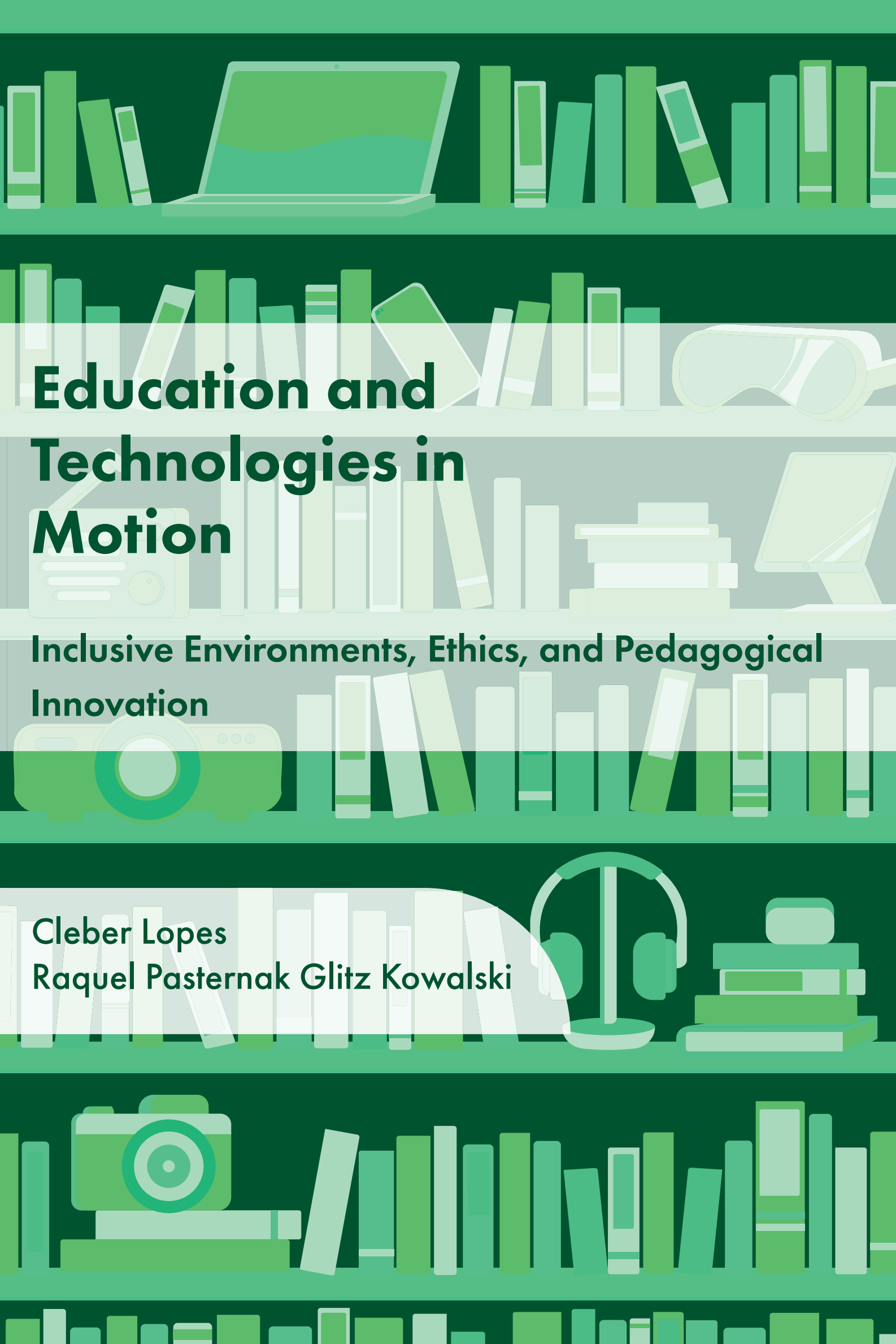




Education and Technologies in Motion

Inclusive Environments, Ethics, and Pedagogical
Innovation

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Raquel Pasternak Glitz Kowalski

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PREFACE

Amid the digital transformations of the twenty-first century, education faces the challenge of repositioning itself in response to emerging technologies, especially artificial intelligence. However, as this book emphasizes, technological progress only gains legitimacy when guided by ethical principles and a focus on human development. Consequently, it proposes a critical reflection that moves beyond technological determinism, placing innovation at the crossroads of knowledge, responsibility, and inclusion.

Organized around three core axes—digital culture and ethics, pedagogical innovation, and inclusive environments—the book presents diverse perspectives that converge on the need for a more aware and human-centered education.

The first axis explores artificial intelligence's role in education, stressing the importance of teacher mediation, algorithmic accountability, and critical teacher training. Technology is viewed not merely as a tool but as a socio-technical phenomenon requiring regulation, transparency, and ethical scrutiny. The second axis considers pedagogical innovation through active methodologies and an ecosystem perspective on learning. By promoting practices such as open education, project-based learning, and integrating multiple languages within cyber-culture, the chapters suggest moving beyond linear teaching models. In this paradigm, students are seen as active participants, while teachers act as mediators, producers, and curators of knowledge within collaborative and complex environments.

The third axis underlines the importance of inclusion and care in education. Through discussions on teachers' mental health, educational violence, and barriers faced by people with disabilities and the "fluid" population, the book underscores the ethical and political dimensions of education. The adoption of assistive technologies and practices grounded in equity reinforces the need to create environments that ensure not only access but full participation for all.

Together, these themes contribute valuable insights to understanding current challenges in education. More than offering definitive solutions, the book affirms education as a domain of tension and potential, where innovation must be intertwined with social justice, human dignity, and the development of critical citizens.

This preface invites readers to engage with a timely and relevant book that affirms education as an ethical commitment in times of technological change, emphasizing that teaching is fundamentally about caring for the human.

Prof. Enrico Zacchei

University of Salamanca (USAL), Spain

PRESENTATION

We present 'Education and Technologies in Motion: Inclusive Environments, Ethics, and Pedagogical Innovation,' a volume that continues the collection's commitment to meaningful academic debate about the challenges and opportunities education faces amid rapid social, cultural, and technological change. This book recognizes that understanding contemporary education involves more than just tracking innovations; it requires critical engagement, contextual understanding of training and pedagogical practices, and alignment with ethical, inclusive, and humanistic principles. By gathering researchers and authors from diverse backgrounds, experiences, and fields of study, the volume highlights the value of interdisciplinary dialogue and collective knowledge creation.

While digital technologies have become prominent in recent educational trends, their mere presence does not ensure pedagogical transformation, equity, or quality. The texts explore the complex relationship between education and technology, emphasizing dimensions such as pedagogical innovation, teacher training, artificial intelligence, care, inclusion, accessibility, and social justice—showing how these dimensions interconnect and complement one another. The chapters, using various theoretical and methodological approaches, share a common concern: how education can respond responsibly, sensitively, and rigorously to current demands. These reflections go beyond analyzing trends to proposing paths, raising questions, and expanding horizons for teaching, research, and inclusive educational environments. The publication also underscores the importance of academic collaboration networks crossing institutions, countries, and disciplines. Its pages feature contributions engaging with emerging and urgent themes, always centering the human element in education. Ultimately, the volume advocates for an educational approach rooted in dignity, diversity, and social responsibility.

We thank the authors for sharing their investigations, experiences, and insights that enrich current educational debates, and we appreciate the guest professor who wrote the preface, offering valuable guidance for interpreting the themes addressed. We hope this book will be valuable for researchers, teachers, students, and others interested in the intersection of education, technology, ethics, and inclusion. May it spark new connections, inspire transformative practices, and strengthen the belief that educational innovation involves intellectual responsibility, human sensitivity, and a commitment to the common good.

Profa. Dra. Raquel Kowalski

Prof. Me. Cleber Lopes

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DIGITAL TRANSFORMATION OF COMPANIES: THE CASE FOR GERMAN HEALTHCARE

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INTRODUCTION

Digital transformation has, over the last decade, become a central axis of policies to modernize European health systems, playing a technical, organizational, and symbolic role in redefining state capacities to address structural challenges such as population aging, shortages of professionals, financial pressure on public services, and growing clinical complexity. In the case of the Federal Republic of Germany, this movement became particularly visible after 2020, when the COVID-19 pandemic highlighted the weaknesses of a historically robust but technologically fragmented system, anchored in analog infrastructures and administrative practices that were not very interoperable. Digitalization was thus no longer seen only as technological modernization and became a strategic imperative, associated with the need to strengthen the system's resilience, promote operational efficiency, and ensure continuity of care in a context marked by epidemiological volatility and increasing pressures on clinical teams (BMG, 2023; OECD, 2023a).

Thus, legislative initiatives such as the Digital Healthcare Act (2019) and the Hospital Future Act (2020) (Krankenhauszukunftsgesetz) have become programmatic milestones of a broader project of socio-technical reconfiguration of the health sector, channeling massive public investments, such as the €4.3 billion, €3 billion from the Federal Government, complemented by around €1.3 billion in co-financing from the Federal States and hospitals, aimed at hospital modernization, and introducing normative provisions to accelerate the adoption of electronic medical records, telemedicine, and digital health applications prescribed by doctors. Subsequently, the Digitalisation of Health Strategy

(2023) set ambitious goals, such as making electronic medical records available to 80% of statutory health insurance policyholders by 2025 and eliminating reliance on paper in 80% of clinical communications by 2026. This political architecture inscribes digital transformation as a constitutive element of a new state vision for the sector, designing a more agile, integrated, and data-driven health system. However, as in other areas of the institutionalization of European policies, this process is far from linear: it is disputed, incremental, and permeated by tensions between normative discourses, social expectations, and institutional practices.

The centrality attributed to digitalization, although widely consensual at the political level, contrasts with the heterogeneity of organizational practices and capacities observed on the ground. Implementation faces obstacles ranging from infrastructure limitations and systemic interoperability failures, which continue to compromise the efficient circulation of data, to cultural resistance rooted in historically hierarchical professional models that are averse to technological disruption. In addition, digitalization has produced ambivalent effects on clinical care routines, even promising efficiency, many professionals report an increase in bureaucratic burden, frustration with unintuitive systems, and fears about the impact of automation on their functions, revealing a mismatch between the technopolitical design of reforms and the experience lived in institutions. As can be seen in other European policies that aim to modernize the "old continent", a tension emerges here between the technical rationality of the State and the socio-cultural reality of public services, which requires implementation methodologies sensitive to organizational contexts and professional subjectivities.

From this tension derives a fundamental axis of this process: organizational change management. Digitalization is not limited to the introduction of technological devices; it entails reconfiguring work cultures, rethinking professional boundaries, and developing new skills distributed across doctors, nurses, managers, and administrative teams. Recent literature and practices converge in pointing out that digital transformation projects only thrive when accompanied by robust change management strategies, based on transparent communication, exemplary leadership, active participation of professionals, and the development of digital skills that enable the translation of technological innovation into effective improvements in care. In several German hospitals, the creation of "digital champions" and new positions, such as transformation managers or clinical leaders in informatics, reflects an attempt to reorganize the professional fabric to accommodate technological innovation without destabilizing the clinical ethos. However, the persistence

of resistance, generational inequalities and fears about the replacement of functions shows that digital transformation, as well as other European processes of institutional modernization, is simultaneously a technical project and a political process of negotiation of professional meanings and identities.

It is in this context, marked by the confluence between technological ambition, systemic pressures, and cultural challenges, that this chapter proposes a critical analysis of the digital transformation of German health, questioning how digitalization has been institutionalized as a public policy, what normative and organizational devices structure this process, and how managers and professionals negotiate, reinterpret, or resist the proposed changes. In addition, it proposes examining the role of digital skills, changing management practices, and organizational dynamics in the materialization of innovation, as well as the limits and contradictions that emerge in day-to-day implementation. Throughout the text, it is argued that understanding the digital transformation in German health requires going beyond merely technological readings and adopting a sociopolitical perspective capable of capturing the fractures, ambivalences and potentialities of a process that simultaneously redefines the present and the future of health care in Germany.

METHODOLOGY

In line with this socio-political perspective, the methodology adopted for the elaboration of this chapter is based on a qualitative, interdisciplinary approach guided by a socio-technical perspective, considered the most appropriate for understanding the complexity of digital transformation in the German health sector. It was based on the principle widely discussed in Science, Technology, and Society Studies, that digitalization is not merely a technical process but a dynamic of cultural and organizational change that reconfigures professional practices, institutional relations, and ways of producing and managing health care. Thus, analyzing digitalization implied simultaneously observing its material devices, infrastructures, software, technical standards, as well as the narratives, values, and power structures that condition its implementation and appropriation.

The qualitative method was chosen because it allows us to capture symbolic, normative, and relational dimensions that are not easily measurable but play a decisive role in how technologies are received, interpreted, and operationalized by health professionals. This approach made it possible to examine digitalization as an institutional phenomenon, analyzing how public policies, such as the Digital Act and the Hospital Future Act, build the narrative of digital urgency and define the conditions for the possibility of innovation

in the German health system (BMG, 2019; 2020). At the same time, it allowed us to observe the mechanisms by which these policies are confronted with heterogeneous organizational realities, ingrained work practices, and professional cultures that do not always converge with the programmatic objectives of the State.

Data collection was based on three main axes. Firstly, a systematic documentary survey was conducted that integrated legislation, government strategies, official reports, technical documents, and institutional opinions, with particular attention to policies produced by the Bundesministerium für Gesundheit (BMG, 2023) and analyses by international bodies such as the OECD (2023). Secondly, a discursive analysis of sectoral reports, communiqués from professional associations, consultancy studies, and specialized media texts was carried out, aiming to understand how different actors, government, hospitals, doctors, nurses, and the technology sector, build meanings, expectations, and resistances around the digitalization of health. Finally, a qualitative analysis of secondary empirical data was carried out, including national surveys of healthcare professionals, such as the E-Health Monitor (McKinsey & Company, 2022; 2024), hospital case studies documented by Fraunhofer IESE (2023), as well as recent surveys on digital maturity in the German hospital sector.

The analytical reading of the corpus followed a critical-contextual procedure, seeking to relate the collected materials to contemporary debates on organizational change, digital literacy, professional identity, and the ethics of technological innovation. Attention was given to the tensions between the promise of efficiency and the perceived increase in administrative burden; between state promotion of digitalization and limited institutional capacities to absorb rapid change; and between the narrative of innovation and cultural resistances, often associated with the erosion of professional control or concerns about clinical autonomy.

It is important to recognize that, although the combination of documentary analysis, discursive reading, and critical-empirical interpretation allows us to capture the socio-technical complexity of digitalization in German health, this approach has inherent limitations. In particular, the research did not integrate direct fieldwork, such as interviews with professionals, participant observation or ethnographic analysis of hospital environments. Thus, the interpretations produced depend on secondary sources and mediate discourses, and may leave out tacit dimensions of work, micropolitical conflicts and informal practices that often structure the appropriation of technologies in everyday life. Despite these limitations, it is considered that the methodology adopted is adequate to

the objective of mapping macrostructural trends and understanding the socio-political framework of digitalization policies, and future research should complement this analysis with in-depth empirical studies.

This methodology, by integrating document analysis, discursive reading and critical-empirical interpretation, has made it possible to capture the digital transformation of German health as a multidimensional and deeply ambivalent phenomenon, simultaneously driven by strong political agendas and conditioned by entrenched institutional practices; a promoter of innovation, but a source of organizational tensions; technically promising, but dependent on processes of learning, negotiation and cultural change. With this approach, it becomes possible to understand not only "what" changes with digitalization, but "how" and "why" these changes are received, tensioned or appropriated by the actors that make up the health system.

RESULTS AND DISCUSSION

From the documentary corpus, a set of trends emerge that allow us to understand how digital transformation has been conceived, operationalized and contested in the German health sector. The following results are organized around different interconnected dimensions, political-institutional framework, reconfigurations of clinical work, organizational culture and resistance, digital skills, systemic obstacles, change management strategies and process ambivalences, seeking to critically articulate the promises of digitalization with the daily reality of institutions and health professionals.

1. Political and institutional configuration of digital transformation

The results reveal that the digital transformation of German health, far from emerging as a spontaneous or exclusively techno-determined process, was structured from a solid political and regulatory framework, conceived by the State as a strategic response to historically diagnosed weaknesses in the health system. As evidenced by reports from the Bundesministerium für Gesundheit, Germany belatedly recognized its digital lag relative to other European countries and, since 2019, has pursued a legislative agenda aimed at accelerating the sector's technological modernization (BMG, 2019; 2020; 2023). Laws such as the Digital Act (2019) and the Hospital Future Act (2020) materialized this shift by introducing binding funding mechanisms, incentives for the adoption of interoperable solutions, and technical obligations for hospitals and providers, while

producing a political discourse focused on technological urgency, operational efficiency, and the need to "upgrade" clinical and administrative practices for the digital age.

This institutional framework is consistent with what the socio-technical literature describes as the political imagination of innovation, i.e., a set of narratives and legal devices that seek to guide society towards desirable futures (Jasanoff, 2015). By promoting digitalization as an inevitability and a functional, if not existential, imperative, the German state articulates a normative vision of modernization that assumes that the introduction of digital technologies will, by itself, yield gains in efficiency, integration, and quality of care. This vision echoes international trends identified by the OECD (2023), which highlights how governments often bet on digital reforms in response to demographic pressures, rising costs, and the fragmentation of health systems.

In addition, the governance of Germany's digital transformation faces the challenge of operating within a highly decentralized system, with responsibilities distributed among the federal state, the Länder, health insurers, professional associations, and private providers. This institutional plurality hinders coordination and contributes to discrepancies in the speed and quality of implementation, a situation that has already been identified by bodies such as the OECD (2023) as a structural obstacle to the digital modernization of federal systems. Thus, although the policy framework creates material and symbolic conditions for the transformation, it does not guarantee its daily implementation, which depends on heterogeneous organizational capacities, sometimes resistant professional cultures, and digital infrastructures whose maturity is still below government ambitions.

In this sense, the results suggest that the digital transformation of German health can only be understood as a tense socio-technical process, situated between the State's strategic vision and the institutional realities in which technologies are incorporated, reinterpreted, or contested. Public policies provide the framework and direction; however, their effectiveness depends on the capacity of organizations and professionals to absorb, translate, and implement changes.

2. Organizational changes and reconfigurations of clinical work

The results show that digitalization has produced structural changes in the routines and organization of health providers, reconfiguring professional roles, information flows, and daily practices. The introduction of digital technologies in hospitals operates not only as a technical tool but also as a vector for the profound reorganization of labor relations, internal hierarchies, and forms of coordination between teams. In this sense, digitalization

serves as an agent of organizational transformation, simultaneously modernizing processes and generating new tensions that require continuous adaptation by professionals.

On the one hand, technologies such as electronic medical records, clinical decision support systems, telemedicine platforms, and digital scheduling mechanisms are often presented as solutions capable of increasing efficiency, reducing redundancies, ensuring continuity of care, and improving information traceability, elements that the OECD (2023b) highlights as pillars of the modernization of health systems. However, these expectations do not always materialize in everyday life. Data analysis reveals that many professionals define these systems as cumbersome, fragmented, and not very user-centric, requiring the repetition of records, navigation between multiple platforms, pages, or screens, and the performance of administrative tasks that consume clinical time and generate daily frustration.

Thus, far from alleviating the workload in the short term, many digital processes cause what some authors call the efficiency paradox, in which technological tools designed to streamline processes end up increasing usability time before producing real gains (Jasanoff, 2015).

The analysis also reveals that digitalization creates new demands for invisible work, redistributing responsibilities that were previously outside the day-to-day roles of many professionals. Nurses and doctors, for example, take on functions of verification, correction, or preparation of data, acting as mediators between technological systems and clinical and administrative practices. As Assmann (2011) argues, when reflecting on broader institutional processes, these changes illustrate how new infrastructures introduce forms of organizational memory that require constant feeding, supervision, and human validation. In the context of health, this means that professionals become not only care providers, but also managers of digital information, accumulating additional responsibilities that are not always recognized or remunerated.

Another relevant result is how these transformations expose and amplify internal inequalities in digital literacy and adaptability. Younger professionals tend to integrate digital tools quickly, while others, trained in predominantly analog contexts, may feel insecure or resistant to new demands. Many of these professionals report a lack of training, time, and institutional support to develop adequate digital skills. This asymmetry generates internal tensions and compromises team performance, reinforcing the need for organizational policies on continuous training, technical support, and changing management that are sensitive to professional trajectories.

In short, the results show that digitalization should not be understood only as technological modernization, but as a process of labor reorganization and redistribution of skills, whose effects strongly depend on the institutional conditions, the quality of the infrastructure, and the organizational cultures involved. Every digital transformation entails identity renegotiation and the reconceptualization of professional roles, a phenomenon that, in the German case, remains ongoing and is marked by ambivalence.

3. Organizational culture, resistance and technological acceptance

Although official documents emphasize the benefits of digitalization, the implementation of this type of project often encounters cultural resistance that cannot be explained by technical limitations alone. Recent data show that, even with important advances, such as the connection of 96% of clinics and 99% of pharmacies to the national telematics infrastructure, as pointed out by data provided by the McKinsey & Company agency, 2022), many professionals continue to report daily difficulties, including weekly technical failures and the need to record information in multiple systems, which reinforces perceptions of overload and loss of autonomy. These experiences fuel fears of erosion of traditional skills and the growing bureaucratization of clinical work, contributing to a defensive posture in the face of digital innovation.

Sectoral studies also show that technological acceptance strongly depends on organizational environments prepared to welcome innovation as a collective process, rather than as an administrative imposition. Institutions with greater digital maturity tend to have collaborative cultures, horizontal communication flows, and leaders who are actively involved in technological implementation, offering not only guidelines, but continuous mechanisms for pedagogical and technical support. This pattern confirms the conclusions of the OECD (2023b), which underline that digital transformation requires institutional capacities for experimentation, learning, and adaptation, particularly decisive elements in complex hospital contexts.

Analysis of recent literature indicates that telemedicine, which was widely expanded during the acute phase of the COVID-19 pandemic, suffered a significant setback in the subsequent period. Although some sectoral reports mention high percentages of outpatient practices that would have reduced the supply of remote services after the pandemic peak, the available evidence allows us to safely affirm, above all, the existence of a general trend of retraction, rather than a precise numerical value (Deutsches Ärzteblatt, 2023). Data from insurance companies and national studies converge in this direction.

Information from Techniker Krankenkasse (TK) points, for example, to a reduction of about a quarter (approximately 25%) in the number of video consultations between 2021 and 2022, signaling a partial return to face-to-face formats after the health emergency period, having decreased by 40% by the end of 2023 (Heckmann, 2024). In addition, results of recent TK surveys reveal that almost half of clients interested in video consultations are unable to use them because their medical practices simply do not offer them (49%). This data reinforces the idea that telemedicine has lost its centrality in the post-pandemic, not due to a lack of demand, but due to a reduction in supply by practices (Deutsches Ärzteblatt, 2023). In addition, analyses conducted by the IGES Institut (2022) in cooperation with the Kassenärztliche Bundesvereinigung (KBV) also document a decrease in the number of medical practices offering video consultations in 2021 compared to 2020, suggesting that, for many providers, telemedicine functioned mainly as a contingent solution during the crisis, rather than as a structural and lasting reconfiguration of care delivery models.

Thus, organizational culture emerges as a determining variable for the success or failure of digital reforms. Digitalization is not implemented by decree or only by funding the organizations to be digitized; it requires legitimate leadership, strategic clarity, investment in training, and an environment that recognizes innovation as a process of co-creation. Where these elements are absent, resistance prevails; where they are present, greater adherence, technology adoption, and gradual improvement in clinical practice are observed.

4. Digital skills and emerging professional capacities

Digitalization requires doctors, nurses, administrators, and managers to develop new digital skills, including digital literacy, clinical data management, navigating electronic platforms, and understanding information flows in interoperable systems, skills that were not part of the traditional training of these professionals (OECD, 2023). National reports reinforce this trend by demonstrating that digitalization is not limited to the introduction of technological tools but also entails a profound reorganization of clinical work and a growing responsibility for digital information management (Fraunhofer IESE, 2023; McKinsey & Company, 2022).

Despite this demand, research reveals a structural deficit in digital skills within the sector. Initial health training in Germany continues to incorporate these contents in a heterogeneous way, and many professionals report not having received formal training to deal with complex digital platforms. This training gap is corroborated by OECD

assessments (2023), which also identify the insufficiency of continuous capacity-building programs as one of the main obstacles to the digital maturity of the German health sector.

In response to this scenario, a movement towards the professionalization of digital transformation is evident in several German institutions, with the creation of new specialized profiles that operate at the interface of technology, clinic, and management. Among these are "digital champions", clinical innovation managers (Clinical Innovation Managers), Health Informatics Specialists, and organizational transformation coordinators. These profiles perform essential functions by interpreting technical requirements, mediating conflicts between teams, offering practical training, articulating clinical needs alongside technological and administrative requirements, and following step-by-step the implementation of projects and the life cycle of these new technologies. Recent reports indicate that these figures have been decisive in reducing internal resistance, improving professionals' confidence, and accelerating the effective use of digital tools (Fraunhofer IESE, 2023).

Thus, the results show that building digital skills in Germany is not just a matter of technical training, but of deep institutional transformation. Without continuous investment in professional development, without structured support, and without specialized profiles capable of translating innovation into clinical practice, digitalization tends to reproduce internal inequalities, increase professional tensions, and limit the scope of technological reforms. On the other hand, where these emerging capabilities are recognized and integrated, greater uptake, ownership, and sustainability of digital innovation in the health sector is observed.

5. Systemic barriers: infrastructure, interoperability and technology governance

Despite legislative advances and recent investments in digital transformation, the German healthcare system continues to face structural obstacles that limit the effectiveness of digital initiatives and directly affect professionals and patients. The specialized literature shows that these challenges manifest themselves at multiple levels, technological, organizational, and political, resulting in uneven and often fragmented implementation. Several hospitals still operate on slow networks, with obsolete equipment and outdated servers, undermining the reliability of digital solutions (McKinsey & Company, 2022, 2024). Recent studies reinforce these limitations, showing that a significant proportion of hospital web systems and digital services remain insecurely configured, without systematic

use of HTTPS or DNSSEC. These gaps reveal structural weaknesses that compromise service continuity and increase vulnerability to attacks.

Interoperability remains one of the most critical areas for the German healthcare system. The coexistence of multiple providers and platforms with heterogeneous technical standards forces professionals to enter repeated data, manage inconsistencies, or maintain parallel paper records (OECD, 2023; Fraunhofer IESE, 2023). As a result, the administrative burden increases, and trust in technology decreases, fueling cultural resistance to adopting digital tools. Research institutions highlight that without a common architecture and interoperable ecosystems, the expected benefits of digitalization, such as reduced redundancies, improved care coordination, or increased operational efficiency, remain limited (Fraunhofer IESE, 2023).

The German federal structure itself imposes limitations on digitalization by distributing responsibilities between the federal government, the federal states, state insurers, and private entities. The existing dispersion in the German context results in uneven implementation rates, duplicated efforts, and a lack of robust standardization. Studies indicate that hospitals across regions tend to develop their own solutions, often incompatible with one another, resulting in a digital mosaic that is difficult to integrate (Fraunhofer IESE, 2023). This institutional fragmentation hinders strategic decision-making, reduces national coordination capacity, and limits the impact of digital policies, delaying the creation of a uniform technological ecosystem.

Digital security is a critical factor for the healthcare sector, which has been repeatedly identified as one of the most vulnerable in Europe, largely due to the reliance on legacy systems, the heterogeneity of update processes, and the growing digital attack surface. Recent reports from the European Union Agency for Cybersecurity (ENISA, 2021; 2023) confirm that the healthcare sector remains among the hardest hit by cyberattacks, especially ransomware. International studies reinforce that many breaches stem not from highly sophisticated operations, but from internal failures such as phishing, inadequate credential management, or delays in security updates, underlining the need for robust organizational practices and an institutional culture of security (OECD, 2023).

The incidents recorded in recent years illustrate the seriousness of the situation. Between 2021 and 2023, dozens of European hospitals were affected by significant attacks, including ransomware cases that forced the suspension of essential services (Klick, Koch & Brandstetter, 2021). One of the most emblematic episodes occurred in 2020, when the attack on the University Hospital Düsseldorf led to the paralysis of critical systems and the

transfer of patients to other units. In 2023, three hospitals in the Katholische Hospitalvereinigung Ostwestfalen network in Germany were severely compromised by the LockBit group, resulting in the temporary interruption of emergency services (Toulas, 2023).

Structural vulnerabilities have become even more visible during the COVID-19 pandemic. Data from Klick, Koch, and Brandstetter (2021) demonstrate that the rapid expansion of connected services, often without proportional reinforcement of security measures, has increased the digital exposure of healthcare institutions. According to the research, 32% of the services analyzed had vulnerabilities, and 36% of hospitals had vulnerable services. Even in a high-risk period like 2020, the German healthcare sector maintained a considerable and potentially exploitable digital attack surface.

These results reinforce the urgency not only to correct technical flaws but to strengthen organizational resilience, improve vulnerability management, and integrate permanent digital security practices into clinical and administrative processes. The pandemic has made it evident that digital health is now an essential component of continuity of care and that technological weaknesses can quickly turn into operational, clinical, and national risks.

6. Change management strategies: good practices and limitations

Despite the negative scenario exposed, research has identified a set of successful change management strategies, adopted by hospitals and clinics in Germany to facilitate the transition to a digital environment. Among the most effective practices is the early involvement of healthcare professionals, among other professionals, i.e. user involvement in the process of designing and implementing digital solutions. Case studies documented by Fraunhofer IESE (2023) show that teams that participate from the beginning in defining functional requirements develop a greater sense of ownership and trust in the tools, reducing initial resistance and increasing adherence to new routines.

Another recurring practice is the offer of continuous training programs, often accompanied by local tutoring and face-to-face support in the first weeks after the adoption of new systems. This model is particularly effective in hospitals with lower digital literacy rates, enabling professionals to handle technological demands more autonomously and reducing dependence on overloaded technical teams. In addition, institutions with regular training programs exhibit higher levels of effective use of digital platforms and lower perceived administrative overload (McKinsey & Company, 2022).

Phased implementation is another critical element of success. In several hospitals, the adoption of digital technologies occurs in progressive stages (through multiple rollouts), allowing for iterative adjustments, continuous feedback collection, and a reduction in operational errors. This incremental approach, in line with international models of digital transformation, has proven to be more effective than abrupt transition strategies, the so-called big bangs, which tend to generate insecurity and resistance among professionals.

Finally, the literature highlights the importance of visible and committed leadership. Clinical and administrative managers who actively use new technologies communicate the objectives of change directly and publicly acknowledge the challenges faced by teams, thereby contributing to the legitimization of the transformation and creating a climate of institutional trust. The OECD (2023) identifies this factor as one of the main determinants of digital maturity not only in Germany but also in European health organizations.

FINAL CONSIDERATIONS

The analysis carried out on the German case shows that digital transformation in health, although strategically promoted and widely recognized as necessary, is a complex, ambivalent process that is deeply conditioned by socio-technical, organizational and cultural dynamics. Far from being reduced to a linear movement of technological modernization, digitalization reveals itself as a field of dispute between political promises, institutional capacities, and the daily experiences of health professionals.

From a structural perspective, the study showed that digitalization is anchored in an ambitious policy framework, supported by large-scale investments and legislative reforms aimed at accelerating the sector's modernization. However, a significant mismatch between policy guidance and institutional reality persists, marked by uneven infrastructure, low interoperability, weaknesses in technological governance, and persistent challenges in data protection. This gap between normative intent and practical implementation contributes to the process's slowness and fragmentation, reinforcing regional and institutional inequalities.

At the organizational level, it has become clear that professional culture and work routines play a determining role in how digitalization is received and appropriate. The resistance identified among many professionals cannot be interpreted as mere opposition to innovation, but as a legitimate response to technologies perceived as intrusive,

unintuitive or overloading. At the same time, the most successful cases show that technological acceptance depends on committed leadership, transparent communication, well-conducted change processes, and active team participation.

In addition, the analysis highlighted the central role of digital skills as a condition for a sustainable transformation. The inadequacy of training programs, the heterogeneity of initial preparation, and the absence of specialized profiles hinder the day-to-day integration of technologies. Institutions that invest in continuous training, local mentoring, and the creation of new professional profiles can mitigate resistance and promote more qualified, strategic use of digital tools.

However, it is evident that a persistent tension between technical rationality (imposed by the State) and socio-professional reality (experienced by professionals) results in ambivalence: digitalization is both a promise of efficiency and a source of daily frustration. Managing this ambivalence requires, as demonstrated by good practices, change management strategies that value the early involvement of professionals and that see digital competence not as a given, but as a continuous process of learning and identity renegotiation.

On the socio-technical level, the results illustrate the existence of a gap between the speed of technological innovations and the institutional and cultural capacity to absorb them. This gap, widely recognized in the literature, does not represent a failure exclusive to Germany, but a challenge that cuts across contemporary health systems. The German case is emblematic for combining high technological potential, strong data protection, complex federal structures, and long-standing professional cultures, factors that make digital transformation both necessary and difficult.

In short, the digitalization of German healthcare is at an intermediate stage: sufficiently advanced to be irreversible, but still far from achieving the full integration and transformative impact it promises. The results demonstrate that technology alone does not transform healthcare systems. Effective change requires continued investment in training, coordinated governance, robust interoperability, and, above all, approaches that are sensitive to organizational realities and the values that guide professional practice.

In addition to systematizing advances, obstacles, and tensions, this chapter sought to offer three original contributions to the literature on digital transformation in health systems. First, it highlights that digitalization, far from being an exclusively technological process, is shaped by socio-technical dynamics arising from the interaction among public policies, organizational practices, and professional identities. Second, it demonstrates that

resistance should not be treated as dysfunction, but as a legitimate expression of work cultures, professional expectations, and risk perceptions generated by technologies that redistribute authority and responsibilities. Third, by articulating macro, meso, and micro levels of change, the chapter proposes an analytical framework capable of capturing the structural inequality of digital implementation, underlining that the effectiveness of reforms depends on the institutional capacity to translate technological imperatives into meaningful everyday practices. These contributions, together, seek to reinforce a critical reading of digitalization that recognizes both its transformative potential and its political, organizational, and cultural boundaries.

Ultimately, the future of healthcare in Germany, by extension, in complex European healthcare systems, will be defined by the system's ability to overcome this translation deficit. That is, the ability of the state to translate its technological imperatives into effective institutional capacities and user experiences that are intuitive and that alleviate, rather than increase, the bureaucratic burden on professionals. Overcoming this barrier is the main challenge for digitalization to deliver on its promise of a more agile, integrated and data-driven system.

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MINDSET AND LEADERSHIP: AN INTEGRATED ANALYSIS ON THE DEVELOPMENT OF ADAPTIVE AND INNOVATIVE LEADERS

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INTRODUCTION

Modern organizations operate in environments characterized by uncertainty, rapid change, and increasing innovation demands. Consequently, it is crucial to understand which psychological and organizational factors help develop leaders capable of navigating these challenges. The growth mindset, as defined by Dweck (2006), is the belief that skills can be improved through effort, effective strategies, and ongoing learning, and it has become important in leadership discussions. It influences how individuals confront challenges, handle mistakes, and pursue learning. Recent research indicates that this mindset also impacts how leaders interpret stress and uncertainty, enhancing their adaptability in complex situations (Kaluza et al., 2022). Furthermore, understanding this dynamic is particularly important for organizations aiming to enhance their innovation capacity and ability to adapt continuously.

Recent literature also highlights the relationship between growth mindset and adaptive leadership, understood as the ability to mobilize people, promote learning, and adjust behaviors in complex situations (Machado et al., 2024; Martins et al., 2024). Evidence from the international literature reinforces this perspective by demonstrating that the growth mindset acts as a mediating force in transformational leadership practices, strengthening self-efficacy, motivation, and the willingness to continuously improve (Lin, Yin, & Liu, 2022). In addition to individual aspects, organizational factors play a decisive role in this process: cultures that value autonomy, experimentation, and inclusion tend to favor innovative and collaborative behaviors (dos Santos, Betim & Franzoni, 2022; Dondi et al., 2021). Diverse teams expand the cognitive repertoire and stimulate creative

solutions, enhancing the positive effects of the growth mindset. In this sense, recent studies highlight that the growth mindset positively influences the integration of diversity and the strengthening of inclusive environments, expanding the creative and collaborative potential of teams (Katsumata & Teixeira, 2024).

Despite the theoretical advance, there are still gaps in the Brazilian literature regarding the integration between growth mindset, organizational culture, diversity, and adaptive leadership. From this gap emerges the research problem that guides this study in understanding how the growth mindset influences the development of adaptive and innovative leaders in contemporary organizations, considering both individual and contextual factors.

To answer this problem, the general objective of this study is to analyze how the growth mindset contributes to the development of adaptive and innovative leaders. To achieve this purpose, the research is guided by the following specific objectives:

- a) discuss the concept of growth mindset and its relationship with adaptive leadership behaviors;
- b) identify influences of the organizational climate and culture on the adoption of the growth mindset;
- c) examine the role of diversity and inclusion in the formation of innovative and collaborative leaders;
- d) relate the growth mindset to learning practices and organizational innovation.

The justification for the study stems from the growing relevance attributed to the topic, both in the literature and in management practices. Research by Dweck (2006), Martins et al. (2024), and Kangas et al. (2023) demonstrates that the growth mindset favors learning behaviors, resilience, and innovation. From an organizational point of view, studies by Dondi et al. (2021) and dos Santos et al. (2022) indicate that cultures that promote autonomy, diversity, and collaboration play an essential role in the development of adaptive leaders. In addition, the scarcity of national studies integrating these dimensions underscores the need to deepen the topic.

THEORETICAL FOUNDATION

To support the discussion proposed in this study, the theoretical framework was structured to initially present the conceptual foundations of the growth mindset, followed by the interfaces between this mindset, adaptive and innovative leadership, organizational

culture, and diversity. This organization allows us to understand how psychological and contextual factors interact to shape leaders' behavior in contemporary organizations.

CONCEPTUAL BASES OF THE GROWTH MINDSET

Understanding the growth mindset is essential to analyzing how leaders develop in dynamic organizational contexts. The concept, proposed by Dweck (2006), describes the belief that skills and competencies can be improved through effort, appropriate strategies, and continuous learning. Recent research reinforces this perspective by demonstrating that leaders with a growth mindset tend to adopt resilient, collaborative, and innovation-friendly behaviors (Martins et al., 2024). Kangas et al. (2023), when developing a specific scale to assess the "*leadership mindset*", highlight that such a mindset involves openness to feedback, acceptance of error as part of the learning process, and predisposition to adapt in complex scenarios.

The growth mindset dialogues directly with the concept of adaptive leadership, understood as the ability to mobilize people and resources to face complex challenges, promote continuous learning, and adjust behaviors in the face of change (Machado et al., 2024). This formal definition of adaptive leadership reinforces the idea that development-related beliefs, such as those proposed by Dweck (2006), are central psychological elements for leaders' effective performance in dynamic environments.

Recent research expands this understanding by indicating that leaders who cultivate a growth mindset are better able to interpret pressure situations as learning opportunities, thereby strengthening adaptive behaviors (Kaluza et al., 2022). This type of mindset directly influences the way leaders evaluate emotional and cognitive demands, reinforcing processes of self-confidence, openness to development, and emotional regulation, essential competencies in highly complex environments.

In addition, studies such as Lin, Yin, & Liu (2022) demonstrate that the growth mindset serves as an important mediator in transformational leadership practices, strengthening self-efficacy and engagement in continuous improvement processes. These results reinforce that the growth mindset is a structuring psychological component of performance and professional evolution, being relevant not only at the individual level, but also at the collective level.

