicatures, Ducrot (1987) identifies two types of linguistic implicatures: presuppositions and implied meanings. This study proposes the analysis of these two pragmatic implicatures in the statements of ENEM 2019, specifically in questions involving the poem genre.

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UNDERSTANDING INFERENCES: PRESUPPOSITIONS AND IMPLIED MEANINGS IN THE POEM GENRE

In poetry, words are used in a denotative manner and adapted to the needs of rhythm, yet they acquire diverse meanings depending on the treatment given by the poet (CÂNDIDO, 1996).

Thus, comprehension and interpretation require certain competencies and skills from the individual regarding the structure of language functioning in the social environment, such as understanding how the conditions of production are organized (BNCC, 2017). This gives rise to the need to teach and learn systematic interpretation:

> Requirements: not to focus exclusively on form or content, not to use standards foreign to the poem. Not to speak of oneself, but of the work—that is, not to project onto it personal feelings and ideas evoked by its suggestion, but to seek to extract those contained within it (p. 18). Rules: "(...) learn to read, know how to listen, pay attention to all the particularities" (CÂNDIDO, p. 18, 1996).

Therefore, interpretation requires the reader to delve into the text, understanding the language appropriate to the subject matter, its internal structure, and its peculiar structural norms—in other words, recognizing the textual genre and its entire formation.

However, analysis practically entails a purely commentative aspect, which involves gathering data external to poetic emotion, especially historical and social data—that is, world knowledge. Additionally, it includes a more interpretative aspect, which is the actual analysis: the analytical breakdown of internal elements of the poem, especially those related to its phonetic and semantic construction, resulting in a decomposition of the poem into elements, reaching the finest details (CÂNDIDO, 1996).

As a suggestive procedure for reading the poem genre, Marcuschi presents several measures regarding comprehensive text study:

> The first concerns identifying the central ideas of the text, as well as the possible intentions of the author. Next come inferential questions and statements, in which the author proposes a set of questions that, to be answered, require the student to infer using information found within or outside the text. He also suggests a special treatment of the text starting from the title, since it helps the reader make a series of assumptions about the subject addressed in the text under study. Working with text titles "is a good way to perceive how a contextual and ideological universe is constructed for texts even before reading them" (MARCUSCHI, 2001, p. 57).

Thus, it is understood that interpretative analysis of a poem requires the use of reading strategies and the application of extralinguistic knowledge. According to Marcuschi (2010, p. 157), "the comprehension of a text cannot be separated from the recognition of the genre to which it belongs."

According to Marcuschi:

> The variety of genres should be explored in school not only as content to be taught, but as a means of developing students' ability to deal with different forms of language use, promoting a critical and situated reading of texts (MARCUSCHI, 2010, p. 158).

In addition to understanding genres, for interaction between these elements to occur, it is necessary to comprehend the inferences present within the poem.

Koch (2007, p. 30) argues that:

> [...] a text constitutes itself as such at the moment when the participants in a global communicative activity, faced with a linguistic manifestation, through the joint action of a complex network of situational, cognitive, sociocultural, and interactional factors, are able to construct a specific meaning for it.

From this conception of text, meaning is not in the text but is constructed from it during the course of interaction. In this context, readers are seen as active agents.

A presupposition can be defined as inferential information from the utterance of a sentence (MOURA, 1999, p. 13). An implied meaning is another important aspect in the process of constructing meaning in a text, because when information is not stated, but everything that is said leads us to identify it, we are dealing with something implied or inferable. Thus, to capture implicatures, the reader must infer.

There are linguistic elements that trigger presuppositions, such as factive verbs, temporal expressions, cleft sentences, among others (MOURA, 1999). All of these mark the presupposition in the sentence.

The implied meaning differs from the presupposition in an important aspect: the presupposition is a given considered indisputable by both speaker and listener, and is not meant to be contested; the implied meaning is the responsibility of the listener, as the speaker, by leaving the information implicit, may hide behind the literal or polysemic meaning of the words, or even the circumstantial context, and may claim not to have intended to affirm what the listener inferred (DUCROT, 1987).

Therefore, in reading and interpreting a text, it is important to detect presuppositions and implied meanings, as they constitute argumentative resources used to lead the listener or reader to accept what is being communicated.

PRESUPPOSITIONS AND IMPLIED MEANINGS IN POEM GENRE QUESTIONS IN THE ENEM 2019 EXAM

ENEM has been conducted by INEP since 1998. Over the years, the exam has undergone several changes, such as updates to scoring parameters, including the criteria for evaluating essays.

The exam requires candidates to possess reading skills; therefore, strategic processing depends not only on textual characteristics but also on the characteristics of language users, such as their goals, beliefs, and world knowledge (KOCH, 2005). Thus, the statements are always presented in a

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contextualized manner. It is emphasized that, to understand questions in the poem genre, candidates must grasp the inferential processes that govern reading skills in this genre.

Let's take a look at the following image: (Original document in Portuguese)

Questão 14

A viagem

Que coisas devo levar
nesta viagem em que partes?
As cartas de navegação só servem
a quem fica.
Com que mapas desvendar
um continente
que falta?
Estrangeira do teu corpo
tão comum
quantas línguas aprender
para calar-me?
Também quem fica
procura
um oriente.
Também
a quem fica
cabe uma paisagem nova
e a travessia insone do desconhecido
e a alegria difícil da descoberta.
O que levas do que fica,
o que, do que levas, retiro?

MARQUES, A. M. In: SANT'ANNA, A. (Org.). **Rua Aribau.**
Porto Alegre: Tag, 2018.

A viagem e a ausência remetem a um repertório poético tradicional. No poema, a voz lírica dialoga com essa tradição, repercutindo a

Ⓐ saudade como experiência de apatia.

Ⓑ presença da fragmentação da identidade.

Ⓒ negação do desejo como expressão de culpa.

Ⓓ persistência da memória na valorização do passado.

Ⓔ revelação de rumos projetada pela vivência da solidão.

Source: file:///C:/Users/Usu%C3%A1rio/Downloads/ENEM%202019%20PROVA.pdf
(Unofficial English translation provided for reference only.)
Question 14

The Journey

What things should I take
on this journey in which I leave?
Navigation charts only serve
those who stay behind.
With what maps can I uncover
a missing
continent?
A stranger to your body
so familiar
how many languages must I learn
to silence myself?
Those who stay
also seek
an Orient.
And those
who stay
deserve a new landscape
and the unbroken crossing of the unknown

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and the hard joy of discovery.
What do you carry of what remains,
what, of what you carry, do I leave behind?

— Marques, A. M. In: Sant'Anna, A. (Org.), Rua Arriba. Tag, 2018.

The journey and absence refer to a traditional poetic repertoire. In the poem, the lyrical voice dialogues with this tradition, reflecting

a) longing as an experience of apathy.

b) the presence of identity fragmentation.

c) the denial of desire as an expression of guilt.

d) the persistence of memory in valuing the past.

e) the revelation of new directions projected by the experience of solitude.

In this question, the verb "remetem" (refer) activates the presupposition that travel and absence have already been highlighted, which indeed occurs within the poem's text. Additionally, the adjective "tradicional" (traditional) leads to the inference of a structure familiar to the candidate, since the verb "dialogar" (dialogue) activates the presupposition that the lyrical voice belongs to the traditional style of poetry.

In the first and second verses of the poem, presupposition triggers such as the verb "levar" (to take) and the adverbial phrase "em quais partes" (in which parts) are present. These relate to the question's statement, establishing inferences with the words "viagem" (journey) and "ausência" (absence). Regarding the verb, one may presuppose that it refers to carrying objects, knowledge, or emotions. As for the adverbial phrase, one may infer that it refers to the traveler's thoughts or the means of transport. Thus, the question's sentence contains elements that prompt the reader to infer the presupposition (MOURA, 1999, p. 13).

It is through these inferences that the candidate arrives at the correct answer. The poem's title already presupposes the idea of exploration and suggests a journey—be it recreational, emotional, or spiritual. However, upon reading the answer choices, it becomes clear that a romantic breakup brings solitude to the lyrical voice. Consequently, the state of abandonment and loneliness leads the lyrical subject to seek new paths: languages to learn, a search for the East or new landscapes, crossings, and discoveries. The correct answer is option E. Thus, the candidate reaches the answer by making inferences about presuppositions and implied meanings.

These inferences make it clear that ENEM participants must understand the functionality of expressions within the poem. Moreover, to facilitate comprehension, it is necessary to relate these expressions to information outside the text—that is, to implied meanings. In this question, the statement "In the poem, the lyrical voice dialogues with this tradition" (ENEM, 2019) prompts the candidate to

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refer to extralinguistic context, as they must know which tradition is being referenced. Therefore, attention must be paid to the poem's authorship and writing style, as these elements aid in understanding the implied meaning (CÂNDIDO, 1996). However, according to Ducrot (1987), implied content is not marked in the sentence but is explained through the interpretative process.

It is thus implied that the poem interrelates with classical Portuguese literature—adventure, navigation, longing, and the unknown—which poetically reflects the historical role of the Portuguese during the Age of Discovery. This historical context shaped the identity of the Portuguese state and spread Portuguese culture and language. In this sense, "tradition" refers to this literary and historical framework. It is a journey of exploration, with the destination yet to be discovered and analyzed. The poem's author focuses on her own subjectivity and uses it as a guide through the world.

Let's observe the following question: (Original document in Portuguese)

Questão 22

Uma ouriça

Se o de longe esboça lhe chegar perto,
se fecha (convexo integral de esfera),
se eriça (bélica e multiespinhenta):
e, esfera e espinho, se ouriça à espera.
Mas não passiva (como ouriço na loca);
nem só defensiva (como se eriça o gato);
sim agressiva (como jamais o ouriço),
do agressivo capaz de bote, de salto
(não do salto para trás, como o gato):
daquele capaz de salto para o assalto.

Se o de longe lhe chega em (de longe),
de esfera aos espinhos, ela se desouriça.
Reconverte: o metal hermético e armado
na carne de antes (côncava e propícia),
e as molas felinas (para o assalto),
nas molas em espiral (para o abraço).

MELO NETO, J. C. **A educação pela pedra**. Rio de Janeiro: Nova Fronteira, 1997.

Com apuro formal, o poema tece um conjunto semântico que metaforiza a atitude feminina de

Ⓐ tenacidade transformada em brandura.
Ⓑ obstinação traduzida em isolamento.
Ⓒ inércia provocada pelo desejo platônico.
Ⓓ irreverência cultivada de forma cautelosa.
Ⓔ desconfiança consumada pela intolerância.

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(Unofficial English translation provided for reference only.)
Question 22

A Female Hedgehog

If from afar it sketches a near approach,
it closes (a convex sphere complete),
it bristles (plebeian and full of spines):
and, sphere and spines, it waits bristling.
But not passive (like an owl in its hollow):
nor only defensive (like the bristling cat);

but aggressive (unlike the hedgehog ever),
capable of striking, of leaping
(not leaping backward, like the cat):
a leap suited for the assault.

If the one from afar finally comes near,
she sheds her spines, disarms herself.
She reconverts: the hermetic metal
becomes again flesh (concave and welcoming),
for feline springs (fit for attack),
spiraled springs (ready for embrace).

MELO NETO, J. C. Education by Stone. Rio de Janeiro: Nova Fronteira, 1997.

With formal precision, the poem weaves a semantic set that metaphorizes the feminine attitude of

   a) tenacity transformed into gentleness.

   b) obstinacy translated into isolation.

   c) inertia caused by platonic desire.

   d) irreverence cultivated cautiously.

   e) mistrust consummated by intolerance.

In this question, the statement uses the term "formal", which presupposes that there are poems with different structures that do not form a semantic set metaphorizing the feminine attitude.

Regarding the implied meaning in the statement, the candidate must understand what it means to "metaphorize the feminine attitude". To do so, they must grasp the context of the statement's production and the meaning of "metaphorize". This requires activating both linguistic and world knowledge.

It is believed that the candidate, upon encountering this question, will recognize from the structure of the text that it is a poem by João Cabral de Melo Neto. The author employs a chaining of linguistic elements in the poem. As Ducrot (1987, p. 37) points out:

> "If a sentence presupposes X, and an utterance of that sentence is used in a discursive chain—for example, when one argues from it—it chains with what is stated, not with what is presupposed."

This chaining criterion is used to test the presuppositions of sentences that require context for determination. It is, therefore, a way to continue the discourse.

Right in the poem's title, the author uses a word that does not exist as a feminine noun: "ouriça", which resembles "ouriço" (hedgehog), an animal. Thus, we infer the analogy used by the poet.

In the first verses, the candidate must rely on their world knowledge to understand what is presupposed and what is implied. As Moura (1999, p. 30) explains, "the determination of the presupposition depends on context," meaning that world knowledge must be activated to relate the verses to the context. In the first verse, "Se o de longe" (If the one from afar), the reader may infer "the one from afar" as someone unknown and presuppose that someone is distant. In the next verse, "esboça lhe chegar

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perto" (sketches approaching), the presupposition is triggered by the verb "esboçar" (to sketch), which implies planning.

The conditional conjunction "se" (if) introduces a necessary condition for an event to occur or not occur, with the result expressed in the following verses. Thus, it is presupposed that if someone from afar plans to approach, there will be a consequence, which is presented in verses three and four, describing the attitude of "a ouriça".

The verses "se fecha (convexo integral de esfera)" (closes itself [complete convex sphere]) and "se eriça (bélica e multiespinhenta)" (bristles [warlike and multi-spiked]) are chained from a presupposition. They focus on what is stated, as Ducrot (1987) posits. "Fechar" (to close) can be interpreted as hiding, and "eriçar" (to bristle) as becoming harsh. Thus, "a ouriça" reacts to the arrival of a stranger by closing off and becoming harsh. The subsequent verses continue this chain of ideas, describing "a ouriça's" attitude.

In verses six and seven, "mas não passiva (como ouriço na loca) nem só defensiva (como se eriça o gato)" (but not passive [like a hedgehog in its den] nor merely defensive [like a bristling cat]), the presupposition is activated by the negations "não" and "nem", presupposing that the feminine attitude is neither passive nor defensive. This is affirmed in verse eight: "sim agressiva (como jamais o ouriço)" (yes, aggressive [like never the hedgehog]), with the presupposition reinforced by the explanation in parentheses and the adverb "jamais" (never). It is thus presupposed that the hedgehog is not as aggressive as "a ouriça".

It is important to note that the term "ouriça" does not exist in the Portuguese lexicon but is used analogically to animalize the human being—in this case, the woman. The feminine figure is inferentially understood as "a ouriça", along with her described traits.

After reading the poem, the candidate must answer the question. The exam confirms the metaphorical composition of the poem, where such metaphors describe the feminine figure. The complexity of the statement is evident, requiring participants to understand the linguistic code and associate the statement with the poem's subjective aspects. Thus, the correct answer is the first option.

The statement works with presuppositions about the poem. Therefore, the candidate must identify these presuppositions to answer the question. The implied meaning is present in the poem but not in the statement, which presupposes that the candidate understands the metaphors used—metaphors that can only be fully understood if the candidate knows how to relate what is implied.

Let us look at the next question: (Original document in Portuguese)

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Essa lua enlutada, esse desassossego
A convulsão de dentro, ilharga
Dentro da solidão, corpo morrendo
Tudo isso te devo. E eram tão vastas
As coisas planejadas, navios,
Muralhas de marfim, palavras largas
Consentimento sempre. E seria dezembro.
Um cavalo de jade sob as águas
Dupla transparência, fio suspenso
Todas essas coisas na ponta dos teus dedos
E tudo se desfez no pórtico do tempo
Em lívido silêncio. Umas manhãs de vidro
Vento, a alma esvaziada, um sol que não vejo

Também isso te devo.

HILST, H. **Júbilo, memória, noviciado da paixão**.
São Paulo: Cia. das Letras, 2018.

No poema, o eu lírico faz um inventário de estados passados espelhados no presente. Nesse processo, aflora o

Ⓐ cuidado em apagar da memória os restos do amor.
Ⓑ amadurecimento revestido de ironia e desapego.
Ⓒ mosaico de alegrias formado seletivamente.
Ⓓ desejo reprimido convertido em delírio.
Ⓔ arrependimento dos erros cometidos.

Source: file:///C:/Users/Usu%C3%A1rio/Downloads/ENEM%202019%20PROVA.pdf

(Unofficial English translation provided for reference only.)
Question 39

That mourning moon, that restlessness
The inner convulsion, faint
Within solitude, a dying body
All this I owe you. And so vast were
The planned things, ships,
Ivory walls, broad words
Consent always. And it would be December.
A jade horse beneath the waters
Double transparency, a suspended thread
All these things at your fingertips
And everything dissolved in the portico of time
In livid silence. Some glass mornings
Wind, an emptied soul, a sun I cannot see

This too I owe you.

HILST, H. Jubilation, Memory, Novitiate of Passion.
São Paulo: Companhia das Letras, 2018.

In the poem, the lyrical self does an inventory of past states mirrored in the present. In this process, emerges

a) the care to erase from memory the remains of love.

b) maturity coated with irony and detachment.

c) a mosaic of joys selectively formed.

d) a repressed desire turned into delirium.

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e) regret for the mistakes committed.

In the analyzed question, the statement includes the verb "faz" (does), which activates the presupposition of habitual action. Upon examining the poem, the expression "isso te devo" (I owe you this) carries a potentially ironic tone, as the lyrical voice indicates, through it, negative feelings—expressed by "desassossego" (restlessness), "alma esvaziada" (emptied soul), etc.—caused by the interlocutor.Additionally, the poem reveals the lyrical subject's emotional maturation resulting from these experiences and a sense of detachment from the person with whom they had an emotional bond.

From this interpretation, the correct answer is option B. To reach this understanding, the reader must recognize that the expressions "desassossego" in the first verse and "solidão e morrendo" (loneliness and dying) in the third verse activate presuppositions of sadness and absence. Thus, verbs and adjectives serve as markers of presupposition in the statement (MOURA, 1999).

However, in the analysis of this particular statement, no implied meaning was identified, as comprehension was based solely on the poem and the statement itself.

Let's look at a further question: (Original document in Portuguese)

Questão 45

Irerê, meu passarinho do sertão do Cariri,
Irerê, meu companheiro,
Cadê viola? Cadê meu bem? Cadê Maria?
Ai triste sorte a do violeiro cantadô!
Ah! Sem a viola em que cantava o seu amô,
Ah! Seu assobio é tua flauta de irerê:
Que tua flauta do sertão quando assobia,
Ah! A gente sofre sem querê!
Ah! Teu canto chega lá no fundo do sertão,
Ah! Como uma brisa amolecendo o coração,
Ah! Ah!
Irerê, solta teu canto!
Canta mais! Canta mais!
Prá alembrá o Cariri!

VILLA-LOBOS, H. Bachianas Brasileiras n. 5 para soprano e oito violoncelos (1938-1945). Disponível em: http://euterpe.blog.br. Acesso em: 23 abr. 2019.

Nesses versos, há uma exaltação ao sertão do Cariri em uma ambientação linguisticamente apoiada no(a)

Ⓐ uso recorrente de pronomes.
Ⓑ variedade popular da língua portuguesa.
Ⓒ referência ao conjunto da fauna nordestina.
Ⓓ exploração de instrumentos musicais eruditos.
Ⓔ predomínio de regionalismos lexicais nordestinos.

Source: file:///C:/Users/Usu%C3%A1rio/Downloads/ENEM%202019%20PROVA.pdf
(Unofficial English translation provided for reference only.)
Question 45

Irerê, my little bird from the backlands of Cariri,
Irerê, my companion,

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Where's the guitar? Where's my love? Where's Maria?
Oh, sad fate of the singing minstrel!
Ah! Without the guitar on which he sang his love,
Ah! Your whistle is your Irerê flute:
That flute of the backlands when it whistles,
Ah! We suffer without wanting to!
Ah! Your song comes from deep in the backlands,
Ah! Like a breeze softening the heart,
Ah! Ah! Ah!

Irerê, release your song!
Sing more! Sing more!
To remember Cariri!

VILLA-LOBOS, H. Bachianas Brasileiras No. 5 for soprano and eight cellos (1938–1945). Available at: http://euterpe.blog.br. Accessed: Oct 23, 2019.

In these verses, there is an exaltation of the Cariri backlands in a setting linguistically supported by

a) recurrent use of pronouns.

b) popular variety of the Portuguese language.

c) reference to the set of Northeastern fauna.

d) exploration of erudite musical instruments.

e) predominance of Northeastern lexical regionalisms.

In the statement of question 45, the theme of the poem is presented as the "exaltation of the Cariri hinterland." This is evident from the very first verse: "Irerê, meu passarinho do sertão do Cariri" (Irerê, my little bird from the backlands of Cariri), which presupposes that "Irerê" is a bird from that region and also that the lyrical voice owns "Irerê."