From a practical point of view, recent findings indicate that leaders who adopt the growth mindset tend to create more collaborative, innovative, and learning-oriented environments, as highlighted by Katsumata & Teixeira (2024), who identify in this mindset

a key element for the development of socio-emotional skills directly related to contemporary leadership.

Thus, it is observed that the growth mindset constitutes the essential psychological basis to understand how leaders develop adaptive behaviors in challenging scenarios, connecting directly to the central purpose of this investigation.

ADAPTIVE AND INNOVATIVE LEADERSHIP IN CONTEMPORARY CONTEXTS

Adaptive leadership emerges as an essential approach for organizations facing continuous transformations. Machado et al. (2024) explain that adaptive leaders work by promoting innovation, managing uncertainty, and encouraging continuous learning. This type of leadership requires cognitive flexibility, the ability to interpret complex scenarios, and the ability to adjust practices and decisions in the face of rapid changes. In this sense, the growth mindset contributes to leaders' openness to learning and willingness to redesign strategies, thereby strengthening innovative behaviors.

Transformations in the work environment also increase the demands on leaders' profiles. Dondi et al. (2021) highlight socio-emotional skills, such as adaptability, critical thinking, empathy, and openness to learning, becoming fundamental in dynamic contexts. Such skills align directly with the assumptions of the growth mindset, reinforcing the idea that the ability to innovate and adapt depends on a mental posture oriented toward continuous development.

In addition, the literature shows that innovative leadership develops in environments that encourage experimentation and accept error as a natural part of the creative process. Martins et al. (2024) indicate that leaders with a growth mindset demonstrate a greater propensity for collaboration, idea sharing, and team development. By integrating these perspectives, it is evident that the growth mindset serves as a psychological engine of organizational learning, driving experimentation, reflection, and continuous improvement.

Recent evidence reinforces this conception by demonstrating that transformational leaders leverage innovative behaviors by inspiring their teams, encouraging autonomy, and strengthening self-efficacy, dimensions directly influenced by the growth mindset (Lin, Yin, & Liu, 2022). These studies point out that the growth mindset expands the ability of leaders to mobilize people towards innovation and facing complex problems.

Thus, evidence demonstrates that the growth mindset sustains both adaptive leadership and organizational innovation processes, reinforcing its role as an indispensable cognitive mechanism in complex and changing environments.

INFLUENCES OF ORGANIZATIONAL CULTURE AND DIVERSITY MANAGEMENT

Organizational culture plays a fundamental role in the development of adaptive and innovative behaviors. According to dos Santos et al. (2022), organizational environments that value autonomy, trust, and experimentation favor the emergence of innovative practices and employees predisposed to take calculated risks. Machado et al. (2024) reinforce that the leadership environment significantly influences openness to new ideas, collaborative posture, and the adoption of behaviors aimed at continuous learning. In the same sense, Dondi et al. (2021) show that organizational cultures that encourage autonomy, continuous learning, and socio-emotional development favor the formation of leaders prepared for complex environments. The authors argue that such cultures enhance behaviors aligned with the growth mindset, especially those related to innovation and adaptability.

Another relevant aspect refers to diversity and inclusion. Studies show that diverse teams tend to have greater creative and innovative potential due to the multiplicity of perspectives. Martins et al. (2024) state that leaders with a growth mindset are more likely to value diversity and promote inclusive environments, in which different identities and experiences are respected and integrated.

Recent contributions also point out that the growth mindset operates as a catalyst in diversity management, expanding the ability of leaders to integrate different perspectives and promote psychologically safe environments. Katsumata & Teixeira (2024) demonstrate that this mindset reinforces socio-emotional skills related to empathy, active listening, and cooperation, essential elements for building diverse and high-performance teams.

Therefore, the literature indicates that organizational culture and diversity act as contexts that amplify the growth mindset, determining to what extent it translates into innovative and collaborative leadership behaviors.

ORGANIZATIONAL GROWTH AND LEARNING MINDSET

Contemporary literature directly associates the growth mindset with organizational learning processes. According to Martins et al. (2024), leaders who believe in continuous development tend to promote learning-oriented environments, in which error is interpreted as an opportunity for evolution. This perspective is close to what Dweck (2006) describes as a "development posture", which stimulates the constant search for new skills, favoring

the construction of more engaged and flexible teams. Thus, the growth mindset serves as a psychological foundation for practices that facilitate the internalization of knowledge.

Machado et al. (2024) reinforce the idea that organizational learning depends on leaders who can review practices, experiment with solutions, and foster cycles of continuous reflection. These behaviors, according to the authors, are essential in environments characterized by volatility and complexity, in which rapid adaptation becomes a competitive advantage. The presence of the growth mindset favors the implementation of feedback routines, the constant exchange of experiences, and the continuous adjustment of strategies, essential characteristics for teams to develop collective learning capabilities.

Additionally, studies indicate that the growth mindset favors the adoption of exploratory behaviors, essential for the construction of learning-oriented environments. Katsumata & Teixeira (2024) point out that leaders with this mindset develop greater tolerance for error and greater willingness to review strategies, strengthening continuous learning and collaboration cycles.

In addition, the role of the growth mindset in organizational learning is manifested in the way leaders interpret challenges and mobilize their teams. Development-oriented leaders tend to stimulate questioning, promote debates, and encourage divergent perspectives, increasing the quality of reflections and decisions. Thus, in the end, it is observed that the growth mindset acts as a catalyst for organizational learning, strengthening the ability of teams to evolve continuously, even in highly challenging scenarios.

GROWTH MINDSET AND INNOVATIVE BEHAVIORS

Organizational innovation is widely treated as a social process that depends on attitudes, beliefs, and cultural conditions that enable experimentation. Martins et al. (2024) highlight that leaders with a growth mindset demonstrate a greater willingness to test solutions, encourage new ideas, and tolerate moderate risks, all of which are essential for the development of innovative behaviors. This posture creates a safe environment for the emergence of creative initiatives, especially in organizational contexts that require constant adaptations.

Dondi et al. (2021) complement this view by stating that competencies such as creativity, adaptability, and critical thinking emerge more strongly in environments that value continuous development. Organizations that recognize error as part of the innovation

process tend to encourage exploratory behaviors, reinforcing the growth mindset as a necessary cognitive basis for new ideas to consolidate into practical solutions. Thus, the mindset directly influences how leaders interpret uncertainty and manage change.

In addition, innovation is intrinsically linked to the ability to integrate diverse perspectives, reinforcing the relationship among growth mindset, inclusion, and creativity. Development-oriented leaders see the heterogeneity of teams as a valuable resource, expanding the collective repertoire of ideas and optimizing solutions to complex problems. It is therefore concluded that the growth mindset is a central component of innovative behavior, strengthening the organization's ability to adapt and renew.

CONNECTIONS BETWEEN MINDSET, ORGANIZATIONAL CULTURE AND STRATEGIC LEADERSHIP

The reviewed literature shows that the relationship among growth mindset, organizational culture, and leadership is a systemic phenomenon that extends beyond the individual sphere. Dondi et al. (2021) argue that organizations oriented toward continuous learning structure their policies, processes, and routines to encourage autonomy and experimentation. These environments facilitate the expression of adaptive and innovative behaviors by leaders, creating a virtuous cycle in which the growth mindset is strengthened and disseminated.

In addition, dos Santos et al. (2022) demonstrate that organizational culture directly influences leaders' willingness to take calculated risks and promote intrapreneurship initiatives. In more rigid and hierarchical cultures, the fear of error tends to restrict innovative behaviors; environments that value collaboration, trust, and openness to dialogue favor the internalization of the growth mindset. Thus, the interaction between culture and mindset is a decisive factor in understanding the dynamics of strategic leadership.

Finally, the integration between growth mindset and organizational culture shapes the ability of organizations to position themselves strategically in the face of external transformations. Development-oriented leaders tend to align their decisions with cultural values that encourage renewal and adaptability, strengthening collective strategic capabilities. With this, it is concluded that the growth mindset and organizational culture reinforce each other, contributing to the construction of more resilient organizations prepared for continuous change.

IDENTIFIED THEORETICAL GAPS

Despite the advances, there are still gaps that justify the development of this research. The Brazilian literature presents few studies that analyze the growth mindset, adaptive leadership, and the influence of organizational culture in an integrated way. In addition, there is a lack of research that directly relates diversity and growth mindset in the context of leadership. Another gap refers to the absence of national theoretical models that articulate growth mindset, organizational learning, and innovation, especially in digital transformation scenarios. Such gaps reinforce the relevance of the literature research adopted, in line with the methodological principles of rigor and systematization presented by Köche (2016) and Castro (2011).

The theoretical framework demonstrates that the growth mindset is a central psychological element of adaptive and innovative leadership, aligning with socio-emotional competencies and organizational cultural factors. This conceptual basis underpins the present research and guides the methodological choices presented below.

INTEGRATIVE SYNTHESIS OF THE THEORETICAL FOUNDATION

From the theoretical contributions presented, it is evident that the growth mindset operates not only as an individual belief but also as a structuring principle with multiple organizational implications. It directly influences leadership practices, learning processes, innovative behaviors, and cultural dynamics, manifesting in a systemic way through organizational aspects that shape collective performance. This perspective broadens the understanding of the role of this mindset in the construction of adaptive and innovative leaders.

The literature also demonstrates that factors such as organizational culture, diversity, and autonomy interfere in the way the growth mindset manifests itself and consolidates itself in the daily practices of organizations. In environments that encourage experimentation, knowledge exchange, and psychological safety, this mindset finds fertile ground to strengthen itself, directly impacting the performance and resilience of teams. Thus, the interaction between individual and contextual elements is essential to explain strategic behaviors.

In this way, the integrated theoretical foundation provides a consistent basis for understanding the relevance of the growth mindset as a psychological and organizational element. By articulating concepts of leadership, culture, learning, and innovation, this section establishes the necessary foundations to analyze how contemporary leaders develop

capacities to act in environments marked by continuous transformation and growing demands for adaptability.

METHODOLOGY

This study is characterized as qualitative, applied, and exploratory. It aims to understand subjective and interpretive phenomena related to the growth mindset, adaptive leadership behaviors, and the influence of cultural and organizational factors shaping these processes. The decision to use a qualitative approach is based on the psychological and contextual nature of these concepts, as argued by Dweck (2006), Kangas et al. (2023), and Machado et al. (2024). These works demonstrate that beliefs, perceptions, and behavioral patterns associated with human development cannot be easily measured numerically and require detailed, contextual analysis. The applied aspect reflects the goal of connecting theory with practice, providing insights to improve leadership development strategies in modern organizations. The exploratory nature arises from identified gaps in the Brazilian literature, particularly concerning the integration of growth mindset, adaptive leadership, organizational culture, and diversity.

From a procedural point of view, it is a bibliographic research, developed from the systematic analysis of national and international scientific productions. Articles published in databases of academic relevance, such as Google Scholar and SciELO, as well as books, institutional reports, and recent empirical studies that address the main conceptual axes of the study were consulted. Considering the timeliness and rapid evolution of discussions on leadership and mindset, articles published between 2021 and 2025 were selected. The selection of sources followed criteria of topicality, relevance, and adherence to the research problem, including fundamental authors such as Dweck (2006), Dondi et al. (2021), dos Santos et al. (2022), Kaluza et al. (2022), Kangas et al. (2023), Katsumata and Teixeira (2024), Lin, Yin & Liu (2022), Machado et al. (2024), and Martins et al. (2024).

The construction and organization of the data occurred through documentary analysis, following the stages of identification, selection, exploratory reading, thematic categorization and critical synthesis, as guided by Castro (2011) and Köche (2016). After organizing the sources, content analysis was carried out, a technique that allows the identification of conceptual patterns, convergences, tensions and theoretical gaps in the reviewed literature. The analytical categories were defined based on the specific objectives of the research, including: conceptual foundations of the growth mindset; relationships between growth mindset and adaptive leadership; influences of organizational culture and

climate; role of diversity and inclusion; and articulations between mindset, organizational learning and innovation. This analytical structure ensures logical alignment between theoretical framework, objectives and interpretation of results.

The methodological choices are directly connected to the theoretical bases that support the study. The works of Dweck (2006), Machado et al. (2024), and Dondi et al. (2021) indicate that the growth mindset, adaptive leadership, and organizational learning are complex phenomena, influenced by social interactions, cultural factors, and individual perceptions, requiring interpretative approaches. Likewise, contemporary studies such as those by Kaluza et al. (2022), Lin, Yin & Liu (2022), and Katsumata & Teixeira (2024) reinforce the need for qualitative approaches by highlighting the relationships between individual beliefs, self-efficacy, emotional regulation, and leadership practices. The adoption of qualitative research allows us to understand nuances, meanings, and interrelationships between these elements, producing a consistent and reasoned critical synthesis. Thus, the methodology used enables rigorous achievement of the general and specific objectives, offering a solid analytical framework to answer the research's central question and contributing to advancing discussions on contemporary leadership.

DISCUSSION AND RESULTS

The integrated analysis of the literature allowed us to understand in depth how the growth mindset is articulated with different dimensions of contemporary leadership, meeting the specific objectives of the research. The results demonstrate that this mindset serves as a central psychological element in explaining adaptive, innovative, and learning-oriented behaviors in dynamic organizational contexts.

The first specific objective was to discuss the conceptual bases of the growth mindset and its relationship with adaptive leadership. The studies by Dweck (2006), Martins et al. (2024), and Kangas et al. (2023) show that development-oriented beliefs promote resilience, openness to feedback, and a willingness to face challenges, which are essential characteristics for leaders operating in highly complex environments. This perspective is directly connected to the arguments of Machado et al. (2024), who describe adaptive leadership as a process that requires constant review of practices, cognitive flexibility, and the ability to mobilize people amid rapid transformations. Thus, the results indicate that the growth mindset is the psychological basis for leaders' adaptive behaviors and strategic performance. Additionally, recent studies show that leaders with a growth

mindset tend to interpret stressful situations as opportunities for development, favoring more adaptive responses in high-pressure contexts (Kaluza et al., 2022).

The second objective sought to identify the influences of organizational culture and work climate on the adoption of the growth mindset. Evidence indicates that cultures that value autonomy, psychological safety, experimentation, and trust, as described by dos Santos et al. (2022) and Dondi et al. (2021) represent essential conditions for the expression of this type of mindset. In rigid, hierarchical, and error-averse environments, the tendency is for leaders and teams to adopt defensive behaviors, reducing their capacity for learning and innovation. Collaborative cultures, on the other hand, favor the development of practices aligned with the growth mindset, reinforcing openness to the new and the continuous search for creative solutions. In this sense, it is evident that the growth mindset strengthens leaders' self-efficacy, expanding the impact of collaborative cultures in promoting innovative behaviors (Lin, Yin, & Liu, 2022).

The third specific objective examined the role of diversity and inclusion in the formation of innovative and collaborative leaders. The reviewed studies indicate that diverse teams expand cognitive repertoires, strengthen collective learning processes, and stimulate creative approaches to problem-solving. Martins et al. (2024) demonstrate that leaders with a growth mindset tend to recognize diversity as a source of value and not as an obstacle, promoting inclusive environments in which multiple perspectives are legitimized. This finding reinforces that diversity not only complements, but enhances the effects of the growth mindset on leadership performance. In addition, authors such as Katsumata & Teixeira (2024) highlight that the growth mindset favors socio-emotional skills essential for diversity management, such as empathy and openness to dialogue, strengthening inclusive environments.

The fourth objective related the growth mindset to organizational learning practices. The results show that development-oriented leaders stimulate continuous cycles of reflection, knowledge exchange, and strategy review. According to Machado et al. (2024), this type of leadership strengthens learning routines that support organizations' ability to adapt to constant change. The literature shows that mindset acts as a catalyst for these practices, directly influencing how mistakes are interpreted and transformed into opportunities for improvement.

The discussion also revealed that the relationship between growth mindset and innovative behaviors is solid and direct. As Martins et al. (2024) point out, leaders with this mindset demonstrate a greater willingness to test ideas, take moderate risks, and engage

their teams in creative processes. The analyses by Dondi et al. (2021) reinforce the finding that skills such as creativity, critical thinking, and adaptability emerge more consistently in environments that value experimentation, indicating that the growth mindset not only influences innovation but is also fundamental to sustaining it.

Another dimension analyzed concerns the connections among growth mindset, organizational culture, and strategic leadership. The results suggest that these three variables operate interdependently: while the growth mindset guides individual behavior, organizational culture creates the conditions for such behavior to be expressed and expanded. As demonstrated by dos Santos et al. (2022), favorable environments encourage innovative behaviors and strengthen leaders' strategic performance, enabling innovative initiatives to gain scale and impact. This set of evidence reinforces that adaptive leadership is not only based on personal competencies but also depends on institutional structures that promote learning and flexibility.

Finally, the identified theoretical gaps point to the need to deepen research that articulates the mindset of growth, organizational learning, and innovation in the Brazilian context. The absence of national analytical models that integrate these dimensions underscores the importance of the present study, which offers a robust theoretical synthesis that can serve as a basis for future research and the formulation of more effective leadership development practices.

In general, the results show that the growth mindset is a key element in explaining the development of adaptive and innovative leaders, serving as a point of convergence among psychological, cultural, and strategic factors. The integration of these dimensions broadens understanding of how leaders can strengthen organizations' adaptive capacity and respond effectively to contemporary challenges.

FINAL CONSIDERATIONS

The present study showed that the growth mindset is one of the most relevant psychological pillars for the development of adaptive and innovative leadership in contemporary organizations. From the integrated analysis of the literature, it was found that this mindset oriented towards continuous development directly impacts how leaders perceive challenges, interpret mistakes, and mobilize their teams towards learning and experimentation. By recognizing that competencies can be improved, leaders strengthen their ability to navigate uncertain scenarios and foster environments that sustain continuous cycles of transformation.

The results also revealed that the growth mindset does not operate in isolation but interacts with organizational structuring factors, such as culture, autonomy, psychological safety, and diversity. Environments that value collaboration, trust, and openness to dialogue create conditions for this mindset to be fully expressed, allowing leaders to review practices, test new approaches, and encourage teams to take moderate risks. Thus, the construction of organizational cultures that favor human development proved essential to the consolidation of adaptive and innovative behaviors.

Another relevant point is that diversity expands the cognitive and creative capacities of teams. The studies analyzed demonstrate that leaders guided by the growth mindset tend to value different perspectives and integrate diverse experiences into the decision-making process. This contributes to the formation of inclusive environments, which strengthen innovation by increasing the quality of interpretations, solution alternatives, and collective strategies. Thus, diversity and a growth mindset emerge as complementary dimensions, capable of enhancing organizational results in complex contexts.

Additionally, it was found that the growth mindset plays a strategic role in sustaining organizational learning routines. Leaders who cultivate this mindset encourage continuous reflection, knowledge exchange, and improvement of practices, elements recognized as essential for organizations that need to reposition themselves in volatile markets. By transforming mistakes into opportunities and challenges into sources of evolution, such leaders reinforce the resilience and adaptive capacity of teams, contributing to constant improvements in processes, products, and strategies.

Another relevant aspect concerns the theoretical gaps observed in national literature, particularly regarding the integration of growth mindset, adaptive leadership, innovation, and organizational culture. The absence of Brazilian theoretical models that articulate these elements suggests that future research can advance by developing approaches more closely aligned with the realities of national organizations. Empirical investigations that examine how leaders apply the mindset in practice, or how regional cultural variables influence this process, represent promising avenues for theoretical and practical deepening.

In summary, the evidence gathered demonstrates that the growth mindset not only contributes to individual leader development but also strengthens collective capabilities essential for organizations to remain competitive, innovative, and resilient. The articulation between psychological, cultural, and strategic factors reveals that the training of adaptive leaders does not depend on isolated competencies, but on the construction of organizational ecosystems that stimulate continuous human development. Thus, the study reinforces the

importance of integrating mindset, culture, diversity, and learning as indispensable foundations for contemporary leadership and organizational sustainability in environments marked by constant transformation.

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TOWARDS AN INTERCONNECTED PRACTICE: OPEN EDUCATION AND THE ECOSYSTEM EDUCATIONAL PARADIGM IN CONTINUING TEACHER EDUCATION

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INTRODUCTION

Contemporary society, heavily influenced by global interconnectedness and digital tech, is considered a complex "networked society." In this context, the rapid flow of information and seamless interactions reshape fundamental aspects of human life. As CASTELLS (2023) notes, the primary spatial feature of this society is the interconnectedness between local and global levels. The global network structure links locations selectively based on their importance within the network.

This chapter presents Open Education, enhanced through Open Educational Resources (OER), articulated with the Ecosystem Educational Paradigm, and how it constitutes a structuring path to reconfigure Continuing Education of Teachers in the network society. It is argued that this convergence strengthens teacher autonomy, the culture of collaboration, and the critical curation of knowledge, with direct implications for institutional policies and professional development programs.

This scenario of rapid paradigmatic transformation requires a restructuring in teacher training, as the linear and fragmented logic of knowledge can no longer respond to the complexity and uncertainties of the twenty-first century. It is in this context that education, driven by the need for adaptability, must seek new models to train educators capable of navigating and acting in a dynamic and interconnected world.

A new consciousness begins to emerge: man, confronted on all sides with uncertainty, is taken on a new adventure. It is necessary to learn to face uncertainty, since we live in a time of change, in which values are ambivalent, and everything is connected. (MORIN, 2011, p. 73)

Teacher training should be improved through a systemic perspective to promote sustainability and environmental awareness. The systemic perspective is essential for Eco-training, which is based on greening and on promoting the reconstruction of relationships within the triad of life: individual, society, and nature.

In this research, the Ecosystem Educational Paradigm is assumed to be the epistemological basis for understanding teaching as an interdependent practice among the subject, collectivity, and environment. From this perspective, eco-training and eco-pedagogy guide a teacher education that integrates complexity, transdisciplinarity, and socio-environmental responsibility, displacing Continuing Education from instrumental models to reflective, situated, and collaborative processes.

For ecopedagogy to materialize, it is necessary to undergo eco-formative processes, that is, to engage in educational experiences of a formative nature, rooted in the relational dynamics among human beings, society, and nature. (MORAES, 2021, p.312)

The materialization of ecopedagogy requires engaging with eco-formative processes grounded in transdisciplinarity and complexity, reflecting educational efforts rooted in planetary citizenship. Sustainability reinforces the idea that educational systems need to serve a more sustainable society and aligns with the UN 2030 Agenda. Human Development promotes planetary citizenship by developing critical awareness of consumer society and social injustices. Integral Education restores human wholeness and promotes a culture of peace and non-violence, recognizing the multidimensionality of the human being.

The education of the future should be the first and universal teaching, centered on the human condition. We are in the planetary era; a common adventure leads human beings, wherever they are. They must recognize themselves in their common humanity, and at the same time, recognize the cultural diversity inherent to every human being. (MORIN, 2011, p. 43).

The Ecosystem Paradigm brings with it theoretical perspectives to be observed in the development of its pedagogical practices. The Dialogic Perspective, inspired by Edgar Morin (2000), accounts for the association of what is apparently antagonistic, based on the idea of the opposite, in process, unfinished. The Ecosystem Educational Paradigm (Moraes, 2021) is adopted here as an epistemological reference that demands overcoming fragmentation and operating with systemic, interconnected, and ethically oriented thinking, articulating scientific and humanistic knowledge in teacher training.

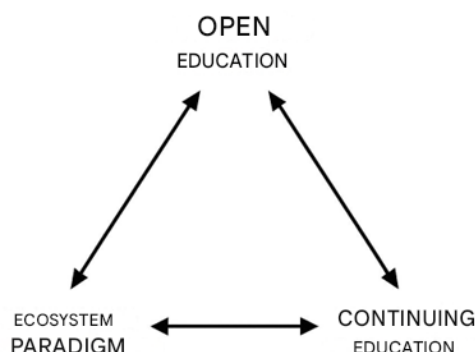
In this panorama of complexity, the exponential advance of technology emerges as the main driver and, simultaneously, the greatest challenge for training processes. Digital tools and the internet not only organize access to information but have also created virtual environments that demonstrate the fragility of geographical and institutional barriers. Technology in education transcends the mere digitization of resources; it represents a change in the teaching-learning process, altering access to knowledge and the concept of authorship. The emergence of Web 2.0 and virtual environments not only offers communication tools, but also establishes spaces for collaboration where knowledge is built in a distributed and continuous way. This new digital architecture dissolves the boundaries of the classroom, requiring the teacher to develop a technological fluency that goes beyond instrumental use, making him a mediator capable of navigating and curating information, and of integrating formal learning with the vast informal networks available. In this way, technology consolidates itself as the inevitable catalyst that drives Continuing Education towards more open, dynamic models adapted to the reality of the network society.

Traditional, centralized, and inflexible models of Continuing Education become unsustainable. It is essential, therefore, that educational systems embrace the principles of Open Education, encouraging teachers to move from the position of mere consumers to that of producers, curators, and sharers of knowledge. This change in attitude, mediated by Open Educational Resources (OER) and collaborative practices, is the way to build a culture of continuous and networked learning, essential for teacher autonomy in the twenty-first century. In Continuing Education, Open Education operates as a formative design strategy: (I) it expands access and reduces barriers; (II) it sustains communities of practice and peer learning; (III) it enables co-authorship and collaborative review of materials; and (IV) it favors critical curation of resources and pedagogical evidence. In this logic, OER function as concrete devices for contextual adaptation, circulation of teaching knowledge, and collective production of professional knowledge.

"Open Education" is a broad term that has undergone evolution and transformation. Weller, Jordan, DeVeris, and Rolfe (2018) used a citation analysis method to investigate different groups of publications associated with open education, revealing eight categories: Distance Learning, Open Education in Schools, E-Learning, OER, MOOCS, Open Practices, Social Media, and Open Space Publishing. (ZAWACKI-RICHTER; JUNG, 2023, p. 121)

Open Education is the essential strategy for democratizing access, making the training path more flexible, and promoting the sharing of knowledge. It is not configured as a mere pedagogical option, but as a structural and ethical need for the continuing education of teachers in the twenty-first century. Promoting the use and creation of Open Educational Resources (OER) breaks with the logic of scarcity and proprietary knowledge, democratizing access to high-quality materials and enabling the personalization of the training path. Its collaborative essence encourages the teacher to act as an active agent in constructing and sharing knowledge, fostering communities of practice and innovation. This movement strengthens teacher autonomy, ensuring that educators are permanently connected to regional trends and needs, ensuring that professional development is continuous, relevant and accessible to all.

Figure 1 – Relationship between Open Education, Ecosystem Paradigm and Continuing Education. Prepared by the authors using artificial intelligence (2025).



The transition to the network society and the inevitable mediation of technology impose an urgent revision in the models of Continuing Education of Teachers. Mere technical improvement is no longer enough; an ontological transformation in the educator's posture is required. It is at this point that Open Education assumes its crucial relevance, as

it is not only a tool, but the methodological instrument capable of promoting collaboration and the democratization of knowledge. In doing so, it paves the way for the adoption of the Ecosystem Educational Paradigm, a theoretical and practical reformulation that requires the teacher to have an interconnected, recursive and complex worldview, essential for the full exercise of teaching and for the construction of a more sustainable and ethical future.

The central challenge of Continuing Education of Teachers in the interconnected society lies in its ability to migrate from the traditional and fragmented model to the holistic view of the Ecosystem Educational Paradigm. This transition demands the abandonment of linear thinking in favor of a systemic and interdependent consciousness. In this scenario, Open Education emerges as an indispensable strategic mechanism: by democratizing access and making the training path more flexible through Open Educational Resources (OER), it promotes the sharing of knowledge and strengthens conditions for teacher eco-training. The synergy between Open Education and the Ecosystem Educational Paradigm favors continuing education practices oriented to collaboration, critical curatorship, and socio-environmental responsibility, preparing the teacher to act in the complexity and uncertainty of the twenty-first century.

THE ECOSYSTEM EDUCATIONAL PARADIGM

Eco-training and Ecopedagogy: Integrated paths for a new epistemology of education

The Concept of Science (or *scientia* in Latin, which means knowledge) is a vague term whose delimitations depend not only on epistemological principles but also on historical contingencies. Bronovsky states that Science is neither definitive nor decisive. The nature of science is continually renewed and self-correcting, constantly revised and improved. For almost a millennium (476 to 1453 of the Common Era), Science was plunged into dense obscurantism. It began to be rediscovered in the European Cultural Renaissance (fourteenth to sixteenth centuries) and took hold in the Age of Enlightenment (seventeenth to eighteenth centuries).

The Cartesian Newtonian Paradigm, consolidated between the end of the seventeenth century and the beginning of the eighteenth century, saw the universe as a perfect machine, governed by exact mathematical laws. The philosopher Descartes (1596-1650) stated that without reason, no knowledge of nature is possible.

With the emergence of Quantum Physics in the twentieth century, the Complexity Paradigm began. This new model of science no longer allows the fragmentation of reality and the disjunction of knowledge. This implies a new way of thinking about reality,

considering that systems do not have programmed responses, but can provide answers to the unexpected. Reality has come to be conceptualized as a complex system. Quantum mechanics, through Werner Heisenberg's Uncertainty Principle, introduced the view of physical reality as a web of relationships. Systems Thinking is at the heart of Deep Ecology, which does not distinguish between humans and nature, seeing the world as a network of interconnected, interdependent beings.

In the year 2000, according to Moraes (2021, p. 70), the Ecosystem Educational Paradigm emerged, establishing a new educational structure grounded in ecological understanding. The Ecosystem Educational Paradigm, proposed by Maria Cândida Moraes, challenges the traditional view, encouraging systemic, dynamic, and interconnected thinking. It is directly related to the objectives of ecopedagogy, which seeks to build an ecosystem-based pedagogy grounded in complexity and transdisciplinarity.

Moraes (2021) proposes a critical and necessary reflection on the transformation of educational paradigms in the light of the science of complexity and transdisciplinarity. The author highlights the urgency of creating learning spaces that promote a new ecology of human learning, integrating scientific and humanistic knowledge. The Ecosystem Educational Paradigm is a fundamental theoretical and practical reformulation for contemporary education. It arises in the midst of the profound transformations of modern society, such as climate change, technological advancement, and the growing awareness of diversity and inclusion. It plays a crucial role in establishing a new educational structure based on an ecological understanding.

Transdisciplinarity is an essential component of the Ecosystem Paradigm and Ecopedagogy. It deals with the multidimensionality of complex processes. According to Nicolescu, the prefix *trans* refers to that which is connected at the same time between disciplines, through disciplines, and beyond any discipline, to explain and understand the present world. Transdisciplinarity faces the challenges of today, as it interconnects knowledge and goes beyond the limits of disciplines and social, political, economic, cultural, and historical phenomena.

Transdisciplinarity, as the prefix 'trans' indicates, concerns that which is at the same time between disciplines, through disciplines, through different disciplines, and beyond any discipline. Its goal is understanding the present world, for which one of the imperatives is the unity of knowledge. (NICOLESCU, 2021, p.53)

According to the Charter of Transdisciplinarity (1994), it is complementary to the disciplinary approach. Transdisciplinarity does not seek mastery over the various other disciplines, but rather the openness of all of them to that which crosses and surpasses them. Although Transdisciplinarity is not a new discipline or a hyper-discipline, it feeds on disciplinary research, which, in turn, is fruitfully illuminated by transdisciplinary knowledge. Nicolescu states that Transdisciplinarity is anchored in three pillars: the levels of Reality, Complexity, and the Logic of the Included Middle.

The transdisciplinary view creates situations of greater involvement of individuals in the construction and reconstruction of meanings. It enables learning to be established in a meaningful way by jointly mobilizing the mental, emotional, and bodily dimensions. Transdisciplinary thinking connects ontology, epistemology, and methodology.

The advent of a transdisciplinary culture, which can help eliminate the tensions threatening life on our planet, is impossible without a new type of education that accounts for all dimensions of the human being. (NICOLESCU, 2021, p.143)

The Ecosystem Paradigm proposes an integral, systemic, and ethical education. And socio-environmental responsibility seeks to build a fairer, more solidarity-based future. This concept integrates three formative dimensions and is based on Pineau's tripolar theory. In Auto-hetero-ecoformation, the subject is built in his individuality (*self*), through the interdependence established with others (*hetero*) and with his material environment (*echo*), forming himself and contributing to the transformation of his own environment and the formation of others.

In practice, it is essential that the teacher develop awareness of himself (self-training), of his relationships with others (heteroformation), and of the environment (eco-training), integrating these three aspects into a coherent pedagogical practice. It allows the teacher to develop a critical and reflective posture that values the complexity and plurality of human experiences.

Teacher Training under the Ecosystem Educational Paradigm must be translated into actions that break with disciplinary fragmentation and promote interconnection. The teacher can, for example, propose mapping local flows and impacts, transforming a vital community resource into a project that integrates science, mathematics, history, and ethics, applying Transdisciplinarity and Systems Thinking beyond curricular limits. Simultaneously, the adoption of a Three-Dimensional Logbook (Auto-hetero-ecoformation) allows the educator to develop awareness of himself, his relationships and

the environment, transforming the pedagogical practice into an act of continuous Eco-training. Such initiatives, instead of seeking definitive answers, use complex debates to seek multifaceted solutions, preparing the teacher to be a mediator of complexity and an active agent in the construction of a more just and solidary society.

CONTINUING EDUCATION OF TEACHERS

Teaching as a collective and situated construction

The discussion on Continuing Teacher Training is central in the Brazilian educational context, being governed by Resolution CNE/CP No. 1, of October 27, 2020, which establishes the National Curriculum Guidelines for the Continuing Education of Basic Education Teachers and the National Common Base for the Continuing Education of Basic Education Teachers (BNC-Continuing Education).

Continuing Education is an essential component of the professionalization of Basic Education teachers. It is seen as an assignment to be promoted by the Union, the Federal District, States, and Municipalities in collaboration, according to § 1 of article 62 of the Law of Guidelines and Bases of Education (LDB).

In the twenty-first century, being a teacher has changed a lot. Teaching functions have diversified, and teachers have had to update themselves and assume new educational and social roles. They have faced uncertainties and changes within the profession, linked to increases in scientific knowledge, technology, social demands, and government policies. Continuing Education should help rethink teaching practice by fostering awareness of contextualization and the complexity of the educational act.

The complexity and uncertainties of twenty-first century society require that Continuing Education focus not only on individual development, but also on the transformation of contexts and structures, adopting continuing education models that expand access to quality training resources, especially in regions where there is a lack of face-to-face continuing education or through other means of updating, making schedules more flexible and the possibility of customizing the training path taking into account the particularities of the teachers' routine

Nóvoa, (2023) emphasizes the importance of teacher training in times of uncertainty. It stimulates collective mobilization and the search for new paths by rethinking their practices and expectations, promoting a more dynamic educational future adapted to contemporary needs.

"The renewal of teacher training is one of the pillars of this process. No one becomes a teacher without the collaboration of more experienced colleagues. It starts in universities and continues in schools. No one can be a teacher today without the effort of the collective dimensions of the profession." (NÓVOA, 2023)

For Garcia (1999), teacher training must be continuous, linked to practice and in harmony with the individualities of each teacher about technological knowledge. According to Garcia (2013) in the Information and Knowledge Age, the exercise of teaching requires the teacher to go beyond the mastery of the subject, pedagogy and didactics. The technical-pedagogical knowledge model is based on four main dimensions: technological knowledge, technological knowledge of the content, technical-pedagogical knowledge and technical-pedagogical knowledge of the content.

Donald Schön (2000) argues that teaching practice should be reflective. Knowledge is obtained through reflection during action. Reflective training is presented not as a merely instrumental technique, but as a holistic practice that requires self-confidence, creativity and the acceptance of uncertainty as an inherent part of the learning process and teacher development.

Tardif (2012) classifies knowledge as: knowledge of professional training, disciplinary knowledge, curricular knowledge, experiential knowledge and social knowledge. Among teaching knowledge, the knowledge of experience is notably the first step in mediating the construction of teacher identity. The knowledge of professional training includes teaching methodologies, evaluation strategies and classroom management, which integrates the mastery of content with pedagogical knowledge, making them teachable scientific knowledge. Disciplinary knowledge involves the mastery of specific content in the areas of knowledge. This knowledge, traditionally transmitted in university courses, needs to be transformed into school knowledge adapted to the realities and needs of students. Curricular knowledge is related to the knowledge of educational guidelines, teaching programs and objectives that guide teaching practice. Experiential Knowledge: built in the practical exercise of the profession, this knowledge includes the knowledge of the students, the school dynamics and the pedagogical strategies applied in various contexts. Practice is understood as a continuous learning environment. Social Knowledge refers to the understanding of the sociocultural context where the school is inserted, considering the influence of this context in the educational process.

Francisco Imbernón (2017) develops an innovative concept of teacher education, centered on collaboration and acceptance of diversity among educators. He argues that a

collaborative climate is essential to create an environment conducive to continuous learning, where teachers can share experiences and practices. This approach allows teacher education to adapt to the specific realities of each educator, promoting more meaningful professional development that is aligned with the needs of students and the school environment.

In innovation, it is not enough for teachers to get involved in collaborative reflection groups, it is necessary for them to become "reflective practitioners", it is not enough for them to develop projects in groups, they must use collaborative approaches as a form of daily work. (IMBERNÓN, 2024, p. 69)

Educational Innovation is a central concept and one of the main objectives of Continuing Education for teachers, and is essential for the professional development of teachers. To promote innovation, training must be oriented towards the development of analytical skills on what the teacher is doing. Training through collaborative work to transform practice. The use of a methodology based on reflection, exchange and innovation projects.

The teacher must be able to generate and promote pedagogical innovations with other teachers in schools, and professional development requires the ability to generate innovations. Training must therefore be linked to a project of innovation and change.

Francisco Imbernón (2006) highlights that teacher training needs to be attentive to regional realities and promote critical reflection on practice, valuing the knowledge built on the school floor.

Imbernón (2002) conceives teacher training as a continuous process of professional development that begins in the school experience and continues throughout life, extends beyond special moments of improvement, and encompasses issues related to salary, career, work climate, structures, levels of participation, and decision-making.

Debating Teacher Education is not only about discussing modalities or methodologies, but also about developing the ability to reflect, investigate, and act meaningfully on the teaching-learning process.

Five major axes of action shape the way of thinking about the processes and modalities of Continuing Education: practical-theoretical reflection on one's own practice and the generation of pedagogical knowledge together with colleagues. The need for exchange of experiences among peers to enable updating and increase communication. Training as a catalyzing and critical agent of labor and social practices. Training through

collaborative work to transform practice, moving from the experience of isolated innovation to institutional innovation

Continuing Education is eminently contextual. Actions should not be generalized in all contexts. Training should act on people *and* contexts to generate institutional innovations.

The complexity and diversity of teaching functions in the twenty-first century, governed by the BNC-Continuing Education, require the teacher to transcend the domain of content (disciplinary knowledge) to become a "reflective practitioner", as Schön (2000) argues. A practical example of this is the development of open reflective digital portfolios. The teacher can record and critically analyze a situation of uncertainty in the classroom, describing the action taken and the subsequent reflection. At the end of the training cycle, this portfolio is shared under an open license, allowing the exchange of experiences between peers and the creation of collective pedagogical knowledge, valuing the experiential knowledge built on the school floor. (Tardif 2021; Imbernón, 2026).

To reflect on practical suggestions for continuing education, it would be necessary to create communities of transdisciplinary practices in the school, in line with the collective mobilization advocated by Nóvoa and Imbernón's concept of collaboration. Instead of isolated training, groups of teachers from different areas (such as Languages and Human Sciences) come together to develop an Innovation and Institutional Change Project focused on a complex and contextual theme (e.g., the digital inclusion of students with low access. This strategy uses collaborative approaches in daily work to plan, implement, and evaluate the project. As a result, they produce and share Open Educational Resources (OER) – such as transdisciplinary didactic sequences, recorded *webinars* on innovative classroom management, or flexible assessment protocols – which become materials available to the network (Open Education), promoting institutional innovation and expanding access to quality training resources, which is crucial in regions with a lack of face-to-face training.

These practices not only make the training path more flexible and personalized, aligning it with technological knowledge and the uncertainty of the routine, but also fulfill the role of training to be a catalyzing and critical agent of work practices, transforming the isolated experience into a shared social and professional knowledge.

OPEN EDUCATION AND CONTINUING TEACHER TRAINING

Technologies that form: innovative paths in teacher training

Ecosystem thinking brings with it a more dynamic view of learning organizations and of life processes themselves, understood as expressions of circular, interactive, recursive, and non-linear movements that constitute the cyclical and self-sustainable nature of autopoietic systems. This new way of thinking, associated with the use of new communication and information technologies, presupposes interactive, dynamic, open processes, in which freedom of expression takes on greater concreteness, since any individual, in a production, can be the author and co-creator of different web pages available to any interested party.

"Technology is no longer just a set of tools to do specific things. Technology is a way of thinking, it is an incredible market, it is a scenario of debates and political struggle, it is part of human nature, and it is a reality that configures existence in many ways. Technology configures human physical reality and human relationships (families, love, friendship) to human realities as citizens." (ZAWACKI-RICHTER; JUNG, 2023, p. 24)

Technologies are considered cultural instruments present in society that enable the production of socially valid knowledge. The historical evolution of "openness" in education is linked to technological advancement: Distance Education (DE), registered in Brazil since the end of the nineteenth century, uses media such as print, TV, and radio to disseminate knowledge, aiming to form young people with lower incomes.

Art. 26. The digital platforms used in distance education must facilitate the process of communication, teaching, learning, and evaluation, and ensure pedagogical interaction between students, teachers, and pedagogical mediators, access to educational content, and the management of academic activities.

Paragraph 1 - Higher Education Institutions shall promote the continuing education of all those involved in the teaching and learning process for the development of digital skills and ensure the accessibility and usability of the resources made available through digital platforms. (DECREE NO. 12,456, OF MAY 19, 2025)

The concept of Open Education (EE) is an ethical perspective. In the twenty-first century, driven by increased access to the web, the Open Education movement has evolved to address how to reduce barriers to quality education in the context of digital culture.

The term Open Educational Resources (OER) was first formally defined at a UNESCO Forum in 2002. Open Educational Resources are teaching, learning, and research materials, in any medium or medium, that are in the public domain or are openly licensed. This feature allows them to be used or adapted by third parties. OER can include complete

courses, modules, textbooks, videos, tests, software, and any other tool that supports access to knowledge. The use of open technical formats facilitates access to and potential reuse of digitally published resources.

The role of open education in contemporary society is multifaceted, significantly influencing the accessibility, inclusiveness, and democratization of knowledge. Open education promotes a transformative approach to traditional educational structures, promoting educational equity and lifelong learning. It is characterized by its emphasis on collaboration, adaptability, and technology integration, which collectively address the challenges posed by globalization and digitalization.

Open Education, according to Liyoshi and Kumar (2014), promotes principles of democratization of knowledge and pedagogical innovation. This model seeks to create environments that favor collaboration and knowledge sharing, which are essential for the continuing education of teachers. By incorporating these principles, teacher training becomes a collective process that values the joint construction of knowledge.

Open Education is directly related to practices that help rethink the concept of authorship and promote the protagonism of teachers and students. It emphasizes collaborative production and shared knowledge, built by different people around common interests. Open Educational Resources are teaching, learning, and research materials, in any medium or media, that are in the public domain or are openly licensed.

ICTs have enabled the OER policy, which combines the tradition of sharing ideas with educators and the collaborative and interactive culture of the Internet. OER uses platforms such as Youtube and TED Talks, and media that can be accessed by anyone, at almost no cost. Openness in education is articulated with participatory technologies and social networks for interaction, peer learning, creation, and student empowerment.

Open Educational Practices are actions that promote collaboration and openness, such as sharing methodologies and adopting open technologies. The concept recognizes openness to all individuals, regardless of whether they are formally enrolled in an educational institution. It encourages making the knowledge generated by research and universities openly available. The modern historical reference is the year 2002, when the OCW (Open Courseware) Project of the Massachusetts Institute of Technology made 50 courses available on the internet in an open format, with the aim of promoting knowledge and educating students worldwide. In the same year, UNESCO, seeking to disseminate this initiative, introduced the term OER (Open Educational Resources), which in Portuguese is also called OER.

The use of OER is governed by the "five freedoms (5R)": Retain: Making and possessing copies of the resource. Reuse: Using content in various ways. Review: Adapting, modifying, or altering content. Remix: Combining content with other resources to create something new. Redistribute: Sharing copies of content.

The proposal of open education, especially when mediated by digital technologies, is aligned with Luhmann's (2009) vision of the open system, which understands the system as an exchange with open flows for exchanges.

Flexible Use licenses allow for greater flexibility and legal use of educational resources. This social solution involves a shift from the "all rights reserved" model to the "some rights reserved" model. Creative Commons (CC) licenses are often used for cultural and educational works, facilitating the free circulation and adaptation of works in a legal and legally based manner.

Technical Openness enables the use of open formats that facilitate the use and manipulation of resources in various *Software*.

In this sense, OER must excel in technical and legal interoperability to facilitate its use and reuse. The use of open formats and the creation based on free software are important elements of this process.

OER facilitates open practices through engagement with learning resources. This engagement is described in the OER "life cycle," which includes Find: Searching for open resources that can meet a need. Create/Adapt: Developing a resource "from scratch," or assembling and organizing found resources into a new form. Remix: Modifying resources in a substantial way, which may include corrections, translations, improvements, or contextualization, culminating in the creation of a new work of authorship. Use: Apply OER in the classroom, on the *internet*, or in pedagogical meetings.

OER has the potential to contribute to inclusive, equitable, and quality education. By easing legal restrictions on use, especially for educational purposes, and fostering collaborative production, they highlight important competencies in the field of digital culture, such as collaboration, shared authorship, and peer review.

For educators, OER has the potential to encourage practices of collaboration, participation and sharing of educational resources, foster the production and dissemination of knowledge produced by teachers and students, improve existing content and allow it to be appropriated and adapted to local realities, allow teaching material and other pedagogical resources to be improved and shared universally.

In practice, the adoption of OER materializes a conception of education centered on the "open", which implies adaptability, collaboration, authorship, and co-authorship. Its use allows educational resources, once purchased, to be downloaded, copied, reused, and altered by different actors and in different contexts, which drastically reduces distribution and access costs.

Establishing clear policies that support OER initiatives can help mitigate barriers and foster a culture of openness in education. While the barriers to implementing open education are significant, addressing these challenges through strategic training, institutional support, and policy development can lead to more effective use of Open Education. However, it is also essential to consider that some educators may resist adopting Open Education due to concerns about the quality and perceived value of traditional educational materials.

Open education, particularly through Open Educational Resources (OER), faces significant barriers to effective implementation in educational settings. These barriers stem from a lack of technical expertise among educators, insufficient institutional support, and challenges related to policy and infrastructure. Understanding these obstacles is crucial to enhancing OER adoption in educational contexts.

Many educators lack the necessary training to effectively utilize, adapt, or create OER, which limits their ability to integrate these resources into their teaching practices. Educational institutions often do not provide adequate support systems or resources for educators to develop and implement OER, leading to underutilization. Issues such as inadequate technological infrastructure, unclear intellectual property rights, and insufficient policy frameworks further complicate the implementation of open education.

Continuing Education of Teachers in the contemporary context must adopt the perspective of Ecosystem Thinking, which conceives teaching practice as a recursive, interactive and non-linear process, inherent to the cyclical and self-sustainable nature of living systems. In this new paradigm, Open Education emerges to promote democratization, inclusion and equity of knowledge. The use of Open Educational Resources (OER) – governed by the freedoms of the 5Rs (Retain, Reuse, Review, Remix, Redistribute) and supported by flexible licenses (Creative Commons) – materializes this vision. It transforms the teacher into author and co-creator, fostering collaboration, shared authorship and the adaptation of knowledge to the local reality, essential elements for an education that recognizes teaching as a continuous process of professional development, aligned with complexity and the search for a fairer and more supportive future.

FINAL CONSIDERATIONS

The challenges posed by the network society require a profound epistemological shift in education. The Ecosystem Educational Paradigm emerges as the indispensable theoretical framework, requiring the abandonment of the linear and fragmented view of knowledge in favor of a complex, recursive, and interconnected perspective. This view, by recognizing the inseparability of mind, body, and environment, positions the educator as a subject fully responsible for articulating knowledge and promoting a more sustainable future.

The relevance of Continuing Education for Teachers, in this scenario, transcends mere technical updating, assuming a role in transforming teacher identity. It is through continuous, intentional, and reflective processes that teachers can deconstruct pedagogical certainties and develop the necessary skills to mediate complexity. Effective Continuing Education is one that not only provides tools, but also ecologizes the educator's thinking, preparing him for uncertainty and for the leadership of an education with a planetary meaning.

In this context, Open Education is consolidated as the methodological instrument most aligned with the logic of the network society. By being based on flexibility, collaboration, and unrestricted access, it enhances Continuing Education, making it democratic and efficient. The adoption of Open Educational Resources (OER) and the creation of collaborative communities of practice break down institutional and geographical barriers, ensuring that teachers' updating is continuous, co-constructed, and directly applicable to their realities, strengthening autonomy and protagonism. Therefore, the success of education in the twenty-first century lies in the synergy of these three pillars.

From the perspective of Continuing Education policies, the convergence between Open Education and the Ecosystem Paradigm entails promoting less prescriptive, more contextualized models, with incentives for teacher authorship, peer collaboration, and the use of open licenses as a basis for formative sustainability. At the institutional level, it is recommended to structure communities of practice, repositories, and open training paths, with criteria for curatorship, pedagogical validation, and recognition of co-authored work and resource adaptation. Finally, the challenges for Brazil remain the expansion of the critical technological fluency of teachers, infrastructure and connectivity, legal clarity on the use of resources, and the consolidation of a culture of sharing and trust, without which openness tends to be reduced to the simple availability of materials, and not to a transformative collaborative practice.

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E-BOOK AND CYBERCULTURE: FORMATIVE EXPERIENCES AND PEDAGOGICAL MEDIATION IN DIGITAL ENVIRONMENTS

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INTRODUCTION

In recent decades, the integration of digital technologies into education has led to significant transformations in teaching and learning practices, particularly in pedagogical mediation across multiple languages and supports. In this scenario, the e-book, understood as a digital form of written media, emerges as a relevant tool for developing reading and authorial skills, as well as for fostering educational practices more closely aligned with the dynamics of cyberculture. Unlike the simple digitization of printed books, the e-book offers opportunities to incorporate interactive elements, hypertext, and multimedia resources, making it a pedagogical artifact with the potential to promote expanded, collaborative, and personalized reading experiences (ALMEIDA; VALENTE, 2016).

The objective of this research, which is an experience report, is to share the process of knowledge construction around the e-book media developed in the context of a discipline of the Master's Degree in Education, which had as its final objective the production of chapters and authorial e-books on different media worked during the training course. The discipline was structured from the critical and creative exploration of five types of media: social networks (with a focus on WhatsApp), oral language (with an emphasis on podcasts), written language (via e-book), visual language (through memes for educational purposes) and multimedia media (such as videos and zines). This diversity of media enables a variety of approaches, which motivate and engage students, placing them as protagonists in the construction of knowledge (SANTOS; KOWALSKI; TRINDADE, 2020). This deepening sought to highlight in moments in the seminar format the educational potential of each language.

In this context, the proposal for the construction of the e-book was conceived not only as a result capable of compiling the knowledge developed throughout the course, but,

above all, as an integral part of the training process. Such an approach favored the engagement of colleagues in constructing meanings, exercising digital authorship, and critically revisiting the contents explored during the course. By mobilizing knowledge of editorial design, content organization, and digital editing and publishing platforms, participants were able to experience, in a critical and situated way, the challenges and potentialities of digital written media in the educational field.

This experience contributed to understanding the e-book as a powerful pedagogical mediation capable of promoting more dialogical, accessible, and creative practices, in line with the principles of teaching anchored in cyberculture. In this sense, the construction of the e-book presented here is inscribed in a perspective on teacher training in which theory and practice are articulated, and in which collective authorship becomes a central element in the resignification of pedagogical practices through collective, collaborative construction. An e-book emerges as a form of organizing and applying media in education.

METHODOLOGICAL DESIGN

This experience report is anchored in a qualitative approach of a collaborative nature, centered on the formative experience that occurred in the context of a discipline of the Master's Degree in Education. As Kramer (2012) points out, "listening, dialogue and collaboration among the subjects of training are fundamental principles for learning to constitute a process of authorship and collective construction of knowledge" (KRAMER, 2012, p. 19). This understanding is reinforced by Torres (2004, p. 131) when he states that "Collaborative Learning is a teaching strategy that encourages student participation in the learning process and makes learning an active and effective process". Such principles were mobilized as methodological axes throughout the training path reported here, promoting an experience that valued the protagonism of the participants and the reflective exercise of teaching in a network.

The training process was structured in sequential and integrated moments, which involved: the presentation of different media by the groups (social networks, oral, written, visual, and multimedia language), the theoretical-practical deepening of the discussions, and the proposal of systematization of the different learnings through the production of e-book chapters by the written media group. This production should dialogue directly with the knowledge previously addressed by the other groups, promoting an exercise of critical resumption and collaborative resignification of the content.

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Thus, the methodology adopted in this training process values the construction of knowledge as a shared experience, in which digital authorship is not limited to the production of a final product but is configured as a critical, situated pedagogical practice. Such a perspective is in line with the assumptions of cyberculture and dialogic education, which recognize learning as a collective, relational, and contextualized process.

CONCEPTUAL CONSTRUCTION

After the initial collective construction of knowledge by the group responsible for the written media, which focused on producing e-books and consisted of three members, we moved on to the dialogical definition of the chapter's approach. This process was mediated by active listening and guidance from the discipline teacher, who stimulated the critical appropriation of the concepts that collaborated with the training path. The conceptual choice was anchored in a theoretical-practical perspective of the e-book as a multimodal pedagogical artifact, articulating written textual content, interactive elements, and external connections.

The team's conceptual construction began with a historical approach to the e-book, understanding it as a product of the evolution of digital information and communication technologies. The term "e-book" is directly associated with a textual work in electronic format, read on devices such as computers, tablets, smartphones, or dedicated digital readers. This transformation of the material support of the text reflects a significant transition in reading and writing practices that begin to incorporate elements of mobility, interactivity, and connectivity.

In Brazil, the use of e-books has only intensified since the 2000s, in line with the popularization of broadband internet, the spread of mobile devices, and the growth of access to digital networks in educational environments.

This reconfiguration is not limited to form; it also directly affects the concept of reading, which is now understood as an expanded, digitally mediated experience.

According to Moraes (2013), "the e-book is born as a natural extension of digital culture, in which textual content migrates to electronic supports, allowing new modes of reading and interaction". This migration from print to digital marks a symbolic break with the traditional linearity of reading on paper, enabling the integration of hypertext, multimedia resources, and interactive features. By integrating these dimensions, e-books emerge as powerful instruments for measuring knowledge and align with emerging pedagogical practices that value digital authorship, the personalization of learning, and the centrality of the student in the educational process.

With regard to textual contents, there is a singular enchantment in writing, reading and, above all, in the cognitive processes that are present in the construction of narratives and stories: a fascination that reconnects us to our most remote human experience. There was a historical moment in which the totality of knowledge, traditions and wisdom was transmitted orally, through stories. Cascudo (1984) reinforces this understanding when he states that "For centuries, the history, customs and morals of the communities were preserved and transmitted by the spoken word, in narratives that crossed generations." (CASCUDO, 1984, p. 27). It was the wise men, the elders, who assumed the role of guardians and disseminators of this knowledge, involving it in a web of emotion, adventure, challenge and curiosity.

This ancestral form of transmission was not merely informative, it was truly formative. Narratives were powerful vehicles for moral teachings, survival strategies, explanations about the world and human nature, statements reinforced by Libâneo "The narrative forms the subject to the extent that it offers him a place of listening and identification, where the experience of the other also becomes collective learning." (LIBÂNEO, 2001, p. 57). The act of listening to a story created a bond between narrator and listener, strengthening the community and perpetuating the culture from generation to generation. Collective memory was built and maintained through the evocative force of these narratives.

From this perspective, the origin of writing corroborates Gnanadesikan's (2008) view of its emergence as a response to the practical need to record information and communicate at a distance in primitive civilizations. The earliest known forms of writing, such as cuneiform in Mesopotamia and hieroglyphics in Egypt, date back to around 3200 BC, and their initial use was restricted to administrative, commercial, and religious functions (GNANADESIKAN, 2008). Over time, their use expanded to other institutional functions, such as the recording of laws, narratives, and cultural traditions.

In Brazil, writing arrived with the colonizers; until then, hunters and gatherers in the region did not make use of this important technology. This instrument was initially used for control and evangelization, functions that lasted for a long time. Over the centuries, however, writing also became a literary and artistic expression, assuming a central role in the formation and preservation of the country's culture and identity.

Therefore, writing as it is used today by humanity is relatively recent, also assuming an important role in the field of entertainment and cultural preservation, closely linked to storytelling. Storr (2021) points out that the human brain is innately programmed for storytelling, and narratives have several functions in addition to entertainment, such as transmitting information, stimulating imagination and creativity, and cultural preservation.

Currently, with the popularization of e-books, writing maintains its historical function of recording and sharing culture, but in a more accessible format, thanks to the practically universal presence of electronic devices compatible with the format. The digital book expands the reach of literature and other textual genres, allowing the dissemination of works and the democratization of access to reading. However, the challenge remains to transform the abundance and ease of access to reading into meaningful experiences, which preserve the function that writing and reading have acquired over thousands of years in human society (SANTOS et al., 2021).

Even with the advent of writing and, later, digital technology, this human impulse for history remained. Written media, whether in parchments, printed books, or digital screens, inherited and transformed this legacy. It has the potential to allow us to relive the thrill of adventure, the challenge of the unknown, and the satiety of curiosity, replicating, in a way, that feeling of discovery and connection that permeated the old storytelling circles. The act of reading and writing today is, in many ways, an echo of this millennial tradition of making sense of the world through the thread of narrative. Lajolo reinforces this perspective by stating that "Reading is not just decoding graphic signs. It is a form of listening, of dialogue with tradition, with memory, and with the collective imagination." (LAJOLO, 1993).

Regarding interactive elements, the evolution of digital reading formats has expanded the possibilities for knowledge construction by integrating multimedia resources. E-books expand their pedagogical potential, especially when they incorporate elements that transform reading into a multimodal experience. As Almeida and Valente (2016) state, "e-books, by incorporating interactive elements, allow the reader an expanded reading experience, favoring active and personalized learning". In this context, reading has the

potential to cease to be a solitary and linear act and to become a dynamic process in which the reader actively participates in the construction of meanings from various stimuli.

The possibility of incorporating explanatory videos, 3D images, sound effects, music, animations, and other multimedia resources complements the textual content, expanding its interpretive and appropriative possibilities. These are elements that not only diversify the formats of information presentation, but also contribute to the development of different cognitive and sensory skills. In educational environments, these characteristics favor student engagement, especially those who benefit from visual and auditory approaches, promoting greater inclusion and participation in the teaching and learning processes. As Kowalski et al. (2021, p. 6) point out, technologies expand possibilities and contribute "positively to developing knowledge in a more flexible, interactive, and collaborative way".

In addition, the personalization provided by interactive e-books allows readers to advance at their own pace, return to content as needed, and establish reading trajectories aligned with their interests, characteristics, and contexts. This autonomy is essential for pedagogical proposals aligned with reflective approaches and the principles of cyberculture, as it shifts the focus from content transmission to knowledge mediation. Thus, e-books are consolidated as powerful resources for innovative educational practices, enabling more meaningful learning that is connected to the contemporary languages of digital culture.

Another relevant aspect concerns external connections; the hypertextual structure of e-books enables a significant expansion of the possibilities of digital reading, offering connections that establish networks of meaning and knowledge. Hyperlinks, by breaking with the traditional linearity of text, allow readers to navigate complementary content, expanding their understanding and deepening the learning process. Genette (1982, p. 16) observes that "relationships are, on the contrary, numerous and generally decisive", pointing to the importance of the connections that the text can establish with other discourses and contexts. In this scenario, the e-book is not only a reading support but an interactive ecosystem in constant construction, which stimulates the reader's autonomy and investigative curiosity.

The possibilities of hypertextual displacement present in interactive e-books favor a non-linear and personalized reading, in which the reader assumes an active role in the construction of their own reading path. Araújo and Sousa (2009, p. 7) highlight that "hyperlinks are strategically constructed to take the hyperreader to other places on the

network", emphasizing the intentional function of these resources in pedagogical design. This characteristic transforms the act of reading into an exploratory experience, which demands not only technical skills, but also critical and interpretative skills to deal with the diversity of sources, languages, and formats present on the web.

However, the pedagogical potential of hyperlinks requires careful curation and didactic planning that prioritizes educational intentionality. Gomes (2007) and Gualberto (2008, p. 18) warn that, in many cases, hyperlinks perform a more navigational than textual function, which can disperse the reader or divert the focus from the learning objectives. Thus, it is essential that the use of hypertextual resources in e-books is aligned with reflective pedagogical practices, which value teacher mediation and promote the development of a critical, situated and meaningful reading.

RESULTS AND ANALYSIS OF THE EXPERIMENT

Building on these ideas, the group started their class presentation with a focus on the e-book as a transforming digital genre. They incorporated key definitions, including Furtado (2006, p. 52 apud MELLO JUNIOR, 2006, p. 322), who describes the e-book as "a literary work in the form of a digital object, comprising one or more identification standards, metadata, and a collection of monographic content, meant for electronic publication or access."

This notion was complemented by Gama Ramírez (2006, p. 12 apud VELASCO; ODDONE, 2007, p. 3), who broadens the conception by stating that "the electronic book [...] can contain texts, graphics, static and moving images, as well as sounds [...] stored in a computer system". Such definitions allowed us to understand the e-book not as a mere transposition from print to digital, but as a new space for language and pedagogical experimentation.

In addition, the impacts of evolution in the reading support were discussed; e-books are configured as powerful instruments for democratizing access to information and cultural production. By eliminating the costs of printing, binding, physical storage, and distribution logistics, digital books have significantly lower costs than printed books, making them more accessible to a wider audience.

This factor contributes to the inclusion of readers who, due to geographical, economic, or structural limitations, would have less access to physical works. The compatibility of e-books with various devices, such as smartphones, tablets, computers,

and digital readers (e-readers), further expands their reach, promoting forms of reading that adapt to different contexts, realities, and social practices.

In this sense, e-books have not only been able to diversify the modes of access to reading, but also reflect broader transformations in literacy and authorship practices in contemporary digital culture. According to Dourado and Medeiros (2005, p. 8), "the wide variety of digital books made available online, with free or restricted access, in society is a reflection of the emergence of digital culture". This expanded availability, enhanced by digital platforms and open repositories, stimulates a freer circulation of knowledge and favors the emergence of new forms of authorship, often collective and collaborative. In the educational field, these possibilities unfold into pedagogical practices that recognize digital reading and writing as fundamental elements for the critical and active formation of subjects, in line with the principles of cyberculture.

INTEGRATION OF EXPERIENCES WITH OTHER DIGITAL MEDIA

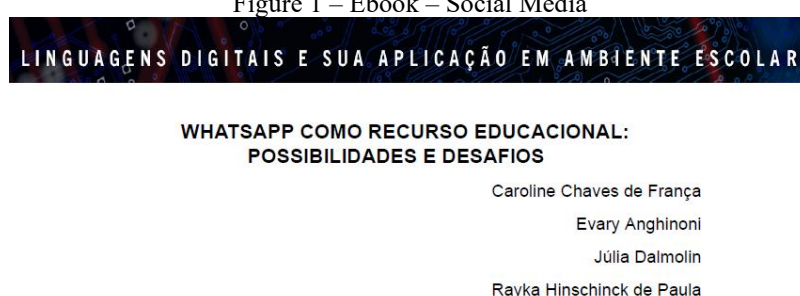
A central aspect of this formative experience was that the construction of the chapter on e-books did not occur in isolation but in constant dialogue with the materials produced by other groups in the discipline. Each team, when focusing on a specific medium, developed an e-book or authorial digital material that, later, became both a source of study and methodological inspiration for the written language group. Thus, the e-book on written media was consolidated through the convergence of different languages: social networks, podcasts, memes, and multimedia.

In the case of social networks, the group responsible for WhatsApp explained, in its material, that the application is not just a communication tool, but a true digital language, marked by digitized orality, informality, and immediacy. By focusing on WhatsApp as an educational resource, the group problematized its double condition: on the one hand, its massive use by students; on the other, the tensions it causes in traditional teaching models. Based on objectives such as developing digital communication skills and rethinking the pedagogical use of the application, the material presented the application's functionalities, strategies, challenges, and possibilities.

This reflection directly impacted the writing of the chapter reported here, particularly by showing that authorship in e-books, beyond linear text, can engage in dialogue with microlearning practices and brief interactions that resemble the dynamics of a WhatsApp group. The way in which the social media group organized immersive activities, polls, triggering messages, and proposals for academic registration based on the

discussions in the application inspired the understanding that the e-book can also act as an "expanded script" for these interactions, recording, systematizing, and deepening debates that emerge in instant communication environments. At the same time, the concern with digital ethics, privacy, limits on teacher availability, and pedagogical intentionality reinforced, in the production of the chapter, the need to treat the e-book as a formative device, and not just as a repository of content. However, due to the systematization of social interactions provoked by the WhatsApp group, it generated the constant need for instigation from students, who were afraid to express and record their opinions.

Figure 1 – Ebook – Social Media



Available at: https://drive.google.com/file/d/1_NZnSQ392GD0gn6grfe3wb2ircjUPtsj

In the field of oral language, the podcast group developed an e-book that presented this media as an expression of the culture of convergence, as discussed by Jenkins (2015), highlighting the passage from consumers to content producers. The podcast was described as an on-demand, accessible, portable, and potentially interactive audio format, which combines narrative, journalistic, and educational elements. The material prepared by the group explored both the history of the podcast and its possibilities in the field of education, focusing on scripting, episode construction, target audience definition, and theme selection.

The experience with the podcast contributed to broaden the understanding, in the e-book chapter, of the centrality of authorship and narrative in cyberculture. By observing the way the oral language group structured the script of an episode, presenting opening, development, climax, and closing; the written media group began to incorporate, in the design of the chapter itself, a logic closer to storytelling, although in an academic format. In addition, the podcast, due to its sound nature, reinforced the idea that a multimodal e-book can articulate text with links to audios, interviews, and recorded discussions, allowing the reader to move between modes of language and experience the training in a more sensorial way. The notion that the podcast democratizes voices and favors scientific

dissemination also resonated in the reflections on the potential of the e-book as a means of free circulation of knowledge, especially in graduate and teacher training contexts.

Figure 2 – Ebook – Oral Media - Podcast



Visual language, worked through memes, was another dimension that deeply marked the training path. The group responsible for visual language started from the understanding that images are powerful ways of reading the world, aligning themselves with the Freirean perspective that reading is not just decoding words, but interpreting realities. In their material, the students emphasized the role of visual literacy for critical interpretation, creativity, and ethical content production. By taking memes as cultural artifacts circulating on the networks, the group highlighted their characteristics of humor, irony, intertextuality, and ability to condense, in a few visual and textual elements, complex discussions and social problems.

The incorporation of this experience into the e-book report occurred on two levels. First, by recognizing memes as a legitimate social language, the written media group began to consider that the e-book, as a multimodal artifact, can dialogue with this universe through images, comparative tables, conceptual illustrations, and even visual references that provoke the reader. Second, the methodological warnings of the meme group, such as the need to pay attention to stereotypes, prejudices, copyrights, and the context of use; helped to reinforce, in the chapter, an ethical posture regarding the curatorship of visual materials incorporated into the digital book. Thus, the writing of the e-book began to operate not only as an exercise in textualization but also as a training device for the critical use of images and visual narratives in the educational field.

Figure 3 – Ebook – VISUAL



Caroline Carmona Marques Gonçalves
Geovana Ribeiro
Jhony Cesar Greni
Luciana Schuartz Brandt

Available at: <https://drive.google.com/file/d/1nMxHKz4XYI319x5NVO8QQyMvbRF4LQEI>

The multimedia group produced an e-book focused on multimedia language and its articulations with expression, learning and mental health in everyday school life. The material brought together examples of the use of videos, documentaries, music, infographics, virtual reality, educational games, software and, especially, fanzines as resources for students' authorial expression. By highlighting experiences such as Fanzinoteca in a school context, the group highlighted the power of multimedia production not only for learning content, but for emotional welcoming, strengthening bonds and promoting creativity.

This multimedia approach directly influenced the conception of the e-book reported in this chapter. The idea that students can be content producers, in addition to content consumers, was reaffirmed when the written media group began to think of the e-book as a space in which text, image, video, and hyperlinks could be integrated to favor both the expression and reflection of readers. The experience with fanzines, for example, was an invitation to see the e-book as an "expanded digital fanzine", in which the aesthetic dimension, the care with design, and the openness to collective authorship gain centrality. In addition, by articulating multimedia, engagement, and mental health, the multimedia group drew attention to the importance of pedagogical proposals that consider students in their entirety, which was also incorporated into the reflections of the chapter on the formative function of the e-book in sensitive, welcoming, and creative teacher training processes.

Figure 4 – Ebook – MULTIMEDIA LANGUAGE



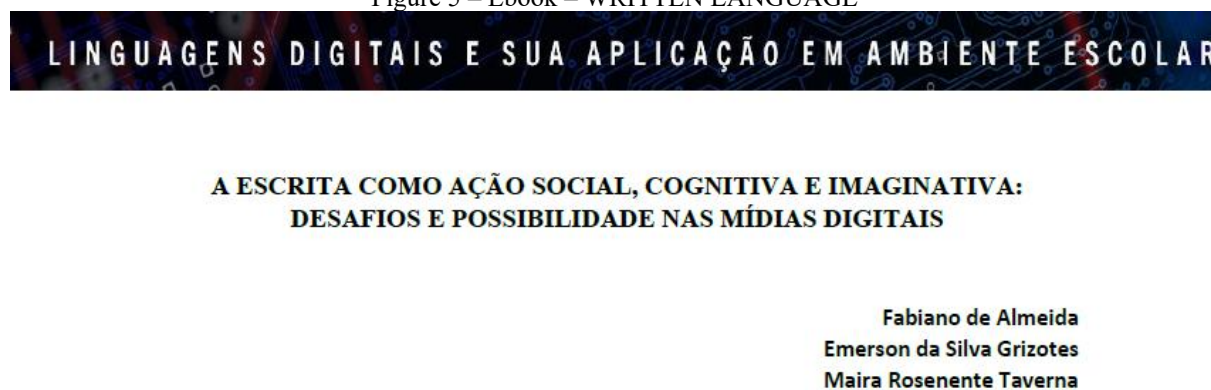
Eduardo Collete da Silva
Luciani de Sousa Amaral Santos
Melissa Tarasiuk Naufel Garcia

Available at: https://drive.google.com/file/d/1OjV_MN1eJMP7njj6tSz3WN1UWqTJjHS

Finally, the group responsible for written media presented important references by showing that the process of creating the e-book constitutes a powerful formative opportunity: to understand writing as a complex cognitive action that involves planning, organizing, revising, and dialoguing with multiple languages. By incorporating hyperlinks, quizzes, and visual narrative elements, chapters cease to be traditionally linear units and begin to configure hypertexts that require intentional choices about navigation, coherence, and communicative purpose. In this context, hypertext creates networks of meanings and calls on the writer to foresee different possible paths of the reader, which demands discursive awareness, intentionality, and metacognition.

Thus, writing in the e-book becomes a reflective practice that articulates imagination, clarity and precision, aspects highlighted in the base text when discussing the role of narratives, the construction of mental images and the "information gap" as drivers of reader engagement. By assuming this perspective, the written media group positions the e-book as a sensitive and creative training tool, capable of integrating collective authorship, aesthetic care and the development of skills that allow future teachers to understand writing as a transformative practice in educational environments mediated by digital technologies.

Figure 5 – Ebook – WRITTEN LANGUAGE



Available at: https://drive.google.com/file/d/1w8Unzd3G2c_TopJi11HGRE3_3D-8Fur8

In general, the integration of these four experiences: social networks, podcast, memes, and multimedia; during the writing process of the e-book on written media revealed that the chapter is not just a final product, but a synthesis of a collective path of experimentation. Each group, by exploring its specific media, offered conceptual and practical lenses that crossed the elaboration of the e-book, making it the result of an interlanguage dialogue. In this sense, the e-book ceases to be a simple "discipline of

writing" to become a meeting point between different ways of communicating, learning, and teaching in cyberculture.

ORGANIZATION OF THE STAGES AND SYNTHESIS IN A COLLECTIVE E-BOOK

The practical and reflective activity developed throughout the course was organized into three main stages, all based on a dialogical and collaborative approach. In the first stage, the groups were invited to conduct exploratory research to delve into the concepts related to the media language each represented. This moment was proposed to foster active listening among participants and conceptual alignment with the themes discussed in previous meetings. Simultaneously, the groups began planning the chapters, defining the central topics to be addressed, the digital resources that would be integrated into the proposal and the structure of the content, respecting the identity and communicational objective of each media.

The second stage corresponded to the production of the chapters and stood out for the challenge of articulating practice and theory. Based on the planning definitions, the groups wrote explanatory texts with clear and accessible language, incorporating images, videos, external hyperlinks, and interactive quizzes through tools such as Google Forms, Mentimeter, or Kahoot. In this stage, the objective was to promote intense moments of exchange between colleagues, joint reviews, and collective construction of the material, enabling concrete experience of critical digital authorship. In the specific case of the written media group, the production of the chapter was thought of as an exercise in convergence between different languages and supports, evidencing the richness and complexity of written language in contemporary digital culture and integrating learning from experiences with WhatsApp, podcasts, memes, and multimedia.

Finally, the third stage aimed to provide teams with reflection on the chapter produced. The methodological choices, the paths taken and the challenges faced throughout the process were rethought and reflected, which favored the expansion of the participants' repertoire and the strengthening of a transversal vision, in which each language can connect to the others in a complementary way. In this reflective movement, the chapter on e-book was constantly revisited in the light of the contributions of other media, assuming the role of a systematized record of an experience that was originally lived in multiple formats and channels.

The result, still being compiled, consists of a collective e-book, composed of complementary chapters: social networks, oral language, written language, visual language and multimedia. The material will be made available in interactive digital format and can be used in future training, both as a record of the experience and as a pedagogical resource. The project highlighted the potential of collaborative construction in cyberculture, highlighting the role of the e-book as an integrated and critical educational technology, capable of intertwining different digital languages in the same formative artifact.

CONCLUSION

The reported experience allowed us to understand the e-book not only as a final product resulting from a learning process, but as a formative device that enhances authorship, collaboration, and critical reflection, a concept reinforced by researchers such as Santaella who state:

For this reason, in cybernetic systems, the concept of text undergoes substantial changes. Although a textual element can still be isolated, computer-based systems are primarily interactive rather than unidirectional, open rather than fixed. Dialogue, regulated and disseminated by digital computing, de-emphasizes authorship in favor of "circuit messages" (SANTAELLA, 2018, p. 93).

Throughout the course, the integration of theoretical foundations, experimental practice, and dialogue with other digital media enabled participants to experience, in concrete terms, the challenges and possibilities inherent in the production of digital media, mobilizing technical, creative, and pedagogical skills. This experience reinforces the idea that the construction of digital artifacts in the educational context cannot be dissociated from a formative intentionality, which guides methodological choices and fosters the emergence of teaching practices more closely aligned with the dynamics of cyberculture.

In addition, the process highlighted the value of co-authorship as a structuring principle of pedagogical practices in digital culture, since, as pointed out by researchers such as Mendonça:

"it can allow a new perspective on authorship and co-authorship, considering that creative and original action makes it possible to plan several paths to be taken, even inserting new content in this book, expanding the interaction with the reader and generating new knowledge" (Mendonça, L. p.5).

The production of the chapter and the collective e-book was permeated by negotiations, exchanges of knowledge, and shared decision-making, revealing that the

construction of knowledge in a network requires openness to dialogue, respect for the diversity of perspectives, and willingness to revisit and resignify contents. In this sense, the collaborative methodology adopted proved coherent with a vision of teaching in which the teacher acts as a mediator and partner in the training process, rather than a merely transmissive role.

Another relevant point was the finding that e-books, as multimodal and interactive resources, offer significant potential to expand engagement and personalize learning. By incorporating hyperlinks, multimedia elements and interactive resources, the e-book has become a space for pedagogical experimentation capable of articulating multiple languages and providing expanded reading. This characteristic dialogues directly with the need for more inclusive and contextualized educational practices that meet diverse learning styles and promote greater student autonomy in the process of constructing meaning.

Finally, the articulation among the different media worked on – social networks, podcasts, memes, and multimedia – showed that teacher training in cyberculture is strengthened when future educators, in practice, experience the languages that will mediate the teaching and learning processes. The e-book, in this context, serves as an emblematic example of how the integration of theory, practice, and collaboration can generate innovative pedagogical resources aligned with a perspective on critical and emancipatory education that recognizes cyberculture as a legitimate field of teacher training and intervention.

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REFLECTIONS ON THE CURRENT EMOTIONAL CRISIS OF TEACHERS AND DEMANDS OF THE PROFESSION

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INTRODUCTION

We live in a time when the school is challenged to resignify its teaching and learning practices. The advancement of digital technologies, the constant presence of social media, and, more recently, the use of artificial intelligence-based tools have profoundly transformed the way students relate to knowledge. Given this scenario, the role of the teacher, far from losing importance, takes on new forms: the educator needs to learn to teach continuously with technology, not against it.

Daily experiences in schools show that many teachers realize the need to break paradigms to reach the new generations. The current context reveals pedagogical, emotional, and relational challenges. While students live immersed in a digital universe that the school often cannot keep up with, teachers face insecurity, fear of being replaced by machines, an overload of tasks, and emotional exhaustion. This scenario has intensified the emotional crisis of teachers, marked by illness, feelings of devaluation, and chronic stress. A study by Fiocruz (2021) involving Brazilian basic education teachers found that most teachers reported symptoms of exhaustion and psychological suffering, with 72.6% of respondents reporting at least one health complaint, including mental fatigue, forgetfulness, and sleepiness. This context directly compromises pedagogical relationships, the school climate, and the quality of teaching.

Thus, discussing "learning to teach" implies considering, in an inseparable way, pedagogical practices, the critical use of technologies, and care for the emotional health of the teacher.

THE EMOTIONAL CRISIS OF TEACHERS AND ILLNESS IN THE PROFESSION

The current emotional crisis that affects teachers does not result from individual weaknesses, but from the structural conditions of the pedagogical work. Esteve (1999) already pointed out the phenomenon of teacher malaise as a result of the intensification of tasks, the precariousness of working conditions, the lack of social recognition and the contradictions between the demands imposed on the school and the resources offered to it.

In the Brazilian context, this process has been aggravated by several factors, among which the following stand out:

- excessive bureaucratic demands, which distance the teacher from his essential pedagogical function;
- conflicts in interpersonal relationships with students and families;
- pressure for results, often without proper institutional support;
- challenges in the face of technologies, when there is no adequate training;
- social devaluation of the profession, which weakens teachers' self-esteem.