These interpretative insights about the exaltation of the Cariri hinterland are not the focus of the question's statement, which instead asks for knowledge about linguistic varieties.

It is implied that the candidate must apply their understanding of Portuguese language variations, identifying the "linguistic setting" referenced in the question's statement.

This poem contains features typical of spoken language, such as in the fourth verse: "ai triste sorte a do violeiro cantadô!" (oh, sad fate of the singing minstrel!), where the word "cantadô" omits the final "r", a common trait in oral language. This phenomenon is known as apocope, defined by Mattoso (2008) as the suppression of a phoneme or syllables at the end of a word.

Apocope recurs in other verses, such as "Ah! Sem a viola em que cantava o seu amô" (Ah! Without the guitar on which he sang his love) and "ah! A gente sofre sem querê!" (ah! We suffer without wanting to!), making this a key observation for understanding the question.

Another common phenomenon in spoken Portuguese is the addition of a phoneme at the beginning of a word, known as prothesis, as seen in the final verse: "prá alembrá o Cariri!" (to remember Cariri!). In

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"alembrá", the vowel "a" is added before "lembrar" (to remember), which also loses the final "r" (apocope).

The candidate uses presuppositions and implied meanings based on their linguistic knowledge to determine that the only correct answer is option B, as it aligns perfectly with the "linguistic setting" based on Portuguese language variations.

It is emphasized that understanding the poem genre and activating world knowledge are essential for comprehending both the poem and the question.

FINAL CONSIDERATIONS

In light of the discussion on presuppositions and implied meanings and the analysis of the questions, it is understood that, for a sufficiently aligned comprehension with the objectives of the ENEM exam, candidates must possess linguistic knowledge to identify expressions that mark presuppositions, as well as extralinguistic knowledge to grasp the true meaning of the statements.

The reality of most schools and ENEM preparatory courses emphasizes linguistic knowledge; however, the analyses conducted in this study reveal that this type of knowledge alone is not sufficient to prepare students/candidates for the exam.

From the four questions analyzed, it was possible to identify presuppositions in the statements. It is emphasized that, for full comprehension of the question, the candidate must revisit the poem, identifying within it the presupposition markers that relate to the question.

Implied meanings were present in three of the four statements analyzed, being absent in only one. Nevertheless, they were still necessary for understanding the question, as the implied meaning did not appear in the statement but was important in its occurrence within the poem for resolving the question.

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SOCIAL FUNCTION, SOLIDARITY, AND TAX INCENTIVES AS AXIOPLASTIC VECTORS OF SUSTAINABLE NATIONAL DEVELOPMENT

Gustavo Davanço Nardi[1]

ABSTRACT

This paper investigates the constitutional legitimacy and legal feasibility of using tax and credit incentives as mechanisms to promote the fulfillment of the social and solidarity functions of the company. Based on articles 3, I, and 170 of the 1988 Brazilian Constitution, it is argued that entrepreneurial activity must transcend the mere pursuit of profit, embracing broader economic and social purposes aimed at promoting sustainable national development. The research adopts a theoretical-dogmatic approach, supported by a logical-dialectical method and bibliographic-documentary analysis. The study defines the social function as a binding legal principle with minimum normative content, while the solidarity function is seen as an ethical and voluntary posture aligned with the common good. From this perspective, it is proposed that the company assumes an axioplastic nature — capable of being molded by the plurality of constitutional values in continuous transformation. The work concludes that it is constitutionally legitimate for the State to condition fiscal or financial incentives on the socially responsible conduct of private agents, aligning economic policy with the principles of justice, solidarity, and the axiological framework of the Constitution.

Keywords: Sustainable development; Social function of the company; Solidarity; Tax incentives; Axioplasty.

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[1] Master of Laws student
UNIMAR
E-mail: nardiadv@gmail.com
LATTES: 1049125778986007

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INTRODUCTION

The 1988 Federal Constitution established a new legal and economic paradigm in Brazil by enshrining, as the foundations of the economic order, the valorization of human labor, free enterprise with a social function, and the commitment to a free, just, and solidary society.

In this context, the role of the company transcends the exclusive logic of profit to assume responsibilities toward the community, requiring that its operations pursue both economic and social purposes cumulatively.

The concepts of social function and solidarity function of the company emerge, the former being treated as a legal principle endowed with binding minimum content, while the latter expresses an ethical and voluntary behavior oriented toward the common good.

Within this framework, the notion is defended that the social function of the company assumes an axioplastic nature, that is, it is moldable according to the (social, cultural, and constitutional) values in constant transformation.

Thus, the solidarity function, grounded in Article 3, I, of the Constitution, represents a voluntary and proactive commitment to the common good, going beyond strict legality to encompass practices of sustainability, intergenerational justice, responsibility toward stakeholders, and active promotion of local and national development.

The question that arises, therefore, is: Is it legitimate and feasible for the State to link the granting of tax and credit incentives to the fulfillment of these constitutional functions by companies?

This inquiry leads to the hypothesis that economic policy can (and should) employ social criteria as instruments of inducement, guiding business activity toward a fairer and more sustainable national development.

The general objective of this study is to investigate the legal feasibility and constitutional legitimacy of using tax and credit incentives as instruments to induce socially and solidarily responsible business practices. The specific objectives are:

> (i) to analyze the constitutional foundations of the social and solidarity functions of the company;
>
> (ii) to identify possible inducement mechanisms in light of fiscal and credit policy; and
>
> (iii) to examine the challenges and risks involved in implementing such criteria in an equitable and effective manner.

METHODOLOGY

This research adopts a qualitative, theoretical-dogmatic, and analytical-propositional approach, structured with the purpose of examining the constitutional, legal, and philosophical foundations that

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legitimize the use of tax and credit incentives as instruments to induce compliance with the social and solidarity functions of the company, within the context of pursuing sustainable national development. It is, therefore, an exploratory and explanatory study that aims not only to systematize existing theoretical and normative elements but also to construct a hermeneutical proposal aimed at realizing constitutional values in the field of economic policy.

The primary technique employed is bibliographic and documentary research, involving the collection and critical analysis of primary sources — the 1988 Federal Constitution, the National Tax Code, the Civil Code, the Corporations Law, and related tax legislation — and secondary sources, particularly doctrinal works by key authors in shaping the constitutional economic order, such as Eros Roberto Grau, André Ramos Tavares, Emerson Ademir Borges de Oliveira, Aurora Tomazini de Carvalho, Décio Zylbersztajn, and Rachel Sztajn. Public policy reports, academic theses, and decisions of the Federal Supreme Court were also examined, with emphasis on case law concerning extrafiscality, the social function of property, and conditional tax incentives.

From a methodological standpoint, the reasoning developed is deductive and systematic, starting from the analysis of the Economic Constitution as the central normative framework, with emphasis on the principles of human dignity, social justice, solidarity, the valorization of human labor, and the social function of property and enterprise. To these foundations is added a critical analysis of the notion of the solidarity function of the company, understood as a voluntary expansion of corporate responsibility beyond strict legality, incorporating ethical and social commitments toward stakeholders, future generations, and society at large.

In this process, the study also draws on the conceptual framework of axioplasty, as proposed by Emerson Ademir Borges de Oliveira, understood as the law's capacity to shape social structures and behaviors in light of constitutional values. Adopting this framework allows tax incentives to be understood not merely as fiscal collection mechanisms but as axioplastic instruments of normative induction, capable of guiding business practices toward conduct standards committed to distributive justice, environmental sustainability, and social inclusion.

The methodology adopted does not aim merely to describe legal institutions but to develop an interpretative proposal that maximizes the effectiveness of constitutional economic principles, contributing to the theoretical and practical advancement of public policies aimed at fiscal justice and fair national development. Thus, this investigation falls within the field of Constitutional Economic Law and inductive Tax Law, with a vocation for interdisciplinary dialogue with Law and Economics and contemporary theories of distributive justice and sustainability.

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RESULTS AND DISCUSSION

SOCIAL FUNCTION OF THE COMPANY: AXIOPLASTIC NATURE AND NORMATIVE
CONTENT

The social function can be understood, within Business Law, as the lung that oxygenates economic activity with legitimacy and collective meaning, while in Constitutional Law it represents the blood that irrigates the entire normative system with the values of human dignity, social justice, and solidarity.

The solidarity function, in turn, can be compared to a legal vaccine: although not mandatory, its voluntary adoption strengthens the social immunity of the system, preventing inequalities, exclusions, and environmental imbalances.

It is crucial to distinguish between the social function and the solidarity function, as they are distinct institutes and should not be confused. As highlighted by Professors Mariana R. Santiago and Pedro A. Machado (2015, p. 170), the social function results from legal obligations, whereas the solidarity function stems from voluntary behavior that goes beyond legal requirements.

In this new scenario, the company emerges as an entity structured for the production and circulation of goods, marked by the separation between capital and labor and by the pursuit of efficiency and profit in increasingly competitive markets.

As Rocha and Santiago (2017, p. 129) point out:

> "The law is the source of the social function of the company. It imposes duties that, once fulfilled, generate direct or indirect benefits to society, such as environmental protection, consumer protection, etc."

Thus, the law is one of the main parameters of social function, in its strict definition. The norm is a primary source, but the social function almost always carries axiological aspects for its definition. It is not a static object but a living principle.

From the French Revolution of 1789 and, especially, with the advent of the Industrial Revolution, the transition from a feudal property-based economic model to a new logic of economic organization was consolidated.

The social function of the company is a constitutional principle enshrined in Article 170 of the 1988 Constitution, which reinforces its strength in business theory. Based on the principle of maximum effectiveness, interpreters of the law must apply it in a way that achieves its core and essential objectives.

The Federal Constitution also provides for other institutes that pursue the social function, such as in urban policy (Article 182, §2), which requires private property to fulfill its social function. This is an imperative of public policy and a constitutional obligation of the property owner.

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Therefore, the social function constitutes an **axioplastic principle**[2], moldable by social dynamics and marked by a vitality that prevents it from being reduced to mere normative rigidity.

Legal Nature of Axioplasty

Axioplasty, in the constitutional context, can be understood as a hermeneutical category of axiological nature, whose function is to shape the normative content of open constitutional principles according to the prevailing values of a given historical moment. Its legal nature is anchored in Eros Roberto Grau's view of the Constitution as a normative order in motion, endowed with historicity and openness to social concretization.

According to Grau (2021), constitutional economic principles — such as the social function of property, solidarity, and free enterprise — cannot be interpreted in isolation or in a static manner, but in connection with constitutional values and the concrete historical context. He states:

> "The Economic Constitution does not establish a rigid economic model, but rather a value framework within which political and legislative choices develop." (GRAU, 2021, p. 134)

Based on this, axioplasty acquires the legal nature of a constitutional technique of teleological concretization, operating as an instrument for densifying open principles and guiding normative application in light of a transforming socioeconomic reality. It does not create new rights but enables the realization of existing ones based on living values, interpreting constitutional principles as normative clauses with progressive and contextual content.

Furthermore, in dialogue with Grau, axioplasty rejects the idea of a merely programmatic Constitution: it assumes that constitutional values have real normative force, provided they are interpreted in a manner sensitive to historical time and public purpose.

Thus, axioplasty is not a legal principle but a method of constitutionally oriented realization, with an instrumental and concretizing legal nature. Its application is crucial, for example, in the Minas Sustenta Project, as it allows verifying whether tax exemptions are effectively aligned with the social function of the company and solidarity, rather than serving merely privatist logic.

In legal terms, axioplasty acts as a bridge between constitutional and social values and the normativity of inductive public policies, such as extrafiscal taxation.

The constitutional axioplasty proposal, as a hermeneutical technique of value-based concretization, aligns directly with Uadi L. Bulos's conception of principles as legal norms endowed with normative force, albeit with varying degrees of generality and applicability.

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[2] Axioplastic = from the Greek axios (value) + plastos (malleable, molded). A principle shaped by living social values.

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According to Bulos (2023, p. 384), current dogmatics breaks with the old dichotomy between norms and principles, recognizing that principles are legal norms with an open structure and axiological content, requiring greater interpretative effort for their concretization.

Axioplasty arises precisely from this challenge: to offer a criterion for normative densification based on constitutional values in transformation, shaping the content of principles according to their social historicity.

From this perspective, axioplasty operates as a method of approximation between the norm-principle and its practical realization. It functions in domains where the constitutional text presents vague standards such as solidarity, social function, dignity, or development — requiring a value-based and contextualized process to achieve concrete normative effectiveness.

In coherence with authors such as Guastini and Dworkin, cited by Bulos, axioplasty helps translate claims of justice into concrete normative commands, giving ethical and functional density to indeterminate constitutional clauses without leaving them to judicial subjectivity or legislative omission.

Therefore, axioplasty not only dialogues with the notion of norm-principle: it is the operative instrument for its transformative realization. Where constitutional values are in dispute or undergoing social evolution, axioplasty acts as an interpretative bridge between the ought-to-be of the Constitution and the being of institutional reality.

Thus, the company, due to the axioplastic character of the social function, has as its scope not only the pursuit of profit but also the achievement of other goals such as sustainability, social well-being, employee development, and the realization of human dignity.

For the company to embody this axioplastic character, it must fulfill its legal obligations, particularly those of a principled nature, such as the social function of the company and the principles set forth in Article 170 of the 1988 Constitution, which regulate the economic order.

Compliance with tax obligations is a prerequisite for social justice, as taxation — although often high and complex in our country — is essential to ensure that, in the future, companies that fulfill their social function can benefit from public policies through tax measures, which is the focus of this article.

Therefore, the axioplastic character is influenced by a series of factors mentioned above (economic, social, cultural phenomena, laws) that will define what constitutes the social function at a given moment, as it is a living principle.

As Eduardo Tomasevicius Filho (2003, pp. 33–50) teaches:

> "The social function of the company constitutes the power-duty of the entrepreneur and the company's managers to harmonize the company's activities according to society's interests, through compliance with certain positive and negative duties."

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These duties should not be confused with mere philanthropy; rather, they constitute structural requirements for legitimizing economic activity within the framework of the Democratic Rule of Law.

Moreover, the social function of the company requires active contribution to the economic, social, and cultural development of the communities in which it operates — whether locally, regionally, or nationally.

This commitment implies considering the impacts of strategic decisions on the environment and society, adopting sustainable business practices, and ensuring full respect for consumer rights. By acting responsibly, the company consolidates its social legitimacy and strengthens its position as a catalyst for inclusive and balanced development.

As Mariana Ribeiro Santiago (2008, p. 113) explains:

> "The social function of the company limits the will and interest of capital holders, replacing the arbitrary power of the business owner with the balance that must exist among the forces that cooperate for the development of business purposes. Thus, as in the case of the social function of the contract, it involves subordinating private interest to social interest."

This includes respecting labor rights, ensuring human dignity in the workplace, and aligning practices with the constitutional principles of social justice, solidarity, and human dignity.

The social function is also present in Administrative Law, particularly when the Public Administration initiates procurement processes under the Public Procurement Law. In this context, companies seeking to contract with the government must meet certain legal requirements, such as being up to date with tax and labor obligations and presenting other certificates, partially demonstrating compliance with workers' rights and tax obligations, thereby respecting society as a whole.

Thus, the Public Administration has incorporated this as a means of verifying compliance with certain requirements that some might consider merely legal. However, this raises the question: what is a legal norm?

The answer depends on the interpretative school adopted. For a positivist, if the norm is valid within the legal system, there is no value judgment, only compliance.

As Professor Alysson Mascaro states:

> "In the modern world, the first and immediate criterion of legal technique, which stands out, is the use of the state legal norm. It is a normative technique. The jurist, instead of engaging in situational craftsmanship to resolve conflicts, becomes a formal technician who manipulates already established, institutionalized mechanical structures."[3]

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[3] MASCARO, Allyson Leandro. Filosofia do direito 7.ed. São Paulo: Atlas, 2021, p.180

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However, in Miguel Reale's view, law is more than a legal norm and its validity; it must be analyzed in a tridimensional manner, encompassing fact, value, and norm in the creation of law.

Thus, should compliance with the social function be limited to what the law prescribes? Or is the law an instrument for inducing state-driven behavior?

As we have seen, there is a fact — the need to recognize entrepreneurs or companies that fulfill their social function — followed by a value, which is axiological in nature, derived from the criterion we have developed and termed AXIOPLASTY, where multiple values are linked to that fact and will directly influence the LEGAL NORM.

It is worth emphasizing that the social function, in its normative content, is not rigid or crystallized; on the contrary, it is a principle endowed with axiological plasticity, whose material density is shaped by social, economic, and constitutional transformations of the present time. Hence the proposal to understand it as a truly axioplastic principle, sensitive to the value mutations of society and the complexity of the corporate role in contemporary times.

Additionally, the Fiscal Responsibility Law (LRF) requires that an assessment of the budgetary impact be carried out for the current fiscal year and the two subsequent years, in addition to fulfilling other obligations such as compensation measures and related requirements.

Therefore, the creation of the proposed tax exemption must follow several steps to achieve its social and, above all, legal purpose. In this case, even if there is strong social pressure, compliance with constitutional provisions and the LRF is essential; otherwise, the measure will lack validity.

SOLIDARITY FUNCTION: AN ACTIVE CONSTITUTIONAL ETHIC

The solidarity function of the company finds direct support in the 1988 Federal Constitution, notably in Article 3, item I, which establishes as one of the fundamental objectives of the Republic "to build a free, just, and solidary society." This directive also unfolds in Article 225, which addresses environmental protection and the rights of future generations, reinforcing the intergenerational commitment to sustainability.

Solidarity, in this context, is not limited to a merely subjective or moral value; it constitutes an ethical category with legal projection, implying concrete duties of cooperation, assistance, care, and reciprocal responsibility among members of society.

For Eros Grau, constitutional solidarity is not a moral ornament: it imposes concrete obligations on the State, companies, and individuals to promote the common good, cooperate with others, and mitigate the exclusionary effects of the free market (2005, p. 120).

Thus, the solidarity function is not a legal obligation but a voluntary act of the company that adopts this posture and conduct, which is why it is described as an ethical business behavior.

The solidarity function of the company requires that its duties go beyond market commitments, encompassing voluntary initiatives that benefit the community and respect others. Therefore, the company must reconcile its private interests with social interests in the pursuit of social justice (PAYÃO; SANTIAGO, 2016).

Considered a new legal and political paradigm, solidarity becomes an interpretative and normative vector guiding the actions of the State and private entities toward promoting the common good, assuming a social and intergenerational dimension. It is articulated with third-generation fundamental rights, the so-called collective or diffuse rights, committed to social justice, material equality, and human dignity.

For Eros Grau, solidarity is a constitutional normative value that imposes mutual responsibilities among social actors, especially between those who hold economic power and those in vulnerable situations (2005, p. ...).

Thus, companies are called upon to develop practices that consider the interests of stakeholders, responsibility for the socio-environmental impacts of their activities, and effective contributions to the economic, environmental, and cultural development of the communities in which they operate.

Through solidarity-based business action, companies would qualify for tax and credit incentives, such as facilitated access to credit lines, encouraging desirable behaviors, correcting negative externalities, and promoting distributive justice.

By stimulating solidarity-oriented business behaviors through tax and credit incentives, the State reinforces the objectives of an economic order oriented toward human dignity and sustainable development.

TAX AND CREDIT INCENTIVES AS INDUCTIVE MECHANISMS

In the constitutional model of the Social State under the rule of law, the State cannot limit itself to a spectator role; it bears the duty to foster business behaviors that contribute to the concrete realization of fundamental rights.

In this context, tax and credit incentives assume a strategic function as instruments of state inducement, capable of guiding corporate behavior toward constitutional objectives such as social justice, sustainability, and human dignity.

The law thus becomes one of the vectors for inducing the solidarity function of the company, including through the granting of tax and financial benefits. Induction is legitimate when directed toward promoting practices that go beyond the minimum normative threshold.

Examples include combating slave labor, promoting diversity, and strengthening tax citizenship. It also encompasses the possibility of state rewards for companies that adopt social compliance policies,

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develop ethical supply chains, or implement expanded standards of responsibility toward consumers and communities.

In this regard, extrafiscality—understood as the use of tax instruments for an inductive rather than a revenue-raising purpose—becomes a tool for correcting market asymmetries and promoting the common good. It allows the State to positively differentiate economic agents that internalize constitutional values in their operational logic.

A classic example of extrafiscality is the use of the IPI (Tax on Industrialized Products) with reduced rates for vehicles powered by ethanol or electricity, clearly aiming to encourage environmentally sustainable practices. Here, the tax ceases to be merely a revenue mechanism and becomes an instrument of public policy, designed to induce desirable economic behaviors.