According to Benevides-Pereira (2019), teachers have been exposed to an invisible emotional overload, which accumulates over the years and manifests itself in symptoms such as anxiety, irritability, discouragement, insomnia, and feelings of helplessness. In more severe cases, this process culminates in *Burnout Syndrome*, recognized by the World Health Organization (WHO, 2019) as an occupational phenomenon characterized by extreme exhaustion, depersonalization, and reduced professional fulfillment.

Maslach and Leiter (2017) explain that *burnout* occurs when there is a persistent imbalance between the demands of work and the personal and institutional resources available to face them. In teaching, this imbalance is recurrent, as it is a profession of an intensely relational and emotional nature. In the school environment, *burnout* can manifest itself through decreased empathy, emotional distance between teacher and student, concentration difficulties, demotivation, depressive conditions, increased absences and leaves, in addition to the consideration of career abandonment. These pillars of *burnout* directly affect the teacher's ability to exercise care and humanization in the classroom.

These impacts directly affect student learning, the institutional climate, and the quality of pedagogical practices. Recent data from the National Confederation of Education Workers (CNTE), based on INSS records, indicate that more than 150 thousand teacher

absences occurred in 2023 due to mental and emotional disorders, revealing the seriousness of the situation.

EDUCATION, TECHNOLOGY AND THE CHALLENGES OF CONTEMPORARY TEACHING

Technologies have always been present in education. However, the accelerated pace of digital innovation has imposed new demands on schools and the teaching profession. According to Kenski (2012), technology is not reduced to electronic devices, but is a way of producing, organizing, and transforming reality. When integrated into educational processes, it can favor more active, collaborative, and meaningful learning. However, this integration does not happen spontaneously: it requires preparation, critical reflection, and openness to the new.

Many teachers, especially those who have been working for a long time, feel out of place and often distressed by change. The contemporary student, connected, autonomous in these technologies, and accustomed to digital language, seeks immediate answers from various sources, sometimes disregarding the teacher as a mediator of knowledge. This mismatch generates tensions in interpersonal relationships and can intensify the emotional illness of the educator, who starts to feel questioned in his authority and social relevance.

The dehumanization of education, observed in different school contexts, is not only related to the excessive use of technologies, but, above all, to the weakening of bonds, listening, and affectivity in pedagogical relationships. When the focus shifts exclusively to performance, indicators, and control, essential elements of the educational process are lost: dialogue, welcoming, belonging, and the construction of meanings.

As Libâneo (2013) points out, the school should be a space for dialogue, cooperation, and humanization, values that no technology can replace.

CONTINUING EDUCATION AND LEARNING TO TEACH WITH TECHNOLOGIES

Forming oneself is a continuous act of reflection on one's own practice. Freire (1996) states that "no one educates anyone, no one educates himself: men educate themselves in communion, mediated by the world". In the contemporary context, this mediation inevitably includes digital technologies.

Learning to teach with technologies implies developing pedagogical, digital, and human skills in an integrated way. The teacher is irreplaceable precisely because he can

attribute meaning, interpret contexts, establish bonds, and humanize processes that machines only perform technically. In this sense, continuing education plays a central role, as it enables the teacher to understand technologies not as rivals but as allies in the teaching and learning process.

Artificial intelligence, when understood in ethical, critical, and pedagogical terms, can serve as an important ally in lesson planning, monitoring learning, personalizing activities, mediating feedback, and analyzing educational data. The pedagogical value of technology is not in the resource itself, but in the human, intentional, and ethical use that the teacher makes of it, recognizing its limits, potentialities, and formative implications.

Continuing education should, therefore, create spaces for experimentation, dialogue, study, and resignification of practices. It is in these spaces that teachers can overcome the fear of technologies, strengthen their pedagogical authorship, and rediscover in them powerful possibilities to promote more meaningful, collaborative, and engaging learning.

TRAINING STRATEGIES FOR THE PREVENTION OF TEACHER ILLNESS

To face the emotional crisis that contemporary teaching is going through, it is essential that continuing education incorporates the mental health axis as a structuring dimension, and not just a complementary one. Taking care of the emotional formation of the teacher is a condition for the quality of pedagogical work.

Among the most effective training strategies for the prevention of teacher illness, the following stand out:

Active listening and welcoming: creation of regular and systematic spaces for speech, qualified listening and sharing of experiences, in which the teacher is recognized in his or her subjectivity.

Simplification of bureaucratic demands: critical review of excessive instruments and records that generate overload and distance the teacher from his essential pedagogical function.

Collaborative culture: strengthening of teacher learning communities, encouraging knowledge exchanges, collective planning and mutual support among professionals.

Structured emotional care: establishment of partnerships with psychologists, conversation circles, restorative practices and actions aimed at mental health in the school environment.

Humanized technological training: promotion of an ethical, authorial, critical and meaningful use of technologies, avoiding merely instrumental practices.

Promotion of professional self-esteem: recognition of achievements, appreciation of good practices and strengthening of teacher identity.

Teacher training takes place in the exercise of practice, mediated by institutional support, recognition and care for the educator's subjectivity. Without this support, the risk of illness intensifies.

THE PEDAGOGICAL COORDINATOR AS A CAREGIVER OF TEACHER CARE

Pedagogical coordination occupies a strategic role in facing the challenges of contemporaneity. Its work is not limited to curriculum management or monitoring of results, but involves welcoming, conflict mediation, sensitive listening, and the promotion of healthy institutional bonds.

Libâneo (2013) states that pedagogical coordination is a mediator of the school's pedagogical and human relations, responsible for organizing significant formative processes and articulating the different subjects of the educational process.

In this sense, the pedagogical coordinator acts as a guardian of the school's emotional climate, a promoter of teacher care, a mediator in the filtering of excessive technological demands, and a facilitator of the humanized integration of technologies, in addition to being an articulator of spaces for training, reflection, and listening.

By assuming this care function, coordination contributes directly to reducing teacher suffering, strengthening professional identity, and improving interpersonal relationships in the school environment. Taking care of the teacher is, essentially, taking care of the students' learning, as there is no quality teaching without emotionally strengthened and recognized teachers.

TRIAD – EDUCATION, CITIZENSHIP AND TECHNOLOGY

Information and communication technology is the basis for the development of today's society.

Thus, it becomes a very important point for the characterization and understanding of this society. So access to information should be a common good, and not a right of the few. Access to information should be a common good, and not a right of the few.

Gadotti (2000) argues:

Whatever the perspective that contemporary education takes, an education focused on the future will always be a contesting education, overcoming the limits imposed by the State and the market; therefore, an education much more focused on social transformation than on cultural transmission. (GADOTTI, 2000, p.7)

Nelson Pretto (2006) points out:

Technology has always been an instrument of social inclusion, but now it acquires a new contour, no longer as an incorporation into the market, but as an incorporation into citizenship and the market, guaranteeing access to information and lowering the costs of the means of multimedia production through new tools that expand the critical potential of the citizen. We are citizens and consumers, senders and receivers of knowledge and information, beings at the same time autonomous and connected in networks, which are the new form of collectivity

It is therefore evident that the greatest need and relevance lie in rethinking and reconstructing an educational and conceptual framework for the interrelationship between technology, citizenship, and Education.

Our experience can no longer be based on only one of the three points, because today we live in a modern, technological, and globalized society. One learns and produces at the same time, forcing the individual to be in constant learning so as not to be forced to leave the labor market. In this plural vision, all people can contribute to social and global improvements and transformations, becoming collaborators of society through technology.

BENEFITS AND CHALLENGES OF TECHNOLOGY IN EDUCATION

Schools, individually, and education systems, collectively, are increasingly aligned with the use of technological resources, aiming to promote their proper use to boost learning. With the use of resources that are available and within the reach of educational institutions, both in financial terms/purchasing power and in terms of access to these technologies, such as interactive screens, tablets, virtual reality glasses, virtual environments, online collections. It makes it possible to promote greater interactivity between students and teachers, making learning more dynamic, playful and enriching, contributing to the construction of affective memories and their global development. Another positive point is that it makes students gain greater autonomy and become protagonists in their learning process, and the search for learning/answers contributes to effective criticality and social formation.

What makes it much easier is that current students were born into an era of widespread access to technology, allowing them to know the tools available and how to

use them. This can all contribute to the development of professional skills and competencies in their student and later in their professional moment.

Increasingly integrated into society, technology makes it possible to help, to make certain content and information more flexible and easier to access, and to carry out various tasks. However, family leaders question whether technology is beneficial or harmful to children, especially those in the early learning stage. And currently, even with several surveys, there is no definitive answer. By adopting the right tools and strategies, it is possible to use technology to promote students' school development; however, the unbridled use of technology can cause problems and impact, and even confuse students' development.

The critical understanding of technology, of which

The education we need must be infused with the one that sees in it an increasingly sophisticated intervention in the world to be necessarily submitted to political and ethical scrutiny. The greater the importance of technology today, the more the need for rigorous ethical vigilance over it is affirmed. Of an ethics at the service of people, of their ontological vocation, that of being more and not of a narrow and evil ethics, such as that of profit, that of the market. (FREIRE, 2000, p. 46).

However,

Education is not reduced to technique, but education cannot be done without it. Using computers in education, instead of reducing, can expand the critical and creative capacity of our boys and girls. Depending on who uses it, in favor of whom and for what. The concrete man must equip himself with the resource of science and technology to better fight for the cause of his humanization and liberation. (FREIRE, 2001, p. 98).

GUIDING PRINCIPLE OF ETHICAL CONDUCT

The effective integration of technologies in the educational environment must be guided by a strict ethical principle and respect. The main guideline for the performance of educators and technology managers is to prevent exposure to content that may compromise the individual or professional integrity of those involved, as well as to avoid elements that have the potential to cause emotional or psychological damage to students and members of the school community.

This proactive approach aims to ensure that the use of technology enhances learning without infringing on individual rights or subjecting users to unnecessary risks.

TYPOLOGIES OF DIGITAL TECHNOLOGIES FOR A SECURE APPLICATION

In order to explore the pedagogical and management potential, and keeping the focus on safety and ethical use, several digital tools that can be integrated into the educational process stand out:

- Virtual Reality (VR) Applications: Used for immersive simulations and field experiences that would be logistically unfeasible. Safe use should focus on validated content and supervision to avoid physical or psychological discomfort.
- Gamification: Strategies that apply game mechanics to the learning context to increase engagement and motivation. Safety lies in the pedagogical focus of the challenges, avoiding the exposure of rankings or scores that generate *bullying* or exclusion.
- Learning Analytics and School Management Applications: Essential tools to monitor performance and optimize administrative processes. Ethical and safe use is critical, requiring full compliance with data protection laws (such as the LGPD in Brazil), ensuring anonymization and strictly pedagogical use of the data collected.
- Google Workspace (and other collaborative suites): Platforms that facilitate collaboration, communication, and content creation. Security is maintained through controlled access policies and digital citizenship training.
- Artificial Intelligence (AI) Tools: Emerging technologies that aid in the personalization of teaching, auto-correction, and tutoring. Responsible use requires transparency about how AI decisions are made and ensuring that *algorithms do not perpetuate biases* or biases.
- The choice of tools and their implementation must be continuously reassessed, ensuring that technological advancement goes hand in hand with social and pedagogical responsibility.

STUDENT AUTONOMY IN THE CONTEXT OF ACTIVE METHODOLOGIES

The student's autonomy is one of the central pillars of active methodologies, as it shifts the focus from transmissive teaching to learning processes in which the subject assumes a leading role. Autonomy, in this context, is not restricted to freedom of choice but also involves the ability to make conscious decisions about one's educational path,

drawing on knowledge, skills, and attitudes. Paulo Freire (1996) argues that teaching requires respect for the learner's autonomy, understood as the progressive construction of responsibility and critical awareness. Thus, active methodologies favor environments in which the student learns to learn, developing initiative, epistemological curiosity, and commitment to knowledge.

By promoting problem situations, interdisciplinary projects, and learning through challenges and projects, the teacher creates conditions for the student to engage cognitively and reflect on their actions and results. According to Perrenoud (2000), forming autonomous subjects implies creating opportunities for them to make decisions, face uncertainties and learn from mistakes. In this way, autonomy ceases to be an abstract objective and is exercised concretely in pedagogical practices.

SELF-REGULATION OF LEARNING AND COGNITIVE DEVELOPMENT

Self-regulation of learning refers to the student's ability to plan, monitor, and evaluate their own learning process. Zimmerman (2002) defines self-regulated learning as an active process in which students set goals, use cognitive and metacognitive strategies, and adjust their behavior based on the results obtained. In active methodologies, this competence is stimulated through open-ended tasks, self-assessments, reflective portfolios, and continuous feedback.

From a cognitive perspective, self-regulation contributes to meaningful learning by facilitating the construction of connections between new content and prior knowledge, as proposed by Ausubel (2003). By reflecting on how they learn, students develop metacognitive skills that are essential to deal with the complexity of contemporary knowledge. This process expands the ability to transfer learning to different contexts, strengthening integral education.

SOCIO-EMOTIONAL SKILLS AND ACTIVE LEARNING

Autonomy and self-regulation are directly related to the development of socio-emotional skills, such as responsibility, empathy, persistence, and collaboration. The National Common Curriculum Base (BNCC) highlights the importance of these skills for student education, emphasizing the need for pedagogical practices that promote self-knowledge and the management of emotions (BRASIL, 2018). In active methodologies,

group work, conflict resolution, and co-responsibility for tasks favor the construction of these skills.

According to Goleman (1995), emotional intelligence plays a fundamental role in academic and social success, as it influences motivation, self-control, and the ability to deal with challenges. By integrating cognitive and socio-emotional aspects, active methodologies contribute to a more human and contextualized learning, preparing the student to act ethically and consciously in society.

REFLECTION ON LEARNING AND CONSTRUCTION OF MEANING

Reflection on the learning process itself is a central element for the consolidation of autonomy and self-regulation. Schön (2000) highlights the importance of reflection-in-action and reflection-on-action as strategies for professional and educational development. In the context of active methodologies, reflection allows students to understand not only what they have learned, but how they have learned it, attributing meaning to their experiences.

Edgar Morin (2000) reinforces that educating for the future requires considering the complexity of knowledge and the need to train subjects capable of thinking critically. By stimulating continuous reflection, the teacher contributes to the student developing an investigative and conscious posture towards knowledge. Thus, autonomy and self-regulation are not only individual competencies, but also as formative practices that sustain meaningful and lifelong learning.

RESIGNIFYING TO LEARN: SENSES AND MEANINGS IN CONTEMPORARY EDUCATION

The concept of resignification occupies a central place in contemporary educational debates, especially in the face of the rapid social, cultural and technological transformations that impact the processes of teaching and learning. Resignification implies attributing new meanings to previously consolidated practices, knowledge and experiences, breaking with traditional and automated teaching models. For Charlot (2000), learning is always a relationship with knowledge, mediated by meanings that the subject constructs from his history, his context, and his expectations. Thus, resignification does not occur spontaneously but demands pedagogical intentionality and openness to change.

In the context of active methodologies, resignifying means shifting the focus from content transmission to the construction of learning experiences that make sense to the

student. This movement requires teachers and students to revisit beliefs, roles, and practices, recognizing that knowledge is not static but is produced in interaction with the world and with others. According to Morin (2000), educating for complexity requires overcoming fragmentation and promoting a contextualized understanding of knowledge.

THE RESIGNIFICATION OF THE TEACHING ROLE

One of the main challenges of resignification in education concerns the role of the teacher. Historically conceived as the holder of knowledge, the teacher is called, in contemporary times, to assume the role of mediator, facilitator and curator of learning experiences. According to Tardif (2014), teaching knowledge is built throughout practice and is in constant transformation, which requires a reflective and investigative posture from the teacher.

Resignifying the teaching role implies recognizing that teaching is not only exposing contents, but creating conditions for the student to construct knowledge in an active and meaningful way. Freire (1996) states that "teaching is not transferring knowledge, but creating the possibilities for its own production or construction". This perspective reinforces the need for the teacher to re-signify his practice, understanding error as part of the process, dialogue as a pedagogical strategy and listening as a fundamental element of the educational relationship.

RESIGNIFICATION OF LEARNING AND STUDENT PROTAGONISM

From the student's point of view, the resignification of learning is directly associated with the development of protagonism and autonomy. Learning ceases to be a passive act to become an active process of investigation, reflection and decision-making. Ausubel (2003) highlights that meaningful learning occurs when new knowledge is anchored in existing cognitive structures, acquiring meaning for the learner. In this process, resignification allows the student to understand the value of what he learns and its applicability in different contexts.

Active methodologies favor this movement by proposing problem situations, projects, and challenges that require cognitive and emotional involvement. By resignifying learning, students begin to perceive knowledge as an instrument of personal and social transformation, strengthening their commitment to their own education. This change in perspective contributes to the formation of critical subjects who can learn throughout life.

RESIGNIFICATION, DIGITAL CULTURE AND MEANINGFUL LEARNING

Digital culture poses new challenges for the resignification of educational processes, as it expands access to information but also requires skills for selecting, interpreting, and attributing meaning to what is learned. According to Kenski (2012), digital technologies transform the ways of teaching and learning, requiring new pedagogical and methodological postures. Resignifying, in this context, means not only incorporating technologies but also using them in a critical and intentional way.

Meaningful learning, mediated by technology, occurs when technology is integrated with pedagogical proposals that are coherent with the training objectives. Schön (2000) highlights the importance of reflection on practice as an essential element for professional and educational resignification. Thus, the challenge of resignification involves understanding that educating is a dynamic process, which requires constant review of meanings, practices and purposes, aiming at the integral formation of the subject in a society in permanent transformation.

FINAL CONSIDERATIONS

The journey of learning to teach with technologies is, fundamentally, a process of human learning and teacher self-care. The teacher of the twenty-first century, faced with digital acceleration and the emotional crisis in his profession, needs to be recognized as the irreplaceable agent in building bridges between the technological world and the complexity of human relationships.

This study demonstrated that teacher illness is a structural symptom, intensified by the precariousness of work and the overload of demands, including insecurity in the face of digital innovations. To reverse this situation, humanized continuing education is the main strategy, centered not only on the development of technical skills, but primarily on emotional care and the strengthening of professional identity.

In this context, the teacher needs to go beyond the instrumental domain, understanding technology from the perspective of Citizenship and Ethics. What is expected to be achieved is the dimensioning of the role of technologies in education, aligning the major domains – Cognition, interpersonal and intrapersonal – for the full development of the student.

Thus, the role of the teacher is re-signified and consolidated as an essential mediator, acting in a metric of care and integral development:

- Intellectual Advisor and Mediator: The one who selects the information necessary for the skills to be developed, transforming digital consumption into the creation and search for information.
- Emotional Advisor and Mediator: One who encourages and stimulates the student to advance in their authenticity and empathy, acting as a caregiver of the bond and promoter of a welcoming environment.
- Management Advisor and Mediator and Communicator: The one who acts as an organizer of the activities and the evaluation process, and helps in the development, interaction and integration of technologies, and who protects the teaching space from unnecessary overload.

The teacher who understands technologies as allies and submits digital advancement to a political and ethical sieve, expands the power of teaching and learning. The essence of education remains human, and training, centered on humanization, becomes the most powerful strategy to rebuild bonds, strengthen teachers' self-esteem and resignify the role of the school in the face of contemporary challenges.

Throughout this study, it was evidenced that the emotional crisis of teachers cannot be treated as an individual problem, but as an institutional, social and political issue. The absence of effective public policies for professional valorization, combined with the intensification of work and the rapid incorporation of technologies without proper training support, contributes to the physical and emotional exhaustion of educators. In this sense, investing in the emotional health of teachers is investing directly in the quality of education and in the sustainability of education systems.

Continuing education, when guided by humanizing principles, assumes a strategic role by enabling spaces for listening, reflection, experimentation, and resignification of pedagogical practices. These spaces allow teachers to reconstruct meanings about their performance, overcome the fear of technology, and develop a more conscious, ethical, and authorial relationship with digital resources. Technology, therefore, is no longer perceived as a threat and is now understood as a tool to support creativity, the personalization of learning, and the construction of more meaningful pedagogical bonds.

In addition, the articulation between education, technology and citizenship, discussed in this text, reinforces the need for a school committed to the integral formation of the subject. Meaningful learning, student autonomy, self-regulation, socio-emotional skills and critical reflection on learning are inseparable elements of an education that proposes to transform. In this scenario, the teacher not only teaches content, but also forms citizens capable of acting ethically, solidarily, and critically in a complex and technologically mediated society.

It is concluded that learning to teach with technology is an ongoing process of redefinition, where caring for teachers, students' active participation, and social responsibility in education are interconnected. The goal is not to choose between human elements and technology but to integrate both thoughtfully, ethically, and sensitively. Only by adopting this approach can we create healthier, more democratic, and inclusive educational spaces that reinforce teacher identity, support emotional well-being, and provide an education that meets current needs and future aspirations.

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ARCHITECTS OF KNOWLEDGE - TEACHER PREPARATION TO TEACH IN THE WORLD OF GENERATIVE ARTIFICIAL INTELLIGENCE

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INTRODUCTION

The rapid spread of generative artificial intelligence in education has led to significant changes in how knowledge is produced, accessed, and validated. Tools that can generate texts, images, codes, and detailed analyses are now part of academic and professional practices, challenging traditional ideas of authorship, learning, and assessment. This shift is more than just a technological advance; it marks an epistemological transformation that calls for adjustments in pedagogy, institutions, and ethics.

According to UNESCO (2023), generative AI represents a new phase in the technology-education relationship by greatly enhancing cognitive automation, offering new learning opportunities, but also posing risks to academic honesty and critical thinking development. Consequently, education must adapt not only to the technology itself but also to the deep impacts it has on human development.

Generative artificial intelligence has the potential to reshape teaching and learning practices, but it also raises significant concerns related to authorship, accountability, equity, and the preservation of human agency in educational decision-making (UNESCO, 2023, p. 12).

The introduction of generative artificial intelligence in educational environments has highlighted a central tension: while these technologies offer efficiency, personalization, and expanded access to information, they can also favor practices of cognitive dependence, analytical superficiality, and undue delegation of intellectual judgment. As Southgate, Kilgour, and Wartho (2023) warn, the discursive fluency of generative systems tends to be interpreted as a sign of epistemic authority, obscuring the fact that such systems do not understand, verify, or take responsibility for the knowledge they produce.

In this context, the role of the teacher becomes even more relevant. Far from being replaced by technology, teaching is called upon to assume expanded functions of mediation, critical guidance, and epistemic responsibility. Krutka et al. (2023) argue that teaching in the age of artificial intelligence requires shifting the focus from the mere transmission of content to the construction of criteria for judging, analyzing, and validating knowledge:

Teaching in the age of generative AI requires educators to help students interrogate how knowledge is produced, whose perspectives are represented, and what assumptions underlie algorithmic systems. This work is not optional; it is central to democratic and ethical education (KRUTKA et al., 2023, p. 778).

From this perspective, this article argues that the teacher should be understood as the architect of knowledge — a professional responsible for designing intentional learning experiences, capable of integrating technology, knowledge, and human development in a critical and ethical way. The architect of knowledge does not delegate to technology the role of defining formative objectives, validation criteria, or pedagogical meanings, but uses artificial intelligence as a resource subordinated to clear educational purposes.

Ng and Wu (2024) highlight that the absence of teacher preparation for the critical use of artificial intelligence tends to widen educational inequalities and compromise the quality of learning, especially when students start to use generative systems as final sources of response, according to them:

Without adequate pedagogical guidance, generative AI can shift learning from inquiry to consumption, reducing opportunities for reasoning, synthesis, and critical engagement. Teacher preparation is therefore a decisive factor in determining whether AI enhances or undermines learning (NG; WU, 2024, p. 740).

In view of this scenario, the present study aims to analyze the theoretical bases that support the teaching performance in the era of generative artificial intelligence, discuss the professional competencies necessary for qualified pedagogical mediation, examine pedagogical strategies aimed at the development of critical thinking and reflect on the challenges, limits and formative possibilities associated with the use of this technology. In doing so, the article reaffirms the centrality of the teacher as a human agent capable of architecting knowledge in educational contexts increasingly mediated by algorithmic technologies.

RESEARCH METHODOLOGY

This study's methodology combines a qualitative bibliographic review with a theoretical-conceptual framework grounded in a critical analysis of recent scientific literature on generative artificial intelligence, education, critical thinking, and teacher training. This approach was selected to facilitate a deep understanding of an emerging phenomenon that encompasses epistemological, pedagogical, and ethical aspects.

The research's theoretical foundation includes scientific articles, books, and institutional documents from recognized organizations, primarily published from 2020 onward, selected for their thematic relevance, current relevance, and academic rigor. The material was analyzed using an interpretative approach to identify recurring conceptual categories, including epistemic authority, pedagogical mediation, teaching competencies, and institutional challenges.

This analysis led to an interpretive framework integrated into the research challenges. Conceptually, the study engages with the Mentes Method, developed by the author as an organizational reference for understanding personalized paths for developing human skills. It is important to note that this method was not empirically applied within this article.

THEORETICAL FOUNDATION: CRITICAL THINKING AND EPISTEMIC AUTHORITY IN THE AGE OF AI

According to Southgate, Kilgour, and Wartho (2023), generative artificial intelligence inaugurates a new regime of knowledge production by shifting the centrality of human authorship to algorithmic systems capable of producing plausible, coherent, and socially convincing discourses. Such a shift challenges traditional conceptions of epistemic authority, historically sustained by scientific, institutional, and pedagogical processes of knowledge validation.

Generative artificial intelligence differs from previous educational technologies in that it not only mediates access to information, but produces content autonomously, even if devoid of cognitive intentionality or epistemological awareness. This characteristic creates the risk of confusing discursive fluency with conceptual validity, requiring new forms of pedagogical mediation:

Generative AI systems produce language that appears authoritative and coherent, yet this fluency should not be mistaken for epistemic reliability. These systems do not reason, verify, or assume responsibility for truth claims, which

fundamentally alters how knowledge must be evaluated in educational contexts (SOUTHGATE; KILGOUR; WARTHO, 2023, p. 7).

In this scenario, critical thinking needs to be understood as an expanded competence. It is not just about the logical analysis of arguments, but also about the ability to interrogate the conditions of knowledge production, identify algorithmic biases, evaluate sources, and recognize the structural limits of digital technologies. As Krutka et al. (2023) state, teaching in the era of artificial intelligence requires a profound review of educational practices, shifting the focus from the simple correct answer to the development of criteria for judgment.

According to Krutka et al. (2023), education cannot respond to the presence of generative AI solely through instrumental prohibitions or permissions, but must take an active role in students' epistemic formation. Therefore:

Educators must help learners develop the capacity to question how knowledge is produced, whose interests it serves, and what assumptions underlie algorithmic systems. Teaching in the age of generative AI requires explicit attention to epistemic authority rather than passive acceptance of technological outputs (KRUTKA et al., 2023, p. 779).

Pedagogical mediation, in this context, assumes renewed centrality. The teacher begins to act as an epistemic mediator, responsible for guiding the processes of validation, contextualization, and the attribution of meaning to knowledge. This mediation involves intentional decisions about the use of artificial intelligence, always subordinated to pedagogical, ethical, and formative objectives.

Ng and Wu (2024) highlight that the absence of this mediation can result in cognitive dependence and impoverishment of learning processes, especially when students start to use AI as a final source of responses, and not as an object of analysis:

When generative AI is used without pedagogical mediation, learners may rely on automated outputs rather than engage in reasoning, synthesis, or evaluation. This dependency undermines the development of critical thinking and shifts responsibility for knowledge away from the learner (NG; WU, 2024, p. 741).

In addition, the presence of artificial intelligence in educational environments broadens the debate on epistemic responsibility. If generative systems produce content that influences academic decisions, who is responsible for its validity? Recent literature

converges in stating that this responsibility cannot be delegated to technology, but must remain under human guidance, particularly the teacher. In this sense:

Without intentional instructional design and epistemic guidance, generative AI risks transforming learning into a process of consumption rather than inquiry. Human judgment remains essential to preserve meaning, responsibility, and intellectual autonomy in educational environments (LO; HUANG, 2024, p. 8).

Thus, the theoretical foundation of this study holds that integrating generative artificial intelligence into education does not diminish the relevance of teaching but rather intensifies it. The teacher, as the architect of knowledge, is the professional capable of articulating disciplinary knowledge, pedagogical judgment, and ethical responsibility, transforming technology into a formative resource and not a substitute for human thought.

Understanding generative artificial intelligence as a sociotechnical phenomenon — and not merely instrumental — allows us to situate its educational use in a broader theoretical framework, in which learning remains a human, intentional, and contextualized process. This perspective underlies the analysis of teaching competencies, pedagogical strategies, and training proposals developed in the following sections.

TEACHING SKILLS IN THE AGE OF GENERATIVE ARTIFICIAL INTELLIGENCE

The incorporation of generative artificial intelligence into educational contexts requires a redefinition of teaching competencies traditionally associated with teaching and learning. Unlike previous moments of technological introduction in education, the current challenge is not limited to the instrumental mastery of digital tools, but involves the capacity for critical mediation, epistemic judgment, and pedagogical decision-making in algorithmic environments. In this scenario, the teacher is called upon to take an active role in the organization of knowledge, in the ethical guidance of the use of technology, and in the preservation of human centrality in the formative process.

According to Ng and Wu (2024), teaching in contexts mediated by artificial intelligence requires an integrated set of skills that articulates conceptual understanding, pedagogical reflection, and ethical responsibility. The absence of these skills tends to transform technology into an undue substitute for human thinking, compromising the quality of learning and the intellectual autonomy of students. Thus, it is important to understand that:

Teachers' competence in generative AI is not merely about knowing how to use tools, but about understanding when, why, and under what conditions AI should be used in learning environments. Without this competence, AI risks becoming a shortcut that replaces reasoning rather than supporting it (NG; WU, 2024, p. 741).

Among the core competencies, epistemic competence stands out, understood as the ability to critically evaluate the validity, consistency, and reliability of content produced by generative systems. This competency involves distinguishing discursive fluency from conceptual rigor, recognizing algorithmic biases, and understanding the structural limits of artificial intelligence. By developing such competence, the teacher positions himself as a mediator between automated information production and the academic criteria for knowledge validation.

Law, Lee, and Leong (2024) point out that teachers who do not develop this competence tend to adopt extreme postures — either of absolute rejection or of uncritical acceptance of technology. Both are harmful to the educational process. For the authors:

AI competence in teacher education must integrate epistemic judgment with pedagogical reasoning. When teachers lack this integration, they are more likely to either avoid AI altogether or to overtrust algorithmic outputs, both of which limit meaningful learning opportunities (LAW; LEE; LEONG, 2024, p. 5).

Another fundamental competence refers to analytical capacity, which involves the critical reading of outputs generated by artificial intelligence, the identification of inaccuracies, hallucinations, and undue generalizations, as well as the comparison between human and algorithmic productions. This competence transforms AI into an object of pedagogical investigation, favoring practices that stimulate intellectual curiosity, argumentation, and reflective thinking in students.

Pedagogical competence, in turn, is manifested in intentional pedagogical design, that is, in the ability to plan learning experiences in which artificial intelligence is subordinated to clear formative objectives. The teacher, as the architect of knowledge, defines when technology can support processes such as brainstorming, simulation, or exploratory analysis, and when human reasoning should remain the core of the activity. This pedagogical intentionality is essential to avoid the empty automation of learning.

Southgate, Kilgour, and Wartho (2023) highlight that the absence of pedagogical intentionality in the use of AI compromises students' epistemic formation. The authors state:

Without clear pedagogical intent, generative AI tools can blur the boundaries between learning and outsourcing cognition. Teachers play a critical role in

designing tasks that maintain epistemic responsibility and promote meaningful engagement with knowledge (SOUTHGATE; KILGOUR; WARTHON, 2023, p. 10).

In addition, teaching in the era of generative artificial intelligence requires evaluative competencies aligned with the valorization of the cognitive process and intellectual authorship. Evaluative models focused exclusively on the final product become insufficient, since they do not capture the learning path or the degree of critical involvement of the student. Evaluating, in this context, implies considering argumentation, decision-making, conceptual justifications, and ethical use of technology.

The ethical dimension is another indispensable competence. The teacher must be able to guide the responsible use of artificial intelligence, promoting transparency, discussing moral limits and recognizing social impacts associated with technology. Ethics, in this case, is not reduced to norms of use, but is part of the process of intellectual and citizenship formation itself.

Lo and Huang (2024) warn that the absence of this ethical dimension can compromise the autonomy of learners and reinforce practices of technological dependence. Thus:

Ethical competence in AI-mediated education is not optional. Without explicit ethical guidance, learners may defer judgment to technology, weakening their sense of agency and responsibility in knowledge construction (LO; HUANG, 2024, p. 9).

Finally, formative competence stands out, related to continuous professional development. The rapid evolution of artificial intelligence requires teachers to maintain a reflective posture and be open to lifelong learning, participating in communities of practice, sharing experiences, and critically reviewing their pedagogical performance. This competence sustains educational innovation in an ethical and sustainable way.

In summary, teaching competencies in the era of generative artificial intelligence cannot be understood as a homogeneous or standardized set. They require specific articulations, adjusted to institutional, cultural, and human contexts, reaffirming the role of the teacher as an architect of knowledge — a professional capable of integrating technology, knowledge, and human development in a critical, intentional, and responsible way.

PEDAGOGICAL STRATEGIES FOR THE DEVELOPMENT OF CRITICAL THINKING

The incorporation of generative artificial intelligence into pedagogical practices requires an intentional reorganization of teaching strategies, since simple access to automated responses does not guarantee meaningful learning. In educational contexts mediated by algorithmic systems, the pedagogical focus must shift from operational efficiency to the development of critical thinking, intellectual authorship, and epistemic responsibility. The strategies adopted need to ensure that technology works as a support for human reasoning, and not as a substitute for it.

A central strategy consists of the systematic problematization of content generated by artificial intelligence, treating algorithmic outputs as objects of analysis rather than final answers. By submitting texts, images, or arguments produced by AI to critical evaluation, the teacher creates conditions for students to identify inconsistencies, biases, and conceptual limits, strengthening investigative and reflective practices. According to KRUTKA, this approach preserves the centrality of human judgment and contributes to the formation of criteria for knowledge validation:

Rather than positioning generative AI as a shortcut to answers, educators should design learning activities that require students to interrogate, critique, and contextualize algorithmic outputs. Such strategies foreground epistemic judgment and ensure that technology supports, rather than replaces, human reasoning (KRUTKA et al., 2023, p. 780).

Another relevant pedagogical strategy refers to the use of artificial intelligence as a cognitive challenge, in which technology is mobilized to generate initial hypotheses or preliminary arguments that will later be analyzed, reviewed, or refuted by students. This type of practice encourages argumentation, counter-argumentation, and reasoned decision-making, promoting greater cognitive depth and reducing the risk of intellectual dependence on technology.

In addition, it is essential to reconfigure the evaluation processes to prioritize the learning path over the final product. Process-oriented evaluation strategies, such as reflective records, conceptual justifications, and analytical presentations, allow the teacher to monitor the development of the student's reasoning and to value intellectual authorship, even in contexts involving the use of artificial intelligence. Therefore:

Assessment in AI-mediated learning environments must move beyond product-based evaluation and prioritize reasoning, reflection, and transparency. When students are required to explain their decisions and the role of AI in their work, assessment becomes a formative process that reinforces critical engagement and intellectual responsibility (NG; WU, 2024, p. 743).

Finally, pedagogical strategies must be contextualized and sensitive to the institutional and cultural realities in which they are applied. There are no universal models for the pedagogical use of artificial intelligence; effective practices in one context may be inadequate in another. It is up to the teacher, as the architect of knowledge, to adjust their strategies to the specificities of their students and institutions, ensuring that technology is integrated in an ethical, critical, and pedagogically meaningful way.

TEACHER TRAINING AND INSTITUTIONAL PROGRAMS

Teacher training plays a strategic role in the responsible incorporation of generative artificial intelligence into educational contexts. The complexity of the epistemological, pedagogical, and ethical challenges associated with these technologies requires that teacher preparation go beyond specific technical training and configure itself as a continuous, reflective, and institutionally sustained training process. In this sense, teacher training needs to articulate a conceptual understanding of technology, develop critical skills, and strengthen professional autonomy.

Institutional programs aimed at the use of artificial intelligence in education must recognize that the mere availability of tools does not guarantee pedagogical innovation or improved learning. On the contrary, without a solid training base, the adoption of AI tends to reinforce superficial instructional practices or widen educational inequalities. Recent literature points out that effective training initiatives are those that integrate critical theory, pedagogical experimentation, and spaces for collective reflection, allowing teachers to understand not only the functioning of technologies, but their educational and social implications.

Teacher professional development related to generative AI should not focus solely on technical proficiency. Effective programs emphasize critical understanding, ethical reflection, and pedagogical decision-making, enabling teachers to align AI use with educational goals rather than technological imperatives (LAW; LEE; LEONG, 2024, p. 6).

Teacher training, in this context, should be conceived as a permanent process, capable of keeping up with the rapid evolution of artificial intelligence systems and

responding to transformations in educational practices. This implies moving beyond training models based on isolated events and adopting sustained approaches that promote communities of practice, the exchange of experiences, and the collective construction of pedagogical knowledge. Such approaches strengthen teacher confidence and favor the critical appropriation of technology.

Another central aspect concerns the role of educational institutions in creating clear and guiding policies for the use of generative artificial intelligence. The absence of institutional guidelines tends to shift the responsibility for complex decisions entirely to the teacher, leading to insecurity and inconsistent practices. Well-structured policies, in turn, provide ethical, pedagogical, and evaluative parameters while preserving teacher autonomy in making contextualized decisions.

Ng and Wu (2024) point out that effective institutional programs recognize the diversity of educational contexts and avoid standardized approaches. According to the authors, valuing local adaptation and cultural sensitivity:

Institutional strategies for AI integration in education must acknowledge contextual diversity and avoid one-size-fits-all approaches. Teacher development programs are most effective when they support local adaptation, professional autonomy, and culturally responsive pedagogical practices (NG; WU, 2024, p. 742).

In addition, teacher training must contemplate the ethical dimension of the use of artificial intelligence, promoting discussions on authorship, transparency, academic responsibility, and social impacts of technology. This dimension is essential for teachers to guide students in the construction of responsible and conscious practices, strengthening academic integrity and commitment to democratic values.

Finally, the consolidation of institutional teacher training programs focused on generative artificial intelligence contributes to the construction of an educational culture oriented towards responsible innovation. By investing in continuous professional development, institutions reinforce the role of the teacher as an architect of knowledge, capable of integrating technology, knowledge, and human development in a critical, ethical, and sustainable way.

CHALLENGES, CONTRADICTIONS, AND LIMITS IN THE INCORPORATION OF GENERATIVE ARTIFICIAL INTELLIGENCE IN EDUCATION

The incorporation of generative artificial intelligence in educational contexts reveals challenges and contradictions that extend beyond mere technical issues, encompassing epistemological, pedagogical, ethical, and institutional dimensions. The adoption of this technology without consistent pedagogical mediation tends to produce fragmented uses, marked by improvisation, teacher insecurity, and weakening of learning processes. Thus, understanding the limits of generative artificial intelligence is an essential condition for its responsible educational integration.

One of the central challenges refers to the risk of undue delegation of intellectual judgment to algorithmic systems. The discursive fluidity and apparent accuracy of the responses produced by artificial intelligence tools can induce teachers and students to over-trust technological outputs, confusing linguistic coherence with epistemological validity. This dynamic compromises the development of critical thinking and reduces the space for analysis, reflection, and reasoned decision-making.

Generative AI introduces a form of epistemic risk when its outputs are treated as authoritative rather than provisional. Without structured pedagogical mediation, learners may substitute algorithmic fluency for critical judgment, leading to superficial engagement with knowledge and diminished intellectual agency (SOUTHGATE; KILGOUR; WARTHO, 2023, p. 12).

Another relevant limit concerns the educational inequalities associated with both access to technologies and the skills necessary for their qualified pedagogical use. In institutional contexts in which there are no clear policies or sustained teacher training programs, artificial intelligence tends to amplify pre-existing asymmetries, benefiting groups with greater technological and training capital. In this way, technology, when adopted uncritically, can reinforce processes of exclusion rather than promote educational equity.

In addition, the presence of generative artificial intelligence highlights significant contradictions in traditional evaluation models. Strategies centered on surveillance, detection of technology use, or penalizing the student shift the focus from learning to control, weakening the pedagogical relationship and limiting higher-order cognitive development. Evaluating in environments mediated by artificial intelligence requires

rethinking criteria, instruments, and purposes, prioritizing reflective processes, argumentation, and intellectual authorship.

Ng and Wu (2024) warn that in the absence of clear pedagogical and institutional guidelines, the use of artificial intelligence can compromise learners' autonomy and reduce learning to the automated consumption of responses. The authors say:

When generative AI is integrated into education without coherent institutional frameworks and sustained teacher development, it risks transforming learning into a passive process of consumption. Human judgment, pedagogical intent, and ethical responsibility remain essential to preserve meaningful learning (NG; WU, 2024, p. 744).

In view of these challenges and limitations, it is necessary for teachers to develop an articulated set of professional competencies to ensure the responsible pedagogical use of generative artificial intelligence, minimize negative impacts, and enhance formative outcomes. These competencies do not operate in isolation or follow standardized trajectories; on the contrary, they require specific combinations, adjusted to institutional, cultural, and human contexts. The systematization of these competencies is presented in Chart 1, which summarizes essential teacher learning for the critical mediation of technology.

Table 1 – Teaching skills to ensure the responsible pedagogical use of generative artificial intelligence

Dimension	Skills to be developed
Epistemic	Critically evaluate AI-generated content; distinguish discursive fluency from scientific validity; recognize epistemological limits of generative systems
Analytics	Identify algorithmic biases, inaccuracies, undue generalizations, and conceptual gaps in AI outputs
Pedagogical	Plan the use of AI intentionally; integrate technology into learning objectives without replacing human reasoning
Evaluative	Value cognitive processes, argumentation and decision-making; prioritize the evaluation of the training path and intellectual authorship
Ethics	Promote transparency in the use of AI; discuss academic responsibility, authorship, and social impacts of technology
Inclusive	Consider inequalities in access and digital skills; adopt equitable pedagogical strategies
Formative	Maintain continuous professional development; review pedagogical practices in the face of technological transformations

Source: Produced by the author.

The analysis of Chart 1 shows that the responsible integration of generative artificial intelligence depends less on technological sophistication and more on the quality of the

teacher's pedagogical mediation. The development of these competencies requires sustained teacher training, intentional planning, and coherent institutional policies capable of supporting the teacher in complex pedagogical decisions.

Thus, the challenges and limits associated with generative artificial intelligence do not indicate the unfeasibility of its educational use, but reaffirm the centrality of the teacher as the architect of knowledge. It is qualified human mediation that makes it possible to transform risks into formative opportunities, ensuring that technology is incorporated as an ally of human development, and not as a substitute for critical thinking, intellectual autonomy and educational responsibility.

CONCLUSION

The analysis developed throughout this article shows that the incorporation of generative artificial intelligence into education is a progressive, complex, and still consolidating process, which cannot be reduced to the instrumental adoption of emerging technologies. It is a sociotechnical phenomenon that redefines pedagogical practices, criteria for validating knowledge, and formative responsibilities, requiring profound conceptual and institutional repositioning.

The results of the theoretical discussion indicate that the educational impacts of generative artificial intelligence depend less on the sophistication of technological systems and more on the quality of the pedagogical mediation exercised by the teacher. Throughout the previous sections, it has been demonstrated that the uncritical use of technology can compromise the development of critical thinking, widen educational inequalities, and weaken students' intellectual authorship. On the other hand, when integrated intentionally, ethically, and contextually, artificial intelligence can support more investigative, reflective, and meaningful learning processes.

In this context, it is reaffirmed that only the teacher can serve as the architect of knowledge. No technology is capable of assuming the pedagogical judgment, epistemic responsibility, and contextual sensitivity that characterize teaching. Artificial intelligence can generate content and support processes, but it cannot attribute formative meaning, establish validity criteria, or guide human development trajectories.

The teaching competencies systematized in Chart 1, presented in Section 6, should be understood as an analytical and formative framework rather than a prescriptive or standardized model. The development of these competencies occurs through personalized combinations, which vary according to the professional profile, institutional culture,

working conditions, and educational objectives of each context. There are no universal paths for teacher training in the era of generative artificial intelligence; there are trajectories built from situated diagnoses and conscious pedagogical decisions.

In this sense, the study recognizes the need for methodological tools capable of organizing and structuring personalized processes of professional development, respecting individual singularities and collective dynamics. This perspective is based on the *Menthes Method*¹, developed by the author, which guides adaptive training paths aimed at the development of human competencies for high personal and professional performance. The method is based on the principle that teacher training requires strategic planning, continuous monitoring and alignment between education, technology, human cognition, entrepreneurship and sustainability, without compromising the intellectual autonomy of the professionals involved.

Thus, it is concluded that the responsible integration of generative artificial intelligence in education requires institutional investment, clear educational policies, and sustained teacher training programs, capable of supporting the teacher in complex pedagogical decisions. More than learning to use tools, educators need to develop critical, analytical, ethical, and formative capacities that allow them to architect knowledge in educational contexts increasingly mediated by algorithmic technologies.

By reaffirming the centrality of the teacher and the need for personalized formative approaches, this article contributes to the contemporary debate on artificial intelligence in education, highlighting that the future of learning will not be defined by the technology itself, but by the way educators, institutions, and public policies choose to guide its use in favor of human development, intellectual autonomy, and social responsibility.

¹ The *Menthes Method*, developed by the author, is a methodological approach oriented to the development of human skills through personalized training paths. The method integrates seven conceptual pillars synthesized in the acrostic MENTHES: Method, Education, Neuroscience, Technology, Human, Entrepreneurship and Sustainability.

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TEACHER TRAINING, ETHICS AND AI IN BRAZILIAN EDUCATION: A NECESSARY DIALOGUE BETWEEN THEORY, LEGISLATION AND THE PRACTICAL EXPERIENCE OF EDUCATORS

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INTRODUCTION: THE ETHICAL-DIGITAL IMPERATIVE IN TEACHER EDUCATION

ARTIFICIAL INTELLIGENCE AS A DISRUPTIVE AND INEVITABLE PHENOMENON IN CONTEMPORARY EDUCATION

The twenty-first century has seen a rapid digital transformation in education, with Artificial Intelligence becoming central to reshaping pedagogical and administrative methods (Porvir, 2025). In Brazil, AI usage in education has been increasing notably (CNN Brasil, 2025), driven by the hopes for improved efficiency and personalized teaching through tools like adaptive platforms, intelligent tutors, virtual assistants, educational data analysis, and automated feedback (Bulut et al., 2024; Nichyshyna et al., 2023; Cardoso et al., 2023).

The trend is for AI to be incorporated primarily as indirect pedagogical support, strengthening the work of educational teams without replacing human mediation, and favoring hybrid models that integrate technology with qualified pedagogical monitoring, thereby promoting more personalized, inclusive, and effective learning (CNN Brasil, 2025). However, the literature emphasizes that this integration requires a critical approach, supported by consistent public policies, transparent and equitable regulatory frameworks, and investment in teacher training (Bulut et al., 2024). Authors such as Selwyn warn of the risks of an uncritical use of technology, arguing that the implementation of AI should be contextualized and guided by ethical and pedagogical principles, especially in contexts of social vulnerability (Selwyn, 2016, 2022; Valente, 2021).

THE CRISIS OF HUMAN MEDIATION AND THE URGENCY OF ETHICAL DILEMMAS

The incorporation of AI in education is a political and epistemological challenge, which requires the reconfiguration of initial and continuing teacher training, given the risks to teacher autonomy and the integrity of the teaching-learning process (Silva, 2022; Gonzaga et al., 2025). Studies show that AI can reproduce inequalities, weaken authorship, and compromise academic integrity, especially as generative systems expand, and can also stimulate the replacement of critical thinking with automated responses (Gonzaga et al., 2025). Practices such as automated assessment, although promising efficiency, disregard the cultural, subjective, and ideological dimensions inherent to the evaluative act (Valente, 2021).

In this context, the research is guided by the question of how teacher training can address the ethical and data-protection challenges associated with the use of AI in education. The literature emphasizes that this training should go beyond the instrumental use of technologies, preparing the teacher for critical evaluation and ethical mediation, ensuring algorithmic transparency and preventing the reproduction of biases and discrimination (Gonzaga et al., 2025).

JUSTIFICATION OF THE RESEARCH AND STRUCTURE OF THE REPORT

The importance of this study lies in the immediate need to define ethical, pedagogical, and normative parameters that guide the use of AI in the educational path of students (Valente, 2021). Although the debate on AI and education is on the rise, there is a gap in the articulation between the Brazilian legal framework (such as the General Data Protection Law - LGPD) and the practical implementation of teacher training strategies that specifically address ethical and *privacy by design risks* (Brasil, 2018).

This chapter seeks to address this gap by combining a rigorous literature review on digital ethics, data privacy, and teaching competencies with an analysis of interviews conducted with teachers. This mixed-methods approach allows us to confront the normative and theoretical levels with the experiences, perceptions, and real needs of the teaching staff (Moura et al., 2025).

The structure of the chapter follows the script: Section II establishes the theoretical-regulatory framework, detailing the ethical challenges (bias and transparency) and the legal implications (LGPD and the AI Regulatory Framework, PL 2338/2023). Section III presents a diagnosis of current teacher training and introduces the axes of competence globally recognized by UNESCO. Section IV proposes, based on theoretical analysis and

practical needs, a set of training strategies that integrate technical knowledge with ethical reflection. Finally, Section V details the research methodology. The chapter therefore aims to discuss the pedagogical and legal implications of the use of AI and to propose a teacher training model that is critical, humanizing, and legally responsible (Bulut et al., 2024; Silva, 2022).

THE THEORETICAL-REGULATORY FRAMEWORK OF AI IN BRAZILIAN EDUCATION

THE SPECTRUM OF ETHICAL CHALLENGES: BIAS, TRANSPARENCY AND AUTONOMY

The integration of AI in education should be guided by three central ethical pillars: non-discrimination, algorithmic transparency, and the preservation of intellectual autonomy. The literature highlights that algorithmic bias constitutes one of the main ethical challenges in the use of AI, alongside privacy and transparency issues, especially when educational systems are trained with data that reproduces historical inequalities, which can reinforce injustices and impact educational trajectories (Bulut et al., 2024; Gonzaga et al., 2025; Nichyshyna et al., 2023; Cardoso et al., 2023). This problem is directly related to the structural inequalities of Brazilian education and the precariousness of teacher training, requiring teachers to be prepared to act as ethical mediators and auditors, with a focus on algorithmic justice and sociotechnical inclusion (Valente, 2021; Silva, 2022; Gonzaga et al., 2025).

Another fundamental axis is algorithmic transparency, understood as the need to understand the criteria and decision-making processes of AI systems, overcoming the logic of the "black box", an essential condition for trust, human intervention, and the responsible use of technology (Gonzaga et al., 2025). Finally, intellectual autonomy must be preserved in the face of the risks of algorithmic plagiarism and the replacement of critical thinking by automated responses, which demands teacher training focused on critical digital literacy, in which AI is treated as an object of analysis and not as a substitute for human creation (Gonzaga et al., 2025).

LEGAL IMPLICATIONS: THE LGPD AND THE DATA PROTECTION OF CHILDREN AND ADOLESCENTS

The use of AI systems, supported by the intensive collection and processing of data, is primarily limited by the General Data Protection Law (LGPD – Law No. 13,709/18),

whose objective is to safeguard the fundamental rights to freedom, privacy, and personality development (Brasil, 2018). In the educational field, this safeguard takes on greater complexity, since the legislation imposes specific rules for the processing of data from children and adolescents, requiring clear justification for the collection and explicit consent of parents or guardians, which demands high levels of transparency and accountability in the applications of educational AI (Brasil, 2018; Transparência Brasil, 2025).

This problem goes beyond the technical level and acquires a constitutional dimension, especially with regard to the use of digital surveillance technologies, such as facial recognition in schools, which must be critically analyzed in the light of the Federal Constitution, the Statute of the Child and Adolescent, and the LGPD itself, under penalty of configuring a "disguised setback" in the protection of children's rights (Sbaite Gonçalves, 2025). From the point of view of governance, the LGPD establishes the principle of accountability and accountability, requiring proof of effective compliance measures, and the preparation of Data Protection Impact Reports for high-impact AI tools is recommended in Brazil (Transparência Brasil, 2025). In this scenario, teacher training should include an understanding of these legal frameworks, enabling teachers to critically evaluate the use of AI from the perspectives of rights, risks, and data protection.

THE EMERGING NORMATIVE SCENARIO: THE AI REGULATORY FRAMEWORK (PL 2338/2023) AND TEACHER TRAINING POLICIES

Brazil is in the process of building a specific regulatory framework for artificial intelligence. Bill No. 2,338/2023, which deals with the development, promotion, and ethical and responsible use of AI, based on the centrality of the human person, has already been approved in the Senate and is still pending in the Chamber of Deputies, with the potential to positively impact education by establishing clearer guidelines for governance and technological security (Brasil, 2023; Chamber of Deputies, 2025; Ribeiro, 2024). At the same time, the National Congress continues debating the regulation of AI use in basic education (Chamber of Deputies, 2025).

While this legal framework is still being consolidated, teacher training policies are beginning to incorporate initial adjustments. CNE/CP Resolution No. 4/2024, which establishes the National Curriculum Guidelines for the initial training of teaching professionals, provides for the integration of digital and ethical-political skills, guiding the critical, contextualized, democratic, and ethical use of Digital Information and Communication Technologies (Brasil, 2024a). However, a more in-depth analysis

highlights a relevant gap: despite emphasizing ethical training and the critical use of DICT, the document does not explicitly reference artificial intelligence. This absence reveals a lag in the face of the rapid expansion of AI in the educational context (CNN Brasil, 2025) and the specific risks associated with these technologies, such as algorithmic bias and generative plagiarism, which are not fully contemplated by generic approaches to DICT (Gonzaga et al., 2025). Such omission makes it difficult to structure more in-depth curricula in HEIs and reinforces the urgency of investigations that articulate teacher training, AI, and the emerging legal framework (PL 2.338/2023).

CURRENT TEACHER TRAINING AND THE ETHICAL-DIGITAL SKILLS GAP

DIAGNOSIS OF THE LACK OF TRAINING: BARRIERS AND OPPORTUNITIES IN THE PERCEPTION OF TEACHERS

Although AI has high transformative potential, its effective adoption in education depends directly on teacher qualification, and the fragility in teacher training is pointed out as one of the main obstacles to the ethical and efficient implementation of these technologies (Bulut et al., 2024; Nichyshyna et al., 2023; Cardoso et al., 2023). In this sense, it is essential to rethink initial and continuing education to integrate AI critically, promoting digital skills, ethical reflection, and commitment to socio-technical inclusion (Silva, 2022; Ribeiro, 2024).

Educators' perceptions of the use of AI in the classroom are decisive in identifying the limits and real possibilities of its application, and studies show the need for training that goes beyond technical training, favoring critical evaluation and responsible use of technology by teachers and students (Moura et al., 2025; DGE, 2024). Thus, the focus of training should shift from the instrumental domain to the analysis of the impacts of AI, avoiding processes of depersonalization and valuing the time freed up by automation to strengthen human mediation, emotional connection, and ethical guidance, dimensions irreplaceable by technology (Valente, 2021; Bulut et al., 2024; Moura et al., 2025).

THE AXES OF COMPETENCE PROPOSED BY UNESCO: ETHICS AND HUMAN-CENTERED MENTALITY

In view of the global demand to organize training programs capable of responding to the challenges AI poses for teacher education, international guidelines offer a consistent framework of reference. UNESCO has highlighted the importance of continuing education

of teachers with specific attention to artificial intelligence and ethics, basing its recommendations on instruments such as the ICT Competency Framework for Teachers and the Recommendations on the Ethics of Artificial Intelligence (2021) (UNESCO, 2024).

The UNESCO publication proposes a matrix of 15 competencies, organized into five complementary dimensions, to enhance human autonomy and promote sustainability (UNESCO, 2022). Two of these dimensions are central to the ethical debate and to the guiding question of this chapter:

Human-Centered Mindset: This aspect defines the values and attitudinal orientation that teachers need to foster in human-AI interactions. It includes levels of progression ranging from acquiring an understanding of human autonomy, deepening human responsibility, to creating a sense of social responsibility (UNESCO, 2022).

AI Ethics: This dimension is directly linked to regulatory and legal aspects. It outlines the essential ethical principles, regulations, institutional laws, and practical ethical rules (such as the LGPD and transparency standards) that teachers must understand, apply, and help adapt (UNESCO, 2022). The levels of progression involve: Acquire (ethical principles), Deepen (safe and responsible use), and Create (collectively ethical rules) (UNESCO, 2022).

UNESCO's framework reinforces that the challenge of training goes far beyond simple technique. It requires the teacher to become a mediator between technology and the human dimension of learning, defending ethical thinking and humanizing commitment in the digital age (Silva, 2022). This perspective is corroborated by the need for joint work between technical and pedagogical areas, in which technology serves learning, not just infrastructure (UNESCO, 2024).

PROPOSALS FOR CAPACITY BUILDING STRATEGIES FOR ETHICAL AI MANAGEMENT

Shifting to a teacher training model that addresses ethical and data protection issues involves implementing specific pedagogical and curricular strategies. These strategies should connect technical-legal knowledge with moral reflection and a humanized pedagogical approach.

METHODOLOGICAL STRATEGIES FOR CRITICAL ETHICAL REFLECTION

Training in AI ethics cannot be delegated to theoretical and isolated modules; it must be integrated in a curricular and transversal way (DGE, 2024). For teachers to develop

critical auditing and responsiveness competence (Gonzaga et al., 2025), training strategies must be active and reflective.

It is highly recommended that training programs use active methodologies, such as case studies and analysis of ethical dilemma scenarios (Brasil, 2018; Moura et al., 2025). For example, provoking students and teachers to analyze scenarios of algorithmic bias in evaluation systems or the impact of generative plagiarism on authorship, allows them to learn how to make appropriate decisions, preserving privacy and data (Brasil, 2018).

Collaborative action between experts in the technical and pedagogical areas is essential to ensure that technological solutions remain oriented to educational purposes (UNESCO, 2024). The implementation of pilot schools, innovation centers, and mentoring networks among teachers is a strategy capable of sustaining this process, resignifying the school as a space for teacher creation and protagonism (UNESCO, 2024). The goal of these initiatives is to strengthen an integrated digital culture, in which technology, training, and pedagogical practice advance in an articulated manner and on a consistent ethical basis (UNESCO, 2024).

TECHNICAL AND LEGAL TRAINING: INTEGRATING AI KNOWLEDGE AND THE LGPD IN PRACTICE

In view of the global demand for training programs capable of facing the challenges of artificial intelligence, UNESCO's guidelines set a consistent benchmark by prioritizing the continuing education of teachers with an emphasis on AI and ethics, based on instruments such as the ICT Competency Framework for Teachers and the Recommendations on the Ethics of Artificial Intelligence (UNESCO, 2024). This framework proposes a matrix of 15 competencies organized into five dimensions, aimed at strengthening human autonomy and sustainability, highlighting the Human-Centered Mindset, guided by values, responsibility, and social commitment, and the Ethics of AI, related to the understanding and application of ethical principles, legal and regulatory standards, such as the LGPD, and algorithmic transparency (UNESCO, 2022).

In this sense, UNESCO emphasizes that teacher training must go beyond the instrumental domain, enabling teachers to act as mediators between technology and learning, with a focus on human values, ethics, and social responsibility, and to articulate pedagogical and technical knowledge (UNESCO, 2024; Silva, 2022).

CHAPTER METHODOLOGY: INTEGRATING THEORETICAL REVIEW AND TEACHING EXPERIENCE

This chapter adopts a mixed-methods approach, essential for confronting the theoretical-normative framework with the reality experienced by educators in schools, as established in the abstract.

LITERATURE REVIEW: SCOPE AND CORPUS OF ANALYSIS

The first phase of the research consists of a qualitative, exploratory literature review using a narrative review (Valente, 2021; Gonzaga et al., 2025; Silva, 2022). The study is based on the analysis of scientific articles, reports from international organizations (such as UNESCO and OECD) (Bulut et al., 2024; DGE, 2024; UNESCO, 2024), and specialized publications that discuss the relationships between AI, ethics, and learning (Bulut et al., 2024).

The theoretical-regulatory corpus is composed of crucial Brazilian normative documents, such as the LGPD (Brazil, 2018), Bill No. 2338/2023 (Chamber of Deputies, 2025), and CNE/CP Resolution No. 4/2024 (Brazil, 2024a), seeking to assess the adequacy of the existing regulatory framework in the face of the new ethical challenges of AI. The review favors authors who offer a critical perspective (Selwyn, 2016, 2022), seeking to problematize ethical and epistemic dilemmas, the principles of transparency, justice, and inclusion, and existing regulatory frameworks (Gonzaga et al., 2025).

QUALITATIVE ANALYSIS: INTERVIEWS WITH TEACHERS

The second methodological stage, aimed at the empirical validation of training proposals, consists of analyzing interviews with teachers, adopting a qualitative approach that values teaching practice and what is "lived" as legitimate sources of knowledge production and of dialogue with the scientific field (Silva, 2022). The data were built collaboratively between teachers and researchers in basic education and teacher training, with the aim of understanding experiences, perceptions, challenges, and training needs related to the use of AI, as well as identifying concrete barriers, such as insufficient training, inequalities in access, and risks to privacy (Bulut et al., 2024; Moura et al., 2025).

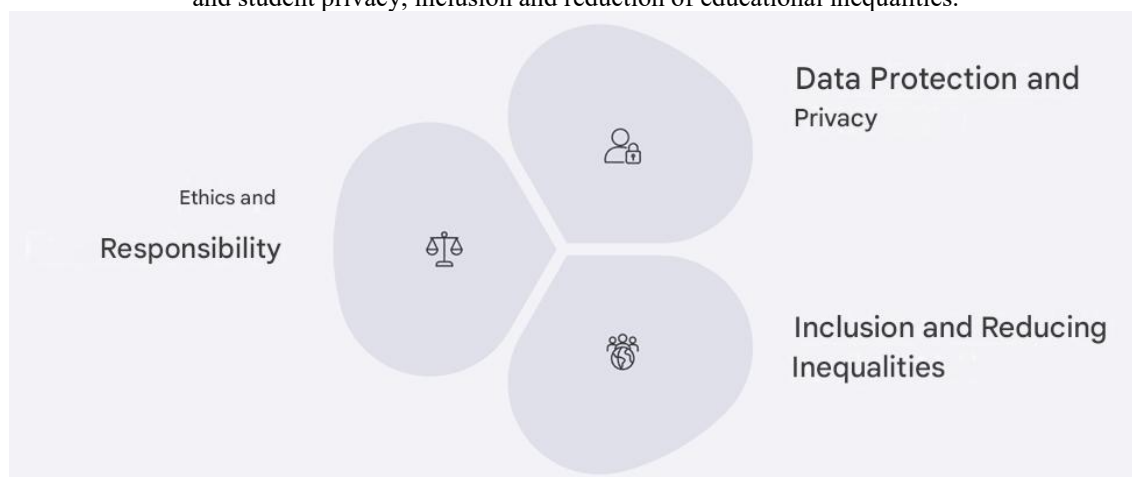
This evidence supports the proposition of a responsive and feasible training model that articulates technical knowledge, ethical reflection, and a commitment to socio-technical inclusion, integrating pedagogical uses of AI, data protection, and fairer, more contextualized educational practices (Silva, 2022; Bulut et al., 2024). The investigation

was developed within the scope of the PRAPETEC research group, linked to the Graduate Program in Education at PUCPR, with the participation of nine master's and doctoral students from different areas, all working as teachers or educational coordinators, characterizing a context of high academic specialization and continuous dialogue with topics of technology, ethics, and educational policies.

Data production took place through an online questionnaire, with characterization questions and open questions focused on ethics in the use of AI, data protection, and the promotion of educational inclusion. The answers were treated through descriptive synthesis and thematic analysis, organized into three main axes: ethics and responsibility in the use of AI, data protection and student privacy, and the potential of AI for inclusion and reduction of educational inequalities.

The analysis was organized into three central axes. The first, ethics and responsibility in the use of AI in education, brings together the participants' understandings of the limits, risks, and pedagogical criteria for the adoption of AI, including concerns about algorithmic biases, transparency of automated decisions, and the role of the teacher as a critical mediator of these technologies. The second axis, data protection and student privacy, contemplates the conceptions of information security, consent, storage, and circulation of personal data in digital environments, as well as the necessary care to ensure the use of AI in accordance with current legislation. The third axis, inclusion and reduction of educational inequalities, addresses perceptions about the potential of AI to expand access to educational resources, support students with specific needs, and mitigate historical inequalities, without ignoring the risks of deepening exclusions resulting from unequal access to technologies. The relationship between these three axes is presented in an integrated way in Figure 1.

Figure 1 – Analytical axes of the research: ethics and responsibility in the use of AI in education, data protection and student privacy, inclusion and reduction of educational inequalities.



Source: survey data (2025).

In each analytical axis, convergences and tensions present in the answers will be examined, with emphasis on representative excerpts from the participants' speeches, which highlight recurring concerns, such as the demand for ethical guidance for students who are already intensive users of AI tools, the relevance of transparency, informed consent and compliance with current legislation, as well as expectations related to the potential of AI for the personalization of learning and for supporting inclusion in public basic education.

The analysis intends, in this way, to articulate the perceptions of the members of PRAPETEC with the theoretical and normative framework previously presented, indicating to what extent such perceptions confirm, tension or expand the debates on ethics, data protection and teacher training for the critical use of artificial intelligence in education.

RESULTS

The responses of the nine participants of the PRAPETEC research group reveal a critical and consistent understanding of the use of Artificial Intelligence in education, especially in the ethical, data protection and promotion of inclusion aspects. The perceptions were organized into three central axes, presented in Figure 1 — Analytical axes of the research: ethics and responsibility in the use of AI in education; data protection and student privacy; and inclusion and reduction of educational inequalities.

When reflecting on the consideration of ethics in the implementation of AI technologies in educational practices, the participants emphasize that ethical commitment must precede any technological decision, guiding criteria, uses, and pedagogical purposes. It is important to highlight the understanding that ethics is not an accessory element, but

the structuring principle that should guide the design, adoption, and use of AI tools in the school context, as illustrated by one of the respondents:

"Ethics must be present in all human areas, especially in education. When implementing AI as a pedagogical tool, it is essential to ensure that it promotes humane and inclusive values. Thus, before technology, ethical commitment must come." (D2)

This understanding is articulated with other statements that associate ethics with responsibility, the bases of social values, and the need to respect students' rights:

"Ethics must be considered in the implementation of Artificial Intelligence (AI) technologies in educational practices in a careful, responsible, and principled manner that ensures respect for students' rights, privacy, equity, and transparency." (D6)

"Ethics guides the use of AI in education by ensuring that technologies are transparent, inclusive, fair, and pedagogically grounded, preserving the rights of students and valuing the role of educators. Therefore, it demands continuous reflection, critical training of professionals, and attention to the social impacts of these technologies in the context of knowledge with scientific." (D8)

The new respondent also emphasizes the centrality of ethics, bringing it closer to justice and responsibility in the use of technologies:

"Ethics must be considered in the implementation of AI in education to ensure that the technology benefits students fairly and responsibly. Issues such as transparency in the use of AI and respect for authorship are relevant." (D9)

In addition to this broader dimension, the answers bring ethics and teacher responsibility closer to the massive use of AI by students. One of the participants draws attention to the urgency of pedagogical mediation, stating that it is necessary to invest in guidance and reflection with students:

"Guidance to students, who are already using it massively and have little responsibility or notion of the consequences of its inappropriate use". (D1)

Other responses condense this stance in terms of responsibility, ethics, and equity, suggesting that the use of AI needs to be anchored in social values and commitments to the common good:

"With the bases of social values". (D3)

"Responsibility, ethics, and equity." (D4)

In another contribution, it is reinforced that the implementation of AI in educational practices must be guided by ethical principles that ensure data protection, respect for privacy, equity in access, and correct use of digital tools, avoiding the reproduction of injustices:

"The implementation of AI technologies in educational practices, I think, should be guided by ethical principles that ensure the protection of personal data, respect for privacy, equity in access, and the correct use of digital tools. It is essential that AI not reproduce inequalities or discriminatory biases, but rather act as an ally in promoting a more inclusive and personalized education. It is also important that the use of AI is aligned with clear pedagogical purposes, respecting the autonomy of teachers and students, with transparency in the algorithms and criteria used by the systems". (D5)

With regard to data protection and student privacy, the participants converge in the defense of transparency, informed consent, and security in the processing of information. One of the statements emphasizes the importance of explaining how the data will be used, of collecting only what is strictly necessary, and of aligning practices with current legislation, especially the LGPD:

"It is essential to ensure transparency in the use of AI, with informed consent from those responsible and explanation of how the data will be used. Only what is necessary must be collected, protecting the information safely and confidentially. Everything must follow current legislation and ethical principles." (D2)

Another professor complements by stating that it is necessary to articulate informed consent, compliance with legislation and high safety standards:

"It is essential to ensure informed consent, follow the LGPD, collect only the necessary data, maintain high security standards, be transparent about the operation of the algorithms, and avoid improper sharing with third parties." (D5)

Transparency is also articulated with the right to know what criteria and information are used by AI systems. In one of the answers, this is expressed in the need to make the criteria visible and to obtain consent from those involved:

"In a transparent way, making available the information and criteria used and with the consent of those involved on the information and data used. (D7)

The speeches also highlight the importance of more robust institutional procedures to ensure data protection. One of the participants systematizes the precautions considered essential to protect data and ensure student privacy in the use of AI:

"To protect data and ensure student privacy in the use of AI, it is essential to: obtain informed consent from guardians; collect only necessary data; ensure secure storage and protection against leaks; adopt clear privacy policies." (D6)

Another suggests the creation of protocols that delimit purposes and avoid undue exposure:

"Have formal protocols on the non-use of data for purposes other than educational purposes and on the non-disclosure of all the information of those involved". (D7)

In summary, one of the statements seeks to articulate the technical, legal and pedagogical dimensions involved in data protection:

"Protecting student data and privacy when using AI means combining technical security, transparency, legal responsibility, and pedagogical ethics. It is ensuring that technology contributes to education without violating rights, exposing sensitive information, or creating risks to students' digital lives." (D8)

The new respondent reinforces the need for caution in the face of the power asymmetry of big techs and the uncertainties related to data storage and processing:

"Transparency and governance regarding the storage and processing of data generated by the use of Artificial Intelligence (AI) systems by big techs remain areas of uncertainty. Therefore, it is imperative to redouble caution in the use of these technologies, ensuring strict respect for sensitive data and private information, in accordance with current regulations, such as the General Data Protection Law (LGPD)". (D9)

At the same time, concerns arise about the difficulty of control in highly digitized contexts, as well as the need for accountability in cases of inappropriate use:

"We won't have much to control if they are in many places." (D3)
"Constant monitoring, rules and, if necessary, legal punishments. If there is no common sense in the use, it is necessary to have consequences for misuse." (D1)

Regarding the potential of AI to promote inclusion and reduce educational inequalities, the statements express both the recognition of possibilities and the warning

about risks. One of the main potentialities pointed out concerns the personalization of learning:

"The responsible use of AI can promote inclusion by offering adaptive learning, respecting the pace, characteristics and needs of each student. This allows everyone to advance in a personalized way, reducing inequalities and expanding educational opportunities". (D2)

In a similar vein, another participant notes that AI can favor the development of personalized resources, capable of meeting different learning needs:

"Enabling the development of personalized resources that meet the different learning needs of students, for example." (D5)

The responses also associate inclusion with expanded access and the provision of more accessible guidance:

"For education, for more accessible means of guidance". (D1)
"Providing access to all". (D3)

Some contributions situate AI-mediated inclusion in the scope of structured policies and actions, especially aimed at public schools:

"Promoting programs and actions, with the use of AI, as support for teachers and students in public schools, monitored by teams of teachers with mastery and experience in the use of AI in basic education. But also, with continued training for user teachers, focusing on the use of AI in the classroom and on the teacher's pedagogical planning". (D7)

Another statement reinforces that AI can be an important ally in reducing inequalities, as long as it is guided by ethical, pedagogical and social principles:

"The responsible use of Artificial Intelligence can become an important ally in promoting inclusion and reducing educational inequalities, as long as it is guided by ethical, pedagogical and social principles. This means using technology to expand opportunities and not reinforce existing exclusions." (D8)

The new respondent adds important layers to this discussion, by highlighting both personalization and support for the management of teaching time:

"Artificial Intelligence (AI) tools represent a strategic support for the educational environment, enabling the creation of solutions that aim to optimize the

management of teaching time, facilitating the reduction of the impacts of administrative and bureaucratic work. Additionally, a great differential of AI lies in the personalization of the teaching-learning process. This ability allows recognizing the uniqueness of each student, adapting the training path and creating personalized routes for them to achieve their goals. Such innovations must always be guided by the attentive, affectionate, and human eye of their teachers, ensuring that technology serves as an instrument of pedagogical enhancement and not a replacement for the teacher-student relationship." (D9)

While recognizing such potential, the participants warn that AI can accentuate inequalities if it is implemented uncritically or disconnected from an educational policy committed to social justice:

It is essential that AI does not reproduce inequalities or discriminatory biases, but that it acts as an ally in promoting a more inclusive and personalized education. (D5)

For this to happen, it is essential that the use of AI is aligned with ethics, data protection, teacher training, and an educational policy committed to social justice, preventing technology from reproducing or expanding inequalities. (D6)

In an integrated way, the results indicate that the participants of this research understand the use of AI in education from a horizon that articulates ethics, rights, care with data and social justice. The statements reveal the awareness that technology can both expand opportunities and deepen inequalities, depending on the conditions of implementation, the protections guaranteed to students and the critical training of teachers. In this sense, the three axes highlighted in Figure 1 synthesize a complex and situated understanding, which can guide formative proposals and pedagogical practices committed to the responsible and humanizing use of Artificial Intelligence in education.

FINAL CONSIDERATIONS

Analysis of the nine participants' responses reveals that, in the realm of academic training and research, discussions about AI in education extend beyond purely technicist views. Instead, they encompass ethical, political, and pedagogical considerations. Participants see AI as a socio-technical artifact involving value judgments, responsibilities, and effects on school practices, along with a commitment to social justice—not merely a tool for automation or efficiency.

The findings are structured around three interconnected areas: ethics and responsibility, data protection and privacy, and inclusion and efforts to reduce educational inequalities. Statements indicate that AI use is never neutral; its adoption raises ethical dilemmas, privacy risks, and potential impacts on existing inequalities. Ethics serve as a

foundation guiding the purposes, criteria, limits, and responsibilities associated with educational technology.

There is a strong concern with data protection, in line with the LGPD and international debates, highlighting the need for transparency, informed consent, and institutional protocols that articulate technical security, legal responsibility, and pedagogical ethics. In the inclusion axis, participants recognize the potential of AI to personalize learning and support public networks, but warn that, without equitable policies, adequate infrastructure, critical teacher training, and clear ethical guidelines, technology can reproduce or intensify inequalities.

From a formative perspective, the findings reinforce the importance of continuing education proposals that integrate the conceptual, ethical, technical, and political dimensions of AI. Although the highly specialized profile of the group limits the generalization of the results, the study offers relevant subsidies for teacher training programs and institutional policies, by evidencing the demand for ethical criteria, safety in the use of data, and conditions for AI to act as an ally of an educational project committed to the rights, dignity, and learning of all students.

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INTRODUCTION

Entrepreneurial education is often limited to teaching business creation, business plans, and market-focused content. This view is quite narrow, especially when applied to childhood education. Within a school setting, entrepreneurship can be more meaningfully understood as fostering initiative, creativity, cooperation, autonomy, and the ability to turn ideas into actions that hold personal, social, and cultural significance. This broader approach aligns with educational goals beyond merely preparing students for the business world (Bacigalupo et al., 2016; Lackéus, 2015).

In the Lusophone context, this conceptual expansion finds support on two fronts. The first is political-curricular, expressed in the Education for Entrepreneurship Framework, which brings together the theme of citizenship, participation, life project, and transversal skills (Directorate-General for Education, DGE, 2024). The second is pedagogical, supported by authors and programs that treat entrepreneurship as human formation, emphasizing attitudes, values, socio-emotional skills, and active methodologies, rather than an approach centered on market performance (Jardim, 2021; Lopes, 2010).

This chapter adopts this expanded perspective and discusses entrepreneurial pedagogy in childhood in Portugal from a theoretical-analytical review of curricular documents, specialized literature, and educational programs. The problem that organizes the discussion can be formulated as follows: how to sustain an entrepreneurial pedagogy in childhood, within a school context, beyond business logic, with conceptual rigor, methodological prudence, and usefulness for teaching practice? The question is necessary because the term "entrepreneurship" circulates across different fields and, without delimitation, can oscillate between incompatible meanings.

The gap faced by the text lies in the articulation between three analytical planes that do not always appear integrated in publications in the field. The first is conceptual, linked to the definition of entrepreneurship and entrepreneurial education. The second is pedagogical, which involves the translation of these meanings into experiences compatible

with child development, with attention to playfulness, teacher mediation, and progression by age group. The third is methodological, in which types of evidence, pedagogical mechanisms, and generalization limits are discussed, avoiding strong causal extrapolations from heterogeneous sources.

The argumentative path of the chapter was organized to favor academic reading and pedagogical utility. After this introduction, Section 2 delimits the field and shows why the notion of value creation in a broad sense is decisive to avoid reductionism. Section 3 explains the conceptual bases of entrepreneurial pedagogy in childhood, with emphasis on the contribution of Jacinto Jardim and the dialogue with EntreComp and with the Portuguese references. Section 4 presents the methodological note and the corpus of analysis. Next, Sections 5 and 6 examine programs, practices, and evidence, differentiating the description of initiatives, pedagogical mechanisms, and generalization limits. Sections 7 and 8 deal, respectively, with implementation challenges and implications for teaching in basic education, and Section 9 resumes the central points in the form of a critical synthesis. This organization seeks to respond to a recurring demand of the scientific community and teachers: to understand not only what is said about entrepreneurial education, but based on which concepts, which practices and under what conditions of validity.

The thesis defended is that entrepreneurial education in childhood can be treated as a pedagogy of human, social and citizen development, as long as it operates with value creation in an expanded sense and maintains explicit conditions of pedagogical quality. Among these conditions, qualified teacher mediation, curricular integration, progression by age group, process-oriented evaluation and ethical centrality of the question about what and for whom value is created stand out (Bacigalupo et al., 2016; DGE, 2024; Jardim, 2021). In this key, the theme ceases to represent an uncritical import of business repertoires and starts to dialogue with formative purposes recognized by the school.