Use As Inductive Tools

The Democratic State under the rule of law was built on certain precepts and principles, serving as a way to democratize access to fundamental rights and

> The construction of the Democratic State under the rule of law, as announced in Article 1, involves costs and strategies that go beyond the mere declaration of rights. There is no Social State without a Fiscal State; they are like two sides of the same coin.
> (MENDES; BRANCO, 2021, p. 751)

The use of tax and credit incentives as instruments to induce socially and solidarily committed business behaviors represents the convergence point between the constitutional foundations of the economic order and the practical requirements of a transformative public policy.

The law can serve as a source of the solidarity function of the company, acting as an inducer of behaviors, including through the granting of tax and credit benefits, as demonstrated by strategic use.

As Paulo de Barros Carvalho notes, tax legislation often contains clear provisions aimed at favoring situations considered socially, politically, or economically valuable, to which the legislator grants more favorable treatment (CARVALHO, 2018, p. 115).

Minister Gilmar Mendes emphasizes:

> "There is always a financial decision behind every state action that requires resources, which, in turn, is preceded by a revenue-raising activity that makes the spending decision possible. For this reason, public finances and the norms that regulate them, beyond their instrumental function, are essential to the realization of rights." (MENDES; BRANCO, 2021, p. 751)

This reinforces the premise that the State can and should use economic instruments to encourage behaviors that will concretize fundamental rights and social well-being.

Since the solidarity function is a voluntary act — a "legal vaccine" — the State's role is to increase the likelihood of private actors adhering to proposed programs or projects, thereby elevating corporate activity to new social and solidarity levels.

It is imperative that the State create relevant public policies to generate more actions in areas where deficiencies exist, promoting economic and financial progress for the population through extrafiscal measures.

As Professor Paulo Caliendo explains:

> "Article 174 of the Constitution establishes a clear constitutional framework for inductive norms, including extrafiscality, requiring: a formal authorizing law; general indicative effectiveness; and administrative-normative activity linked to these parameters. [...] There is no general constitutional clause authorizing the creation of taxes with an extrafiscal purpose; such action must be provided for by law and have a relevant justification.."[4]

Thus, as Caliendo points out, the absence of a general constitutional clause for extrafiscal taxation means the State must create mechanisms to use this powerful and necessary tool to achieve programmatic norms and enhance the effectiveness of rights.

Tax incentives, in this scenario, are not arbitrary benefits but tools for recognizing and encouraging companies that choose to act with expanded social responsibility, investing in productive inclusion, sustainability, the valorization of human labor, and the strengthening of community ties.

Consequently, axioplasty must be applied when creating and implementing such laws, as it determines which values will guide the granting of tax exemptions in the case under discussion.

As André Ramos Tavares asserts, legislation cannot favor specific groups with exclusively private interests (RAMOS, 2008, p. 140).

By conditioning the granting of incentives on compliance with social and solidarity practices, the State transforms tax and credit policy into legitimate instruments for achieving the fundamental objectives of the Republic (applying axioplasty), as provided in Article 3 of the Constitution, as well as the principles of the economic order listed in Article 170.

The focus shifts from being exclusively revenue-oriented to having an extrafiscal function, promoting distributive justice, reducing inequalities, and ensuring socio-environmental protection, while also fostering institutional reputation and social legitimacy as factors that, although not formally recognized as incentive criteria, influence risk perception and trust in financial markets.

We have excellent examples of general public policies and financial mechanisms already aligned with this ideal, among them: the need for public support for worker cooperatives formed from bankruptcy

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[4] Caliendo, P. (2000). Tributação e ordem econômica: os tributos podem ser utilizados como instrumentos de indução econômica? [Taxation and economic order: can taxes be used as instruments of economic induction?] Revista Direitos Fundamentais & Democracia, 20, 215–216.

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proceedings — a model that requires specific credit lines and tax incentives for economic viability; and crowdfunding.

Such examples demonstrate that companies fulfilling their social and solidarity functions tend to reduce legal, reputational, and operational risks, which may justify their differentiated treatment through credit and tax benefits. This occurs not only in economic terms but also as institutional recognition for adherence to constitutional values.

Thus, the use of incentives as a public policy aimed at business induction does not constitute an unjustified tax privilege but a legitimate strategy of constitutionally oriented inducement, based on the principles of social function, efficiency, social justice, and solidarity, which serve as references for the application of axioplasty.

It is legitimate and consistent, under Brazilian law, for the State to condition the granting of tax and credit incentives on companies' compliance with social and solidarity obligations.

The Federal Constitution, by establishing that free enterprise must respect its social function (Art. 170, caput and III) and by electing as a fundamental objective of the Republic the construction of a free, just, and solidary society (Art. 3, I), assigns to companies a role that goes beyond profit generation, positioning them as active agents of national development.

This legitimacy also derives from the transformative capacity of business activity, which has capital, structure, and technical personnel capable of generating concrete impacts on the social and environmental spheres.

The use of targeted incentives, in this context, represents a way to channel this potential toward public objectives, promoting synergy between private interest and the collective good.

Moreover, establishing social requirements as criteria for incentives makes it possible to distinguish companies truly committed to the common good from those that adopt greenwashing or social washing strategies — that is, those that merely simulate social responsibility as a marketing tool.

Finally, it must be recognized that reconciling economic interests with social purposes is one of the central challenges of contemporary public policy. The strategic use of tax and credit incentives, anchored in clear and verifiable normative criteria, helps balance this equation, transforming the social and solidarity functions of the company from a theoretical ideal into an institutional reality encouraged and safeguarded by the Democratic State under the rule of law.

SUSTAINABLE NATIONAL DEVELOPMENT

National development is a fundamental objective of the Federative Republic of Brazil. It can be summarized as priority goals for the country. Thus, the 1988 Federal Constitution wisely introduced

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national development in a broad sense, as Brazil was experiencing a period of severe recession and an urgent need for progress.

The year 1988 marked one of the most critical economic contexts in Brazil's republican history. The country faced **galloping hyperinflation**, which reached an annual average of **1,037.56%**, eroding wages, making consumption unfeasible, and disrupting the productive sector.

The succession of failed economic plans — such as the Cruzado Plan (1986), the Bresser Plan (1987), and shortly after, the Summer Plan (1989) — highlighted the institutional fragility in attempts to contain the inflationary spiral. Simultaneously, the partial moratorium on external debt declared in 1987 worsened Brazil's international financial isolation, generating market distrust and restricting access to foreign credit.

Thus, it became necessary to establish certain objectives as the foundation for developing the new republic that was emerging, in order to bring greater social and legal stability.

The Federal Constitution contains numerous programmatic norms that induce the State to take action in favor of certain objectives, principles, or goals. Among them is national development, which today must be understood as sustainable, with a focus on inclusive and balanced growth.

It is important to note that the legal system does not provide objective and detailed criteria for granting tax and credit incentives based exclusively on sustainable national development. However, the 1988 Constitution offers a sufficiently robust normative framework to guide such public policy choices.

Professor Bulos clarifies the spirit of Article 3 of the Federal Constitution, demonstrating its importance:

> "Guaranteeing national development (Art. 3, II) — material resources are essential for improving human living conditions, as they provide stability, education, health, culture, etc. In the 1988 Charter, social development remains an unattainable dream for millions of Brazilians. The term is recent in Sociology and Economics, meaning the transition from an agrarian society to an industrial society, with an increase in Gross Domestic Product and per capita income. Normally, social development is measured by infant mortality rates, hospital care, public sanitation, installation of job-generating industries, literacy levels, and consumption of electricity, cement, and oil, among others."
> (BULOS, 2023, p. 397) .[5]

Thus, national development can be understood as the application of material resources to improve living conditions, marking the transition from an agrarian society to an industrial one, where the State must encourage growth and industrialization, which may lead to an increase in GDP.

However, as Professor Bulos's definition shows, there are no objective criteria, but rather a set of effects that qualify what we call national development.

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[5] Bulos (2023, p. 397)

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Therefore, it is necessary to create criteria that can be structured based on indicators such as the generation of formal jobs, the inclusion of vulnerable populations in the labor market, operations in regions with low Human Development Index (HDI), the adoption of compliance and sustainability practices, and the company's tax and labor compliance.

State Inducers To Strengthen Sustainable National Development

The need to create state-driven inducements is a way to strengthen or support the adherence of new projects that can promote the Administration's priority goals, such as solidarity.

For this type of policy to occur, it is first necessary to ensure tax collection, which primarily takes place through derivative means, as provided by Law 4.320/64.

Minister Gilmar Mendes states that the predominance of taxation as the standard for financing public spending presupposes free enterprise and the principle of subsidiarity as fundamental guidelines for State intervention in the economic sphere[6].

Public policies aimed at the private sector have the power to enhance the value of human labor. Thus, a State based on this concept presupposes limited action by the Public Power in the economic domain, since the financing of its financial activity does not depend on business or patrimonial revenues. (MENDES, 2021, p. 751)

Therefore, the State has no interest in creating state-owned companies to produce services that fall under free enterprise, although the Constitution still reserves certain services exclusively for state entities, as provided in Article 21, item IX.

In Brazil, there is a revenue-sharing system, meaning differentiated taxation due to federalism, which grants each public entity that makes up the Federative Republic of Brazil the competence to collect certain taxes.

In this context, this work addresses one of the main taxes affecting business activity: the ICMS (Tax on the Circulation of Goods and Services), which, according to the Constitution, falls under the exclusive competence of the States.

The granting of ICMS-related tax incentives by the States is subject to prior agreement within the scope of CONFAZ, under Article 155, §2, XII, "g" of the Federal Constitution and Complementary Law No. 24/1975. There are legally viable mechanisms for federative entities to promote business behaviors aligned with fair and sustainable national development. For example, it is possible to establish credit-granting programs.

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[6] MENDES, 2021, pg751

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The State can create criteria structured around indicators such as the generation of formal jobs, the inclusion of vulnerable populations in the labor market, operations in regions with low HDI, the adoption of compliance and sustainability practices, and the company's tax and labor compliance.

Furthermore, the incentive or credit law will be based on the axioplastic principle, adopting economic and social criteria and implementing a scoring model based on social and environmental impact indicators.

The State ensures equality, predictability, and public oversight while inducing business behaviors aligned with the Federal Constitution and the ideal of fair and sustainable national development, as illustrated in the example below:

Example of public policy: "minas sustenta" (fictional model)

Objective: Grant a tax credit of up to 5% of the ICMS due to companies that meet criteria contributing to fair and sustainable national development.

Scoring Matrix (cumulative up to 100 points):

Criterion	Points
Creation of more than 50 formal jobs in the last 12 months	20 pts
At least 10% of workforce from vulnerable groups	15 pts
Operations in municipalities with HDI < 0.65	15 pts
ESG or ISO 14001 certification	15 pts
Compliance program with audited report	10 pts
Updated negative labor and tax certificates	10 pts
Investment in sustainable R&D ≥ 2% of gross revenue	15 pts

Minimum score required to access the benefit: 60 points.

This law would objectively and directly reward companies that contribute to national development, supporting sustainability and social justice, making it a public policy or tax incentive that achieves its core purpose.

CONCLUSION

The 1988 Federal Constitution outlined an economic order committed not only to free enterprise and the valorization of human labor but, above all, to the realization of a free, just, and solidary society. In this context, the company is no longer understood as a mere wealth-producing agent but as an active constitutional subject, bearing social duties that transcend the logic of profit.

The distinction between the social function and the solidarity function of the company allowed us to identify distinct yet complementary normative dimensions: the social function as a binding legal imperative, and the solidarity function as an ethical and voluntary behavior that should be recognized, encouraged, and rewarded by the State. Based on constitutional and doctrinal grounds, it was argued that

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the social function possesses an axioplastic nature, moldable by constitutional and social values in constant transformation, requiring interpretative sensitivity for its progressive realization.

In this light, economic policy — particularly tax and credit policy — emerges as a legitimate instrument for inducing business behaviors aligned with the fundamental objectives of the Republic, especially those linked to national development, while also enabling the inclusion of sustainability, albeit not as a mandatory requirement.

This approach represents a way to direct extrafiscality through the principle of axioplasty, reducing subjectivity and increasing principled determinism in inductive measures. Consequently, it stimulates **socially desirable behaviors** and, in turn, corrects inequalities and promotes distributive justice.

Tax incentive laws must include objective and verifiable criteria, such as job creation, inclusion of vulnerable groups, sustainability, fiscal compliance, and structured compliance programs, organized in a scoring model, as illustrated by the "Minas Sustenta" program. This demonstrates that it is possible to design public policies for tax and credit incentives based on concrete constitutional values.

Induction, in this context, does not constitute privilege or unjustified tax waiver but rather an institutional reward for companies that actively contribute to the common good.

Thus, it is concluded that the strategic use of tax and credit incentives — combined with axioplasty — as a tool to encourage the social and solidarity functions of the company is not only legally possible but constitutionally required. Ultimately, this means transforming the principles enshrined in the constitutional text into concrete normative practices, strengthening the alliance between the State, the market, and society in building truly fair and sustainable development.

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AURUM
EDITORA

THE DYNAMICS OF GEOGRAPHICAL SPACE: A COMPARATIVE ANALYSIS OF THE WORKS OF MILTON SANTOS (2008) AND ROBERTO LOBATO CORRÊA (1995)

Kennedy José Alves da Silva[1], Francisco Welton Machado[2], Edson Osterne da Silva Santos[3], Kaique Marlen da Conceição[4], Ruan Gabriel Linhares Chaves[5] and José Manoel Morais Silva[6]

ABSTRACT

In this paper, we review and compare the works of Milton Santos (2008) and Roberto Lobato Corrêa (1995), which discuss the concept of geographical space, the object of study of geography. In this way, the authors' contributions to the renewal of the science are examined. In his work, Milton Santos encourages us to see space as a social product that arises from man's interaction with the environment. The concept of roughness refers to the marks that form over time in space. These marks are indicative of the importance of mechanisms, information and the reflections of globalization today and its relationship with space. Lobato Corrêa, on the other hand, highlights the importance of territory and territoriality, whereby territory is characterized as a demarcated area that exerts both political and social control. The focus is on the analysis of the relationship between power and territoriality, through the perspectives of the main social actors who shape the organization of space. The issue of multi-territoriality and the construction of identities continues to be discussed, highlighting the various meanings that space harbors, as well as making a comparative analysis of their different approaches. The authors' perspectives offer theoretical and methodological tools for analyzing spatial dynamics, allowing for a more complex and integrated understanding of geographical space in contemporary times.

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[1] Specialist in Sustainable Development and Environment (2012), Sociology Teaching for High School by the State University of Piauí (UESPI, 2016), and Natural Sciences, their Technologies and the World of Work by UFPI (2022).
Master's student at the Federal University of Piauí (UFPI), through the Dean of Graduate Studies (PRPG), the Center for Human Sciences and Letters (CCHL), and the Coordination of the Graduate Program in Geography (PPGGEO), Academic Master's in Geography – Class 14 (2024–2026).
E-mail: profkjose@gmail.com
LATTES: http://lattes.cnpq.br/6486047277790904
[2] Specialist in Development with the Environment (2012–2014).
Master's student at the Federal University of Piauí (UFPI), through the Dean of Graduate Studies (PRPG), the Center for Human Sciences and Letters (CCHL), and the Coordination of the Graduate Program in Geography (PPGGEO), Academic Master's in Geography – Class 14 (2024–2026).
E-mail: wmachado-2011@hotmail.com
LATTES: http://lattes.cnpq.br/3652789785115922
[3] Specialist in Human and Social Sciences and the World of Work (CEAD/UFPI/SEB/MEC).
Master's student at the Federal University of Piauí (UFPI), through the Dean of Graduate Studies (PRPG), the Center for Human Sciences and Letters (CCHL), and the Coordination of the Graduate Program in Geography (PPGGEO), Academic Master's in Geography – Class 14 (2024–2026).
E-mail: Edsonosterne23@gmail.com
LATTES: http://lattes.cnpq.br/4318087538278709
[4] Licentiate in Geography from the State University of Maranhão.
E-mail: kaiquemarlen87@gmail.com
LATTES: http://lattes.cnpq.br/9041722079548251
[5] Licentiate in Geography from the State University of Maranhão.
E-mail: ruangabriellinhares75@gmail.com
LATTES: http://lattes.cnpq.br/0938924424844344
[6] Licentiate in Geography from the State University of Maranhão.
E-mail: josemanoelcx14@gmail.com
LATTES: http://lattes.cnpq.br/8297487088103418

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INTRODUCTION

Over the past 30 years, as we entered the 21st century, the concept of geographical space has undergone significant transformations, driven by theoretical and methodological advances. Milton Santos, in his work *Por uma Geografia Nova (2008)*, and Roberto Lobato Corrêa, with *Traços de um Território (1995)*, played fundamental roles in the renewal of this concept, presenting new perspectives that considerably expanded our understanding of the subject.

This study is dedicated to a comparative analysis of Santos and Corrêa's approaches to geographical space, highlighting their main theoretical and methodological contributions. Focusing specifically on the aforementioned works, the aim was to understand how each author conceived this space and how their perspectives influenced contemporary geography.

Given the differing theoretical views of Santos (2008) and Corrêa (1995), it became necessary to investigate their conceptions of geographical space, the discrepancies between them, and how these approaches contributed to an integrated view of this space in contemporary times. Thus, the central question of this study was: How did the approaches of Milton Santos (2008) and Roberto Lobato Corrêa (1995) differ in the conceptualization of geographical space, and in what ways did these differences influence the understanding of spatial dynamics in the 21st century?

The general objective was to analyze and contrast the approaches of Santos (2008) and Corrêa (1995) regarding the concept of geographical space, aiming to highlight their contributions to the renewal of geographical science. To achieve this goal, three specific objectives were outlined: (I) Investigate the main concepts and theoretical categories of Milton Santos (2008) related to geographical space; (II) Explore the concepts of territory and territoriality as presented by Roberto Lobato Corrêa (1995); and (III) Analyze the implications of the different approaches of Santos (2008) and Corrêa (1995) for understanding spatial dynamics in contemporary times.

This study is relevant as it provides a critical analysis of the contributions of two of the most important Brazilian geographers, whose works were fundamental to the understanding of contemporary geographical space. Furthermore, it contributes to the theoretical and methodological development of geography by comparing and integrating different perspectives on space, promoting a more complex and integrated understanding of spatial dynamics.

METHODOLOGY

The research was conducted through a qualitative approach, beginning with an in-depth bibliographic review of the works of Milton Santos and Roberto Lobato Corrêa. Subsequently, a systematic comparative analysis of both authors' approaches was carried out, aiming to understand how each conceptualizes geographical space and the implications of their perspectives. The application of

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content analysis techniques enabled the extraction and contrast of the main arguments and theoretical categories, facilitating a more comprehensive understanding of spatial dynamics.

RESULTS AND DISCUSSION

MILTON SANTOS: DEFINITION OF THE CONCEPT OF SPACE

In his work, Santos (2008) revolutionized the concept of space by situating it within the context of the renewal of geographical science, becoming one of the most influential figures in Brazilian geography. For Santos (2008), space is not merely a passive backdrop for human activities, but rather a dynamic result of complex interactions between society and the environment. He emphasizes that space is not limited to being superficial; on the contrary, it is a constantly changing environment in which social, economic, and cultural relations intertwine, mutually influence one another, and evolve over time.

Santos (2008) argues that understanding space as a social product is fundamental to capturing its true essence. Over time, human communities are shaped by aspirations, conflicts, and changes that leave their marks on space. Highlighting the constant transformation of space, Santos not only describes its progression but also presents a critical perspective that challenges static and limited views. He contends that this dynamic approach is essential for a comprehensive understanding of the complexities of geographical space, which cannot be reduced to a one-dimensional view.

Furthermore, Santos (2008) underscores the importance of technology and information in driving spatial changes in the era of globalization. Technologies spread rapidly and information flows constantly, redefining not only physical boundaries but also the ways in which different parts of the world interact and connect. In this scenario, space is not merely a passive container of these changes, but rather a dynamic environment in which new forms of social and territorial organization emerge. The author emphasizes the need to understand how these technological advances and information flows influence the structure and dynamics of contemporary geographical spaces, where multiple forces interact and are continuously reconfigured.

By providing a solid theory of geographical space, Santos (2008) encourages us to reflect on our connection with the environment in which we live. His humanized and dynamic view of space constantly challenges geographers and academics to explore the complex interactions that determine how we experience the world. The author argues that understanding space is not limited to grasping its physical and functional configuration, but also involves recognizing the narratives, meanings, and social relations that permeate it. This approach not only enriches our academic understanding but also empowers us to act more informedly and responsibly in the management and conservation of the environments we inhabit.

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Space in Motion: Keywords Defining the New Era (roughness, dialectics, technique, information, and globalization)

Santos (2008) introduced a significant contribution by exploring the concept of roughness in the geographical environment. This concept goes beyond simple physical characteristics of the terrain; it encompasses the historical and cultural evidence left over time as a result of human interactions. The roughness of the terrain is not merely a physical trait, but a visual indicator of multiple eras of human occupation, revealing how societies have shaped and been shaped by the environment throughout history. For Santos (2008), understanding roughness is crucial to grasping the current configuration of space and its dynamics, allowing us to visualize layers of history and the transformations that have occurred. This deeper understanding of the relationships between society and environment is facilitated by the analysis of roughness, which invites us to recognize space not merely as a static backdrop, but as a palimpsest—a surface that has been erased or overwritten to be reused—where different times and processes continuously intertwine, influencing the landscape and its meanings.