The general objective is to analyze entrepreneurial pedagogy in childhood in Portugal and to explain the displacement of entrepreneurial education beyond business logic, systematizing conceptual bases of entrepreneurial pedagogy, broadening the reading of Portuguese programs and practices, qualifying the discussion of contributions and evidence, examining challenges for implementation and research, and translating the findings into didactic implications for basic education.

It is a text of a theoretical-analytical nature and critical systematization, without unpublished field data, elaborated from the article by Pinho and Jardim (2025), the works

of Jacinto Jardim, the DGE Referential and national and international literature. The expected contribution is twofold: to offer a conceptual and methodological synthesis useful to the scientific community and, at the same time, intelligible parameters for professors who wish to work on the theme rigorously.

ENTREPRENEURIAL EDUCATION IN A PERSPECTIVE THAT EXCEEDS BUSINESS LOGIC

A more mature academic reading of entrepreneurial education requires shifting the axis of the discussion. Instead of asking only how to train future entrepreneurs, the educational question becomes how to develop, from an early age, skills to identify problems, imagine solutions, mobilize resources, and act responsibly. This shift brings entrepreneurship closer to classic themes of education, such as protagonism, life project, intellectual autonomy, and social participation.

Lopes (2010) already pointed out that entrepreneurial education goes beyond the functional areas of a business and requires a broader understanding of the subject and society. This formulation helps to prevent the school from treating the theme as a mere anticipation of the corporate world. In pedagogical terms, it is a field that dialogues with citizenship education, human development and social innovation.

At the international level, EntreComp has consolidated this approach by defining entrepreneurship as the ability to act on opportunities and ideas to create value, and this value can be economic, social, cultural, or personal (Bacigalupo et al., 2016). For the school, this framework is especially useful because it legitimizes practices aimed at creativity, collaboration, initiative, perseverance, and ethical awareness, even when there is no objective of creating a company.

The literature also reinforces that entrepreneurial learning is more consistent when it involves active, contextualized, and problem-oriented experiences. In other words, entrepreneurial initiative and action are learned through intentional practices, projects, and mediations, and not only through abstract definitions (Jardim et al., 2021; Lackéus, 2015; Saptono et al., 2021). In childhood, this principle is even more important because playing, experimenting, and interacting are structuring dimensions of development.

A rigorous reading of entrepreneurial education needs to recognize the field's heterogeneity. There are approaches oriented to the creation of companies, approaches centered on transversal skills, proposals for social entrepreneurship, financial education programs, and experiences of pedagogical innovation that use the vocabulary of

entrepreneurship. The scientific question is not to choose an abstract, universal definition, but to explain the approach adopted and justify its adequacy for the school context.

In this chapter, the delimitation is pedagogical. Entrepreneurship is understood as the ability to transform ideas into actions that create value in a broad sense, and entrepreneurial education is treated as a training process that develops skills, attitudes, and values to act on problems and opportunities in an ethically oriented way. This approach is compatible with EntreComp and with the literature that dialogues with the field of Education (Bacigalupo et al., 2016; Lackéus, 2015; Lopes, 2010).

This delimitation is also important to avoid a frequent misconception: to suppose that displacing entrepreneurial education beyond business logic means eliminating the dimension of action and planning. The proposed movement is different. Instead of eliminating action, it redefines its formative meaning. Entrepreneurial action in childhood is now read as an experience of authorship, cooperation, responsibility and situated intervention, and not as an early rehearsal of market performance.

The notion of value creation in a broader sense is the axis that best translates entrepreneurial education into the school context. In terms of personal value, entrepreneurial action can be worked on in situations that strengthen self-knowledge, self-confidence, and a perception of agency, such as planned interventions in which the child follows what he or she has accomplished, at what points he or she needed help, and what he or she learned along the way (Jardim, 2021; Saptono et al., 2021). In terms of social value, the focus is on cooperation, empathy, and co-responsibility, for example in coexistence projects built collectively, with agreements, visual materials, and moments of listening that transform the initiative into relational learning (Bacigalupo et al., 2016; DGE, 2024).

In terms of cultural value, the creation of value can appear in experiences of expression and belonging, such as when children transform community stories into narratives, dramatizations, exhibitions, or actions to preserve school memory (Martins et al., 2017; Pinho & Jardim, 2025). In terms of environmental value, entrepreneurial education can guide challenges of caring for the territory, with investigation and testing of solutions to issues such as waste, water, and the use of common spaces, articulating initiative and daily responsibility (DGE, 2024; Lackéus, 2015).

Economic value can also be worked on in childhood, as long as it is in an introductory and contextualized key. In this case, financial education proposals contribute to planning, choices and responsible use of resources, without converting the school into a

competitive training space for the market. The evaluation criterion remains pedagogical: the formative meaning of the action and its impact on children's development are of interest, and not commercial results (Fundação António Cupertino de Miranda, 2009; Pinho & Jardim, 2025).

A methodological consequence of this framing is that the instruments of analysis and evaluation also need to be compatible with the plurality of values at stake. When the school observes only final products or individual performance, it loses sight of central dimensions of entrepreneurial pedagogy, such as the quality of cooperation, group decision-making, the ability to review, and responsibility for the effects of action. For researchers and educators, this implies building observation protocols and rubrics that articulate personal, social, cognitive, and ethical dimensions, rather than transplanting metrics designed for adult entrepreneurship. This caution is particularly important in childhood, where participation, language, emotional regulation, and authorship develop in a relational and situated way.

The conceptual expansion of entrepreneurial education does not automatically eliminate the risks of instrumentalization. A school can use the language of entrepreneurship to reinforce competition, individualism, and productivity without ethical reflection. It can also adopt the vocabulary of innovation only as a discursive ornament, without altering teaching or evaluation practices. These risks make a methodologically oriented reading of the theme even more necessary.

To avoid instrumentalization, implementation needs to operate with explicitly pedagogical quality criteria. The first is intentionality: entrepreneurial activities require clear formative objectives, didactic sequence, language mediation, and procedural monitoring, especially in childhood, when the teacher is decisive in transforming curiosity into investigation and action into learning (Jardim, 2021; Jardim et al., 2023). The second is curricular integration, as the proposal tends to gain consistency when it spans areas such as language, mathematics, science, arts, and citizenship, rather than remaining isolated (DGE, 2024; Martins et al., 2017).

The third criterion is process-oriented evaluation, with records, observations, portfolios, and rubrics that can capture the development of autonomy, collaboration, and creativity along the way (Jardim, 2021; Paños-Castro et al., 2022). The fourth is ethical and citizen centrality, synthesized in the question about what and for whom value is created, which shifts the focus from individual performance to collective responsibility (Bacigalupo et al., 2016; DGE, 2024).

Translating entrepreneurial education for childhood, in this context, implies assuming a relational notion of competence. Capacities are not treated as fixed attributes, but as competences in formation, manifested in concrete situations of participation and mediated action. This translation is also linguistic: when presented in pedagogical categories such as project, investigation, authorship, coexistence and citizenship, the proposal tends to be recognized by the school as a legitimate formative practice, and not as an external agenda.

CONCEPTUAL BASES OF ENTREPRENEURIAL PEDAGOGY IN CHILDHOOD

In the corpus analyzed, Jacinto Jardim's formulation offers a conceptual basis for thinking about entrepreneurial education in school. In the Dictionary of Entrepreneurship (Jardim, 2022), entrepreneurial pedagogy is presented as an educational theory and practice in a school context, of a playful and intentional nature, centered on the development of entrepreneurial skills and the design of life and intervention projects.

The definition proposed by Jardim is relevant because it explicitly situates entrepreneurial pedagogy in the pedagogical field, recognizes playfulness as a methodological principle, and articulates the development of competencies with a formative sense. In this same framework, the notion of dream pedagogy expands the scope of the proposal by shifting the focus from a pedagogy centered only on external goals to a pedagogy that helps children and young people to imagine desirable futures, recognize talents, name desires, and transform aspirations into paths of oriented action (Jardim, 2021, 2022).

In educational terms, the dream ceases to be a fantasy disconnected from reality and becomes an engine of learning, self-regulation, and a life project. This perspective dialogues directly with the Entrepreneurship Education Framework, which brings entrepreneurship closer to citizenship, development, and integral training (DGE, 2024).

Jardim's contribution is relevant because it replaces entrepreneurship within a pedagogical grammar. By defining entrepreneurial pedagogy as educational theory and practice in a school context that is playful and intentional, the author moves the discussion away from the exclusive domain of management and reinserts it into the domain of training. This conceptual shift is one of the most solid bases for addressing entrepreneurial education in childhood without resorting to reductionism (Jardim, 2021, 2022).

From an academic point of view, this formulation offers at least three gains. First, it defines an identifiable pedagogical object: school practices intentionally oriented to the development of entrepreneurial skills. Second, it explains methodological principles, with emphasis on playfulness and teacher mediation. Third, it introduces a teleological dimension, as it links pedagogical work to life projects, intervention, and value creation. This set makes the proposal analyzable in terms of curriculum, didactics, and evaluation.

The consistency of this conceptual basis also depends on avoiding two interpretative extremes. The first is to transform entrepreneurial pedagogy into a motivational repertoire without a curricular link. The second is to convert it into a technique of school management detached from childhood. The reading of Jardim's works, when articulated with Portuguese educational references, allows us to escape both extremes, as it sustains a pedagogy of accompanied authorship, in which imagination, project, and intervention are linked to teacher mediation and the development of competences in context.

The emphasis on playfulness does not mean the absence of rigor. In the context of childhood, playfulness is a methodological condition for meaningful learning. Play, exploration, imagination, and experimentation are ways of knowing and acting that structure child development. When entrepreneurial pedagogy adopts this principle, it adopts a didactic approach to guided experimentation, in which the teacher creates challenging situations and follows the course of the class.

Pedagogical intentionality complements playfulness. Without intentionality, creative activities can become episodic and poorly articulated with the curriculum. With intentionality, the teacher defines formative objectives, explains competencies in focus, organizes work stages, and monitors how each child participates, cooperates, decides, and reviews their actions. This combination is central to the proposals analyzed in Jardim (2021) and reappears in Pinho and Jardim's (2025) discussions on programs for primary education.

Another important conceptual element is progression by age group. The literature and materials analyzed show that entrepreneurial education in childhood should not adopt a single model for all ages. On the contrary, progression organizes the curriculum according to the development of children, adjusting language, complexity of tasks, degree of autonomy and type of mediation. This point, apparently operational, is actually an indicator of pedagogical coherence.

The notion of dream pedagogy, mobilized in Jardim's work, expands the formative reach of entrepreneurial pedagogy. It shifts entrepreneurial education from a pedagogy

focused only on productivity and external goals to a pedagogy that helps children and young people to imagine desirable futures, recognize talents, name desires, and build paths of action. In the field of Education, this dialogues directly with discussions about the meaning of learning, life project, and integral development (Jardim, 2021, 2022).

It is important to avoid a misunderstanding at this point. Working on dreams does not mean operating with fantasy disconnected from reality. In the analyzed framework, the dream functions as a horizon of mobilization and as a pedagogical language to connect desire, planning and action. Teacher mediation plays a central role in transforming diffuse aspirations into situated learning experiences, with tasks, decisions, cooperation and evaluation. The pedagogy of dreams can be read as a pedagogical technology of authorship and commitment. For children, this proposal is particularly fertile because it respects the way children articulate imagination and experience. By inviting the class to dream, plan, experiment and review, the school does not abandon the curriculum. It creates conditions for the curriculum to be experienced as a field of action and production of meaning. This movement brings entrepreneurial pedagogy closer to active methodologies, but with its own mark: the explicitness of value creation and the ethical intentionality of action.

The dialogue between Jardim's formulation and EntreComp is analytically productive. While EntreComp offers a broad conceptual architecture to understand entrepreneurship as value creation, entrepreneurial pedagogy provides a pedagogical translation closer to school and classroom practices. The combination of these frameworks helps the researcher to operate at two levels: a macro level, of defining competencies and categories, and a meso level, of didactic design and mediation (Bacigalupo et al., 2016; Jardim, 2021).

In the Portuguese context, this dialogue is strengthened by the Entrepreneurship Education Framework and the Profile of Students Leaving Compulsory Education. These documents do not treat entrepreneurship as a content separate from the curriculum, but as a transversal dimension linked to citizenship, development, and integral training. This approximation is decisive for the school legitimacy of the theme, as it allows entrepreneurial education to be planned in line with institutionally recognized formative purposes (DGE, 2024; Martins et al., 2017).

The convergence between these frameworks also offers a methodological advantage for research. When pedagogical objectives, curriculum documents, and school programs share close categories, it becomes more feasible to construct analysis instruments, rubrics, and follow-up protocols. In terms of academic rigor, this convergence reduces ambiguities

and favors comparisons between studies if researchers maintain clarity about the cut, age group, and context of implementation.

A consistent conceptual basis for entrepreneurial pedagogy in childhood needs to make the role of the teacher explicit. In some superficial interpretations, entrepreneurial education is presented as a pedagogy of spontaneity, in which the child only 'does projects'. The sources analyzed point in another direction. Teacher mediation organizes the environment, defines challenges, offers language, regulates time, supports cooperation, and helps the class transform experiences into reflected learning (Jardim, 2021; Jardim et al., 2023).

This role of the teacher brings entrepreneurial pedagogy closer to teaching of high complexity. It is not enough to propose creative activities. It is necessary to observe processes, formulate questions, intervene without removing the child's authorship, sustain a climate of trust, negotiate conflicts and build learning records. Therefore, teacher training and pedagogical monitoring are not accessory components of the proposal. They are part of their own conceptual definition.

METHODOLOGICAL NOTE AND CORPUS OF ANALYSIS

This study assumes a theoretical-analytical review design based on reference documents and literature. The corpus was composed of: (a) the article published in the Annals of CIEECI 2025 on entrepreneurial education in primary education in Portugal (Pinho & Jardim, 2025); (b) works by Jacinto Jardim, including the Global Manual of Education for Entrepreneurship and the 365+ Dictionary of Entrepreneurship; (c) the DGE Entrepreneurship Education Framework; and (d) national and international supporting literature on entrepreneurial education and entrepreneurial skills.

The strategy combined conceptual analysis, synthesis of programs and critical articulation with the literature. It is important to explain the scope of this proposal. The chapter does not present the results of original field research nor does it intend to replace impact evaluation studies. What is offered here is an analytical synthesis guided by references and documented experiences, with the potential to support future research and pedagogical practices.

PROGRAMS AND PRACTICES OF ENTREPRENEURIAL EDUCATION IN CHILDHOOD IN PORTUGAL

A central contribution of the analyzed material is the description of structured programs for different age groups. In the Global Manual of Education for Entrepreneurship, Jardim (2021) presents a progressive itinerary that goes from pre-school to higher education, with specific proposals for each stage. This design is pedagogically relevant because it avoids applying the same model to very different ages and needs.

For childhood, three programs organized in sequence stand out. In pre-school (4-5 years old), the Pirates of Dreams program works on life skills in a playful and mediated way. In the 1st and 2nd years of primary school, the Dream Explorers program (2018) proposes a path of discovery with an emphasis on self-knowledge, confidence and initiative. In the 3rd and 4th years, the Dream Toys program (2016) deepens intra and interpersonal skills, participation and action in projects, maintaining playfulness as a methodological axis (Jardim, 2021).

The strength of this design lies in the progression. Instead of anticipating formal management content, the programs start from questions that are educationally pertinent to childhood: who I am, what I like, how I live, how I take care of them, how do I collaborate, how do I transform an idea into action. In curricular terms, this favors continuity, coherence and adequacy to the children's development.

Another relevant element is teacher preparation. The manual recommends training in a workshop format, with a structured workload, and provides for monitoring in the transition from training to practice, including monitoring implementation (Jardim, 2021). This point is decisive, because the quality of the teacher's mediation conditions the consistency of entrepreneurial education in the classroom.

More than the PEEC described by Jardim (2021), the article by Pinho and Jardim (2025) systematizes complementary initiatives in Portuguese primary education and highlights a broader ecosystem of entrepreneurial education. Among the references cited are Junior Achievement Portugal programs, GesEntrepreneur actions, and financial education initiatives such as No Poupança Está o Ganho!, by the António Cupertino de Miranda Foundation. Although they have different formats, these experiences converge in valuing active learning, connection to daily life, and community participation (António Cupertino de Miranda Foundation, 2009; GesEntrepreneur, n.d.; Junior Achievement Portugal, 2024a, 2024b; Pinho & Jardim, 2025).

The literature analyzed indicates that entrepreneurial education in childhood in Portugal is not limited to isolated initiatives. There is an ecosystem of programs and materials that, although heterogeneous, share the appreciation of transversal skills, active learning, and connection with children's daily lives. From a curricular perspective, this finding is relevant because it suggests that the theme can be treated as a pedagogical culture rather than just a one-off event (Jardim, 2021; Pinho & Jardim, 2025).

The progressive design presented in the Global Manual of Education for Entrepreneurship deserves special mention. By organizing proposals by stage of schooling, the manual avoids a common problem in pedagogical innovation programs: applying the same model across very different ages and contexts. In childhood, progression is not a technical detail. It is a condition for pedagogical adequacy, as it regulates language, complexity, autonomy, and mediation (Jardim, 2021).

Among the programs described by Jardim (2021), Piratas dos Sonhos exemplifies the adaptation of entrepreneurial pedagogy to pre-school (ages 4-5). The focus is on life skills, self-discovery, and first experiences of shared action, with strong adult mediation. In methodological terms, narratives, symbolic games, cooperation routines, and small guided decisions create a safe environment for the child to experience initiative without losing the centrality of playfulness and pedagogical protection.

In the 1st and 2nd years of primary school, Dream Explorers (2018) expands self-knowledge, confidence and initiative in paths of discovery with activities that combine guided exploration, simple recording, group dialogue and short stages of planning and execution. In the 3rd and 4th years, Dream Toys (2016) deepens intra and interpersonal skills, cooperation and participation in projects with greater density, making the articulation between initiative, responsibility and impact on the group more visible. In both cases, progression appears in the adjustment of the complexity of the tasks and in the gradual increase of the children's authorship, without breaking with the playful language.

Taken together, these programs begin with pedagogical questions rather than business content. The axis falls on who I am, what I can do with others, how I plan an action, how I take care of what is common, and how I transform an idea into a concrete experience. This inversion of the starting point is one reason the Sonhos line of programs is especially fruitful for the academic debate on entrepreneurial education in childhood.

The material analyzed also highlights that entrepreneurial education programs are not based only on manuals or ready-made activities. The quality of implementation depends on teacher training and pedagogical monitoring. In Jardim's manual (2021), the

recommendation for training workshops and for monitoring the transition from training to practice makes explicit a consistent understanding of educational change: teachers need to understand the fundamentals, experiment with methodologies, and receive support in their use in real contexts.

This point has great weight for research and school management. Many program evaluations tend to focus on results observed in children, but underestimate implementation variables, such as time available, coordination support, materials, school culture, and pedagogical safety of the teacher. By making teacher training explicit as a component of the program, the sources analyzed offer a relevant methodological clue for future studies and dissemination policies.

Without limiting the line of programs described by Jardim, the Portuguese scenario analyzed by Pinho and Jardim (2025) includes initiatives by Junior Achievement Portugal, GesEntrepreneur and the financial education program *No Poupança Está o Ganho!*, by the António Cupertino de Miranda Foundation. Although they have different formats, these experiences converge in active learning, contextualization and connection with the children's daily lives. From an analytical point of view, Junior Achievement Portugal highlights diversified formats of projects and workshops articulated with schools; GesEntrepreneur reinforces the importance of adapting language and materials to the 1st cycle; and the financial literacy program expands the dimension of planning and responsible decision when integrated in a critical and contextualized way (Fundação António Cupertino de Miranda, 2009; GesEntrepreneur, n.d.; Junior Achievement Portugal, 2024a, 2024b; Pinho & Jardim, 2025).

Going beyond the description of each program, the expansion of this section proposes a useful comparative reading grid for researchers and educators. Five dimensions seem particularly relevant: predominant training objective, adequacy of language to the age group, type of teacher mediation, degree of curricular integration, and ways of monitoring the process. This grid helps to compare programs without reducing them to a list of activities and can support both qualitative research and implementation studies.

In the objectives dimension, there is a strong convergence around socio-emotional competencies and soft skills, such as self-confidence, collaboration, initiative, and assertiveness. In the methodological dimension, convergence appears in the use of projects, challenges, playful materials, and participation situations. In the curricular dimension, differences in intensity and integration arise, indicating an important agenda for

investigation: to understand under what conditions entrepreneurial education becomes a transversal axis and when it remains a peripheral action.

For comparative research, the distinction between continuous programs and one-off initiatives is especially relevant. Continuous programs, with progression and follow-up, tend to produce better conditions for observing the development of competencies over time. One-off initiatives may have high motivational value and strong potential to raise awareness, but they require greater institutional effort to ensure continuity and integration into the pedagogical project. Without this distinction, evaluations end up comparing very different designs as if they were equivalent, thereby reducing analytical accuracy and hindering cumulative synthesis in the field.

It is also relevant to distinguish between programs that offer continuous pedagogical sequences and more punctual initiatives. Continuous programs tend to favor progression and more consistent monitoring of children's development. Specific initiatives may have high motivational and awareness-raising value but require greater effort from the school for continuity and integration into the pedagogical project. This distinction is central to the evaluation of results and to educational policy decisions.

The sources analyzed suggest that entrepreneurial education gains strength when it is perceived as a shared responsibility between school, family and community. This articulation does not mean outsourcing the curriculum, but expanding the field of meaning of school activities. When children investigate real problems in the environment, listen to different actors and give back to the community some form of action or product, learning becomes more situated and the notion of value creation becomes more concrete.

However, the participation of families and the community needs to be pedagogically mediated. The school remains responsible for the training objectives, the quality of interactions, and the protection of learning conditions. Without this mediation, the approach to the environment can result in excessive demands for execution, undue exposure, or a deviation from pedagogical intentionality. This balance between openness and regulation is one of the most sophisticated aspects of implementing entrepreneurial education programs in childhood.

PEDAGOGICAL CONTRIBUTIONS AND EVIDENCE

The literature and documents analyzed indicate that entrepreneurial education in childhood can make meaningful contributions when it is well-designed and integrated into the school's pedagogical project. Among the most consistent effects reported are the

strengthening of transversal skills, such as self-confidence, creativity, communication, collaboration, and perseverance, dimensions that dialogue directly with the integral education provided for in contemporary educational policies (Bacigalupo et al., 2016; DGE, 2024; Martins et al., 2017).

Entrepreneurial education practices tend to increase student engagement when activities are meaningful, contextualized, and allow authorship. Studies across different levels of education indicate positive effects on competencies, self-efficacy, and dispositions related to initiative, although the results vary with pedagogical design, intervention duration, and teacher training (Jardim et al., 2021; Paños-Castro et al., 2022; Saptono et al., 2021). In childhood, this finding needs to be interpreted with caution, because the central objective is not to orient early to the market, but to support human development and capacity for action.

In the Portuguese context, the set of programs described by Jardim (2021) and analyzed by Pinho and Jardim (2025) suggests an important trend: entrepreneurial education can be organized as a pedagogical culture, and not just as a one-off or extracurricular activity. This change increases the coherence of the proposal and its formative potential.

The work of Jardim et al. (2023), focused on the development, feasibility, and acceptability of a program for primary education centered on soft skills, reinforces this direction by treating entrepreneurial education with design and evaluation criteria. For the scientific community, this type of study is especially relevant because it shifts the debate from impressionistic reports to more robust models of implementation and analysis.

This section starts from a simple methodological principle: distinguishing plausible and recurrent contributions from strong causal statements. The sources analyzed, including Pinho and Jardim (2025), consistently point to pedagogical gains related to personal, social, and cognitive skills. However, the available studies do not always use the same research design, the same intervention time, or equivalent instruments. Therefore, the chapter works with the idea of converging trends rather than universal promises.

Among the most common contributions are strengthening self-confidence, self-knowledge, collaboration, communication, and assertiveness. These competencies appear across different programs and align with the logic of active learning, projects, and problem-solving described in the sources. In pedagogical terms, these are significant results because they directly affect the child's participation in the classroom and their relationship with learning (Jardim, 2021; Pinho & Jardim, 2025; Saptono et al., 2021).

Another important methodological point is the adequacy of the instruments to the specificities of childhood. Part of the international literature still resorts to indicators formulated for adolescents or adults, which may overestimate some dimensions and underestimate others. In childhood, entrepreneurial skills often emerge in brief, distributed, and mediated forms, such as a shared decision, an attempt at a solution, the ability to resume a task, or the negotiation of a conflict. This requires instruments sensitive to micro-evidence of participation and learning, combining qualitative records and explicit observation criteria.

In the intrapersonal dimension, the sources converge around self-confidence, self-regulation, and perception of the ability to act. When the child participates in cycles of imagining, planning, executing, and reviewing, he experiences of situated efficacy that can be observed in small decisions, in persistence in the face of difficulties, and in the willingness to try again (Jardim, 2021; Saptono et al., 2021). In the interpersonal dimension, cooperation, listening, negotiation, and shared responsibility stand out, since school entrepreneurial projects require a combination of tasks, conflict management, and recognition of the other's work, shifting the proposal from individualistic readings to a grammar of coexistence and citizenship (Bacigalupo et al., 2016; DGE, 2024; Pinho & Jardim, 2025).

In the cognitive dimension, well-mediated entrepreneurial education tends to favor problem-solving, planning, and creative thinking, by placing the child in front of challenges in which he needs to formulate hypotheses, test paths, and adjust decisions in dialogue with disciplinary content (Lackéus, 2015; Lopes, 2010; Paños-Castro et al., 2022). In the ethical and citizen dimension, the contribution appears in the reflection on the effects of action and in the creation of value for the collective, visible in projects of care for the class, the school, and the environment, in which initiative and responsibility go hand in hand (Bacigalupo et al., 2016; DGE, 2024).

There is also a relevant school and curricular dimension. When the proposal is connected to the curriculum and the daily life of the class, students tend to perceive greater meaning in learning, and the activity starts to function as an axis of integration between knowledge and skills, and not as an isolated task (Jardim, 2021; Martins et al., 2017; Pinho & Jardim, 2025). This point is particularly important for teachers who wish to work with active methodologies with curricular coherence.

The discussion of evidence becomes more consistent when one observes not only what improves, but how it improves. In the sources analyzed, some pedagogical

mechanisms appear recurrently and help explain the results attributed to entrepreneurial education. Among them are: contextualized challenges, project work, explicit teacher mediation, playful language, cooperation between peers, and moments of reflection on the process.

These mechanisms are relevant because they shift the discussion from the logic of the program as a 'package' to a logic of didactic principles. In other words, the pedagogical effect does not depend only on the name of the program adopted, but on the quality of the implementation of certain principles. For the research, this means that future studies need to observe implementation fidelity, contextual conditions, and actual mediation practices, rather than merely register formal adherence to a material or methodology.

Even when recognizing important contributions, it is necessary to make the limits of the evidence explicit. The studies and reports available vary in terms of duration, sample, focus of competencies and monitoring instruments. In many cases, there is a strong formative potential observed by teachers and researchers, but less standardization of metrics and comparative designs. This scenario does not invalidate the proposal, but requires prudence in the generalization of results.

Another caution concerns the relationship between intervention and context. The same proposal can produce different effects depending on school culture, teacher training, curricular time, management support, and family involvement. For this reason, a chapter with academic rigor needs to avoid the temptation to transform successful experiences into universal recipes. The advancement of the field depends on studies that articulate a dense description of the context and more comparable analysis instruments.

This methodological prudence, far from weakening entrepreneurial education, strengthens its scientific legitimacy. The more the field spells out limits, conditions, and mechanisms, the more capable it becomes of producing cumulative knowledge and supporting consistent policies and practices. In terms of scholarly publishing, this point is essential, because it distinguishes critical argumentation from promotional discourse.

CHALLENGES FOR IMPLEMENTATION AND RESEARCH

Despite the advances, the implementation of entrepreneurial education in childhood faces recurring challenges. The first is the risk of economic instrumentalization. Without conceptual mediation, the theme can be reduced to competition, productivity, or consumption. The analyzed references point to another path, centered on skills, citizenship,

and social value creation, but this requires theoretical clarity and continuous teacher training (Bacigalupo et al., 2016; Jardim, 2021; Lackéus, 2015).

The second challenge is curricular. Entrepreneurial education tends to work best when it is transversal and articulated across different areas, such as language, science, arts, and citizenship, rather than as isolated content. This requires pedagogical coordination, planning time, and assessment methods compatible with complex competencies that cannot always be captured by traditional instruments (DGE, 2024; Martins et al., 2017).

The third challenge is methodological, especially for researchers. There is still a need for longitudinal studies, mixed designs, and evaluations with greater robustness to understand medium and long-term effects, contextual mediations, and differences between programs. It is also necessary to advance the instruments for assessing entrepreneurial skills appropriate to childhood, avoiding the automatic transplantation of metrics designed for adults or higher education (Jardim et al., 2021; Paños-Castro et al., 2022).

Finally, there is the challenge of language. To gain school adherence, entrepreneurial education needs to be communicated in pedagogical terms. When the teacher understands that the proposal dialogues with integral training, inclusion, participation, life project, and active learning, the implementation tends to be more consistent. When the theme arrives only in business jargon, the educational potential is weakened.

One of the central challenges for the consolidation of entrepreneurial education in childhood is conceptual and pedagogical translation. As long as the term entrepreneurship is understood in school mainly as a synonym for business, some teachers and managers will tend to reject the theme or apply it defensively. Even when relevance is recognized, implementation can remain generic if examples of didactic sequences, evaluation criteria, and possible mediations are lacking. Therefore, support materials and teacher training need to combine conceptual foundations and applicability in school language (DGE, 2024; Lopes, 2010).

At the curricular level, the most frequent challenge is to prevent entrepreneurial education from being treated as a peripheral activity. When it appears only in thematic weeks or isolated events, it loses continuity and the ability to produce progressive development. Curricular integration requires planning time, coordination between teachers and reading the school's pedagogical project, elements that are not always available in institutional routines.

At the organizational level, the sustainability of the proposals depends on concrete conditions. Workload, material resources, management support, team stability, and articulation with families directly influence the quality of implementation. This aspect is particularly important for research, because results observed in contexts with high institutional support cannot be automatically generalized to schools in more restricted conditions.

For the scientific community, the methodological challenge is twofold. On the one hand, it is necessary to produce studies with greater comparability, which explain age group, duration of intervention, focused competencies and assessment instruments. On the other hand, it is necessary to preserve sensitivity to the context, avoiding designs that erase the complexity of school practices in the name of simplified metrics.

A promising agenda involves combining methods. Qualitative studies can describe teacher mediations, children's participation, and implementation conditions with analytical richness. Quantitative and quasi-experimental studies, when feasible, can contribute to comparing developmental trends in certain competencies. Mixed approaches seem particularly suitable for the field, because they allow for articulation

It is also necessary to include the ethical and equity dimension in the agenda of challenges. Entrepreneurial education runs the risk of reproducing inequalities when it presupposes repertoires, family resources, or conditions of participation that not all children have. A consistent approach needs to provide for inclusive mediations, diversity of languages, and appreciation of different forms of participation, so that entrepreneurial initiative is not confused with extroversion, cultural capital, or individual performance.

In the same way, the valorization of child autonomy cannot be used to shift pedagogical responsibilities to children. Autonomy in childhood is always accompanied autonomy. Recognizing this principle is fundamental to maintain ethical and pedagogical coherence in the implementation of entrepreneurial proposals.

IMPLICATIONS FOR BASIC EDUCATION TEACHERS

The analysis allows us to indicate some practical principles for teachers who want to work on entrepreneurial education in childhood without simplifications. The first is to start with clear training objectives, such as autonomy, cooperation, creativity, communication and responsibility, instead of starting with final products or events.

The second is to organize didactic sequences based on problems and age-appropriate projects. In childhood, entrepreneurial learning is strengthened in

environments of guided experimentation, with space to play, imagine, test, make mistakes, talk and redo. The role of the teacher is that of a mediator who gives structure to the process without removing the child's authorship.

The third is to integrate families and the community in a pedagogical way, and not just operationally. Programs that bring school and community closer together expand the repertoire, reinforce the social meaning of the activities and make learning more situated (Junior Achievement Portugal, 2024a, 2024b; Jardim, 2021).

Finally, evaluation needs to observe processes, and not just visible results. Participation records, portfolios, competency rubrics, mediated self-evaluation, and teacher observation are strategies that are more coherent with an entrepreneurial pedagogy focused on integral education.

An important practical implication is to start planning by defining pedagogical competencies and problems, and not by the name of a program. Questions such as what type of initiative one wants to develop, what class or school problem can be worked on, and what curricular knowledge can be mobilized help to build meaningful proposals and favor curricular integration. An especially useful didactic strategy is to organize sequences in short cycles of challenge identification, idea gathering, path choice, execution, observation of results, and review. Repeated at different scales throughout the year, this cycle makes the progression of the class visible and dialogues with the logic of entrepreneurial pedagogy described in the sources (Jardim, 2021; Pinho & Jardim, 2025).

In school contexts with higher teacher turnover or reduced planning time, a viable strategy is to start with small-scale projects, but with high quality documentation. Short sequences, well recorded and collectively discussed, allow the pedagogical team to learn from their own practice and build common criteria for mediation and evaluation. This incremental path tends to be more sustainable than the immediate adoption of complex programs without institutional conditions for follow-up.

The teacher acts as a mediator of the process, which requires fine didactic decisions. It is up to the teacher to formulate mobilizing questions, organize groups, distribute time, support the negotiation of conflicts and help children transform experiences into language and reflection. In practice, this means that entrepreneurial education does not reduce the role of the teacher. On the contrary, it requires a more intentional and observant teaching.

The classroom management also needs to consider that projects and challenges generate movement, conversation, and unpredictability. This dynamism should not be confused with a lack of structure. Structure, in this case, is the set of agreements, routines,

records, and criteria that allows the class to act with accompanied autonomy. When these conditions are clear, the classroom ceases to be a space of passive execution and becomes a pedagogical laboratory of situated learning.

Evaluation is an especially sensitive point. Entrepreneurial skills in childhood rarely appear adequately in exclusively summative instruments. Therefore, the sources analyzed reinforce the importance of procedural observation, participation records, portfolios, guided self-evaluation, and age-appropriate rubrics (Jardim, 2021; Paños-Castro et al., 2022). For the teacher, this means documenting not only the final product, but the path, including forms of participation, decisions made by the class, difficulties faced, and mobilized curricular knowledge. This documentation produces richer pedagogical evidence and supports dialogue with families, coordination, and other teachers.

The approach to families and the community can greatly expand the meaning of the proposals, as long as it is pedagogically planned. Inviting families to listen, sharing problems of the school or the surroundings and organizing moments of feedback on the projects helps the children to realize that their action has real recipients. At the same time, the teacher needs to preserve the educational logic of the process, defining objectives, limits and forms of participation.

Finally, the consistent implementation of entrepreneurial education in childhood depends on continuing education and collective work. Teachers need spaces to study references, analyze experiences, adapt materials, and discuss evaluation criteria. Teams that plan collaboratively tend to better integrate the topic into the curriculum and produce more stable practices than individual and episodic initiatives.

For managers and pedagogical coordinators, the implication is clear: supporting entrepreneurial education is not just about acquiring a program, but creating conditions for professional development. Without this support, even quality materials can be applied superficially. With support, entrepreneurial pedagogy can become part of the school's pedagogical identity.

FINAL CONSIDERATIONS

This chapter confirms that entrepreneurial education, when pedagogically grounded, offers a relevant path for the formation of more autonomous, creative, collaborative, and socially committed children. The central axis of the proposal is not to teach business in miniature, but to cultivate skills and dispositions that help the child to understand himself, relate to others, and act on the world with meaning.

The references analyzed, especially Jacinto Jardim's conceptual framework, the DGE Framework, the Student Profile, and the CIEECI 2025 article, indicate that Portugal has a consistent repertoire to sustain an entrepreneurial pedagogy in childhood. This repertoire becomes more powerful when read as an articulation among foundations, programs, mediations, and implementation conditions, rather than as a collection of motivational activities or a language of innovation without a pedagogical basis.

From a conceptual point of view, the discussion showed that the notion of value creation in a broader sense is decisive for displacing entrepreneurial education beyond business logic. This displacement allows the integration of the proposal with recognized school purposes, such as citizenship, integral education and social participation, without eliminating the dimension of action and planning. On the contrary, it redefines its formative and ethical meaning in childhood.

From the pedagogical point of view, the analysis of the Portuguese programs reinforced the importance of progression by age group, playfulness with intentionality, qualified teacher mediation and articulation between school, family and community. The discussion of the evidence, in turn, allowed us to sustain convergent tendencies of contribution in the intrapersonal, interpersonal, cognitive, ethical and curricular dimensions, but with methodological prudence regarding strong causal generalizations.

For the scientific agenda, the chapter reinforces the need for more comparable and context-sensitive studies, with explicit age groups, implementation conditions, and assessment instruments appropriate to childhood. For teaching, the main implication is that entrepreneurial education can be integrated into the curriculum without abandoning the principles of childhood pedagogy, as long as it works with clear training objectives, structured didactic sequences, procedural evaluation, and institutional support for continuing education.

As an editorial and scientific development, it also seeks to offer a text that can circulate in two registers at the same time: that of academic argumentation, with explicit methodological concepts and cautions, and that of teacher reading, with intelligible practical implications. This double readability is strategic for a field that depends, simultaneously, on the production of knowledge and on the quality of implementation in schools.

In summary, entrepreneurial pedagogy in childhood, as discussed in this chapter, can be understood as a pedagogy of training to act in the world with imagination, responsibility, and cooperation. When anchored in robust conceptual references, qualified

teacher mediation, and curricular integration, this approach is simultaneously relevant to the scientific community and practicable for teachers, which justifies its presence in the contemporary academic debate on education.

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THE PROJECT METHOD OF WILLIAM H. KILPATRICK AND ITS INFLUENCE ON PEDAGOGY AND GEOGRAPHIC EDUCATION PROJECTS IN BRAZIL

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ABSTRACT

This analysis explores William H. Kilpatrick's project method and its impact on contemporary education, with a focus on geographic education in Brazil. Inspired by Kilpatrick and Paulo Freire, it advocates a student-centered approach based on action, experience, and independence, contrasting with traditional passive teaching. Drawing from the New School movement, these ideas have been incorporated into Brazil's educational practices, emphasizing meaningful learning and student agency. In geographic education, the project method is valuable for linking theory and practice, encouraging investigation of lived space and critical thinking. It fosters interdisciplinary dialogue and collective knowledge-building, enhancing understanding of socio-spatial realities and the connections between society and nature. Such practices cultivate active individuals capable of interpreting and transforming their environment. Overall, Kilpatrick's and Freire's influence extends beyond pedagogy, becoming a key reference for modern geographic education—particularly within critical and emancipatory frameworks aimed at developing socially conscious citizens dedicated to social change.

Keywords: Geography teaching. Project Pedagogy. New school. Citizenship. Interdisciplinarity.

INTRODUCTION

This text was prepared during the discipline IM 1612 – Geographic Education Projects, linked to the Graduate Program in Geography – Master's and Doctorate at the Federal Rural University of Rio de Janeiro (PPGGEO/UFRRJ).

The objective is to analyze the Project Method developed by William H. Kilpatrick, highlighting his main ideas, works and influence on Brazilian education. The text also presents the evolution of Project Pedagogy in Brazil, highlighting its differences and adaptations to the national context. Relevant academic references are used, including books, dissertations and articles that delve into the theme.