Santos' (2008) proposal regarding space highlights its simultaneous condition as both medium and product of social relations. He argues that this dialectic is essential to understanding the various contradictions and dynamics that characterize geographical space. The author challenges the limited view of space as a static setting, encouraging its consideration as a field of continuous interactions, where social relations shape and are shaped by the physical environment.

It is crucial, according to Santos (2008), to understand the complexity of the contemporary world through the interdependence between social and spatial processes. This implies recognizing how human activities not only transform the physical landscape but also influence the social and economic organization of places. By adopting this dialectical approach, the author alerts us to the need to examine the contradictions emerging from interactions among different actors and interests within geographical space, offering an integrated understanding of contemporary spatial dynamics.

For Santos (2008), technique and information play fundamental roles in the construction of contemporary geographical space. In the era of globalization, these elements introduce new technologies and flows of information that profoundly reconfigure spatial relationships. Contrary to the idea of global homogenization, Santos (2008) argues that globalization promotes disparities and spatial diversity, where different times and methods coexist.

Therefore, a precise analysis of contemporary geographical space must not only consider global uniformity but also how local dynamics articulate with global influences, creating a complex mosaic of practices, cultures, and forms of territorial organization.

Santos (2008) emphasizes that technical changes are not superficial; they fundamentally shape the ways in which societies organize themselves territorially, influencing the social and economic dynamics

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of places. In parallel, information accelerates flows and connects regions of the world, creating an intricate network of interactions that transcend geographical and temporal boundaries. This dynamic combination of technique and information reveals an ever-evolving environment, where transformations are driven by technological advances and new forms of global connectivity, challenging geographers to understand and anticipate the changes shaping the contemporary world.

Space: A Set of Objects and Activities

Another central issue in Santos' (2008) work is the conception of space as a dynamic set of physical elements and interactive activities. Santos argues that geographical space is not merely a static backdrop for human activities, but rather a living environment where complex interactions occur between physical infrastructures, technological artifacts, and the social actions that permeate them. This systemic approach allows for a more integrated understanding of space, considering both tangible elements—such as roads, buildings, and natural resources—and intangible aspects, such as cultural values, social practices, and systems of meaning that continuously define and transform space.

For Santos (2008), this holistic perspective reveals that geographical space cannot be reduced solely to its physical dimension, but must be understood as a complex network of relationships between material objects and the human activities that animate them. These interactions not only shape the physical landscape but also deeply influence the social and economic organization of the communities inhabiting these spaces.

Thus, by adopting a view that considers the dynamic interaction between material and immaterial elements, Santos offers a robust conceptual framework for exploring the multiple dimensions of contemporary geographical space.

Santos (2008) suggests that space should be understood as a set of interactive and overlapping systems. These systems are not limited to tangible geographical objects such as cities, roads, and rivers, but also encompass the dynamic activities occurring within these spaces. Among these activities are human migrations, economic flows, cultural practices, and other forms of social interaction that continuously shape the geographical environment.

For the author, the relationship between these systems is not merely linear but results in complex and interconnected spatial patterns. These patterns reflect the structure and organization of geographical space across its multiple layers and scales. By studying these patterns, it is possible to gain a clearer understanding of the socio-spatial dynamics that characterize different regions and localities around the world (Santos, 2008).

This systemic approach proposed by Santos (2008) not only emphasizes the interconnection between physical elements and human activities but also recognizes the importance of considering

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history, culture, and power relations that shape space. Thus, by integrating geographical analyses with sociocultural and economic perceptions, Santos offers a robust theoretical framework for understanding the complexities of contemporary geographical space and its transformations over time.

ROBERTO LOBATO CORRÊA: DEFINITION OF SPACE

In his book published in 1995, Corrêa presented a distinct perspective on the concept of space by introducing the ideas of territory and territoriality. Corrêa argues that geographical space should not be viewed simply as a static landscape, but rather as a dynamic environment in which people live, interact, and build complex relationships.

Central to his approach is the notion of territory, which goes beyond physical boundaries and includes the practices and meanings that people attribute to these spaces. Territoriality, in turn, refers to the strategies and behaviors adopted by individuals and groups to claim, control, and organize territories according to their needs and interests (Corrêa, 1995).

Corrêa (1995) emphasizes that understanding geographical space requires a deep analysis of power relations and the strategies of social actors operating within that space. Social, economic, and political interactions play a crucial role in the ongoing transformation of these territories. By considering these dynamics, it becomes possible to grasp not only the physical configuration of space but also the social and cultural processes that shape it over time.

For a more comprehensive analysis, Corrêa (1995) highlights the importance of investigating the territorial practices of different social groups, as these reveal how spaces are lived, used, and contested. The dynamics of power, therefore, not only influence decisions about space usage but also shape identities and relationships among communities within a specific geographical context. Thus, by introducing the concepts of territory and territoriality, Corrêa (1995) expands the understanding of geographical space, emphasizing its multifaceted nature and the multiple layers of meaning that make it a rich field for geographical and social analysis.

Moreover, Corrêa (1995) defends the idea that territory is not simply a physically delimited space, but a collective construction that is constantly evolving through dynamic interactions among the individuals and groups who inhabit it. He emphasizes that territorialization practices are fundamental to understanding how social actors establish control, influence, and organization over space. These practices are not limited to physical demarcation but also involve the imposition of cultural, political, and economic meanings upon the territory.

By considering the social relations and power structures involved in the formation and transformation of geographical space, Corrêa's (1995) approach provides a deeper and more sophisticated understanding. He argues that it is through these lenses that we can grasp the complexity of territorial

dynamics, in which conflicts, negotiations, and resistance continuously shape both physical and symbolic landscapes. Territoriality, therefore, not only reflects the physical occupation of space but also reveals the strategies and aspirations of various social actors who compete and collaborate in the construction of territory.

This integrated view of space, territory, and territoriality proposed by Corrêa (1995) challenges more simplistic and static approaches in geography, encouraging a more contextualized and sensitive analysis of the social and cultural dynamics that permeate the geographical environment.

Through this perspective, Corrêa (1995) offers a highly relevant contribution to contemporary geography. He not only introduces social, political, and economic elements into the analysis of space but also demonstrates how these aspects are essential for a comprehensive understanding of territorial dynamics. By integrating these elements, Corrêa significantly enriches the academic debate, providing deep insights that are fundamental both for research and for the practical application of the geographical discipline.

By recognizing that territory is not merely a physical setting but a product of human interactions imbued with meaning and power, Corrêa (1995) challenges traditional approaches that overlook the complexity of social and political relations in the configuration of geographical space. His analysis broadens the horizons of geography by highlighting how territorialization practices reflect and shape identities, aspirations, and conflicts across different spatial scales.

Thus, Corrêa's (1995) work not only offers a robust conceptual framework for understanding territory and territoriality but also inspires geographers and scholars from related disciplines to explore more deeply and critically the contemporary spatial dynamics. His ideas continue to be a source of inspiration and an essential starting point for those interested in unraveling the complex processes that define our geographical environments.

Geographical Space, Territorial Delimitation, Dimensions, and the Presence of Multiple Territories

A territory is more than simply a physically delimited space; it represents a defined and controlled area by social groups, within which specific activities are carried out and power strategies are applied. Territorialization, in turn, refers to the processes through which individuals and groups establish control, influence, and organization over this territorial space. According to Corrêa (1995), these actions are not limited to the physical demarcation of territory but also involve the imposition of symbolic meanings and social representations that assign value and identity to space.

By emphasizing this perspective, Corrêa (1995) highlights the complexity of territory as a dynamic and multifaceted phenomenon, shaped by social, political, and economic interactions over time. He argues that understanding territory requires not only the analysis of its physical and geographical

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characteristics but also a deep investigation into power relations, occupation and resistance strategies, and the symbolic representations that permeate these processes.

According to Corrêa (1995), territory is a space laden with meanings and disputes, in which different social actors engage in territorialization practices to assert their identities, interests, and forms of control over space. These practices are not only physical—such as the demarcation of borders and the construction of infrastructure—but also symbolic, through which cultural and political meanings are established that legitimize territorial claims.

In examining territorial dynamics, Corrêa (1995) emphasizes the importance of considering the strategies of occupation and resistance that shape territory. For him, understanding territory goes beyond analyzing its visible forms; it is essential to explore the underlying power relations, negotiations among social groups, and the processes of adaptation and transformation that occur over time.

In this context, the notion that territoriality can vary across different scales—from the local to the global—is discussed. Corrêa (1995) asserts that different social actors, such as individuals, collectives, organizations, and governments, possess distinct ways of perceiving and utilizing space. This results in the simultaneous existence of multiple territories and territorialities. By considering the interactions and conflicts among different scales and actors, the perspective of multi-territoriality enables a more detailed analysis of contemporary spatial dynamics (Corrêa, 1995).

Contemporary society is marked by the characteristic of multi-territoriality—the coexistence of various territories that shape identities and social relationships. This condition demonstrates the complexity and interaction of different spatial logics, in which diverse forms of territoriality coexist. Corrêa (1995) argues that this approach offers the opportunity to understand spatial relationships more deeply, taking into account both the various actors involved and their territorial strategies.

Thus, Corrêa's (1995) work provides a comprehensive view of contemporary territorial dynamics, emphasizing the importance of considering multiple scales and diverse forms of territoriality in the analysis of geographical space. His contributions are fundamental to understanding the power relations, identity, and control that permeate territories, enriching both academic and practical debates in political and social geography.

Space: Power and Control

Another central aspect in Corrêa's (1995) work is the connection between territoriality and power. He maintains that territorial control is an essential way of exercising power, encompassing both resources and the resident communities. Territorial power manifests in various forms, ranging from direct physical domination of space to symbolic and ideological influence, capable of shaping the perceptions and actions of individuals and social groups.

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Corrêa emphasizes that understanding territoriality requires an analysis of the strategies and practices employed by social actors to control and organize space. These strategies may include physical demarcation of boundaries as well as the use of symbols and narratives that reinforce legitimacy and control over a given territory. For him, territorial power is not limited to physical occupation but also involves symbolic and discursive disputes that are fundamental in the construction and maintenance of territorial identity (Corrêa, 1995).

By exploring the intersection between territoriality and power, Corrêa (1995) offers a profound analysis of the social and political dynamics that shape geographical space. His approach enables us to understand how different social actors use territory as a means to assert identities, establish relations of domination or resistance, and influence the living conditions of local communities. This perspective broadens our understanding of the complex interactions between space, power, and society in contemporary times.

Corrêa (1995) also highlights the relevance of scale in assessing territorial power and domination. He asserts that the dynamics of power and territorial strategies of social actors are influenced by a variety of geographical scales, from the local to the global. Considering both local and global aspects in the formation and transformation of geographical space allows for a more comprehensive understanding of spatial relations through a scaled approach.

Space: Identity and Representation

Corrêa (1995) offers a profound exploration of the themes of identity and representation within geographical space, emphasizing that space is not a neutral backdrop but an environment imbued with symbolism and social representations. For Corrêa (1995), territorial identities are not static; they are dynamic, emerging from the practices and representations of individuals and groups who assign unique meanings and values to the places they inhabit.

Image and narrative play fundamental roles in this process of forming territorial identities. According to Corrêa (1995), symbolic representation not only reflects but also constitutes power relations within geographical space. The way a place is represented directly influences perceptions and social interactions within it, shaping both collective and individual identities over time.

By examining represented spaces, it becomes possible to understand not only how identities are initially constructed but also how they are contested and transformed through social, political, and cultural dynamics. Corrêa (1995) emphasizes that representations are not merely passive reflections of reality; they are active agents in the continuous construction and reconstruction of territorial identities.

Therefore, Corrêa's (1995) analysis of identity and representation offers a critical and in-depth perspective on how geographical spaces are shaped and how meanings are attributed to them. This

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reflects an essential approach for understanding the complexity of social and spatial relations in contemporary geography.

COMPARISON BETWEEN THE APPROACHES OF MILTON SANTOS AND ROBERTO LOBATO CORRÊA

There are different approaches and conceptualizations of geographical space among authors and geographical schools. When comparing the concepts of Santos (2008) with those of Corrêa (1995), the differences between the authors also become evident. Santos focuses on the complexity and dynamism of space, understanding it as shaped by various products—social, economic, political, cultural, among others.

Corrêa (1995), on the other hand, views space as a manifestation of power and territoriality, which organize and reorganize both the physical space and the identities that inhabit it. For Santos (2008), geographical space has a systemic nature, in which everything that occurs is interconnected, with antecedents and consequences that reflect interactions in the world.

Santos (2008) emphasizes the dialectic between the local and the global, and between technique and information—categories that are crucial in the processes of transformation in contemporary society. In contrast, Corrêa (1995) highlights territory and territoriality as fundamental elements of geographical space. He argues that territory is not merely a physical space, but also a symbolic and social space, laden with meanings and symbolism. Territoriality, in turn, expresses the practices and strategies through which social groups seek to control and organize territorial space, thereby configuring power and territorial identities.

CONCLUSION

The analysis of the works of Milton Santos and Roberto Lobato Corrêa reveals that both authors offer complementary and enriching perspectives on the concept of geographical space. Santos emphasizes the dynamic complexity of space, highlighting how social, economic, and cultural interactions continuously shape the environment. Corrêa, on the other hand, focuses on the central role of power, territoriality, and identity in the configuration of space, underscoring the relationships of control and meaning that permeate territories.

The research objectives, which included comparing the approaches of Santos and Corrêa, were achieved, resulting in a deeper understanding of each author's contributions to the renewal of geographical science. The main findings demonstrate that while Santos invites us to view space as a social product in constant transformation, Corrêa draws attention to the political and social implications of territorial configuration.

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The contributions of this research are significant, as they provide theoretical and methodological foundations for a holistic understanding of geographical space and the processes that constitute it. Moreover, the comparison between the two authors enriches academic debate, offering tools for more complex analyses of contemporary spatial dynamics.

For future research, it is suggested to further investigate the intersection between Santos' and Corrêa's approaches, especially in the context of globalization and new technologies. Additionally, studies that address the practical implications of these theories in geographical practice and territorial planning may yield new insights and further contribute to the understanding of spatial dynamics in a constantly changing world.

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Noé da Silva Carvalho[1], Francisco Welton Machado[2], Edson Osterne da Silva Santos[3], Kennedy José Alves da Silva[4], Raimundo Lenilde de Araújo[5], Kaique Marlen da Conceição[6], Ruan Gabriel Linhares Chaves[7] and José Manoel Morais Silva[8]

[1] Holds a specialization in Brazilian Regional Geography from Faculdade de Venda Nova do Imigrante (FAVENI) and in Human and Social Sciences Applied to the World of Work, as well as Curriculum and Teaching Practice in the Early Years of Elementary Education, both from UFPI.
Master's student at the Federal University of Piauí (UFPI), through the Office of Graduate Studies (PRPG), the Center for Human Sciences and Letters (CCHL), and the Coordination of the Graduate Program in Geography (PPGGEO), Academic Master's in Geography
 – Class 14 (2024–2026).
E-mail: carvalhonoe614@gmail.com
LATTES: http://lattes.cnpq.br/7750716456039484
[2] Specialist in Development and the Environment (2012–2014).
Master's student at the Federal University of Piauí (UFPI), through the Office of Graduate Studies (PRPG), the Center for Human Sciences and Letters (CCHL), and the Coordination of the Graduate Program in Geography (PPGGEO), Academic Master's in Geography
– Class 14 (2024–2026).
E-mail: wmachado-2011@hotmail.com
LATTES: http://lattes.cnpq.br/3652789785115922
[3] Specialist in Human and Social Sciences Applied to the World of Work (CEAD/UFPI/SEB/MEC).
Master's student at the Federal University of Piauí (UFPI), through the Office of Graduate Studies (PRPG), the Center for Human Sciences and Letters (CCHL), and the Coordination of the Graduate Program in Geography (PPGGEO), Academic Master's in Geography
– Class 14 (2024–2026).
E-mail: Edsonosterne23@gmail.com
LATTES: http://lattes.cnpq.br/4318087538278709
[4] Specialist in Sustainable Development and the Environment (2012); Teaching Sociology for High School, offered by the State University of Piauí (UESPI, 2016); and in Natural Sciences, Their
Technologies, and the World of Work, offered by UFPI (2022).
Master's student at the Federal University of Piauí (UFPI), through the Office of Graduate Studies (PRPG), the Center for Human Sciences and Letters (CCHL), and the Coordination of the Graduate Program in Geography (PPGGEO), Academic Master's in Geography
– Class 14 (2024–2026).
E-mail: profkjose@gmail.com
LATTES: http://lattes.cnpq.br/6486047277790904
[5] Postdoctoral Research (2024, IGOT/ULISBOA). Ph.D. in Brazilian Education and Master's in Development and Environment (UFC). Specialist in Geography Teaching and Graduate in Geography – Licentiate (UECE). Associate Professor III at the Federal University of Piauí (UFPI), teaching in the Geography Licentiate program (Undergraduate) and in the Graduate Program in Geography/Master's/UFPI.
E-mail: raimundolenilde@gmail.com
LATTES: http://lattes.cnpq.br/7741473553613369
[6] Geography Licentiate from the State University of Maranhão.
E-mail: kaiquemarlen87@gmail.com
LATTES: http://lattes.cnpq.br/9041722079548251
[7] Geography Licentiate from the State University of Maranhão.
E-mail: ruangabriellinhares75@gmail.com
LATTES: http://lattes.cnpq.br/0938924424844344
[8] Geography Licentiate from the State University of Maranhão.
E-mail: josemanoelcx14@gmail.com
LATTES: http://lattes.cnpq.br/8297487088103418

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ABSTRACT

Brazil presents one of the largest land inequalities in the world, reflected in the concentration of land and related social conflicts. This research investigates how the theme of agrarian reform is approached in Geography education in the municipality of Barras-PI, considering the importance of this theme for critical and citizenship-oriented education. The main objective was to analyze the pedagogical practices and teaching materials used in Geography education, evaluating how they promote critical reflections on the local reality and contribute to students' understanding of agrarian reform. The methodology adopted a mixed approach, including bibliographic research and the application of questionnaires to Geography teachers in the final years of elementary school in rural schools, in addition to the analysis of the textbooks used. The results pointed to significant challenges, such as the superficiality of content in textbooks, the lack of specific training on the topic, and the predominant use of traditional methodologies. Despite this, complementary practices, such as debates and visits to settlements, stood out as strategies to connect students to the local reality and promote engagement with the topic. It was concluded that, although there are structural and pedagogical barriers, there is potential to improve the teaching of agrarian reform through investments in teacher training, the adoption of contextualized teaching materials, and the diversification of methodologies. These changes can strengthen the transformative role of Geography education in the formation of critical and engaged citizens.

Keywords: Geography education; Agrarian reform; Textbook; Teaching practice.

INTRODUCTION

Brazil is widely recognized as one of the most unequal countries in the world, and this inequality is a structural feature of its reality. It manifests in various forms, such as the sharp concentration of wealth in the hands of a small portion of the population, land concentration, violence, housing deficits, hunger, and many other situations that reflect the country's social and economic disparity.

Stédile (1997) emphasizes that the distribution of land in Brazil, initiated during the colonial period with the hereditary captaincies and the sesmaria system, and consolidated by the enactment of the Land Law of 1850 (Law No. 601), constitutes the structural basis of underdevelopment, social inequalities, poverty, and the various forms of exclusion that characterize Brazilian society.

While countries currently considered developed, such as those in Europe and the United States, adopted an opposite path, access to land was more democratic. Stédile (1997) highlights that, in the case of the United States, it was sufficient for each family to occupy and cultivate the land to guarantee the right of possession, with a limitation of up to 100 acres per family.

According to Veiga (1981), "[...] the modification of the agrarian structure of a country or region with a view to a more equitable distribution of land and agricultural income is the most common definition of agrarian reform." In this sense, when fully implemented, agrarian reform emerges as an instrument with the potential to confront and overcome inequalities and social injustices in Brazil.

Geography, as a critical discipline with a transformative role, must address this theme in depth, fostering a more critical perspective among students. This enables them to understand the importance and role of effective agrarian reform as an instrument to break with inequalities and address social issues. Penteado (2010) asserts that Geography plays a fundamental role in shaping critical citizens, as it aids in understanding the society in which one lives, recognizing oneself as a social agent, and identifying and understanding the processes that influence and shape social organization.