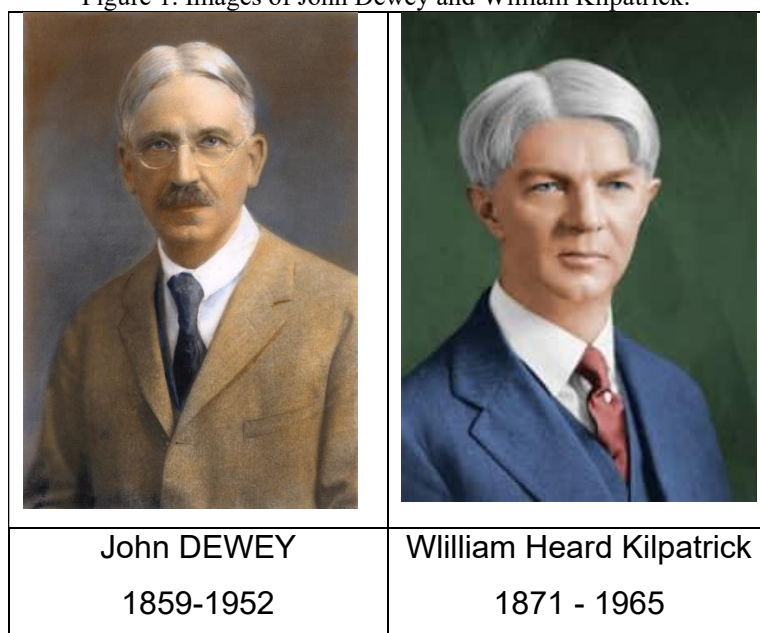
The methodology adopted is qualitative, supported by a theoretical framework composed of reference works, such as those of Kilpatrick (1918, 1921, 1925, 1947), Dewey (1959) and Freire (1987, 1996), as well as authors who expand this discussion, such as Hernández (1998), Demo (2002a, 2002b), Mantoan (2011), Rodrigues (2015) and Gotarde (2019), among others.

THE PROJECT METHOD: TRAJECTORIES AND PATHS

The Project Method was introduced by William H. Kilpatrick in 1918 as a pedagogical approach that emphasizes the active participation of students in the learning process. Based on the ideas of progressive educator John Dewey, William H. Kilpatrick proposed that teaching be structured in meaningful projects that reflected the interests of students and promoted the development of life skills. See figure 01, the images of John Dewey and William H. Kilpatrick.

In Brazil, his ideas were incorporated and adapted, giving rise to Project Pedagogy, which was consolidated from the 1980s onwards.

Figure 1. Images of John Dewey and William Kilpatrick.



Source: Author, 2025

The Project Method proposes that learning occurs through problem solving and the construction of knowledge autonomously. Kilpatrick identified four main types of projects: production projects, in which students create something concrete, such as the construction

of a model; consumption projects, which involve the exploration of existing knowledge, such as reading a book; problem-solving projects, which stimulate investigation and the search for solutions to specific issues; and aesthetic appreciation projects, which encourage the study of cultural and artistic manifestations.

From the 1980s onwards, Project Pedagogy began to gain strength in Brazil as a flexible and interdisciplinary methodology, differentiating itself from Kilpatrick's original model. Some key differences include greater teacher intervention, which can suggest themes and guide the development of projects; integration between disciplines, promoting an interdisciplinary approach; a focus on collaboration and group work, rather than an emphasis on individual autonomy; and adaptation to the Brazilian educational reality, allowing its application from Early Childhood Education to Higher Education.

Among the main works of William H. Kilpatrick, "The Project Method: The Use of the Project in the Teaching of Subjects" (1918), translated into Portuguese as "The Project Method" (Petrópolis: Vozes, 1960), "Education for a Changing Civilization" (1925), "The Use of the Project Method in the Elementary School" (1921) and "The Education of the Child" (1947) stand out. Below we briefly present the content of each of William H. Kilpatrick's works.

"THE PROJECT METHOD" (1918)

This is Kilpatrick's best-known work, where he details the concept of "project method". Kilpatrick argues that projects should be the core of the educational experience, as they stimulate the student to work with real problems and meaningful contexts. The book explores the characteristics of the method, its implementation, and its benefits in learning. This work was the only one translated into Portuguese whose title remained: The Project Method. The translation into Portuguese was made around the 1950s-1960s by Edith P. B. Simões and published by Editora Vozes.

"EDUCATION FOR A CHANGING CIVILIZATION" (1925)

In this work, Kilpatrick discusses how education should be adjusted to cultural and social changes. He argues that the school should prepare students to face the challenges of a society in constant transformation. The work reflects his commitment to a dynamic education, in which learning is centered on the student and their experiences.

"THE USE OF THE PROJECT METHOD IN THE ELEMENTARY SCHOOL" (1921)

Kilpatrick has written several articles and texts explaining how the project method could be implemented specifically in primary schools. In this work, he addresses pedagogical practices and suggestions on how to organize projects effectively in elementary classes.

"THE EDUCATION OF THE CHILD" (1947)

This book is a reflection on the educational process, focusing on the importance of an education that considers the integral development of the child. Kilpatrick seeks to show how the educational environment should provide experiences that allow students to develop their skills, critical and problem-solving skills.

In chart 01 we highlight the differences between Kilpatrick's Project method and Project Pedagogy in Brazil.

Chart 1. Differences between Kilpatrick's Project Method and Project Pedagogy in Brazil	
Kilpatrick's Project Method	Project Pedagogy in Brazil
The Project Method proposes that learning occurs through problem solving and knowledge construction autonomously	From the 1980s onwards, Project Pedagogy began to gain strength in Brazil as a flexible and interdisciplinary methodology, different from Kilpatrick's original model
Kilpatrick identified four main types of projects: Production projects: creating something concrete (e.g., building a mockup). Consumer projects: exploring ready-made knowledge (such as reading a book). Problem-solving projects: investigating and solving specific issues. Aesthetic appreciation projects: to study cultural and artistic manifestations.	Some key differences include: Greater intervention by the teacher, who can suggest themes and guide the development of projects. Integration between disciplines, promoting an interdisciplinary approach. Focus on collaboration and group work, rather than the emphasis on individual autonomy. Adaptation to the Brazilian educational reality, with application from Early Childhood Education to Higher Education.

Source, Author, 2025

In Brazil, Project Pedagogy has also been widely studied and disseminated in works such as "Transgression and Change in Education: The Work Projects" by Fernando Hernández (1998), "Project-Based Learning" by José Moran, "The Pedagogy of Projects in Practice" by Maria Teresa Eglér Mantoan (2011) and "Project Pedagogy: Foundations and Implications" by Pedro Demo (2002).

WORKS THAT INFLUENCED THE WORK WITH PROJECT PEDAGOGY IN BRAZIL

Fernando Hernández's work, *Transgression and Change in Education: The Work Projects* (1998), is one of the milestones in the reflection on Project Pedagogy in Brazil. Hernández, influenced by the critical pedagogical tradition and progressive education studies, proposes that work projects can serve to transcend traditional educational models, allowing students to actively participate in the learning process.

For Hernández, work projects are more than simple educational activities; they are tools for transformation. He argues that by working on projects, students can explore the reality surrounding them and relate school knowledge to the social and cultural world. From this, he proposes that projects can be a key to the construction of an emancipatory education, in which students see themselves as agents of change, not just as passive recipients of content.

Hernández's work stands out for its critique of the traditional educational model and its emphasis on the need for teaching more closely aligned with students' needs and contexts. By incorporating the idea of "transgression," he suggests that education should be a practice that challenges established norms, encouraging students to question the world and their own formation.

The book *Project-Based Learning* by José Moran (2025) is an important work that addresses Project Pedagogy from the perspective of active and meaningful learning. Moran highlights the importance of working with projects to overcome the fragmentation of knowledge in schools, promoting more integrated, contextualized, and engaging learning for students.

Moran is based on a constructivist view of learning, influenced by theorists such as Piaget and Vygotsky, arguing that knowledge is built from the interaction of students with the environment and with others. The author proposes that projects should be designed in order to engage students in a real way, providing learning situations that connect them with everyday issues, with real problems and with the world outside the classroom.

He also discusses the importance of working with interdisciplinary projects, allowing students to integrate knowledge from different areas of knowledge. For Moran, project-based learning offers an opportunity to make teaching more dynamic and relevant for students, developing not only cognitive skills, but also social skills, such as group work and communication.

The work *The Pedagogy of Projects in Practice*, by Maria Teresa Eglér Mantoan (2011), offers an in-depth reflection on how Project Pedagogy can be applied in a practical

way in schools. Mantoan, one of the leading Brazilian researchers in the field of education, shares concrete experiences in the implementation of Project Pedagogy, highlighting the challenges and potentialities of this methodology.

She addresses the need to create conditions for Project Pedagogy to be successful in schools, emphasizing the importance of adequate planning, continuing education of teachers and collaboration among students. For Mantoan (2011), the practice of projects requires a change in the attitude of the teacher, who is no longer a mere transmitter of content and becomes a facilitator of learning, helping students to explore their own questions and discoveries.

In addition, the author points out the importance of working on projects that are contextualized, that is, that take into account the realities of students, their experiences and interests. Mantoan (2011) also highlights that projects should be a means for the development of broader skills, such as critical thinking, problem solving and the ability to work in teams.

In the work *Pedagogy of Projects: Foundations and Implications* of Pedro Demo (2002), the author makes a critical analysis of Pedagogy of Projects, discussing its theoretical foundations and its practical implications for education. Demo starts from a constructivist approach, arguing that projects allow students to build knowledge in a more dynamic way, by promoting interactivity between students and teachers, in addition to interdisciplinarity.

The author also highlights the importance of reflecting on the pedagogical and social implications of adopting this methodology, pointing out that, for Project Pedagogy to be effective, it is necessary to overcome the view of traditional teaching, centered on the transmission of content. For him, the methodology should be understood as a tool to develop in the student the ability to make decisions, think critically and collaborate constructively.

In the book, Demo also discusses the practical difficulties that may arise when applying Project Pedagogy in Brazilian schools, such as the resistance of some educators to new methodologies, the overload of content to be taught and the scarcity of resources. He suggests that, to overcome these obstacles, it is necessary that the projects are well planned and appropriate to the reality of the school, in addition to the training of teachers

These works are fundamental for understanding Project Pedagogy in Brazil, as they offer both a solid theoretical basis and concrete pedagogical practices that can be applied in the classroom. They contribute to the reflection on how the methodology can be a path

to a more active, integrated, and meaningful education for students. In addition, they highlight the importance of adapting the method to specific educational realities, respecting cultural diversity and the needs of each student.

Although Project Pedagogy in Brazil has been influenced by Kilpatrick's Project Method, their approaches differ significantly. While Kilpatrick emphasized individual student autonomy, the Brazilian adaptation incorporated a collective and interdisciplinary dimension, often guided by the teacher. The study of these differences is essential to understand how the methodology can be applied effectively in the contemporary educational context.

THE RELEVANCE OF THE IDEAS OF PAULO FREIRE AND JEAN PIAGET IN BRAZILIAN EDUCATION THROUGH PROJECT PEDAGOGY

Project Pedagogy in Brazil was also deeply influenced by the ideas of great educational thinkers, such as Paulo Freire and Jean Piaget. Paulo Freire, with his proposal for liberating education, always emphasized the importance of an education that respects students' knowledge and experiences, allowing them to become protagonists in their learning process. His vision of a critical and dialogical education is directly connected with the principles of Project Pedagogy, because, like the project method, it proposes that the student actively participate in their learning, investigate their reality and seek solutions to concrete problems.

Jean Piaget, with his contributions to cognitive psychology and developmental theory, profoundly influenced how we understand learning across age groups. Piaget argued that children build their knowledge through interaction with the environment and problem-solving, which is compatible with the proposal of Kilpatrick's Project Method. In his approach, students are not passive receivers of information, but active subjects who build their understanding in a progressive and contextualized way. This idea is fundamental for the effective application of Project Pedagogy, which seeks to create learning situations that challenge and develop students' cognitive and social capacities.

Freire and Piaget's ideas were fundamental for the adaptation of the Project Method in Brazil, making it a methodology that not only promotes problem solving, but also respects and enhances the individual and collective development of students. The combination of these theories with project-based pedagogical practices contributes to a more participatory, critical, and constructive education, aligned with students' needs and

realities. In this text, we have chosen to emphasize more the contributions of Paulo Freire to Project Pedagogy.

PEDAGOGY OF PROJECTS IN BRAZIL: BETWEEN THE NEW SCHOOL MOVEMENT AND THE FREIREAN PERSPECTIVE

Project Pedagogy is one of the most effective methodologies to integrate school knowledge into students' life experiences. In Brazil, this proposal was initially influenced by the New School movement, in the first decades of the twentieth century, and later resignified in the light of Paulo Freire's critical pedagogy.

The New School will emerge as a reaction to traditional pedagogy, centered on memorization and the figure of the teacher as the only holder of knowledge. The New School, also called the Progressive School, emerged in the early twentieth century, influenced by thinkers such as John Dewey and Piaget. In Brazil, figures such as Anísio Teixeira, Fernando de Azevedo and Lourenço were great exponents of this movement.

According to Santos (2025):

Project Pedagogy is strongly linked to educational movements that sought to break with traditional teaching and seeks to promote more active, meaningful, and student-centered learning. And in Brazil, Project Pedagogy received great influence and was propagated in works such as those of Hernández (1998); the works of José Moran; the works of Maria Teresa Eglér (2011) and the works of Pedro Demo (2002). (Santos, 2025, p.5)

Dewey conceived education as a process of continuous renewal of social life, in which the school should reflect the democratic community. His ideas dialogue strongly with those of Freire, who conceived education as a practice of freedom, defending dialogue, problematization and the collective construction of knowledge.

In this conception, we will briefly explain the perceptions of John Dewey (1959) who proposes an educational theory deeply linked to democratic principles. For the author, education is a process of continuous renewal of social life, in which each generation transmits its values and practices, thereby rejecting the traditional conception of education as a mere transmission of ready-made content and arguing that learning is an active, experimental process. The author also highlights that the school is a social environment that should reflect community life, and education is fundamental for the construction of a democratic society. Democracy, according to the author, is not only a form of government but a way of life based on communication and cooperation.

According to Santos (2025), Dewey's ideas will influence Freire's perceptions, especially regarding some fundamental points about education. Considering that learning should be centered on the student's experience, criticizing traditional methods that disregard individual interests, needs and rhythms, thus seeking to value a pedagogy that starts from the concrete experience of the student to achieve more elaborate knowledge. Dewey argued that education should be based on experience, on the active participation of the student and on preparation for democratic life. Freire also understood education as a practice of freedom, a dialogical process, active and aimed at social transformation, breaking with the traditional model of "banking" teaching (in which the teacher deposits knowledge in the student).

Dewey and Freire believed that the student should not be passive, but an active subject of learning, that the educational process should start from the concrete reality of the students, with education being a fundamental instrument for social and democratic changes. However, despite the approximations, there were important differences, Freire went beyond Dewey by integrating a strong political and social critique into his pedagogy. While Dewey focused on democracy as a form of community life, Freire placed the struggle against oppression, colonialism, and social exclusion at the center.

Freire's proposal of education went beyond the limits of the New School by incorporating the political and dialogical dimension of the educational process. For Freire (1996), the act of educating must start from the concrete reality of the students, being mediated by the problematization and collective construction of knowledge. According to (Freire, 1996, p. 47): "Teaching is not transferring knowledge, but creating the possibilities for its production or construction"

The Freirean perspective is based on the ideas of the French educator Célestin Freinet, who proposed a life-oriented pedagogy, with strong inspiration in the work, cooperation and autonomy of students. Thus, in this Freirean conception, the Pedagogy of Projects will become a practice of freedom, which should emerge from the interests and needs of the students, promoting a dialogue between popular knowledge and scientific knowledge. In addition, the teaching practice assumes a horizontal posture, in which educator and student learn together in the transformation of the world (Freire, 1987).

In the practice of Project Pedagogy in Brazil, many schools and educators articulate the integration between Escola Nova and Freinet in the practice of projects. Considering that Escola Nova contributes to a more flexible and student-centered curriculum, Freinet's

Pedagogy discusses participatory and self-managed methodologies that strengthen work with significant projects based on the reality of the student.

Freire (1987) contextualized criticisms of banking education, characterized by the vertical relationship between the educator and the student, in which the former deposits content in the latter, the latter being seen as passive and incapable. According to Freire (1987, p. 58), "in the banking view, the educator is the one who educates, the students those who are educated; the educator is the one who knows, the students those who do not know". This conception reduces education to an act of domestication, incompatible with the development of individuals' autonomy and criticality.

For Freire, teaching requires respect for the autonomy and dignity of the student, emphasizing that the educational practice must respect the autonomy of the students, understanding them as subjects capable of thinking, acting and transforming reality. Teaching, therefore, cannot be an act of imposition, but an exercise of dialogue and recognition of human dignity. For the author, teaching is "an act of love, of respect for others" (Freire, 1996, p. 43), and it is essential that the educator promote conditions for the development of students' freedom and responsibility.

Project Pedagogy is based on constructivist and socio-interactionist principles, proposing an educational practice centered on students' interests and needs, with an emphasis on interdisciplinarity and active learning. For this pedagogical proposal to be effectively implemented in schools, it is essential to consider educators' perceptions and practices, as they are the primary mediators of the teaching-learning process. From this perspective, Hernández (1998) highlights that Project Pedagogy is characterized by organizing the curriculum around interdisciplinary projects that start with real problems and students' interests, thereby promoting meaningful learning. The autonomy of students is encouraged, but the role of the educator is central in guiding the processes, selecting appropriate methodologies and monitoring progress. "The work project is a device that facilitates the integration of curricular content according to the interests of students and the needs of daily life" (HERNÁNDEZ, 1998, p. 28).

Still in the conceptions of Hernández (1998), the transgression of traditional school practices is essential for educational change, as it stimulates the development of critical, creative and collaborative skills. The work projects are presented as pedagogical strategies capable of integrating knowledge, promoting relevant learning and transforming the school culture. The proposal is based on principles such as interdisciplinarity, dialogue, problematization and curricular flexibility, prioritizing the collective construction of

knowledge. The educator, in this model, ceases to be the transmitter of information to assume the role of facilitator and guide of the students' investigative processes.

Project Pedagogy in Brazil, by articulating the assumptions of the New School with Freire's perspectives, presents itself as a powerful methodology for the construction of a meaningful, critical and liberating education. By promoting the articulation between academic knowledge and life experiences, this approach contributes to the formation of autonomous subjects who are aware of their role in the world. In order for Project Pedagogy to reach its emancipatory fullness, it is essential that the educator assumes his role as a reflective mediator, capable of listening, problematizing and dialoguing with the students' knowledge. Thus, education becomes, in the words of Freire (1987), a practice of freedom.

DEVELOPMENTS IN GEOGRAPHIC EDUCATION PROJECTS

During the IM 1612 course - Geographic Education Projects in the Graduate Program in Geography of the Federal Rural University of Rio de Janeiro (PPGGEO/UFRRJ), the IV Seminar on Geographic Education Projects (See figure 2) was organized on May 22, 2025 in room 103 of the Graduate Building at the Multidisciplinary Institute of the Federal Rural University of Rio de Janeiro (IM/UFRRJ) Nova Iguaçu campus.

The general objective of the IV Seminar on Geographic Education Projects was to provide a space for deepening and reflection on William H. Kilpatrick's Project Method, the adaptation of this methodology in Brazil and its practical application in current education.

Among the specific objectives: To deepen knowledge about Project Pedagogy and its influences in Brazil; To promote the capacity for critical research and the oral presentation of complex ideas; To stimulate the exchange of experiences and reflections among students on the practical implications of the methodology in the classroom; To encourage students to think about the contemporary challenges of education and how Project Pedagogy can contribute to a more active, collaborative and critical education.

As a broad methodological orientation, on the deepening and reflection on William H. Kilpatrick's Project Method, the adaptation of this methodology in Brazil and its practical application in current education, the groups should incorporate other educators such as Paulo Freire, Jean Piaget, Fernando Hernández, José Moran, Maria Teresa Mantoan, Pedro Demo, among others. From this research, the students developed an

interactive presentation that explores the application of Project Pedagogy in different educational contexts.

Figure 2. Poster of the IV Seminar on Geographic Education Projects of the PPGGEO/UFRRJ



Source: Author, 2025

Below we explain the steps of the organization of the *IV Seminar Geographic Education Projects: Experiences of projects in the teaching of geography in elementary and high school*.

THE FIRST STEP OF THE SEMINAR WAS THE DIVISION OF GROUPS AND DISTRIBUTION OF TOPICS

The class was divided into small groups (of 3 to 5 students) and assigned to each group a specific theme about Project Pedagogy. Each group was responsible for researching and deepening one of the following questions: 1. William H. Kilpatrick's

Project Method – Principles and Objectives; 2. The evolution of Project Pedagogy in Brazil: Differences with Kilpatrick's model and Paulo Freire's influence; 3. Jean Piaget's contributions to Project Pedagogy and Cognitive Development; 4. Challenges of Project Pedagogy today: Overcoming obstacles in educational practice; and 5. Case studies: Analysis of academic and practical works by authors such as Fernando Hernández, José Moran, Maria Teresa Mantoan, Pedro Demo, among others.

THE SECOND STEP RELATES RESEARCH AND PRODUCTION

Students should conduct in-depth research on the assigned theme using bibliographic sources, academic articles, and theses/dissertations. They should seek to understand the historical context, objectives, and applications of Project Pedagogy in the Teaching of Geography.

As part of the research, the groups will be asked to select excerpts from relevant books and articles and to conduct a critical analysis of each author's ideas. Each group will be asked to write a summary of the main ideas of their research, which will serve as the basis for their presentation.

THIRD STEP: DEVELOPMENT OF THE SEMINAR PRESENTATION

Each group should create a multimodal presentation (e.g., slides, videos, concept maps, etc.), 10-15 minutes long. The presentation should address the central ideas of the theme, its main authors, contributions, applications, and critiques.

The group should integrate the research with practical examples, either from school experiences or case studies, and also suggest ways to apply these ideas in the Brazilian school reality. They should also discuss the difficulties that may arise when applying these concepts in the current context and how to overcome them.

THE LAST STAGE FINAL REFLECTION AND SYNTHESIS

As a final task, each group should write a personal reflection on the seminar, highlighting what they learned, how they can apply these ideas in their pedagogical practice and what are the main challenges they still need to overcome.

The topics addressed in the seminar were: 1) The challenges of Project Pedagogy; 2) The evolution of Project Pedagogy in Brazil: differences with Kilpatrick's model and Paulo Freire's influence; 3) Jean Piaget's Contributions to Project Pedagogy and Cognitive Development.

The seminar opened with a conference given by Professor Lía Bachmann from the Department of Geography of the Faculdade de Filosofia y Letras of the Universidad de Buenos Aires (FFyL/UBA) entitled Environmental Education and Geography Project in High School in Buenos Aires. The professor this semester carried out the stay via the Move la América public notice under the supervision of Prof. Dr. Clézio dos Santos in the Graduate Program in Education, Contemporary Contexts and Popular Demands of the Federal Rural University of Rio de Janeiro (PPGEduc/UFRRJ).

FINAL CONSIDERATIONS

The trajectory of Project Pedagogy in Brazil shows how a proposal originally centered on the individual action of students was transformed into a critical and emancipatory educational practice. Under the influence of Paulo Freire, it began to value dialogue, listening and the concrete reality of students as the foundations of learning and social transformation.

The IV Seminar on Geographic Education Projects, in its fourth edition, was an important moment, where students of the discipline IM 1612 - Geographic Education Projects in the Graduate Program in Geography - master's and doctorate at the Federal Rural University of Rio de Janeiro (PPGGEO/UFRRJ), were able to address various aspects of the Pedagogy of Projects contextualized in the Teaching of Geography in different educational stages, especially in the final years of Elementary and High School.

Projects in Geography gain power by connecting students to their territories, enabling a critical reading of space and inequalities. It is in this encounter between theory and practice, between the lived and the imagined, that learning becomes truly meaningful.

Project Pedagogy invites the creation of experiences that awaken critical thinking and build meanings for knowledge. When creatively adapted to school realities, it reveals its greatest potential: to form conscious, autonomous citizens committed to the transformation of the world.

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THE SOCIAL DECONSTRUCTION OF EDUCATIONAL VIOLENCE AGAINST CHILDREN WITH DISABILITIES AND THE NECESSARY PRODUCTION OF TRULY INCLUSIVE PLANS

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ABSTRACT

The article examines educational violence as a form of discriminatory practice within the framework of Inclusive Education, highlighting the challenges faced by People with Disabilities (PWD). It contends that, while tools like Individual Educational Plans (IEP) and Individual Development Plans (IDP) are vital for promoting equity and providing "reasonable accommodations" (Brasil, 2008), poor implementation or lack thereof can subtly lead to violence and exclusion in education. The theoretical foundation criticizes the system's rigidity and the "paradigm of normality" (Mantoan), advocating for school adaptation to students and dialogic pedagogy (Freire). The text discusses disability as a social construct (Werneck; Sassaki), not an innate individual trait but a result of institutional barriers, also distinguishing between inclusive teaching and an inclusive school. Key obstacles include the dominance of the medical-biological paradigm, curricular inflexibility (Paschoal), and inadequate teacher training, which, without proper preparation, sustains the "paradigm of charity" (Barbosa) by viewing students as "objects" (Chauí). The restricted curriculum and limited opportunities reflect setbacks and violence that necessitate a profound cultural and pedagogical shift, emphasizing the importance of empowering educators to achieve full inclusion (aligned with Goal 4 of the National Education Plan - PNE).

Keywords: Educational Violence. School Inclusion. PEI/PDI.

THE INCLUSIVE SCHOOL AND EDUCATIONAL VIOLENCE

Educational violence, a phenomenon that encompasses a range of harmful and discriminatory practices in the school context, is a growing concern in the field of inclusive education.

This concept is particularly relevant when it comes to people with disabilities (PWD), who often face specific challenges and additional barriers in the school environment.

Among these barriers, the implementation of Individual Educational Plans (IEP) and Individual Development Plans (IDP) stand out, instruments that aim to adapt the curriculum and pedagogical practices to the specific needs of students with disabilities.

Inclusive education, which seeks to ensure the access and participation of all students in the teaching and learning process, finds the Individualized Teaching Plan and the Individual Development Plan to be essential tools for its effectiveness.

Although they are often used interchangeably, they have distinct but complementary functions and are critical to meeting the specific needs of students with disabilities, pervasive developmental disorders, or high abilities.

However, despite the inclusive intent of these plans, there is growing evidence that the application of these resources is not always effective and, in some cases, may even result in subtle forms of educational violence.

The Individualized Teaching Plan and the Individual Development Plan are necessary whenever a student has special educational needs that are not met by the school's common curriculum. Maria Teresa Eglér Mantoan, one of the foremost references on inclusion in Brazil, argues that the school should adapt to the student, not the other way around (Mantoan, 2003).

In this sense, the Individualized Teaching Plan and the Individual Development Plan serve as a roadmap for this adaptation, ensuring that the student receives the necessary support to learn and develop fully.

The preparation of these plans should be a collaborative process, involving the family, the teachers of the regular classroom, the teacher of the Specialized Educational Service (SES), the pedagogical coordinator, and, when necessary, professionals from other areas, such as occupational therapists, speech therapists, and psychologists.

Paulo Freire's view of education as a dialogical act emphasizes the importance of the participation of all those involved (Freire, 1996).

The construction of the Individualized Teaching Plan and the Individual Development Plan follows the following steps:

Initial assessment: The first step is to gather information about the student, including their strengths, interests, learning style, and support needs. This assessment should be ongoing and formative.

Definition of objectives: Clear, realistic and measurable objectives must be established for the student. They can be academic, social, communication or autonomy.

Planning strategies: The team should detail the methodologies, resources, and adaptations that will be used. This may include making the curriculum more flexible, using assistive technologies, modifying activities, and providing individualized support.

Monitoring and evaluation: The plan should be reviewed periodically to check the student's progress and make adjustments as needed. This flexibility is crucial to ensure that the plan continues to meet the student's ever-evolving needs.

The need for an individualized plan arises from a pedagogical and multidisciplinary evaluation that identifies the student's potentialities and challenges.

It is not about segregation, but rather a strategy to ensure equity. According to the United Nations Convention on the Rights of Persons with Disabilities, inclusive education requires "reasonable accommodations" to ensure full participation (Brasil, 2008). The Individualized Teaching Plan and the Individual Development Plan are the materialization of these accommodations, making the educational process fairer and more accessible.

The importance of these plans goes beyond the technical-pedagogical aspect. They are documents that formalize the school's commitment to inclusion. The Individualized Teaching Plan, with a more academic focus, details curricular adaptations and teaching methodologies. The Individual Development Plan, more comprehensive, addresses the student's global development, including social and emotional aspects. Together, they:

Promote equity: They ensure that each student, regardless of their particularities, has the chance to learn and develop at their own pace.

Organise pedagogical work: They serve as a practical guide for teachers, avoiding improvisation and ensuring consistency of interventions.

Strengthen the family-school partnership: Create a clear and transparent communication channel, allowing the family to actively participate in the educational process.

Validate the existence of the subject: As defended by Freire, the plan recognizes the student as a unique being, with his own history and potential, and not just as one more in the classroom.

Tomlinson (2001) highlighted the importance of differentiating teaching to meet the diverse needs of students. Tomlinson's model of inclusion advocates that teaching should be adapted to ensure that all students, regardless of their abilities or difficulties, can access the curriculum.

The Individualized Teaching Plan and the Individual Development Plan, if poorly implemented or inadequately understood, can perpetuate inequalities instead of promoting true inclusion. At times, it is possible to observe in practice a lack of adaptation of the curriculum in an inclusive way, totally disrespecting the student's development.

In this context, Historical-Critical Pedagogy, developed by Professor Dermeval Saviani, is a theoretical approach that proposes a critical and historical understanding of the educational process.

It is necessary to explore the complex intersection between educational violence and the inclusion practices represented by the Individualized Teaching Plan and the Individual Development Plan. Through an analysis of the existing literature and case studies, it is intended to investigate how these tools are used in practice and to what extent they can contribute to the perpetuation of harmful behaviors.

Historical-Critical Pedagogy sees education as a social practice that should be oriented towards the transformation of society. Saviani (2007) argues that education should be a means for the construction of a more just and egalitarian society, and not only for the adaptation of individuals to existing conditions.

In addition, the impact of educational violence on the school experience and on the academic and personal development of students with disabilities should be investigated, seeking to identify strategies to improve the effectiveness of the Individualized Teaching Plan and the Individual Development Plan and to promote a truly inclusive and respectful educational environment.

Paulo Freire (1970) advocated an approach to teaching that values dialogue, awareness, and student emancipation. Critical pedagogy emphasizes the importance of an education that challenges power structures and allows students to actively participate in the educational process.

In modern times, much is discussed about violence. Several authors approach the theme as a social production that establishes power relations between subjects (Chauí, 1985; Saffioti, 1987; Castañeda, 2006).

According to Chauí (1985, p. 34), violence is an action that transforms differences into hierarchical inequalities, thereby dominating, exploiting, and oppressing. Violent action treats the dominated being as an "object" and not as a "subject", who is silenced and becomes dependent and passive.

In this sense, the dominated being loses his autonomy, that is, his freedom, understood as "the capacity for self-determination to think, want, feel and act".

It is necessary to understand the cultural dimensions that build and perpetuate the various forms of inequalities, hierarchies, and oppression against certain groups, including children with disabilities.

According to Chauí (1985), a violent action treats the dominated being as an "object" and not as a "subject", who is silenced and becomes dependent and passive. In this sense, the dominated being loses its autonomy, that is, its freedom, understood as "the capacity for self-determination to think, want, feel and act".

Historical evolution has brought other forms of violence and, consequently, exclusion, including against people with disabilities.

Brazil, after becoming a signatory to an international pact, made an advance on the theme of disability and inclusion by enacting the Brazilian Inclusion Law (LBI) No. 13,146, of July 2015. In it, disability is understood as the result of the interaction between impediments, which are conditions present in the functions and structures of the body.

According to data from the Secretariat for Persons with Disabilities of the State of São Paulo (2023), the State of São Paulo has a population of 44,411,238 inhabitants, of whom 3,323,729 have some disability, representing an estimated 7.48% increase in the PWD population.

The numbers are growing, but there is still a lack of preparation of the network to serve children with disabilities, not because of the intention of education professionals, but because of a lack of structure in the State itself.

Despite its recognized importance, teacher training in Brazil faces several weaknesses. The first of these is the devaluation of the profession, which is reflected in low salaries, precarious working conditions and lack of social prestige. These factors affect the attractiveness of the career, leading many to give up teaching or not to choose it as their first option, as Gatti (2013) points out.

Here, we highlight the importance of teacher training, which lies in overcoming a purely technical view of teaching.

Authors such as Maurice Tardif and Bernardete Gatti highlight that training should prepare teachers to be professionals who articulate knowledge of different natures: disciplinary knowledge, pedagogical knowledge and knowledge from their own practice and experience.

The lack of adequate training of education professionals also contributes to this scenario. Many educators do not feel prepared to deal with the specificities of students with disabilities, which leads to insecurity, fear and, consequently, attitudes of exclusion disguised as care.

According to psychologist and researcher Lúcia de Fátima Barbosa, the lack of knowledge about disability can generate a "paradigm of charity", in which the student is

seen as someone to be helped and not as a subject of rights and capacities (Barbosa, 2009). This paternalistic view is one of the most dangerous faces of educational violence, as it prevents the recognition of the child as an autonomous and capable being.

METHODOLOGY AND THEORETICAL FRAMEWORK

The text presented develops a critical analysis of the intersection between educational violence and the effectiveness of inclusion tools, such as the Individualized Educational Plan (IEP) and the Individual Development Plan (IDP), in the context of the

The general objective of the study is to analyze the complex intersection between educational violence and inclusion practices, represented by the implementation of Individual Educational Plans (IEP) and Individual Development Plans (IDP), investigating to what extent these instruments contribute to the effectiveness of inclusion or, in their misapplication, to the perpetuation of harmful behaviors in the school environment.

Specific objectives of the work include:

Conceptualize educational violence, distinguishing its subtle and institutional forms in the context of inclusive education.

Discuss the importance and process of elaboration of the IEP and IDP as instruments of equity and "reasonable accommodations".

To explore the framework of the Social Model of Disability, contrasting it with the medical-biological paradigm that still persists in the school.

Identify and analyze the structural and pedagogical challenges that hinder the effective implementation of individualized plans, including curricular rigidity and fragility in teacher training.

To investigate the impact of educational violence on the academic and personal development of students with disabilities.

The study adopted a methodological approach that combines the nature of bibliographic research with the qualitative approach, essential for the in-depth interpretation of the meanings and human relations around inclusion and school violence.

The research is predominantly bibliographic, as it bases its argumentation on systematic review and critical analysis of classic works, contemporary scientific productions and legal documents.

The choice for the qualitative approach is justified by the need to go beyond quantitative data, focusing on the understanding of the cultural and social dimensions that

construct disability and perpetuate violence (Chauí, 1985), and on the critical analysis of pedagogical practices (Saviani, 2007).

The methodology includes the analysis of existing literature to establish a dialogue between different fields of knowledge – the sociology of violence, inclusive education and critical pedagogy. The text also suggests the need for case studies and the analysis of secondary data (such as those of the LBI and Goal 4 of the PNE) to contextualize the theory and policies with the practical reality of the school.

The theoretical framework is multifaceted and critical, built on three conceptual pillars:

a) Inclusive Education and Adaptation based on the studies of Maria Teresa Eglér Mantoan (2003; 2015) which supports the premise that the school must transform itself to welcome diversity, breaking with the "paradigm of normality" and the focus on the "deficit".

Carol Ann Tomlinson (2001) bringing productions that support the importance of differentiation of teaching so that the curriculum is accessible to all, legitimizing the adaptive function of the IEP/PDI.

Janaina C. Paschoal (2018): reinforcing scientific studies with the criticism of curricular rigidity and the need for flexibility for inclusion to be effective.

b) Social and Pedagogical Criticism, bringing to the fore the studies of Paulo Freire (1970; 1996) who offered the framework of critical and dialogical pedagogy, essential for the deconstruction of the relations of domination in the school and for the valorization of the student as a "subject" and not as an "object".

Marilena Chauí (1985) provides the conceptual basis for social (and educational) violence, understood as the transformation of differences into hierarchical inequalities, and Dermeval Saviani (2007), with his noble work entitled Historical-Critical Pedagogy, guides the analysis of education as a transformative social practice, which should seek to overcome inequalities.

c) Social Model of Disability and Teacher Training

Cláudia Werneck (2000) and Romeu Kazumi Sassaki (2006) support the perspective that disability is a social construction, the result of environmental barriers, rather than an inherent condition of the individual.

Bernardete Gatti (2013) and Lúcia de Fátima Barbosa (2009) affirm the need to analyze institutional challenges, especially the fragility of teacher training and the

perpetuation of the "paradigm of charity" in schools. In this way, the theoretical framework for the conclusion of this research is founded.

THE CHALLENGES OF THE SCHOOL AGAINST EDUCATIONAL VIOLENCE

The non-inclusion of students with disabilities in the school environment can be understood as a form of educational violence, a theme that is deepened in the National Education Plan PNE 2014-2024, especially in Goal 4.

This goal aims to universalize, for the population aged 4 to 17 years with disabilities, global developmental disorders and high abilities or giftedness, access to basic education and specialized educational service (SES).

This challenge, however, goes far beyond simple enrollment, entering the complex social and pedagogical structures of the school. One of the biggest challenges is facing the paradigm of normality.

Historically, the school was built on the premise that there is a single model of the student and a single pattern of learning and development. Mantoan (2015) argues that the school remains resistant to the idea that diversity is the norm.

Violence manifests itself when the student with disabilities is seen as a "problem to be solved", a "foreign body" that needs to be adapted to a system that was not made for him. Non-inclusion, in this sense, is the consequence of a structure that denies difference, perpetuating a cycle of marginalization and exclusion.

The lack of resources, the overload of work and the lack of knowledge of methodologies and assistive technologies lead to veiled segregation, where the student with disabilities is physically in the classroom, but isolated, without effective participation.

In addition, the inflexible curricular and evaluation structure is a significant obstacle. PNE 4 advocates specialized educational care, but its implementation comes up against the rigidity of the system.

Standardized assessments and linear content do not contemplate the different forms of learning, limiting the potential of students with disabilities and reinforcing the perception of their "incompetence".

Paschoal (2018) reinforces that inclusion requires a flexible and diversified curriculum that allows multiple paths to access knowledge and values each student's potential, deconstructing the violence that manifests in the lack of opportunities.

In summary, the challenges for today's school in reducing educational violence due to non-inclusion are profound and multifaceted.

Overcoming these obstacles requires not only compliance with the cold letter of the law, but a profound cultural and pedagogical transformation, where the school recognizes itself as a space for welcoming and valuing diversity, in line with Goal 4 of the PNE.

THE SOCIAL CONSTRUCTION OF STUDENTS WITH DISABILITIES IN THE SCHOOL ENVIRONMENT

Inclusive education, as an ideal and a practice, has been the subject of intense discussion and transformation, especially regarding the understanding of the social construction of students with disabilities.

Far from being a merely biological or individual condition, disability is largely shaped by social, cultural, and historical factors. This understanding, which breaks with the traditional medical model, is fundamental to the advancement of educational policies and practices in the current era.

The idea that disability is a social construction is a central point in the work of authors such as Michel Foucault and, in the educational context, has been explored by researchers such as Cláudia Werneck and Romeu Kazumi Sassaki.

The social model of disability argues that the barriers encountered by people with disabilities are not inherent to their condition, but rather the result of an environment and a society that are not designed to accommodate them. The school, in this sense, acts as a privileged space where these barriers manifest themselves and can be both reproduced and deconstructed.