The National Curriculum Parameters (PCN) establish guidelines for teaching in basic education schools in Brazil, defining content and pedagogical approaches for various subjects. Regarding Geography, the PCNs present in thematic axis III, called "The Countryside and the City as Socio-spatial Formations," guidelines for addressing agrarian reform, aiming to promote reflection on the relationships between rural and urban spaces and their transformations throughout history. Meanwhile, the National Common Curricular Base (BNCC) does not treat agrarian reform as a specific theme but incorporates related issues within the context of citizenship education and sustainable development.

In this context, the present research seeks to investigate how agrarian reform and its impacts on rural settlements are addressed in Geography education in Barras-PI. This municipality, marked by a history of numerous land tenure conflicts, currently has 39 rural settlements in the 21st century. However, little progress and success have been observed in the projects developed in the region. Thus, it is expected

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that Geography teachers, as far as possible and in accordance with their critical role, contextualize the problems of students' reality and explore this theme in depth, promoting a more consistent and transformative reflection. Nevertheless, it is important to emphasize that teachers should not bear this responsibility alone.

The main objective of this research is to analyze how the theme of agrarian reform is addressed in Geography education in the municipality of Barras-PI, with an emphasis on the use of teaching materials and teaching practices. The specific objectives of the research were: (I) to identify the pedagogical practices of Geography teachers; (II) to examine the quality and contextualization of teaching materials. This analysis seeks to understand how Geography teachers in the municipality contextualize the local reality and how this is reflected in the teaching-learning process. Furthermore, the research also aims to identify the limitations and potentialities of the teaching materials used, as well as the critical stance adopted by teachers when addressing social and spatial issues related to agrarian reform.

Therefore, this research is of great relevance, considering the historical background of land inequality in Brazil, which is reflected in various social and economic spheres. The country has one of the highest concentrations of land in the world, generating conflicts and perpetuating poverty in many regions, especially in rural areas such as Barras. It is hoped, therefore, to contribute to a more meaningful pedagogical practice in this context, capable of awakening in students a critical view of the reality in which they live and the transformative role of agrarian reform in combating social inequalities and injustices.

METHODOLOGY

This research is descriptive and exploratory in nature, grounded in an approach that integrates both qualitative and quantitative methods. It was complemented by the use of data collection techniques, with emphasis on bibliographic research. According to Prodanov and Freitas (2013), bibliographic research is developed from materials already published, encompassing sources such as books, journals, scientific articles, newspapers, bulletins, monographs, dissertations, theses, cartographic materials, and online content. This provided a more consistent theoretical foundation.

Questionnaires were also administered to six Geography teachers who teach in the final years of elementary school (6th to 9th grades) in schools located in rural areas of Barras-PI. Among these schools, four are situated in settlements resulting from agrarian reform. The questionnaires were designed to understand how Geography teachers address the theme of agrarian reform in their pedagogical practices, as well as to identify the challenges faced and the strategies adopted in teaching in rural areas. The questions sought to explore relevant aspects such as teacher training, classroom methods, and available resources. Among the questions were: how teachers assess their training to address topics related to

agrarian reform, how they approach this theme in their classes, and whether the textbooks used include content on agrarian reform.

In addition, an analysis was conducted of the Geography textbooks used in the final years of elementary education (6th to 9th grades) in the schools surveyed. It was identified that the adopted collection is Jovem Sapiens, published by Editora Scipione and organized by Bruna Migotto Barbieri Estruzani. Through this analysis, the study sought to understand how the theme of agrarian reform is addressed in these materials, evaluating the depth of the content and its relationship with the reality of students in rural areas.

RESULTS AND DISCUSSION
TEACHING PRACTICES AND AGRARIAN REFORM

The data collected through the questionnaire applied to six Geography teachers working in the final years of elementary education in Barras-PI revealed information about teacher training, pedagogical practices, and challenges in teaching the topic of agrarian reform. Half of the teachers hold a degree in Geography, while the other half complemented their education with postgraduate studies in the field. This training is important; however, even so, teachers' self-assessment regarding their preparation to address the topic of agrarian reform is moderate. While 50% consider their training "slightly adequate," 33.3% classify it as "adequate," and only 16.7% as "very adequate," as shown in Graph 1.

Graph 01: Teachers' perception of their training to address agrarian reform in Geography education

Source: Author, 2024

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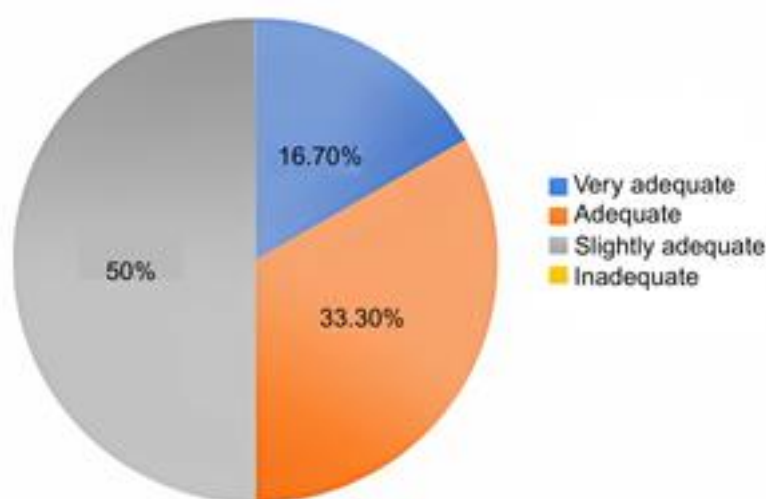
The data show that although no teacher considers their training completely inadequate for teaching agrarian reform, 50% consider it slightly adequate and only 16.7% see it as very adequate. This indicates weaknesses in both initial and continuing education, suggesting the need for greater investment in including this topic in curricula and pedagogical practices.

In summary, these findings demonstrate that although there is basic training in the field, there may be a lack of specific depth on the topic of agrarian reform. Menezes and Kaercher (2015) emphasize that teachers, as social agents and promoters of change, need training that enables them to deal with a constantly globalized world full of complex and diverse issues. While the importance of teacher training as a social agent and promoter of change is recognized, it is crucial to question whether this training is truly sufficient to address the complexity of a globalized world. Training must go beyond the basics, addressing contemporary issues in depth. It is widely agreed that preparation is essential, but it is also necessary to ensure that this training is robust and practical.

Regarding the second question, of the six teachers surveyed, one (16.7%) reported never having addressed the topic of agrarian reform in the classroom. The omission, neglect, or simple act of "skipping" such an important subject for understanding our reality can perpetuate a knowledge gap in students' lives, causing future harm in exams and limiting their critical view of the context in which they live, as shown in Graph 2.

Graph 02: Teachers who have addressed the topic of agrarian reform in their classes
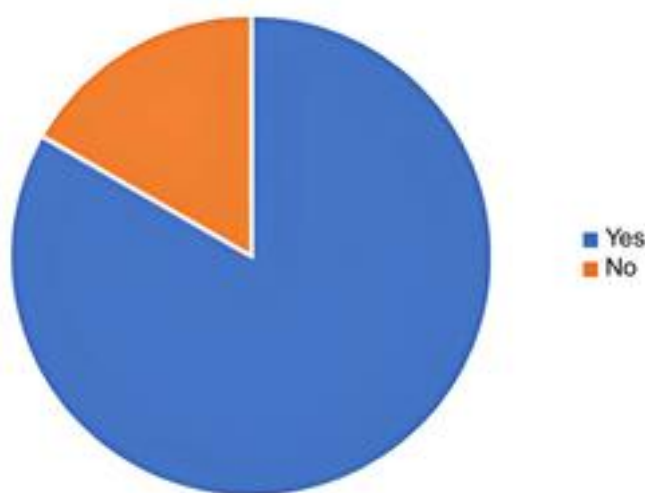
Source: Author, 2024

A Geography teacher must have the ability to connect the subject's content with real-world and current events. This ability can undoubtedly transform the way students perceive Geography, both as a

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school subject and as a way of understanding the world. On the other hand, the absence or denial of certain content can compromise the education of an entire generation of critical, conscious, and active citizens. Kimura (2008) stresses that it is essential for the teaching of geographic knowledge to be developed in a contextualized manner, offering students different perspectives on a specific issue and proposing problems for analysis.

In terms of pedagogical practices, 83.3% of teachers use lectures and promote debates or discussion circles to address the topic, and 50% complement these with the analysis of local cases, especially those related to agrarian reform settlements in the region. These strategies show efforts to contextualize the content to students' daily lives, but the predominance of traditional methodologies, such as lectures, indicates the need to diversify approaches to foster greater engagement and active participation by students. Libâneo (2008) emphasizes that traditional teaching, based exclusively on verbal transmission of information and learning as mere accumulation of knowledge, is no longer sufficient. It is essential for the teacher to act as a mediator, promoting an active relationship between the student and the content addressed. This process must consider students' experiences, meanings, cognitive potential, abilities, interests, and ways of thinking and working.

Regarding teaching materials, 50% of teachers indicated that the textbooks used address the topic superficially, while 33.3% stated that the topic is not covered. Only 16.7% believe that the books provide detailed content on agrarian reform. Teachers reported that this limitation is partially mitigated by the use of supplementary materials, such as articles and videos, which are used by half of the teachers. This reliance on additional materials points to the need to improve the textbooks adopted, making them more aligned with the local reality and the topic in question. According to Castellar and Vilhena (2010), the textbook remains an essential resource in teaching but should be used as support to enrich content with other activities and texts. Thus, it is important for teachers to understand their pedagogical objectives and relate them to everyday life, making learning more meaningful.

According to teachers' responses, 50% used the textbook as the main resource in their classes. The others were equally divided among supplementary materials such as articles and videos (16.7%), practical activities such as visits and debates (16.7%), and other unspecified methods (16.7%). Castellar and Vilhena (2010) highlight that when used inappropriately, focusing only on memorization, the textbook limits the potential for deepening and expanding students' knowledge.

Regarding student interest, 50% of teachers reported that students show engagement with the topic but also acknowledged that many have little familiarity with the issue of agrarian reform. This information points to the need to further contextualize teaching, using local examples and promoting activities that connect academic content to students' experiences. The inclusion of visits to rural settlements, considered important by 100% of teachers, can significantly enrich the teaching-learning

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process. In this context, field classes in these rural spaces present themselves as a highly interesting alternative to promote content contextualization, especially because students are directly inserted in this environment. According to Piaget (1993), knowledge is constructed through interaction with the environment, which reinforces the importance of field classes as a tool for understanding both the environment and scientific content, as these are intrinsically linked to geographic space and the relationships that develop within it.

The challenges identified by teachers include the lack of adequate teaching materials (100%), insufficient time to work on extracurricular topics (33.3%), lack of interest from some students (33.3%), and the absence of specific training on the subject (33.3%). Despite these difficulties, teachers acknowledged the transformative potential of teaching about agrarian reform. They noted that addressing this topic stimulates reflections on social inequalities, connects content to local reality, and contributes to students' civic education—these aspects were considered essential by 83.3% of teachers.

In this scenario, school Geography assumes a transformative role by contributing to critical and civic education. For Esteves (2006), Geography should go beyond memorization and the location of isolated facts, adopting the analysis of reality as a starting point. This approach enables students to understand more complex and distant phenomena while developing a critical capacity for analysis.

THE APPROACH TO AGRARIAN REFORM IN TEXTBOOKS

The municipal education network of Barras-PI uses the Geography textbooks from the Jovem Sapiens collection, published by Editora Scipione and organized by Bruna Migotto Barbieri Estruzani. This collection aims to align with the guidelines of the National Common Curricular Base (BNCC), addressing the general skills and competencies expected for each stage of elementary education. However, the analysis of how the topic of agrarian reform is treated in the volumes intended for the final years (6th to 9th grades) reveals considerable variation in depth and contextualization, as shown in Figure 1.

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Figure 1 –Textbooks from the PNLD Jovem Sapiens Collection

Source: Editora Spicione, 2024

For the 6th grade, the textbook does not address the topic of agrarian reform. This absence may be understandable within curricular guidelines but reflects a missed opportunity to introduce, in a simple and adapted way, fundamental concepts about land structure and rural space. Introducing this topic, even superficially, could prepare students for more in-depth discussions in later years. According to Vygotsky (1988), from a sociocultural perspective, concept formation in education occurs through the interaction between students' everyday knowledge and the systematized knowledge offered by the school environment. Thus, in Geography teaching, it is necessary to adopt a sequential and progressive approach that respects students' contexts and promotes the connection between content and lived reality.

In the 7th grade, the textbook addresses agrarian reform in a moderate way. The content includes explanations about Brazil's land structure, land concentration, and the impacts of this reality, such as deforestation and agrarian conflicts. It also discusses social movements, such as the MST, and government actions related to agrarian reform. The proposed activities encourage debates and reflections, connecting the topic to concrete problems such as land inequality and underutilization. Despite this approach, the content lacks deeper critical and historical analysis, limiting itself to a basic exposition of facts.

The inclusion of graphs, such as the distribution of rural establishments by size, can be considered a positive point, as it provides concrete data for analysis. However, the absence of practical activities that promote greater interaction with local reality, such as visits to rural settlements or specific case studies, may limit student engagement. In this sense, Santos (1996) highlights the importance of promoting a critical understanding of the relationships between society and space, considering factors such as culture,

economy, politics, and the environment. The author advocates overcoming descriptive approaches in Geography, emphasizing the analysis of socio-spatial inequalities, power relations, and urban and rural dynamics, with the aim of encouraging students to understand the impact of these aspects on their lives and communities.

In the 8th grade, the textbook addresses agrarian reform within the historical and geopolitical context of the Cuban Revolution, mentioning it as one of the transformative actions carried out by the socialist government after 1959. The content briefly discusses how poor land distribution generated social movements demanding agrarian reform in Latin American countries, including Brazil. Additionally, there is a proposal for contextualization, encouraging students to identify rural settlements in their region.

This approach presents an interesting perspective by connecting the topic to an international context but lacks a more in-depth analysis of Brazilian specificities and the contemporary challenges of agrarian reform in the country. According to Ferreira (2023), an adequate organization of Geography teaching helps students understand the interactions between the global and the local, as well as the socioeconomic inequalities and globalization processes that impact different regions of the world.

In the 9th grade, the textbook does not address the topic of agrarian reform, as the BNCC also does not include it in this grade. However, this absence represents a missed opportunity to revisit and deepen discussions on the topic, as students are more prepared for critical and complex reflections. The process of assimilation and retention of content is continuous; in this sense, Kimura (2008) emphasizes that learning facilitates the assimilation of new information, as it integrates into a constantly evolving cognitive framework, serving as a reference for future incorporations. This process occurs actively, through interaction between the individual and the environment.

CONCLUSION

Agrarian reform, despite its importance as a social and political issue, still faces barriers to being properly incorporated into Geography education in the final years of elementary school in the municipality of Barras-PI. The research revealed that teachers encounter challenges such as the absence of specific teaching materials, lack of time to address extracurricular topics, limitations in teacher training, and textbooks that are poorly suited to the specificities and daily realities of students. Nevertheless, the efforts of teachers who seek to contextualize the topic using complementary methodologies and activities that connect content to students' realities are noteworthy.

The research objective—to analyze how agrarian reform is addressed in Geography education—was achieved by identifying both the potentialities and the gaps in pedagogical practices and the materials used. The findings show that while some pedagogical practices succeed in fostering critical reflections, the predominance of traditional methodologies may limit student engagement. Furthermore, the

superficial treatment of the topic in the textbooks used in the schools studied highlights the need for adaptations that promote greater depth and connection with local realities.

The study also revealed that the absence of content on agrarian reform in certain grades, such as the 6th and 9th, represents a missed opportunity to prepare students for broader and more critical discussions. However, the complementary practices implemented by teachers, such as discussion circles and visits to rural settlements, demonstrate the potential of this topic to develop a civic and critical perspective among students.

In short, Geography education in Barras-PI presents structural and pedagogical limitations that need to be overcome for the topic of agrarian reform to be addressed in a meaningful and transformative way. To achieve this, it is necessary to invest in continuing teacher education, adopt more contextualized teaching materials, and expand the use of active methodologies that promote student interaction with their reality. In this way, Geography education can contribute more effectively to the formation of critical citizens capable of understanding socio-spatial inequalities and acting in the construction of a fairer and more equitable society.

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TRAILS AND WATERFALLS IN PEDRO II: DIDACTIC DEVICES AS A METHODOLOGICAL PROPOSAL FOR OUTDOOR ACTIVITY PRACTICES

Edson Osterne da Silva Santos[1], Raissa de Almeida Sousa[2], Francisco Welton Machado[3], Kennedy José Alves da Silva[4] and Noé da Silva Carvalho[5]

ABSTRACT

The use of educational tools can help in understanding the geographical spaces of fieldwork, promoting meaningful learning and moving away from traditional approaches. In this regard, this research focuses on highlighting the benefits of outdoor activities for people's well-being, especially with the support of educational devices that utilize geographic coordinates. The research methodology analyzed the 8.5 km trails of the Waterfall Circuit in Pedro II, Piauí, in 2022, using photographic records, educational tools like Relive, Strava, and the creation of a map in QGIS. The study also includes interviews about safety and the use of technologies, emphasizing the importance of guides, with key authors including Capra (2006) and Santos (1996), and the analysis of experiences followed a Vygotskian logic. The overall objective is to relate the experience of the trails and waterfalls in Pedro II to the practice of physical

[1] Specialist in Human and Social Sciences Applied to the World of Work
(CEAD/UFPI/SEB/MEC)
Master's student at the Federal University of Piauí (UFPI), through the Office of Post Graduate Studies (PRPG), Center for Human Sciences and Letters (CCHL), and the
Post Graduate Program in Geography (PPGGEO), Academic Master's in Geography
– Class 14 (2024–2026)
E-mail: edsonosterne23@gmail.com
LATTES: http://lattes.cnpq.br/4318087538278709
[2] Bachelor's in Physical Education from Universidade Paulista (UNIP), Teresina, Piauí
E-mail: raialmeida75@gmail.com
[3] Specialist in Development and the Environment (2012–2014)
Master's student at the Federal University of Piauí (UFPI), through the Office of Post Graduate Studies (PRPG), Center for Human Sciences and Letters (CCHL), and the Post Graduate Program in Geography (PPGGEO), Academic Master's in Geography
– Class 14 (2024–2026)
E-mail: wmachado-2011@hotmail.com
LATTES: http://lattes.cnpq.br/3652789785115922
[4] Specialist in Sustainable Development and the Environment (2012), Teaching Sociology for High School at the State University of Piauí (UESPI, 2016), and Natural Sciences,
Their Technologies, and the World of Work at UFPI (2022)
Master's student at the Federal University of Piauí (UFPI), through the Office of Post Graduate Studies (PRPG), Center for Human Sciences and Letters (CCHL), and the Post Graduate Program in Geography (PPGGEO), Academic Master's in Geography
– Class 14 (2024–2026)
E-mail: profkjose@gmail.com
LATTES: http://lattes.cnpq.br/6486047277790904
[5] Specialist in Brazilian Regional Geography from Faculdade de Venda Nova do Imigrante (FAVENI) and in Human and Social Sciences Applied to the World of Work, as well as Curriculum and Teaching Practice in the Early Years of Elementary Education, both from UFPI
Master's student at the Federal University of Piauí (UFPI), through the Office of Post Graduate Studies (PRPG), Center for Human Sciences and Letters (CCHL), and the Post Graduate Program in Geography (PPGGEO), Academic Master's in Geography
– Class 14 (2024–2026)
E-mail: carvalhonoe614@gmail.com
LATTES: http://lattes.cnpq.br/7750716456039484

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activity, exploring the interaction between geographical space and practical experience. The results and discussion highlighted that trails and physical activities can promote health, environmental awareness, and sustainable tourism, provided there is an emphasis on the importance of conserving these spaces. Therefore, the integration of didactic devices aligned with environmental awareness enriches the teaching-learning process in Geography.

Keywords: Meaningful learning; Outdoor activities; Waterfall circuit; Didactic devices; Geography.

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INTRODUCTION

The use of didactic devices such as Relive, Strava, and maps in QGIS allows for the establishment of guidelines for fieldwork and facilitates the understanding of fundamental concepts, transforming practice into an observation laboratory. This approach moves away from traditional Geography, which is centered on memorization, and promotes meaningful learning, essential for building geographical reasoning and valuing individual experiences.

The research hypothesis suggests that the experience on the trails improves participants' quality of life by integrating learning with the environment. Thus, this innovative methodology emphasizes the interaction of the individual with nature, contributing to a richer and more engaged social formation.

The choice of the Waterfall Circuit in Pedro II as the object of study is justified by its natural richness and tourism potential. The research aims to explore how the use of technologies and didactic devices can enrich the learning experience in field activities, in addition to contributing to the improvement of participants' quality of life. The relevance of the topic is accentuated by the need for geographic education that integrates theory and practice, promoting a deeper understanding of geographic space.

How can the integration of didactic devices and practical experiences on natural trails transform learning in Geography? What are the impacts of this approach on the safety and well-being of participants, especially beginners? And in what ways can these outdoor experiences contribute to the development of healthy habits and a greater connection with the environment?

The main objective of this work is to relate the experience of the trails and waterfalls in Pedro II to the practice of physical activity, exploring the interaction between geographic space and practical experience. Specifically, it seeks to: (I) Investigate how didactic devices such as Relive and Strava influence learning and safety on the trails; (II) Assess the benefits of outdoor activities for individuals' physical and mental well-being; (III) Analyze the importance of experienced guides in trail practice, especially for beginners; (IV) Discuss the relationship between practical experience in Geography and the formation of a more critical environmental awareness.

METHODOLOGY

The research is classified as applied, with a qualitative approach and bibliographic foundation. It describes and explains the stages of the study, which included in loco photographic records and the creation of a map in QGIS, representing the trails carried out in 2022 in the Waterfall Circuit, in Pedro II. The main focus was to contemplate the experience related to the natural aspects of the region, using different didactic devices.

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The study was descriptive and based on the researcher's experiences, complemented by an interview conducted with a Physical Education professional on the day of the trails. The questions addressed recommendations to ensure the safety and well-being of beginners on trails, as well as perceptions regarding the use of technologies such as Strava and Relive in physical activities. The responses obtained are discussed throughout the chapter.

This approach is justified by the need to consider the concerns of students, teachers, and guardians when carrying out outdoor activities such as trails. Consulting experienced professionals or guides is essential to minimize risks, recognizing that these activities involve both benefits and challenges.

The research includes a section dedicated to discussing the different didactic devices used, as well as the representation of the route in the Waterfall Circuit, developed with QGIS. To enrich the geographical reflection, an experiential report from the researcher was incorporated, considering the Vygotskian logic in the construction of concepts such as consciousness, perception, memory, and thought (Morais, 2021). Two books were also used as references: The Web of Life by Capra (2006) and The Nature of Space by Milton Santos (1996).

Conducted in the Waterfall Circuit in Pedro II, Piauí, in 2022, the research involved trails of approximately 8.5 km. During these activities, devices such as Relive, Strava, and maps created in QGIS were used. Data collection included photographic records and interviews, which were analyzed qualitatively. Participants' experiences were compared with the theoretical foundation, using Vygotskian logic to understand psychological development during the activities. The research adhered to ethical guidelines, ensuring participants' consent and enabling a comprehensive understanding of the impacts of outdoor activities on learning and well-being.

RESULTS AND DISCUSSION

The use of trails and the encouragement of physical activity in geographic spaces in a conscious manner offer significant benefits for health, the environment, the local economy, social cohesion, and community education. This holistic approach can drive regional development sustainably, in addition to improving the population's quality of life.

According to Costa and Silva (2007), adopting a healthy lifestyle through physical exercise provides individuals with greater resistance to stress, emotional stability, motivation, work efficiency, as well as improvements in self-image and interpersonal relationships. Kelley and Kelley (2013) also highlight that the practice of physical exercise contributes to health and quality of life, promoting improvements in cardiorespiratory fitness, body composition, and psychosocial well-being.

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INTERVIEW WITH THE PHYSICAL EDUCATION PROFESSIONAL

In an interview with a Physical Education professional, recommendations were addressed to ensure the safety and well-being of beginners during trails in natural environments. The professional emphasized the importance of starting with easy routes and progressing gradually. It is essential to carry offline maps, energy snacks such as dried fruits and cereal bars, as well as water, to maintain energy during the activity. It is also crucial to avoid leaving traces in nature by collecting all waste. Proper preparation with essential equipment such as a backpack, appropriate footwear, and a first-aid kit is vital to ensure a safe and enjoyable experience.

For any field activity, a minimum level of prior preparation is necessary. In the Waterfall Circuit in Pedro II, for example, boots, sneakers, caps, light backpacks, water bottles, and energy snacks were used. This preparation is vital for the success of the trails, as illustrated in Figure 1

Figure 1 – Use of equipment for field trails
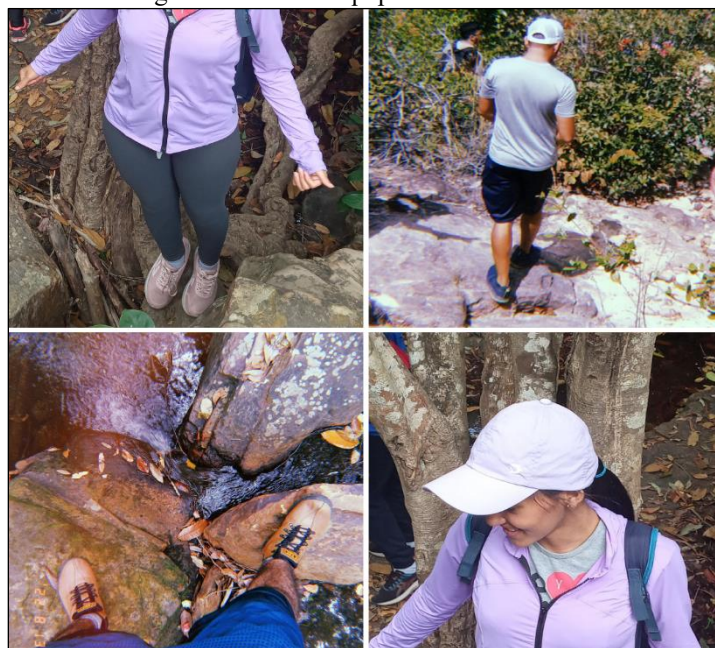
Source: Authors, 2022.

In the second question, the Physical Education professional was asked about the integration of technologies such as Strava and Relive in the practice of physical activities on trails and their impact on the user experience. She emphasized that these applications have significantly contributed to physical and mental well-being, as they provide greater safety for users during trails. With tools that allow performance monitoring, experience sharing, and connection with a community of practitioners, these applications enrich the outdoor experience. Furthermore, they offer valuable geographic data that help users orient themselves and stay focused on activities.
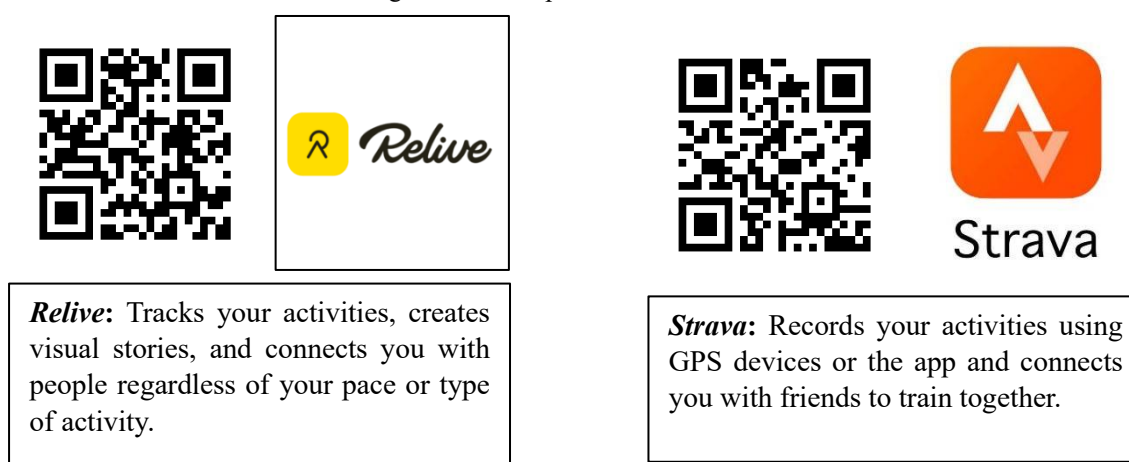
Technology can be applied in various field activities, being extremely useful by saving time and attention. The information generated by these applications can also be used in future academic work, as they offer resources such as offline maps and detailed data about the trails.

DIFFERENT DIDACTIC DEVICES

There are different types of applications that assist in trail practices, providing valuable resources for users. Among them, Relive and Strava stand out, offering specific functionalities to enhance the outdoor experience and ensure a safer and more rewarding practice (Figure 2).

Figure 2 – Examples of didactic devices

Relive: Tracks your activities, creates visual stories, and connects you with people regardless of your pace or type of activity.

Strava: Records your activities using GPS devices or the app and connects you with friends to train together.

Source: Authors, 2024.

INTEGRATING PSYCHOLOGICAL AND THEORETICAL CONCEPTS INTO EDUCATIONAL PRACTICE

During the integrated recognition of the landscape, two fundamental books were considered: The Web of Life: A New Scientific Understanding of Living Systems by Capra (2006) and The Nature of Space: Technique and Time, Reason and Emotion by Milton Santos (1996). The formation of participants' concepts was carried out collaboratively, using Vygotskian logic (Morais, 2021), as illustrated in the conceptual system presented in Figure 3. This approach enabled a deeper understanding of the interactions between landscape elements and the concepts discussed.

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Figure 3 – Integration of psychological and theoretical concepts into educational practice
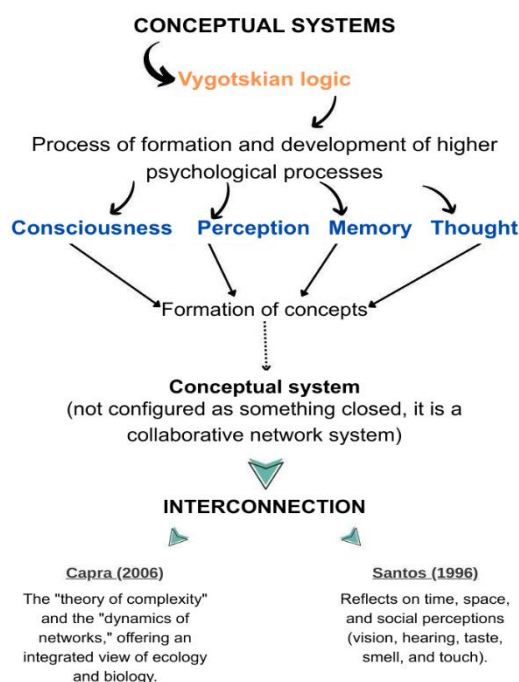
Source: Authors, 2024.

Figure 3 addresses the interrelationship between various psychological and theoretical concepts, such as consciousness, perception, and memory, within the context of Vygotskian logic and conceptual systems. Capra's (2006) "theory of complexity" and Santos' (1996) reflection on time and space emphasize the importance of an integrated view that connects ecology, biology, and social perceptions.

When deepening the integrated study of the landscape, we encounter Bertalanffy's (2014) systems theory, which highlights the interconnection between society and nature. The concept of the Geosystem, developed by Sotchava, Bertrand, and Tricart in the 1960s, integrates natural, social, and cultural elements. Sotchava (1977) addresses three dimensions of analysis, Bertrand (1972) focuses on interactive dynamics, and Tricart (1977) explores environmental ecodynamics. Christofoletti (1998) relates the "environment" to the geosphere and biosphere, leading to the concept of Geoecology, applicable to geosystemic studies.

These concepts underpin the use of didactic devices such as Relive, Strava, and QGIS, which guide fieldwork and promote meaningful learning. Thus, the use of practical classes or technical visits in loco becomes an essential methodological proposal for this praxis.

RESEARCHER'S EXPERIENCE REPORT

In the Waterfall Circuit, the trail began at Morro do Gritador. After 2 km of walking, the first stop was at the waterfall viewpoint. Then, 400 meters further to Buriti Waterfall, followed by 500 meters to Samambaia Waterfall, and then 200 meters to Lajeiro Waterfall. The trail continued for 1.5 km to Urubu

Rei Waterfall, followed by a 2.5 km walk to the Rancho do Dino leisure area, where it was possible to rest and have a snack. The return to Morro do Gritador was made by car, totaling 8.5 km of walking on a difficult-level route that lasted the entire day. A map was created based on this route, as shown in Figure 4.

Figure 4 – Map of the location of the Waterfall Circuit trails in Pedro II (Original PT-BR)
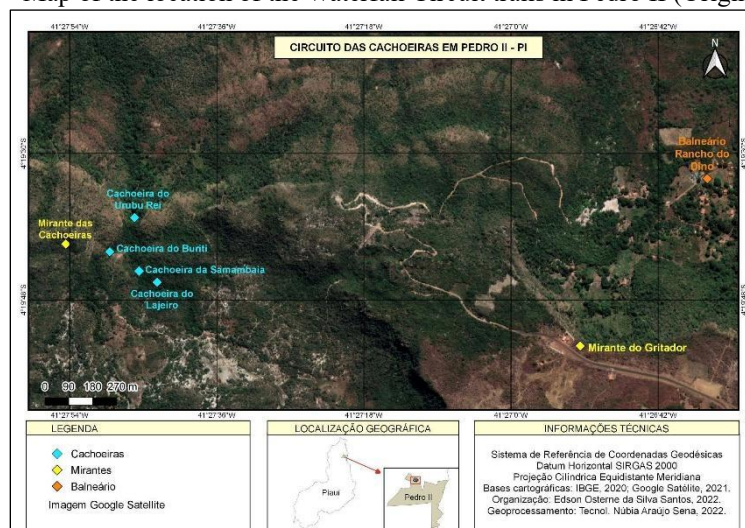
The Waterfall Circuit in Pedro II – PI features four waterfalls — Urubu Rei, Buriti, Samambaia, and Lajeiro — along with two viewpoints, the Waterfalls Viewpoint and the Gritador Viewpoint, and the Rancho do Olho d'Água Spa. On the map, waterfalls are marked in blue, viewpoints in yellow, and the spa in orange, based on Google Satellite imagery.
Source: QGIS, 2022. Authors, 2022.

One of the main results of the research was that the integration between theory and practice, through the use of maps in QGIS, significantly improved the researcher's performance. It is concluded that this combination is fundamental to promoting balanced and inclusive development in a given geographic area, in line with the interdisciplinary approach presented in this work. Regarding the first trail route, according to Barros et al. (2014, p. 31), it refers to the Gritador Viewpoint:

> [...] it offers a view of the contact between the escarpment (Serra Grande Group, Jaicós Formation) of the Pedro II plateau and the planation surface, at the top of the Serra dos Matões. It corresponds to a canyon about 280 meters deep, at an altitude of 739 meters above sea level. From the viewpoint, one can have a privileged view of the valleys divided among Pedro II, Piracuruca, and Domingos Mourão. Throughout the valley, native vegetation and immense rock walls can be observed. The name "Gritador" comes from the echo produced by the sound bouncing off the geological structure of the walls, and, whether fact or legend, it is said that the communities living at the top and base of the hill used to communicate by shouting. The name derives from the production of echoes that reproduce the sound of a shout.

The viewpoint of the Serra Grande Group escarpment, located in Pedro II, offers a stunning view of a canyon that extends from 280 to 739 meters in altitude. The site displays valleys and native vegetation, and the name "Gritador" refers to the echo generated by the rock walls, which allowed

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communities to communicate through shouts. Morro do Gritador can be seen in Figure 5, where the trails highlighted in Map 1 of Figure 4 also begin.

Figure 5 – Photograph of the Gritador Viewpoint

Source: Authors, 2022.

Experiencing new interactions with nature manifests uniquely for each individual, although the benefits associated with this interaction are widely recognized. During the exploration of some trail sections, evidence of the benefits of contact with the natural environment was identified, as illustrated in Figure 6. The phrase "There is no Wi-Fi in nature, but you will find a much better connection" went viral on social media and is often associated with Pedro II.

Figure 6 – Reflective phrase about the habit of connecting with nature

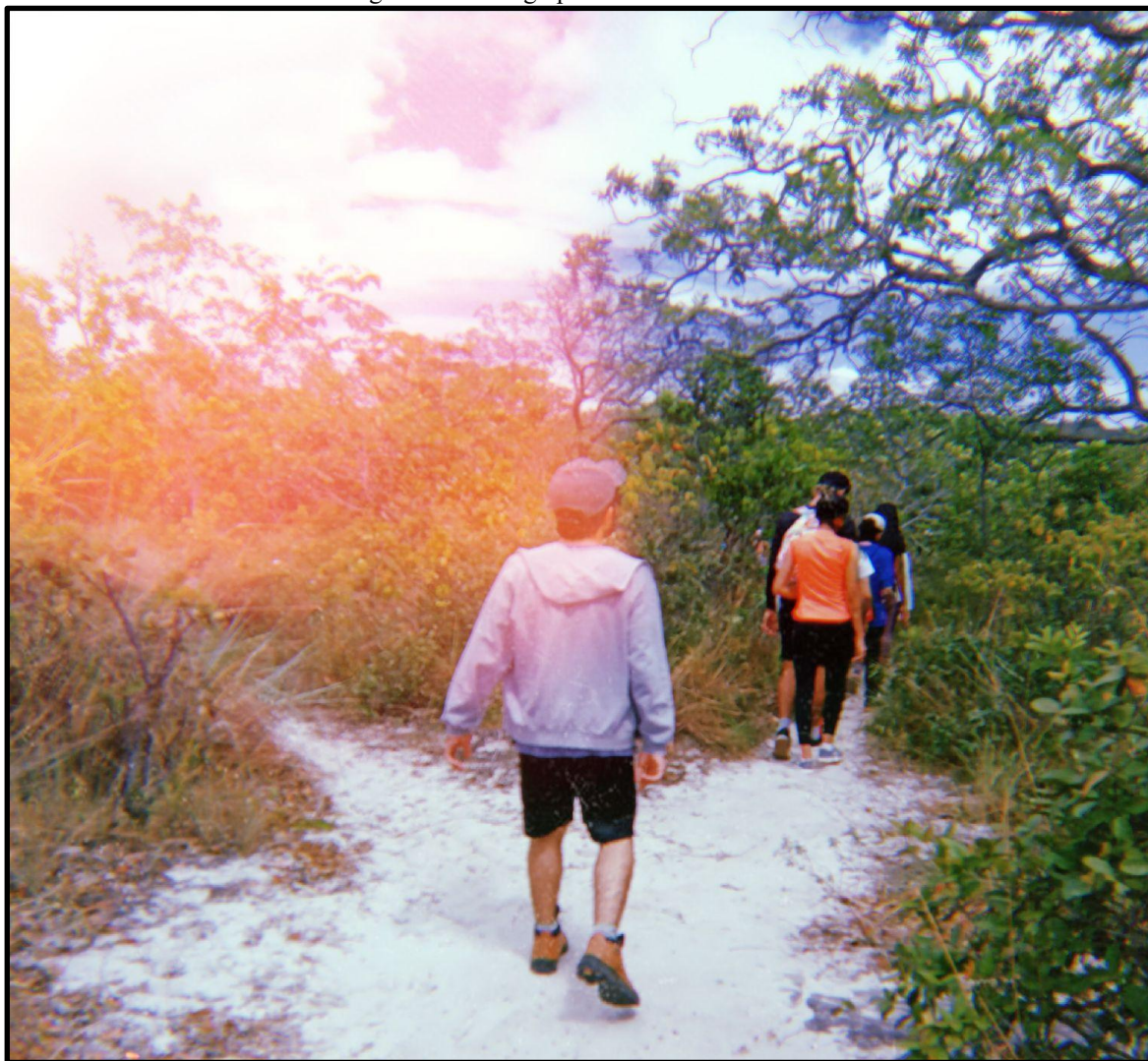"There is no Wi-Fi in nature, but you will find a much better connection."
Source: Authors, 2022.

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Although trails may initially seem like an informative alternative, they present a significant lack of data explaining the true meaning and relevance of this region. During the exploration, a concerning amount of solid waste was observed along all trails, evidencing the persistence of some people in disregarding the limits of the local environment. This situation not only compromises the landscape's aesthetics but also poses a threat to biodiversity and ecosystem health.

The trails have high tourism potential, as many landscapes are interconnected and promote the benefits of outdoor physical activities, adaptable to different age groups and skill levels. The Waterfall Circuit in Pedro II, illustrated in Figure 7, serves as an example of this interconnection. In addition to providing an enriching visual experience, this circuit highlights the importance of environmental awareness, encouraging practices of preservation and respect for nature.

Figure 7 – Photograph of the trail in Pedro II

Fonte: Dos próprios autores, 2022.

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During the trail, we were accompanied by tour guides hired to lead us along the entire Waterfall Circuit route. We were in a group of 50 people, and some images of the waterfalls can be seen in Figure 8. To maximize tourism potential and ensure the region's sustainability, it is essential to implement environmental education strategies that inform visitors about the importance of preservation and respect for local ecosystems. These initiatives will not only contribute to biodiversity conservation but also enrich tourists' experiences, promoting a deeper connection with nature.

Figure 8 – Photograph of one of the waterfalls on the trail

Source: Authors, 2022.

Furthermore, promoting collective actions and active participation of the local community is essential to cultivate an environment of respect and responsibility toward natural heritage. By engaging the community and raising visitor awareness, we can establish a model of sustainable tourism that benefits both the local population and tourists, ensuring the preservation of natural resources for future generations.

These activities make regional development through trail tourism an effective way to interconnect economic, social, environmental, and institutional aspects, contributing to the improvement of the population's well-being. Trail tourism, therefore, not only promotes the appreciation of the environment but also integrates different elements in the regional development process, considering both positive and

negative impacts on the local community. This integrated approach is essential to ensure that tourism becomes a driving force for sustainable development, benefiting all stakeholders.

CONCLUSION

The integration of didactic devices such as Relive, Strava, and maps in QGIS not only transforms fieldwork in Geography but also enriches the learning experience by valuing participants' individual experiences. The results demonstrated that outdoor activities, such as the trails in the Waterfall Circuit, promote significant benefits for health, environmental awareness, and sustainable tourism, provided they are accompanied by adequate preparation and community engagement, ensuring the conservation of these spaces. Thus, this holistic approach contributes not only to a richer education connected to the environment and its different ecological niches but also to regional and sustainable development.

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CLIMATIC ANALYSIS OF VIÇOSA DO CEARÁ: TRENDS AND CHANGES (2000, 2010, AND 2020)

Noé da Silva Carvalho[1], Raimundo Wilson Pereira dos Santos[2], Edson Osterne da Silva Santos[3], Francisco Welton Machado[4] and Kennedy José Alves da Silva[5]

ABSTRACT

Urban expansion has altered climatic patterns and the microclimate, intensifying local warming due to paving and the reduction of green areas. These changes, along with ongoing climate alterations, affect thermal comfort and create a complex interaction between humans and the environment. This study analyzes climate changes in Viçosa do Ceará in the years 2000, 2010, and 2020, focusing on precipitation, temperature, relative humidity, and wind speed. The aim is to identify trends and seasonal patterns that indicate changes in the local climate, providing data for public policies and climate change mitigation strategies. The data were obtained from the NASA POWER platform, which offers precise information on climatic variables for the years in question. They were organized in spreadsheets using Microsoft Excel,

[1] Holds a specialization in Brazilian Regional Geography from the Faculdade de Venda Nova do Imigrante (FAVENI), and in Human and Social Sciences Applied to the World of Work, as well as Curriculum and Teaching Practice in the Early Years of Elementary Education, both from UFPI.
Master's student at the Federal University of Piauí (UFPI), through the Office of the Dean of Graduate Studies (PRPG), the Center for Human Sciences and Letters (CCHL), and the Coordination of the Graduate Program in Geography (PPGGEO), Academic Master's in Geography
– Class 14 (2024–2026).
E-mail: carvalhonoe614@gmail.com
LATTES: http://lattes.cnpq.br/7750716456039484

[2] PhD in Geography from the Federal University of Minas Gerais – UFMG, faculty member of the Graduate Program in Geography at the Federal University of Piauí – UFPI.
E-mail: wilsonpereira@ufpi.edu.br
LATTES: http://lattes.cnpq.br/4538302624471379

[3] Specialist in Human and Social Sciences Applied to the World of Work
(CEAD/UFPI/SEB/MEC).
Master's student at the Federal University of Piauí (UFPI), through the Office of the Dean of Graduate Studies (PRPG), the Center for Human Sciences and Letters (CCHL), and the Coordination of the Graduate Program in Geography (PPGGEO), Academic Master's in Geography
– Class 14 (2024–2026)
E-mail: edsonosterne23@gmail.com
LATTES: http://lattes.cnpq.br/4318087538278709

[4] Specialist in Development and the Environment (2012–2014).
Master's student at the Federal University of Piauí (UFPI), through the Office of the Dean of Graduate Studies (PRPG), the Center for Human Sciences and Letters (CCHL), and the Coordination of the Graduate Program in Geography (PPGGEO), Academic Master's in Geography
– Class 14 (2024–2026).
E-mail: wmachado-2011@hotmail.com
LATTES: http://lattes.cnpq.br/3652789785115922

[5] Specialist in Sustainable Development and the Environment (2012), Teaching Sociology for High School by the State University of Piauí (UESPI, 2016), and Natural Sciences, Their Technologies, and the World of Work by UFPI (2022).
Master's student at the Federal University of Piauí (UFPI), through the Office of the Dean of Graduate Studies (PRPG), the Center for Human Sciences and Letters (CCHL), and the Coordination of the Graduate Program in Geography (PPGGEO), Academic Master's in Geography
– Class 14 (2024–2026).
E-mail: profkjose@gmail.com
LATTES: http://lattes.cnpq.br/6486047277790904

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allowing for the construction of graphs and detailed comparisons. Data collection was conducted at Praça Clóvis Beviláqua, in the center of Viçosa do Ceará, located at an altitude of 685 meters in the Serra da Ibiapaba. The research revealed significant changes in climatic patterns, including a substantial reduction in precipitation in 2010 due to the El Niño phenomenon and a recovery in 2020. There was also an increase in temperatures, intensification of dry periods, and greater thermal amplitude in 2010, along with a decrease in relative humidity. Wind speeds increased during dry months, reflecting local climate changes.

Keywords: Microclimate; Local warming; Relative humidity; Wind speed; Public policies.

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INTRODUCTION

The expansion of urban areas has considerably altered the natural landscape not only in large cities but also in small and medium-sized towns. These changes, together with ongoing global warming, result in modifications to local climatic patterns, making the interaction between humans and the natural environment increasingly complex.

Celis et al. (2022) affirm that in urban environments, the microclimate has a direct impact on people's thermal comfort. Urban surfaces tend to be warmer, a result of human interventions such as asphalt paving and the reduction of green areas, among other factors.

According to Oliveira (2008), when studying the urban microclimate, it is important to interpret climatic variables; however, it is also necessary to analyze personal variables, since thermal comfort varies from person to person. Temperature is generally the first climatic element whose pattern variations are perceptible. In the 21st century, it is common to hear older individuals mention that, in their time, "temperatures were milder" or that "the years were marked by pleasant climates," indicating a perceived warming of climatic conditions over the years.

Thus, the central issue of this study lies in the attempt to understand what changes can be observed in the dynamics of precipitation, air temperatures, relative humidity, and wind speed in Viçosa do Ceará during the years 2000, 2010, and 2020. Based on this question, the proposed objective is to analyze and compare, through a temporal analysis, the climatic elements: precipitation (mm), temperature (maximum and minimum) (ºC), relative humidity (%), and wind speed (maximum and minimum) (m/s) in Viçosa do Ceará for the aforementioned years, observing changes in the annual cycle of each variable. Furthermore, the study also seeks to identify seasonal patterns, calculate thermal amplitude, and verify whether these climatic elements exhibit trends that indicate changes in local climatic patterns.

Regarding the justification, it is observed that news about climate change is increasingly frequent in our daily lives. Understanding the possible manifestations of these changes and their implications in local contexts, such as Viçosa do Ceará, is essential. Moreover, it is important to scientifically understand how these manifestations may occur in high-altitude regions in Northeast Brazil. The analysis of data referring to the years 2000, 2010, and 2020 will allow the identification of trends and patterns that may be useful in the formulation of public policies and strategies for climate change mitigation. Additionally, the study aims to fill existing knowledge gaps regarding climate changes in the municipality, offering support for future investigations and potential necessary measures and interventions.

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METHODOLOGY

The platform used for data acquisition was the *NASA POWER* website (https://dados-nasa-power.streamlit.app/), a recognized source for providing precise and detailed climatic data. Through this platform, climatic data were collected, including monthly totals of precipitation, monthly averages of minimum and maximum temperatures, relative humidity, and average wind speeds (minimum and maximum) for the years 2000, 2010, and 2020.

The data obtained were stored and organized in electronic spreadsheets using *Microsoft Excel*. Once stored, the data were structured and tabulated, enabling the construction of tables and graphs, which facilitated detailed comparisons and in-depth analyses. Monthly and annual averages of the various climatic parameters were also calculated, providing a clearer view of variations over time.

Additionally, a bibliographic review was conducted using previously published materials such as articles, books, and journals available in digital databases, including *Google Scholar, SciELO*, and the CAPES Journal Portal. This review aimed to provide theoretical grounding and contextualize the study based on existing research.
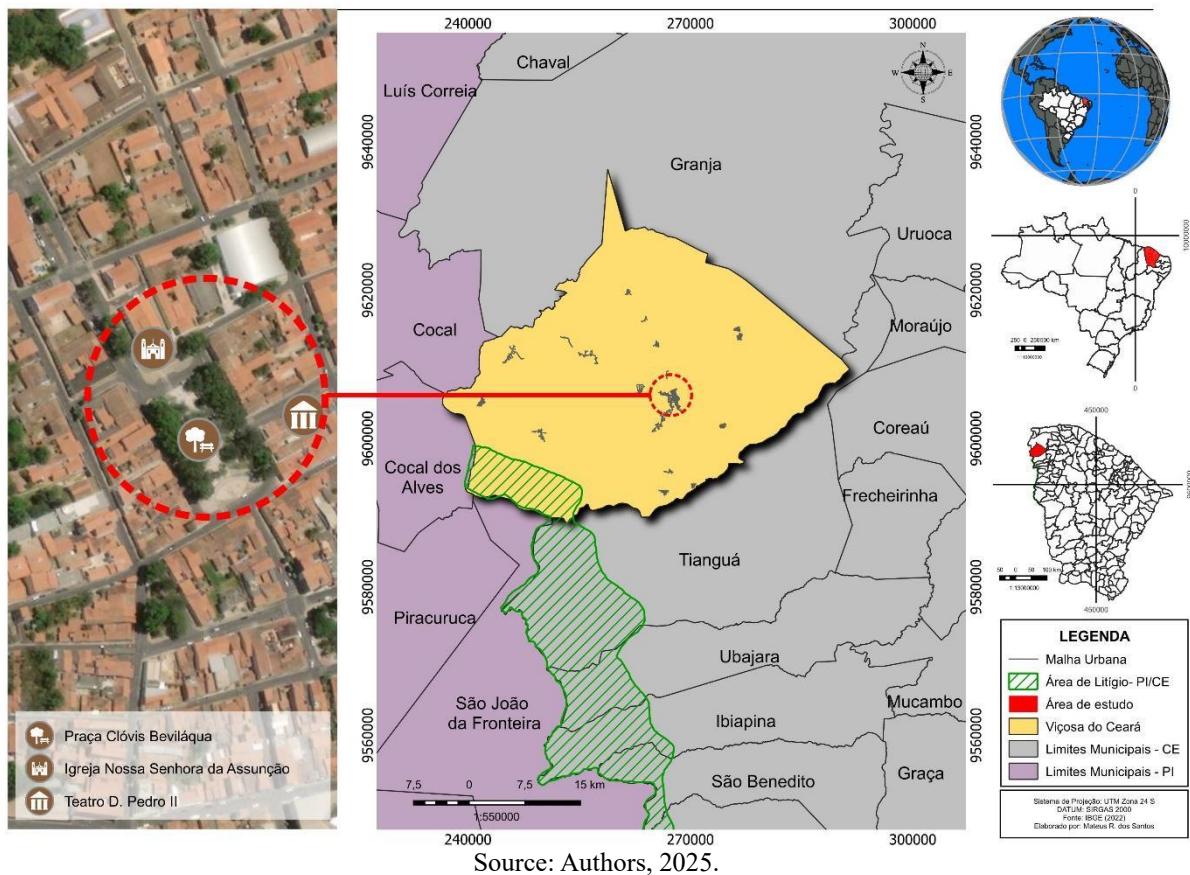
Viçosa do Ceará is located in the Northeast Region of Brazil, in the northwestern portion of the state of Ceará. The municipal seat is situated in the Serra da Ibiapaba, at an altitude of 685 meters above sea level, according to data from the Institute for Research and Economic Strategy of Ceará (IPECE, 2017). Due to this altitude, the municipal seat exhibits a hot sub-humid tropical climate, with average temperatures ranging between 22°C and 24°C, earning it the nickname "Swiss of Ceará." Also according to IPECE, the historical annual average rainfall in Viçosa do Ceará is 1,349 mm, with the rainy season concentrated between January and April.

According to IPECE (2017), the municipal seat of Viçosa do Ceará is located on the watershed divide between the Serra da Ibiapaba Basin and the Coreaú Basin. In terms of relief, the seat is situated on the Ibiapaba Plateau. Regarding vegetation, the region is characterized by the presence of tropical subcaducifolious pluvial-nebular forest (humid forest), a vegetation formation adapted to high humidity conditions, common in high-altitude areas of the Serra da Ibiapaba.

Meteorological data collection was referenced from Praça Clóvis Beviláqua, located in the city center, with geographic coordinates of 3° 33' 54" south latitude, 41° 05' 29" west longitude, and an altitude of 685 meters (Map 01).

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Map 01: Location of the study area, 2024 (Original PT-BR)

Source: Authors, 2025.

The map illustrates the location of Viçosa do Ceará, situated in the northwest of the state, on the border with Piauí. It highlights neighboring municipalities and the interstate dispute zone between the two states. The municipality of Viçosa do Ceará is marked in yellow, while adjacent municipalities in Ceará appear in gray and those in Piauí in purple. The disputed area is represented by green hatching. The urban grid is delineated in black, and a red rectangle outlines the study area, which is enlarged in a satellite image of the municipal seat. In this enlargement, a red dashed circle indicates points of cultural and historical interest, such as Praça Clóvis Beviláqua, the Church of Our Lady of the Assumption, and the Dom Pedro II Theater, emphasizing the relevance of the urban center in the spatial composition of the research.

RESULTS AND DISCUSSION

PRECIPITATION

The analysis of precipitation data indicates that the year 2000 recorded the highest rainfall index, with a total of 1,298.15 mm throughout the year. In contrast, 2010 showed a significant drop in rainfall, totaling only 753.07 mm, representing a substantial reduction compared to 2000. According to information from the Ceará Foundation for Meteorology and Water Resources (FUNCEME, 2010), the El

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Niño phenomenon was the main factor responsible for the significant reduction in rainfall in Ceará in 2010. This phenomenon, characterized by anomalous warming of equatorial Pacific Ocean waters, directly impacted the state's rainfall regime, contributing to the considerably lower annual precipitation index in Viçosa do Ceará.

In 2020, an increase in rainfall levels was observed, with a total accumulation of 1,259.4 mm, approaching the values recorded in 2000.

Table 01: Accumulated precipitation for the years 2000, 2010, and 2020

YEAR	RAINFALL (mm)
2000	1298,15
2010	753,07
2020	1259,4

Source: Authors, 2025.

Monthly comparisons for the years 2000, 2010, and 2020 in Viçosa do Ceará show that the rainy season is concentrated between January and April, with the highest rainfall indices recorded in March and April. In 2000, April was the rainiest month, with 336.77 mm. In 2010, the highest rainfall occurred in March, with 189.92 mm—a value significantly lower than those recorded in the other years. In 2020, March again stood out, with 336.76 mm, nearly matching April 2000. This analysis reveals variations in both the quantity and distribution of rainfall over the years, with 2010 showing the lowest indices during the rainy season.

Graph 01: Monthly precipitation for the years 2000, 2010, and 2020
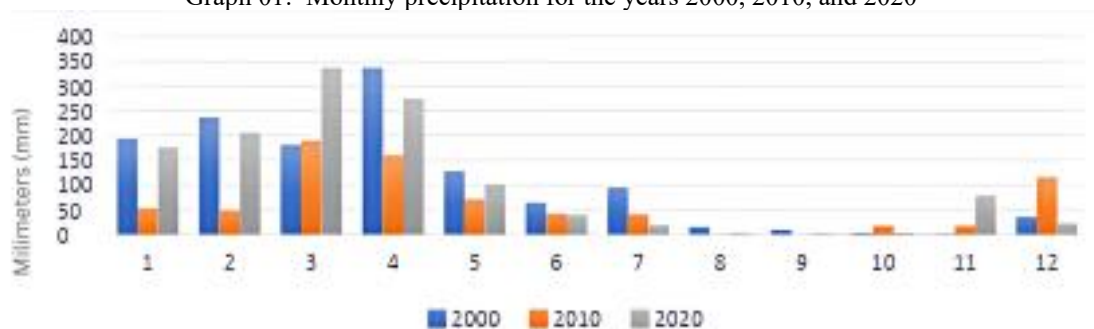
Source: Authors, 2025.

The graph analysis identifies the dry season in Viçosa do Ceará as occurring between August and December, with significantly reduced rainfall indices. The lowest values are recorded in September and October, months with virtually no precipitation in any of the years analyzed. A recovery in rainfall levels begins in November, with December 2010 showing a notable increase compared to the other years. This

pattern suggests a well-defined climatic seasonality, characterized by a prolonged dry season followed by occasional rains at the end of the year, whose intensity varies depending on the year.

MINIMUM TEMPERATURE

The study of annual average minimum temperatures in Viçosa do Ceará, which recorded 21.8 ºC in 2000, 22.8 ºC in 2010, and 22.6 ºC in 2020, reveals a warming trend, with an increase of 1.0 ºC between 2000 and 2010, followed by a slight decrease of 0.2 ºC in 2020. Nevertheless, the 2020 value remains 0.8 ºC above that of 2000.
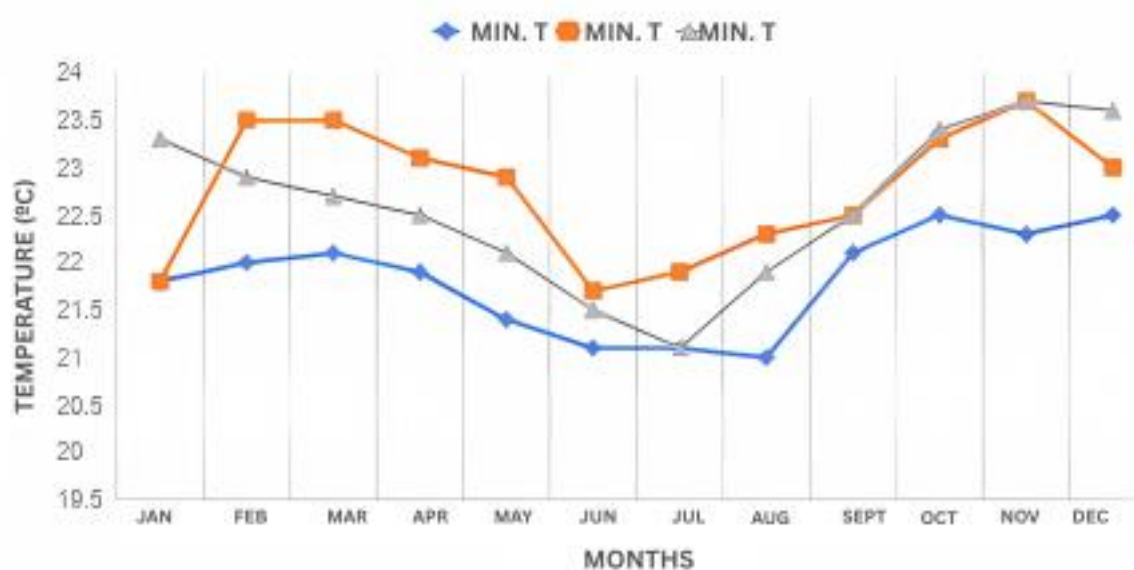
Table 02: Annual Average Minimum Temperature for the Years 2000, 2010, and 2020

YEAR	ANNUAL AVERAGE MINIMUM TEMPERATURE (ºC)
2000	21,8
2010	22,8
2020	22,6

Fonte: Autores, 2025.

When comparing the same periods across the three years, a general trend is observed with seasonal variations in temperature, characterized by lower values between May and July, corresponding to the beginning of winter. This period is followed by a gradual increase in minimum temperatures, extending until December.

Graph 02: Monthly Average Minimum Temperatures for the Years 2000, 2010, and 2020

Source: Authors, 2025.

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The analysis reveals a rise in minimum temperatures over the three years studied, indicating potential risks of local warming or regional climate changes. This increase is most evident between September and December, a period during which minimum temperatures in 2020 surpassed those recorded in previous years. This phenomenon may be associated with changes in climatic patterns, such as the intensification of urban heat islands or alterations in atmospheric circulation during these months.

A seasonal analysis shows that the winter months, particularly June and July, exhibited less variation in minimum temperatures over the years. In contrast, transitional and summer months, especially from September onward, displayed greater variation in minimum temperatures among the years analyzed, highlighting a consistent increase in these temperatures during this period. These data suggest that the warmer season has become progressively more intense over the years.

According to the IPCC (2013) report, global warming is an indisputable phenomenon. Its most recent reports highlight, among other changes, the increased frequency of hot days and nights since the 1950s, attributed to human activities. Furthermore, it is projected that this warming will continue throughout the 21st century. There is also an intensification of dry periods, with longer and more severe drought events in various regions, exacerbating the impacts of climate change.

MAXIMUM TEMPERATURE

An analysis of the annual average maximum temperatures in Viçosa do Ceará reveals that in 2000, the average maximum temperature was 31.2 ºC, increasing to 33.6 ºC in 2010, which represents a rise of 2.4 ºC in the annual average.

Table 03: Annual Average Maximum Temperature for the Years 2000, 2010, and 2020

YEAR	ANNUAL AVERAGE MAXIMUM TEMPERATURE (ºC)
2000	31,2
2010	33,6
2020	32,4

Source: Authors, 2025.

This increase may suggest a trend of local warming or the influence of regional climatic factors. However, in 2020, a decrease in the annual average maximum temperature was observed, falling to 32.4 ºC, representing a reduction of 1.2 ºC compared to the previous decade. This decline may indicate not only a stabilization but also a seasonal fluctuation that warrants further investigation.

This behavior reveals that, although there is a general trend of rising temperatures, it is essential to conduct continuous and systematic monitoring to determine whether this pattern persists over time or

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whether other factors—such as changes in land cover or atmospheric variables—are influencing maximum temperatures in the years analyzed.

When comparing the months across the years studied, 2010 stands out as an atypical year, presenting significantly higher temperatures during most of the period, except in October and December, which showed a different trend. This climatological anomaly in 2010 may be attributed to phenomena such as El Niño, which frequently causes changes in regional climatic patterns. It is essential to consider such events when interpreting temperature data.

Therefore, the analysis of these data not only provides insights into climatic trends in Viçosa do Ceará but also underscores the need for management strategies and adaptation to ongoing climate changes. It is crucial that public policies take these variations into account to mitigate the negative impacts that may arise in the near future.

Graph 03: Monthly Average Maximum Temperatures for the Years 2000, 2010, and 2020

Source: Authors, 2025.

Additionally, it is important to highlight the gradual increase in maximum temperatures from June to November, which is evident in all the years analyzed. The months of September and October show the highest values, characteristic of the region's hot and dry season. On the other hand, the early months of the year, such as January and February, have relatively lower maximum temperatures due to the rainy season, which tends to moderate the heat.

THERMAL AMPLITUDE

Thermal amplitude refers to the difference between the maximum and minimum air temperatures recorded over a given time interval, which may be annual, monthly, or even daily. This measure is crucial for understanding climatic variations in a specific region, as it provides insights into temperature fluctuations that can impact both the natural environment and human activities. In this study, monthly

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thermal amplitudes for the years 2000, 2010, and 2020 in Viçosa do Ceará were analyzed, allowing for a comprehensive comparison of climate changes over time.

In 2000, thermal amplitude was relatively low compared to the other years analyzed—2010 and 2020. During the months from January to June, this amplitude ranged from 5.8°C in April to 8.2°C in June, reflecting a less extreme and possibly more stable climatic pattern. This initial stability suggests that the climatic conditions during that period were less susceptible to drastic temperature variations, which may indicate a less turbulent atmospheric dynamic.

However, starting in July, a gradual increase in thermal amplitude was observed, reaching its peak in October and November, with an impressive 12.9°C. This significant increase may be attributed to seasonal factors, such as intensified heat and reduced rainfall typical of the dry season in the region. In December, there was a slight decline in thermal amplitude, settling at 11.5°C, indicating a possible transition to a different climatic pattern with the approach of the rainy season.

These monthly variations, detailed in the chart below, not only illustrate temperature changes throughout the year but also highlight the complexity of climatic interactions in Viçosa do Ceará. Thus, the analysis of thermal amplitude is a valuable tool for understanding local climatic dynamics and their implications for the environment and society.

Graph 04: Monthly Thermal Amplitude for the Years 2000, 2010, and 2020
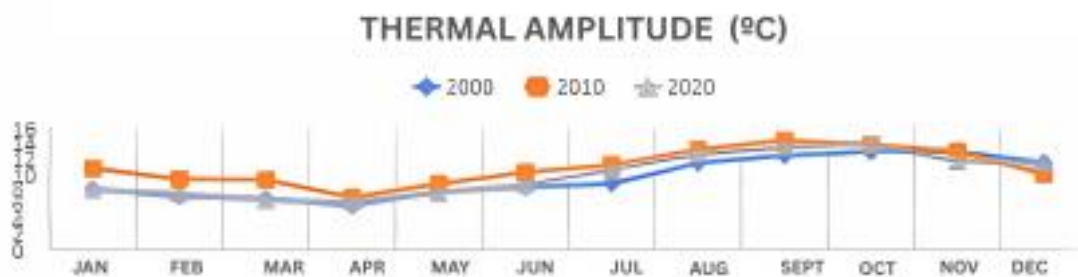
Source: Authors, 2025.

In 2010, thermal amplitude was considerably higher, especially in the early months. January began with a high amplitude of 10.7°C, maintaining elevated values throughout the year. September recorded the peak amplitude of 14.4°C, the highest among the three specific years.

In 2020, thermal amplitude represented an intermediate scenario between 2000 and 2010, with less extreme values than in 2010 but higher than those of 2000 in several months. From April onward, a

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gradual increase was observed, reaching 13.5°C and 14°C in September and October, respectively. As in 2010, the highest values occurred in the second half of the year, with a reduction to 11.3°C in December.

Based on the data presented, it is observed that April in Viçosa do Ceará consistently shows the lowest thermal amplitudes across the years analyzed (2000, 2010, and 2020). This may be related to increased cloud cover and humidity typical of this period, which reduce the variation between daytime and nighttime temperatures. Conversely, September and October record the highest thermal amplitudes, reflecting conditions characteristic of drier periods, in which intense solar radiation during the day and rapid heat loss at night result in greater differences between maximum and minimum temperatures.

The increase in thermal amplitudes during the months of 2010 and the maintenance of high values in 2020 may indicate ongoing climate changes. "The rise in maximum and minimum temperatures may be associated with both local changes, such as the intensification of urban heat islands, and global climate changes" (Saraiva & Caracristi, 2023).

TEMPERATURE VS. PRECIPITATION

By comparing the data on temperature (maximum and minimum) and precipitation (see Chart 05) for Viçosa do Ceará, it is possible to identify that the year 2010 stands out as atypical in relation to 2000 and 2020. In 2010, the precipitation index was significantly lower, while the average minimum and maximum temperatures were higher.

Graph 05: Variations in Precipitation and Temperature in Viçosa do Ceará (2000, 2010, and 2020)
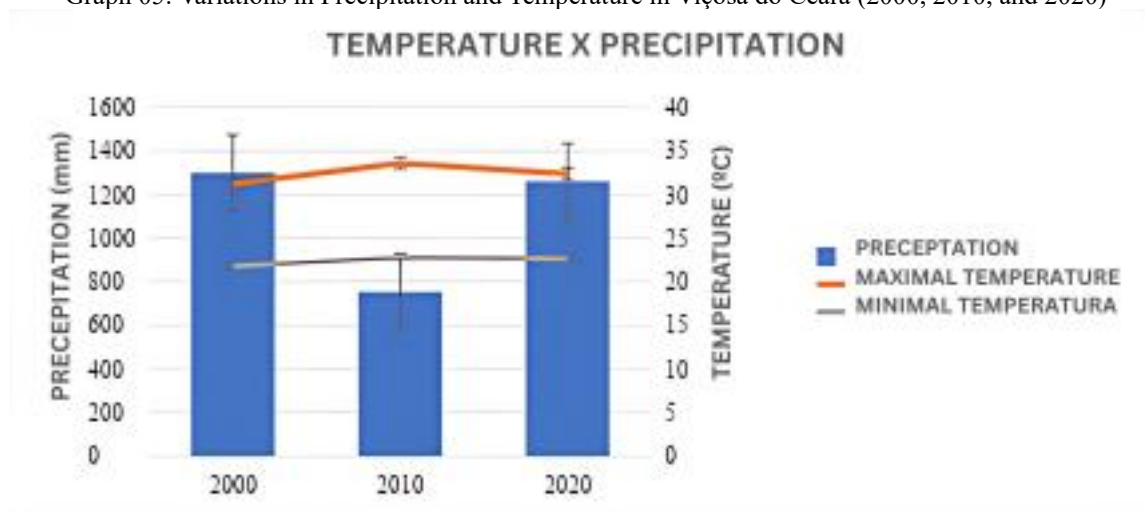
Source: Authors, 2025.

The climatic behavior in Viçosa do Ceará in 2010 can be associated with the influence of the El Niño phenomenon, according to data from the World Meteorological Organization (WMO). This climatic

event, active between 2009 and 2010, is characterized by rising global temperatures and reduced rainfall in various regions, including Northeast Brazil, which experienced significant impacts during this period.

Costa (2012) emphasizes that "there is a direct cause-and-effect relationship between the El Niño phenomenon and droughts in Northeast Brazil, at least in terms of the extension of the dry period beyond normal." Thus, the decrease in precipitation in Viçosa do Ceará, combined with the increase in temperatures in 2010, reflects typical characteristics of El Niño and demonstrates how global climatic events can directly influence local dynamics.

RELATIVE HUMIDITY

An analysis of the monthly average relative humidity for the years 2000, 2010, and 2020 in Viçosa do Ceará reveals that in 2010, relative humidity values were consistently lower throughout the year when compared to 2000 and 2020. This difference is particularly pronounced during the months of June to September, a period in which relative humidity reaches its lowest levels. This reduction coincides with the dry season and the increase in both maximum and minimum temperatures previously observed, clearly indicating more arid conditions in 2010.

Gráfico 06: Monthly Average Relative Humidity for the Years 2000, 2010, and 2020
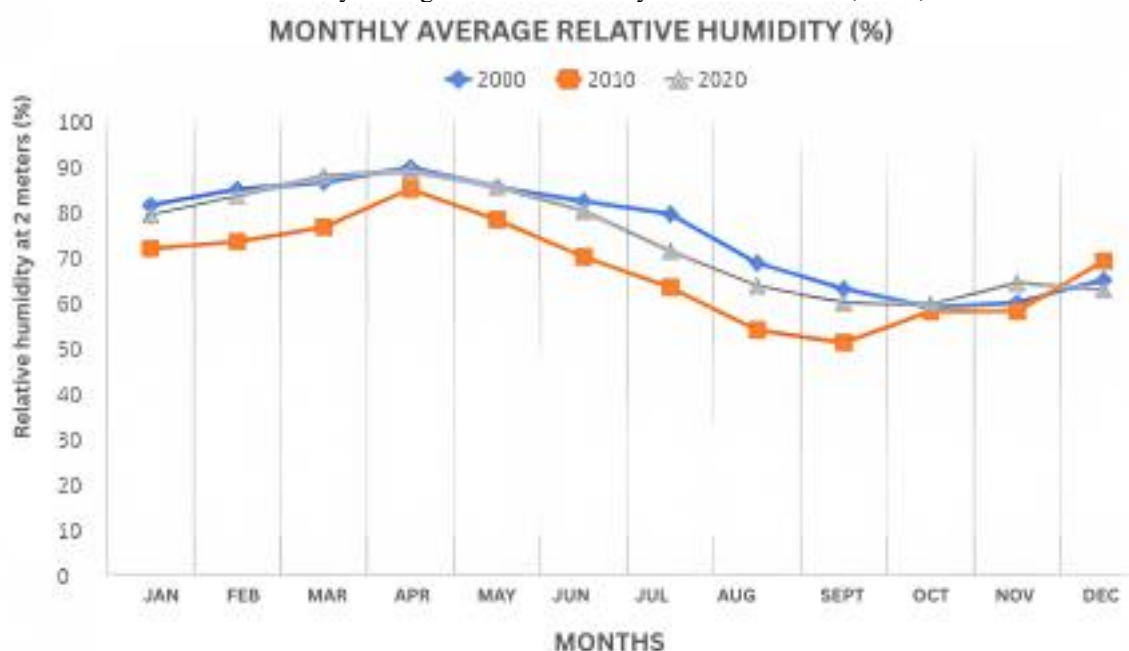
Source: Authors, 2025.

In 2020, relative humidity levels were slightly higher than in 2010 but still somewhat lower than in 2000, especially during the months of July to September. This may reflect ongoing climatic changes, including a slight decline in humidity compared to the year 2000. It could also be associated with regional

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climate changes that have impacted the local hydrological regime and atmospheric moisture availability. However, Oliveira and Reis (2011) emphasize that rising average temperatures may lead to a continuous decrease in relative humidity in the coming years. In the short term, this trend tends to intensify health problems, particularly those related to respiratory illnesses. In the medium and long term, it is likely to result in landscape transformations, reduced agricultural and livestock productivity, decreased economic revenues, and worsening of local social and economic conditions.

WIND SPEED (MINIMUM AND MAXIMUM)

Upon examining the chart of minimum wind speed in Viçosa do Ceará (Chart 07), it is evident that, for all years analyzed, there is a trend of lower minimum wind speeds between the months of April and June, while the highest values occur between September and November. This variation aligns with the region's climatic regime, which features well-defined dry and rainy seasons. During the dry season—particularly from September to November—wind speed tends to increase due to lower humidity and the intensification of the trade winds that prevail in Northeast Brazil. The greater incidence of solar radiation during this period may also intensify air currents, contributing to increased wind speeds.

Graph 07: Average Minimum Wind Speed for the Years 2000, 2010, and 2020
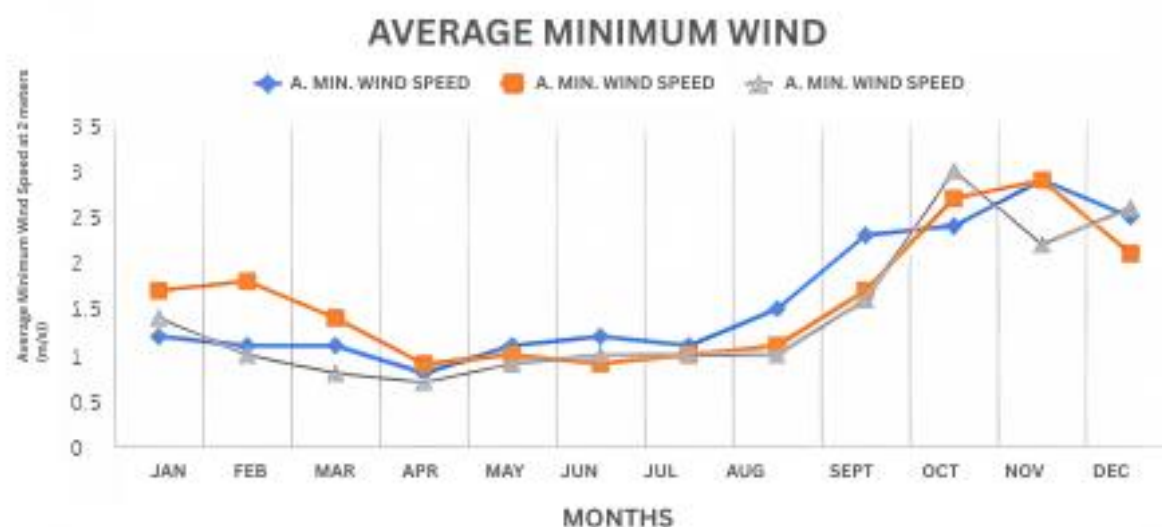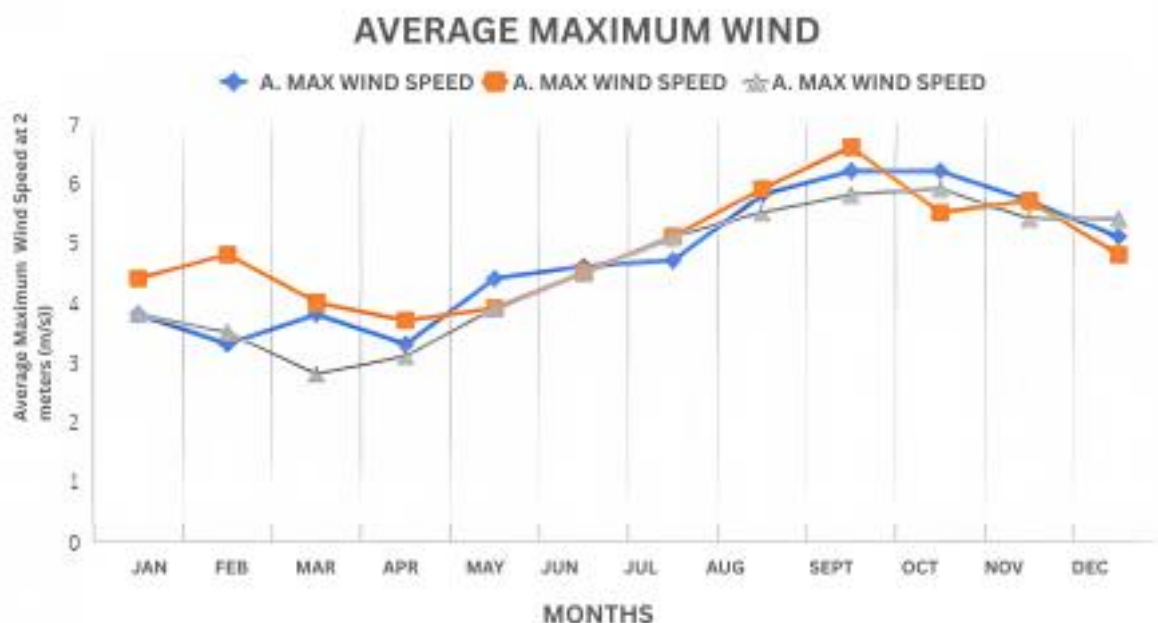

Source: Authors, 2025.

A comparative analysis across the years suggests a subtle trend of increasing minimum wind speeds over time, especially during the months of greatest intensity, such as October and November. This may be the result of ongoing global climate changes that influence wind patterns in various regions, including Northeast Brazil.

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When analyzing the average maximum wind speeds for the years studied (Chart 08), the data confirm the patterns observed in the minimum wind speed analysis. The driest months, which occur in the second half of the year, show higher average wind speeds, with September being the month that records the highest wind speeds in all three years.

Graph 08: Average Maximum Wind Speed for the Years 2000, 2010, and 2020

Source: Authors, 2025.

A comparison of the three years analyzed reveals that maximum wind speeds are similar across the board, with only slight variations among them. This may indicate a certain stability in wind patterns in recent periods. However, there is a noticeable tendency toward increased maximum wind intensity, particularly in the peak months of September and October.

Based on the results observed, even with the presence of the El Niño phenomenon in 2010, it is possible to identify a trend in Viçosa do Ceará's urban microclimate toward rising average temperatures (both maximum and minimum) and a lengthening of the dry season. These phenomena, resulting from ongoing climate change, may lead to effects such as natural disasters, the emergence of diseases associated with low humidity, and damage to agriculture—among other consequences. Therefore, it is essential that all sectors of society act collectively to mitigate these impacts, promote adaptation, and ensure resilience in the face of these environmental challenges.

According to the IPCC (2022), climate change has increased risks in cities, especially smaller ones, which face difficulties due to a lack of infrastructure and resources for adaptation. Public policies must also focus on these localities to enhance resilience and reduce vulnerability.

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The National Plan for Adaptation to Climate Change (PNA, 2016) emphasizes that adaptation in smaller municipalities should prioritize the reduction of socioeconomic vulnerabilities, functioning as a driver of sustainable development across various dimensions.

Thus, adapting cities to climate change requires:

(I) regionalized management to mitigate emissions and adapt to climate impacts, considering natural resources, urban infrastructure, public health, and the economy;

(II) coordination among public, private, and social actors, across sectors and levels of government, which is essential for preventive and emergency actions;

(III) the generation of reliable climate data to reduce uncertainties and plan specific interventions.

CONCLUSION

The research made it possible to identify and understand significant changes in the climatic patterns of Viçosa do Ceará over the years 2000, 2010, and 2020. The analysis of climatic elements revealed that precipitation exhibited expressive variations, with a notable reduction in 2010, influenced by the El Niño phenomenon, and a partial recovery in 2020. The data also evidenced a trend of increasing minimum and maximum temperatures, indicating possible local warming.

Furthermore, it was found that dry periods have become more intense and prolonged, reflecting a climatic pattern of increased aridity. It was possible to compare and analyze climatic elements over time, identifying seasonal patterns and changes in thermal amplitude, which was highest in 2010, particularly in the months of September and October. Relative humidity also declined during those same years, corroborating the intensification of arid conditions.

Wind speeds, although stable in some periods, showed a subtle trend of increase during the driest months, such as September and October, suggesting changes in regional atmospheric patterns.

Among the main findings, the influence of El Niño on the significant reduction in rainfall in 2010 stands out, along with the increase in both minimum and maximum temperatures and the intensification of thermal amplitude. These local climatic changes align with global trends, such as the rise in extreme events and warming patterns, with direct consequences for thermal comfort and the environmental dynamics of the municipality of Viçosa do Ceará.

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