According to Werneck (2000), society creates people with disabilities by segregating and stigmatizing those who deviate from the norm.

In the school environment, this translates into inflexible curricula, standardized assessment methods, and a lack of resources and training for educators. Sassaki (2006) reinforces this perspective when talking about inclusion as a process of transformation of society.

For him, inclusion is not just about putting students with disabilities in regular school, but about restructuring the school so that it welcomes diversity in a genuine way, ensuring access and participation for all.

In current times, this social construction becomes even more evident with the rise of technologies and new educational paradigms.

The COVID-19 pandemic, for example, exposed inequalities and the lack of preparation of institutions to deal with diversity, revealing the urgency of rethinking pedagogical strategies.

However, the contemporary debate also points to the advancement of public policies, such as the National Education Plan (PNE), which aim at inclusion.

The struggle, therefore, is for the student with disabilities not to be seen as a problem to be corrected, but as a human being who, like everyone else, has the right to learn and develop in an environment that respects and values him.

Inclusive education, from this perspective, reflects society's commitment to dismantling barriers and building a fairer future for all.

CHALLENGES IN THE SOCIAL DECONSTRUCTION OF STUDENTS WITH DISABILITIES

Despite theoretical and legislative advances towards a more inclusive education, the social deconstruction of students with disabilities still faces significant challenges. Disability, as several contemporary scholars emphasize, is not an intrinsic condition of the individual, but rather a social construction that operates through norms and barriers imposed by society.

The educational system, although it is the main stage for inclusion, often reproduces these barriers, making it difficult for students with disabilities to fully participate and be recognized.

The first major difficulty lies in maintaining a medical-biological paradigm, which still permeates school practices. According to Mantoan (2015), the tendency is to focus on the student's "deficit", seeking treatments and adaptations that bring him closer to "normality".

This view disregards the richness of human diversity and reinforces the idea that the student is the problem, and not the school structure. The author argues that the school should transform itself to welcome the plurality of its students, rather than trying to transform them to fit a single model.

Another obstacle is the persistence of an inflexible and standardized curriculum. Researcher Janaína Conceição Paschoal (2018) points out that most schools continue to follow a rigid curricular model, which ignores the learning specificities of students with disabilities.

This rigidity leads to exclusion, as the student is forced to adapt to a system that was not designed for him. For Paschoal, true inclusion requires a curricular reorganization that allows different forms of access to knowledge and assessment, valuing the multiple learning paths.

In addition, the lack of continuing education and support for teachers is a critical point. Pletsch and Jacques (2020) point out that although many public policies recognize the need for training, the reality in schools still falls short.

Teachers, without the proper theoretical and practical preparation, feel insecure and overloaded, which can lead to segregationist practices or superficial teaching that does not guarantee the full development of students with disabilities.

For the authors, it is essential to invest in training that not only provides technical training but also promotes a change in mindset regarding diversity.

In short, the social deconstruction of students with disabilities in the school environment is not a simple task. It requires a break with old paradigms, a restructuring of the curriculum, and a continuous investment in educator training. Only in this way will it be possible to create a school that not only receives, but that truly welcomes, values, and enhances the diversity of each student, ensuring their full participation in society.

FINAL CONSIDERATIONS

The lack of curricular flexibility and the limitation of opportunities represent a form of educational violence that directly affects disabled students, undermining their potential and their right to a truly inclusive education, clearly distancing them from the existing objective in Goal 4 of the National Education Plan PNE 2014-2024.

The correct analysis and elaboration of the Individualized Teaching Plan and the Individual Development Plan are indispensable, not as mere bureaucracies, but as instruments of a transformative pedagogical practice, which is aligned with the principles of inclusive education and human rights.

They are proof that the school is truly willing to welcome diversity, making the learning environment fairer and more enriching for all.

Not making the curriculum more flexible, neglecting inclusion and inclusive education is a latent educational violence, as it crosses the student's life by not being offered the opportunity for a dignified and adequate education, according to their needs.

This violence, often subtle and institutionalized, is a direct reflection of the fragility in the initial training of teachers and the absence of quality continuing education programs.

Without adequate preparation to deal with diversity and to adapt their pedagogical practices, educators end up reproducing a rigid and excluding teaching model. The lack of teacher recognition and appreciation, in turn, aggravates the problem, demotivating professionals and making it difficult to attract talent for the career.

Thus, overcoming educational violence depends on a virtuous cycle that includes the revision of teacher training curricula, investment in constant qualification and, fundamentally, the appreciation and support of educators in their journey of transformation.

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CARING AND EDUCATION: THE WILLINGNESS TO CARE FOR TEACHERS

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ABSTRACT

This work reflects the relationship between caring for educators and caring for the world. It originates from a postdoctoral project that accompanied a year-long training program for teachers, creating a space for self-reflection and for developing strategies to reduce suffering in educational work, with a particular focus on inclusion. Considering care within the educational context reveals an ethical and political commitment, strengthens interpersonal relationships at school, and helps teachers analyze these experiences and their implications for themselves, students, and pedagogical practice. The adopted method is Research-Transformation, which involves participating in and collaborating on change processes during training. It employs various techniques to gather information and knowledge, fostering the researcher's deeper involvement with the field. This approach emphasizes respect for others' knowledge and encourages reflection on pedagogical practices. Through experience, it aims to produce a concrete understanding of reality and actions, ultimately leading to transformation. Additionally, the work presents ideas from Hannah Arendt on the importance of education and caring for the world to support reflection on our vulnerabilities amid times of intolerance, inequality, and violence.

Keywords: Care. Education. Teacher Training. Inclusive Education. Mental Health.

INTRODUCTION

Reflections on care and education are fundamental and cannot be exhausted. Caring is not an activity confined to a single act, and educating is a constant opening to the cultivation of relationships with the world and its preservation.

Caring consists of an experience with the world; we are ourselves care; existing, we care. We are responsible and co-responsible for ourselves and for the environment that surrounds us, so taking care of oneself also means caring for others. Care is revealed in the engaging and significant way of relating to others, which combines the characteristics: being considerate of the other and having patience with the other, or being negligent and indifferent.

We then say that caring is not something optional or circumstantial or that can be acquired; it is a condition of living in a relationship, living is taking care of oneself, and taking care of oneself takes care of others. This is the ontological dimension of care. And, in the daily occurrence of life, the act of caring ends up being situated in an ethical dimension, it implies taking upon oneself the question of what to care for and the way of caring. The responsibility for the way one cares begins with recognizing the fragility and interdependence among beings (MORTARI, 2024).

Boff (2013) warns us about the risk of automatism in the sphere of work, which can lead us to the idea that everything around us is reduced to a type of utilitarianism, control, adequacy and domination that leads care to be seen in its restrictive aspect, only as a task, and not as a way of existing. Based on this alert, we affirm that reflecting on the meaning of care allows us to assume our place in the world.

Taking as the focus of our research the care of the educator reveals a commitment to the preservation of the world, since education is the place, *par excellence*, where one discovers about oneself and one's connection with the world that has been constituting itself around us and may continue to exist depending on the way we assume our place in it.

In the words of Arendt (2022), educating is taking responsibility for the world until the time comes when our children and young people take this responsibility for themselves, as adults, in the exercise of political activity.

To fulfill the role of producing humanity, the education offered has to favor the development of something new, which places human beings in a qualitatively different condition from other animals (VIGOTSKI, 2000).

Thinking about the formative process and the teaching performance implies, then, recognizing the teacher as a creative subject, capable of transforming the world around him through the construction of new strategies, languages and ways of relating to knowledge, to students and to the school.

The present research establishes a direct relationship with the research entitled "The meanings of teachers on pedagogical practices for students with disabilities in the movement of research-trans-formation" coordinated by Prof^a. Dr. Daniela Leal, since by proposing spaces of care for teachers we can contribute to the training process of the proposed teacher and to the expansion and enhancement of the discussion on affirmative policies for the education of people with disabilities. From now on, we will take Hannah Arendt's thought on education and thought as a guide for our reflection.

CARING FOR THE WORLD

The ordinary world ends when it is seen only from one aspect and is allowed to present itself only in a single perspective.
Hannah Arendt

Understanding the richness of Hannah Arendt's thought is only possible through the constant exercise of following the web of concepts and reflections that sustain the complexity and timeliness of her ideas and, to begin the work, I turn to the poetry of Carlos Drummond de Andrade entitled "The man; the journeys" (1973).

Man, such a small animal of the Earth, gets upset on Earth, a place of much misery and little fun, makes a rocket, a capsule, a module, touches the Moon[...] When they are all over, only man is left (is he equipped?), the very difficult journey from himself to himself: to put his foot on the ground of his heart, to try to colonize, civilize, humanize man, discovering in his own unexplored entrails perennial, unsuspected joy of living together.

Drummond allows us to think about the relationship between man and technology, and how, even when dealing with desires for world domination, the necessary and complex experience is that of being among men. Even if we live under earthly conditions, we are not earthly beings; the human condition differs from human nature, which entails participation in the species' life cycle and survival.

For Arendt (2011), the human condition refers to more elements than the conditions of man's life on earth (the conditioning factors of human existence are life itself, birth - initiation, mortality, worldliness, plurality, and the planet), and the term world consists of things produced by men. The world is the material and symbolic legacy (language, objects, tools, constructions, institutions, and knowledge) that transcends individual existence and extends across generations. And, because of its characteristic of connecting man with objects and with the men with whom we share such objects and their meanings, Arendt calls it the common world.

The human world is always the product of man's *amor mundi*, a human artifice whose potential immortality is always subject to the mortality of those who build it and to the birth of those who come to live in it [...] In this sense, in its need for beginners so that it can start anew, the world is always a desert. But from the condition of non-world that came to light in the modern era [...] came the question [...]: why is there something instead of nothing? And from the specific conditions of our contemporary world, which threatens us not only with nothing, but also with nobody, perhaps the question arises: why is there someone instead of no one? (ARENDT, 2009, p. 269).

It is clear that the possibility of creating and taking care of a common world is a fundamental issue in Arendt's thought, in her writings she warns us about the fragility inherent to our civilization and, therefore, highlights the need to be aware of the responsibility and commitment to this common and public world.

According to Arendt (2010), the common world is a public space, where one can be seen and heard, a place of appearing and constituting what we call reality. Reality is revealed when men communicate and live together. The common world is the space between men that makes politics possible and is the stage for human stories.

For although the common world is the common ground for all, those who are present occupy different places in it, and the place of one cannot coincide with that of another, in the same way that two objects cannot occupy the same place in space. Being seen and heard by others is important because everyone sees and hears from different angles (ARENDT, 2011, p. 70).

Taking care of this world entails considering natality, which Arendt defines as not biological but political, because from birth, man becomes part of the community. And, plurality refers to the fact that man is equal to all men and, at the same time, is distinct, singular.

At each birth, a man comes into the world equal to all the others and, at the same time, singular, unique. This singularity always brings to the world a novelty and the possibility of innovation through distinction. However, this distinction only manifests itself in the presence of others; it is necessary for others to perceive it and qualify it as such.

It is this condition of human beings being among men and sharing reality, yet being affected by it in different ways, that allows for different ways of being human, inhabiting the world, and ensuring its preservation.

Initially welcomed in the private sphere, the home, under the care and protection of the child/young person (the newcomer), prepares to participate in the public sphere, the common world, knowing its legacy and appropriating it. When prepared, it will participate in the public sphere. And in it, equality and distinction are already presupposed, so it needs action and discourse to relate.

Action is the only activity that takes place directly among men, in the public space of the common world. Thus, the person who initiates the action begins by exposing his uniqueness through acts and words, thereby distinguishing himself by bringing the unexpected. This action is based on spontaneity.

Arendt refers to acting as spontaneous and creative. By acting, man reveals his condition as an initiator; action is a human activity linked to *natality*. Natalty as initiating, the power to start a new movement, which breaks with the linearity of everyday life.

Any action affects those who initiated it and those who were witnesses of its appearance. As Arendt observes, "[...] stories, the result of action and discourse, reveal an agent, but this agent is neither author nor producer. Someone initiated it and the subject of it, in the double meaning of the word, its actor and its patient, is its subject" (2011, p. 230) and continues (2011, p. 238): "As action acts on beings that are also capable of acting, reaction, in addition to being a response, is always a new action with its own power to reach and affect others".

In this way, they constitute what she calls *a web of human relationships*, in which actions manifest and intertwine, triggering novelties in the life stories of all those involved, reordering and reinventing the web itself. Therefore, responsibility should be understood as interest in the other, beyond private interests, openness to common affairs in a common world, a willingness to tolerate situations and an example is set for others to follow, thus changing the world.

Responsibility for the world is not only about caring for the environment, but above all about the world that we have in common with other men, through relationships. The author also highlights the meaning of the educator's presence in front of the young child when she states that...

... the educator is here in relation to the young person as a representative of a world for which he must take responsibility, even though he has not done so and even if secretly or openly he may want it to be different from what it is. This responsibility is not arbitrarily imposed on educators; it is implicit in the fact that young people are introduced into the world by adults in a world in continuous change (ARENDT, 2022, 276).

Hope lies in the new generations that arrive in the world and, for this very reason, it is necessary for adults to introduce young people to the pre-existing world. For knowledge and enjoyment of the world, a process of initiation into its meanings, practices, senses and languages is fundamental, training that takes place through education. Therefore, education is "The act of welcoming and initiating young people into the world, so that they become able to dominate, appreciate and transform the public traditions that form the common symbolic heritage (CARVALHO, 2008, p. 22).

The teacher, before children and young people, is the representative of all the adult inhabitants of the world and must collectively assume responsibility for a world that he may even contest, but of which he is a part and that he shares with others. The authority of the educator emerges from the responsibility he assumes for this world when he is before his students.

And, in order to fulfill this task, the educator needs to feel comfortable in his place as a representative of the world, in his job of instilling love for the world in the children and young people under his responsibility. At this moment, he reveals the sense of care that we presented at the beginning of this reflection...

Education is the point at which we decide whether we love the world enough to take responsibility for it and, with such a gesture, save it from the ruin that would be inevitable if it were not for the renewal and the coming of the new and the young. Education is also where we decide whether we love our children enough not to expel them from our world, abandon them to their own resources, nor to snatch from their hands the opportunity to undertake something new and unforeseen for us, preparing them instead in advance for the task of renewing a common world (ARENDT, 2022, p. 284).

By assuming the profession of teacher, the person puts himself at the point of questioning the way of caring that he imposed on himself and to do so he needs to make himself available to the exchange of knowledge and dialogue with other areas of knowledge that intersect and training for the cultivation and future care of the common world.

METHODOLOGY

The research under development seeks to offer a space of care, through the practice of the Creativity Workshop. The Creativity Workshop is a Psychoeducational practice, developed by Professor Christina Cupertino in the late 80s in Brazil, which promotes personal rediscovery and transformation of professional relationships (CUPERTINO, 2008).

With this practice, it is intended to offer a space of care for educators in which reflection on their ways of taking care of themselves and their professional performance are the point of gestating new ways of conducting the learning process in an inclusive way, considering the challenges experienced in the daily life of the classroom.

This research is part of the larger research project that aims to seek the meanings of teachers on pedagogical practices for students with disabilities (CNPq Universal Project

2023, Process No. 405414/2023-4), developed by NIEPED – Interarea Center for Studies and Research in Learning and Pedagogical Practices (Unochapecó), coordinated by Prof. Dr. Daniela Leal.

As a methodological path, we developed Research-Trans-Formation, as proposed by Magalhães (2021). The author states that through sensitive and critical listening to teachers' experiences, thoughts and feelings are allowed to emerge and a space of ethical resistance is created capable of resignifying, in the daily life of the school, the power of teaching, feeling and existing.

The research is already underway, its format takes place in biweekly training meetings, in the school space lasting 1 hour and 30 minutes each meeting. The meetings are interspersed: Creativity Workshop meetings and Formative Meetings. The entire process will take place over a year, totaling 24 meetings involving theoretical, pedagogical and teacher-oriented aspects.

The *locus* of research is a private school in a municipality in the West of Santa Catarina, which serves students from kindergarten to high school. The group that participates in the training process consists of (13) teachers of the initial grades of Elementary School (1st to 5th grade), (3) pedagogical coordinators and (1) pedagogical advisor.

INITIAL RESULTS AND DISCUSSIONS

The research process began with three Creativity Workshop meetings - "From taking care of oneself to pedagogical care", with the presence of all research participants.

In the three meetings, the proposals for experiences in the Creativity Workshop aimed to get to know the participants from some references on how they perceive themselves, considering aspects already lived, in an event and to come.

In these initial meetings from the Workshop, songs, chronicles and book-albums were used as resources as triggers of the questions: Who was I as a child? How was learning? – If I were me, what would change in my learning process? What teacher have I been, am I currently and how will I be? In all the questions, there was an invitation to consider different perspectives of looking and thus approaching other elements to compose understandings about existence and the learning process.

Participants are invited to revisit their stories with the learning process, as a door to the creation of other ways of understanding the meaning of the history lived as a teacher and in facing the difficulties of the daily work of the school and the classroom.

Caring, as seen above, is an ethical imperative to sustain care for the other. In this purpose, we resume that care is not only a condition for the act of teaching, but part of the subjective construction of being a teacher and, in this movement, care is revealed as a symbolic and concrete space, where the teacher recognizes himself and is recognized as co-responsible for the world in which he exists.

SPACES OF CARE FOR TEACHERS AND THEIR COMMITMENT TO THE WORLD

Taking as a reference the ethical principles of Psychology in Brazil, the professional must base his work on the respect and promotion of freedom, dignity, equality and integrity of man, and promote the health and quality of life of people and collectivities, contributing to the elimination of any forms of negligence, discrimination, exploitation, violence and oppression (FEDERAL COUNCIL OF PSYCHOLOGY, 2005).

With these principles as guides, it is sought to create with the teachers, in the reflective meetings, which take place in the practice of the Creativity Workshop, a discourse of rights that opposes the representations that naturalize social vulnerability and propagate the idea of causality - "the population's own will".

The relevance of the Creativity Workshop is revealed in the statement that psychology has the task of participating in the contemporary challenge of providing the construction of new ways and practices of thinking about psychological knowledge and the realization of activities that are increasingly in tune with the psychosocial demands in community and educational contexts.

In other words, it means that in the face of precarious situations experienced by people and groups, which have repercussions on suffering and paralysis, interventions will be necessary in order to enable the situation to be faced in a field of collective responsibility.

As it carries these principles and is based on the idea of common space, the Creativity Workshop promotes the encounter in a condition of horizontality among the participants and resumes the principle presented by Arendt that the world shared in different ways, by different people allows the creation of stories and their reinvention.

It is necessary to highlight a principle that is relevant to the functioning of the Creativity Workshop is to favor the understanding that the sharing of experiences is not consistent with the idea of blaming or offering recipes for problem solving. What is at stake in the Creativity Workshop is the willingness to look at common issues based on the

consideration of different views and opinions. It is important to preserve the space for dialogue, as Roviello (1987) states from Arendt's words:

It is important to preserve the space of humanity, which is the space of dialogue about the world, even in a totalitarian world where this becomes practically impossible; even in a world that is sinking into darkness it is essential to preserve a space of understanding where the exchange of judgments about the world makes it appear again and, in this way, reintroduces the human into the world: 'we humanize what is happening in the world by talking to each other and, by talking, we learn to be human', because the world only becomes human when it opens up to this fundamental 'willingness to share the world with other men' (ROVIELLO, 1987, p.49).

The Creativity Workshop is indeed a construction possibility in the face of what is urgent, which asks for another look. Becoming, a moment of organization of ideas and construction of a discourse for the interlocutors; where the perceptions of the other and of oneself, expectations, feelings, prejudices and interpretations of the protagonists: on-duty and participants are at stake. From it, people can see and hear each other, unveiling various ways of understanding reality and new possibilities of living them

It is up to the workshop worker to encourage people to see themselves and, therefore, position themselves as authors and co-actors of the stories, beyond subjects who need to be given directions. Experiencing the condition of freedom: the ability to create something new together with others in relation to the past.

When this is no longer lived with others, the relationship with the world becomes strictly individualized, as if it were up to each one to live in and in "his/her" world. The acts of the individual have no importance or consequence for others, as already seen above:

To live an entirely private life means, above all, to be deprived of things essential to a truly human life: to be deprived of the reality that comes from being seen and heard by others [...] the private man does not appear, and therefore it is as if he did not exist. Whatever he does remains unimportant or consequential to others, and what is important to him is devoid of interest to others' (ARENDT, 2011, p. 71-72).

When the common world disappears, the apparitions of different looks also disappear. It can be said, then, that over-individualization can dull thought. A relationship between people and the utilitarian world, in addition to generating loneliness, causes them to dissolve in the collectivity, massifying them. The world appears in a single way and the different possibilities of inhabiting it become like individual dreams or nightmares that fade away, because they are devoid of reality.

In the speech of the other, something that we had not yet found in our own experience of the world, is revealed. It is an opening made from the other and at the same time to oneself. Language is the human condition that allows us to share a common experience, "To speak means to speak to someone" (GADAMER, 2004, p. 179).

A relevant aspect is to understand that what we call language is not limited to orality, but all the expressions that are constituted in the encounter between men, such as laughter, crying, gestures and physiognomies. Thus, dialogue is a living exchange between the interlocutors.

Dialogue begins with a willingness to be open to the other, to get closer to the other's experience and listen to it. Thus, dialogue refers to the possibility of "someone opening up to the other and finding in that other an opening so that the thread of conversation can flow freely" (GADAMER, 2004, p. 244).

That said, sharing the experience with others allows the participants to occupy other points of view, which in solitude would not be possible. It is the coexistence with others, crossed by dialogue, that allows us to share and guarantee reality. Each one refers to it from a unique place in the world, but lives it collectively.

The Creativity Workshop opens up to the group the sharing of lived experiences and their interpretations, allowing the lived to be circumvented in different ways, bringing different understandings. Reflection presents itself as a possibility to question the interpretations hitherto taken as true, providing a thawing of them. Such an activity provides the opening to new perspectives of seeing oneself and one's possibilities of dealing with the world.

So far, it is perceived that the participants valued and recognized the need to move and feed from different points of view to understand reality in a broader way, especially in the educational process of students with disabilities, since they feel overloaded, lonely and without resources to deal with some students.

In the face of such statements, we reinforce that it is the experience in the world shared with others that enables reflection, it is only through it that the human being is able to constitute an understanding of things, of others. Thought is one of the human conditions, which allows man to reflect on these generalizations constituted in his relationship with the world.

The act of unfreezing one's understanding of the world, questioning concepts, values, doctrines, has no end while we are alive, because according to the author:

[...] thinking and being completely alive are the same thing, and this implies that thought always has to start anew; it is an activity that accompanies life and has to do with concepts such as justice, happiness and virtue, which are offered to us by language itself, expressing the meaning of everything that happens in life and occurs to us while we are alive. (Arendt, 2002, p.134)

For this reason we can say that thinking breaks with the automatic and mechanical experience of life. By questioning understandings of common sense, one also calls into question the actions that are linked to them, that is, dealing with the world.

It is important to remember that, according to Arendt, reflection, despite being a human condition, is not an activity performed by all people, although everyone has the conditions to do so. One of the relationships that can be made in this regard is that thought is not discovered in isolation.

Thus, some relationships that people establish with each other request for the activity of thinking. When this request, as in dialogue, for example, not only is the ordinary world perceived, but it can be understood in an unprecedented way. Turning to Arendt again: "A life without thought is totally possible, but it fails to make its own essence blossom – it is not only meaningless; it is not totally alive. Men who do not think are like sleepwalkers" (2002, p. 143).

Based on Arendt's (2002) reflection, we can say that living with others and the dialogue made possible by it can foster self-awareness. The opportunity to establish a dialogue and reflect on various topics can provoke participants to develop an internal dialogue "between me and myself" about the perspectives unveiled, allowing them to problematize, expand, and clarify the aspects discussed.

Arendt, when resuming the public life of ancient Greece, recalls that this consisted largely of "citizens' conversation". These, when they met in the life of the *polis*, were absolutely equal in importance, with no distinction between them. The distinction arose in the opinion presented by each one about the world. Opinion, as the author recalls, which had the meaning of "it seems to me", coming from *dokeí moi*, seems to me.

The Greeks learned to understand—not to understand each other as individual persons, but to look at the same world from the other's point of view, to see the same world from the other's point of view, to see the same in very different and often opposite aspects (ARENDT, 2022, p.82).

As Arendt (2000) reminds us, the facts in themselves have no meaning, it is the interpretation of the facts, based on the singularity of the person who experiences them, of

the testimonies they have to validate their interpretation that makes it possible to tell a story about them.

The constitution of stories is linked both to the experiences lived in the past and to the projection made into the future, both having their veracity confirmed by the witness of others.

The past refers to the biography assembled by the subject, which, at the same time, mentions where he started from, defines the meaning of his past and future trajectory. According to Arendt: "Reality is different from the totality of facts and occurrences and more than this totality, which, in any case, is unascertainable" (2002, p. 323).

Thus, instead of offering services, the Creativity Workshop offers the opportunity to see and be seen, to recognize in the condition of co-author and constituent-belonging of the common world.

The Creativity Workshop reveals itself as a space to sit, listen, complain, give opinions, create and, thus, take care of the world we share. It is a place for welcoming and reflecting on health-disease relationships, the health services offered to the population and the sharing of experiences and solutions to health and social issues in groups, allowing the participants to exercise understanding mediated and witnessed by the workshop participants.

And in this way, she manages to make men recognize themselves as responsible for the world, to the extent that it guarantees the participants a common space so that they can recognize themselves as men of action and be able to reconcile with reality, "that is, we try to feel the world as our home" (ARENDT, 2008, p.330). According to the author in another text:

Understanding does not mean denying the shocking in facts, eliminating the unheard of from them, or, when explaining phenomena, using analogies and generalities that diminish the impact of reality and the shock of experience. It means, first of all, consciously examining and bearing the burden that our century has placed on us – without denying its existence, nor humbly bending under its weight. Understanding means, in short, facing reality without prejudice and with attention, and resisting it – whatever it may be (ARENDT, 2012, p.12).

In the Creativity Workshop, teachers and workshop participants open themselves to understanding, doing an exercise of imagination that can clarify other paths to follow and places to inhabit. For Arendt (2008), the imaginative exercise is an essential characteristic of thinking, since it is the imagination that can open up to the understanding with which one recognizes one's own references in the world and one can feel at home in the world.

And so, we recognize that the Creativity Workshop provides participants with the ability to feel belonging and responsible for the preservation and renewal of the common world.

FINAL CONSIDERATIONS

In Arendt's thought, we see the great importance of the common world, the care it requires, and how the human capacity to act and speak stands out in the task of taking responsibility for this world.

Dialogue and reflection justify the prominent place they occupy in the development of the Creativity Workshop. The meeting for dialogue and reflection is privileged as a place of welcome that offers unveiling and the possibility of transformation and creation.

In these meetings, all participants actively engage, and through speech, what did not appear can become visible. A thought can be organized in an unprecedented way, and sharing this is extremely enriching.

Understanding a theme or a problem and inspiration for new ways of acting are constituted through dialogue and reflection together. There is a co-construction of understanding, both for the participants and for the coordinators of the group, who are workshop participants.

The aim of the Creativity Workshop is to trigger moments for the experience of sharing and creating, abandoning loneliness... [...] a life without speech and action – and this is the only way of life in which there is a sincere renunciation of all appearance and vanity [...] – is literally dead to the world; it ceases to be a human life, since it is no longer lived among men (ARENDT, 2010, p.221).

Dialogue has a transformative force that enables a way of appropriating one's own history and the stories of others, undoing knots and thus taking care of oneself, others, and the world. For Gadamer, "where dialogue is successful, something has remained with us and something remains in us that has transformed us" (1992, p.247).

The moment of the encounter requires interrupting the automatic of life. It requires stopping, stopping to look, stopping to listen, stopping to feel, dwelling on the details, stopping to think, and suspending opinion and preconceived judgment.

The care space that is constituted in the Creativity Workshop is revealing itself as a device in which listening is prioritized and where there is no offer of solutions, but rather a space to highlight the potential in the search for solutions to the various issues in the face of the challenges of the inclusion of autistic children.

We seek to promote good encounters, those that can strengthen the power to act, boost action to face conflicting situations and suffering, establish dialogues, and desire and act for a more dignified and fairer world (BADER and BUSARELLO, 2025).

In short, to foster changes in which there is co-responsibility. This co-responsibility, which demands participation and collaboration, values and invests in the power to act. Participating is not restricted to adhering to or reproducing a generic script; it presupposes sharing, setting oneself in motion, and being able to feel pleasure in participating and caring for the world.

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INCLUSIVE EDUCATION AND TRANS EMPLOYABILITY: THE ROLE OF TECHNICAL TRAINING IN BRAZIL'S LABOR MARKET

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ABSTRACT

This study investigates the challenges transgender individuals face in accessing education and formal employment in Brazil, focusing on the role of technical training programs as tools for productive inclusion. The research is justified by the persistent underrepresentation of trans people in the labor market and the lack of organizational preparedness to support their inclusion. Drawing on a qualitative approach, the study combines bibliographic research and semi-structured interviews with six transgender individuals from different Brazilian states. The analysis was conducted using content analysis supported by NVivo software, allowing for the identification of thematic categories related to educational trajectories, professional experiences, organizational culture, and perceptions of training programs. The findings reveal that trans individuals face structural and symbolic barriers, including school dropout, institutional transphobia, racial and geographic exclusion, and unrealistic prerequisites for employment. Although all participants viewed training programs positively, they expressed concerns about limited career advancement and the lack of inclusive practices within organizations. The study concludes that technical training alone is insufficient for comprehensive inclusion; it must be integrated with diversity, equity, and inclusion (DEI) strategies and ESG-oriented organizational policies. By articulating theory and practice, the research contributes to the academic and professional debate on trans inclusion, offering insights for companies, policymakers, and civil society. The study also highlights the need for intersectional and longitudinal approaches in future research to strengthen institutional transformation and promote equitable labor market access.

Keywords: Diversity, equity, and inclusion (DEI). Labor market. Organizational practices. Professional training. Transgender inclusion.

INTRODUCTION

In recent years, the appreciation of diversity, equity, and inclusion (DEI) in the formal labor market has gained increasing relevance, especially in contexts where pluralities demand recognition, respect, and structural transformation. Organizations, as reflections of society, must ensure the presence and participation of underrepresented groups, assuming responsibility for implementing inclusive measures that contribute to a more just and equitable environment.

Among these groups, transgender individuals, including trans men, trans women, and travestis¹, face persistent barriers to accessing education and employment. These challenges are exacerbated by systemic prejudice, low qualification levels, and institutional transphobia, which collectively hinder their entry and permanence in the formal labor market (Fundação de Amparo à Pesquisa do Estado de São Paulo, 2023). The average life expectancy of trans people in Brazil is alarmingly low, around 35 years (Associação Nacional de Travestis e Transexuais, 2023), reinforcing the urgency of inclusive policies that address both immediate and structural needs.

Despite growing corporate discourse around DEI, the gap between intention and practice remains significant. The “Diversidade Aprendiz” survey (Somos Diversidade, Organização Internacional do Trabalho & Práxis Informação e Estratégia, 2021) revealed that although 90% of companies express concern about diversity, 40% lack concrete programs or actions to promote inclusion. This contradiction highlights the need for empirical studies that not only explore the lived experiences of trans individuals but also examine the effectiveness of organizational strategies aimed at inclusion.

This study seeks to understand the challenges faced by transgender individuals in Brazil in accessing education and formal employment. It investigates whether the promotion of technical training opportunities by organizations can contribute to increasing the representation of trans people in the labor market. The research is guided by the following problem: How do structural and symbolic barriers affect the employability of transgender individuals in Brazil, and to what extent can technical training programs serve as tools for their inclusion in the formal labor market?

To address this problem, the study adopts a qualitative approach, combining a literature review, interviews with transgender individuals, and content analysis. The aim is to explore the relationship between professional qualification and labor market inclusion, considering the perceptions and experiences of trans individuals regarding recruitment, workplace dynamics, and career development.

Although the topic of trans inclusion has gained visibility in recent years, there remains a notable gap in the literature regarding the role of technical training as a pathway to employability. By examining the labor context of transgender individuals and identifying the main barriers to their inclusion, this study contributes to the academic and

¹ Travesti refers to a person assigned male at birth who identifies with a feminine gender expression but does not necessarily conform to the traditional concept of womanhood. The term carries specific cultural and political significance in Latin America (Naomi, 2022).

professional debate on DEI, offering insights for organizations, policymakers, and civil society. The research does not seek to validate predefined hypotheses, but rather to understand complex realities through the voices of those directly affected.

LITERATURE REVIEW

The concept of gender has undergone significant transformations throughout history. Initially associated with biological sex and anatomical characteristics, particularly in the 15th century, the term evolved by the 18th century to encompass social constructions that define roles and expectations within society (Pontificia Universidade Católica de São Paulo, 2017). In contemporary contexts, gender identity is understood as a deeply personal and social experience that transcends binary classifications, reflecting how individuals perceive and position themselves in relation to societal norms (Prado & Dangelo, 2017).

Scholars such as Bento (2008) have critically examined the binary system of gender, arguing that it perpetuates the notion that gender merely mirrors biological sex. This perspective reinforces normative expectations and limits the recognition of diverse identities. Bento emphasizes that transsexuality should be viewed as a legitimate identity experience, marked by a dissonance between assigned gender at birth and self-perception. This incongruence often leads to psychological distress and social alienation, particularly in the absence of supportive environments (Moreira, 2015).

The challenges faced by transgender individuals frequently begin in early life, as the lack of identification with the gender assigned at birth can result in feelings of estrangement, anger, and disconnection. These experiences are often intensified by the absence of guidance from families and educational institutions, contributing to long-term exclusion from social and professional spaces.

To understand the nuances of gender identity, it is essential to distinguish between cisgender and transgender experiences. Cisgender individuals identify with the gender assigned to them at birth, whereas transgender individuals identify with a gender different from their biological assignment. This includes trans women (assigned male at birth, identifying as female) and trans men (assigned female at birth, identifying as male), as well as non-binary and travesti identities, which challenge traditional gender norms (Transcendemos Consultoria, 2024).

Jesus (2012) highlights that transsexual individuals often adopt names, appearances, and behaviors aligned with their gender identity, though not all pursue medical or surgical interventions. The defining element of trans identity lies in self-recognition, not in physical

transformation. Travesti identity, as discussed by Naomi (2022), carries historical and social significance, often associated with marginalization and resistance. Travestis identify as feminine but do not necessarily conform to conventional notions of womanhood, and the term itself has been reclaimed from its historically pejorative use.

The recognition and respect for diverse gender identities are fundamental to fostering inclusive environments. However, organizational and academic spaces have historically failed to accommodate these identities adequately. Studies in organizational diversity have begun to address this gap. Baggio (2017) argues that transgender individuals represent new subjects in the study of organizational diversity, challenging existing paradigms and demanding more inclusive practices. Similarly, Collins, McFadden, Rocco, and Mathis (2015) emphasize the need for critical actions in human resource development to address the marginalization of transgender people. Rudin et al. (2016) advocate for transformative approaches to organizational attitudes, highlighting the importance of education and policy in advancing transgender employee rights.

These perspectives collectively underscore the importance of moving beyond binary frameworks and embracing a more inclusive understanding of gender. They also highlight the need for structural changes in organizations and institutions to support the full participation of transgender individuals in society.

The lack of official data on the transgender population in Brazil has historically hindered the development of inclusive public policies. The Brazilian Institute of Geography and Statistics (IBGE) has not included questions about gender identity or sexual orientation in its national census, which contributes to the invisibility of this population and the consequent neglect of their rights (Farias, 2023). Recent efforts, such as the inclusion of gender identity questions in the National Demographic and Health Survey, represent a step forward in recognizing the diversity of identities in the country (Freire, 2023).

Empirical studies have attempted to fill this gap. Research conducted by the Botucatu School of Medicine at São Paulo State University (Farias, 2023) estimated that trans and non-binary individuals represent approximately 2% of the Brazilian population, with transgender individuals specifically accounting for 0.69% of the sample. These individuals are geographically distributed across central and inland regions, and their average age is 32.8 years, a figure that reflects the vulnerability of this group, whose life expectancy is alarmingly low, around 35 years (Associação Nacional de Travestis e Transexuais, 2023).

The prevalence of violence against trans people remains a critical issue. Transphobia, understood as prejudice and aversion toward gender expressions that deviate from the binary norm, manifests in various forms, including social exclusion, verbal aggression, and physical violence (Jesus, 2012; Lanz, 2014). Although the Brazilian Supreme Federal Court (STF) equated acts of homophobia and transphobia with the crime of racism in 2019, the persistence of discriminatory practices continues to undermine the citizenship and dignity of trans individuals (Spagna, 2022).

In the context of employability, the absence of comprehensive demographic data complicates the understanding of the socioeconomic profile of the trans population (Diéguez et al., 2021). Mapping studies, such as the one conducted by Centro de Estudos de Cultura Contemporânea (2021) in São Paulo, reveal that a significant portion of trans individuals engage in informal or precarious work. Sex work remains a primary occupation for many, particularly among travestis and trans women, while formal employment with labor contracts is accessible to only a minority.

Appearance and conformity to normative gender expectations are frequently cited as barriers to labor market entry. Trans individuals often face discrimination based on how closely their presentation aligns with societal standards, which affects their chances of being hired or retained in formal positions (Pizzi, Pereira, & Rodrigues, 2017). Moreover, educational exclusion plays a central role in limiting professional opportunities. The difficulty in completing formal education, often due to bullying, exclusion, and lack of institutional support, directly impacts the ability of trans individuals to qualify for competitive roles (Santos & Fajardo, 2020; Teixeira, 2019).

The intersection between education and employability is further complicated by the lack of inclusive organizational practices. Baggio (2017) emphasizes that transgender individuals challenge traditional models of organizational diversity, requiring new frameworks that recognize their specific needs. Collins, McFadden, Rocco, and Mathis (2015) argue that human resource development must adopt critical actions to address systemic exclusion, while Rudin et al. (2016) advocate for educational initiatives that transform organizational attitudes toward transgender rights.

In this context, training and development programs emerge as strategic tools for inclusion. Chiavenato (2014) highlights the evolution of training from a bureaucratic function to a strategic asset that adds value to individuals and organizations. However, Mantovani et al. (2022) observe that companies have become increasingly selective,

favoring candidates with advanced degrees and sidelining internal development efforts. This trend exacerbates exclusion for individuals with limited access to formal education.

Silva et al. (2020) argue that professional qualification within organizations can generate positive outcomes for individuals and institutions, especially when it includes first-job opportunities and structured training initiatives. For trans individuals, such programs can serve as gateways to formal employment, provided they are designed with sensitivity to their social realities and accompanied by inclusive policies.

The concepts of diversity and inclusion have gained prominence in organizational studies, particularly in response to the increasing heterogeneity of the workforce. Diversity refers to the coexistence of individuals with distinct identities within the same social system, where majority and minority groups interact, although the former often benefit from historical advantages in terms of access to resources and power (Fleury, 2000). Inclusion, on the other hand, encompasses social and political dimensions, aiming to ensure that all individuals can participate actively in society while being respected for their differences (Freire, 2008).

In organizational contexts, diversity and inclusion management involves a range of human resource practices, including the implementation of diversity policies, inclusive recruitment strategies, training and development programs, equitable compensation, and community engagement initiatives (Silva & Castro, 2022). These practices are essential for creating environments that value pluralism and promote equal opportunities.

Brazil's social structure presents unique challenges to the implementation of diversity and inclusion policies. As a country shaped by Indigenous, African, and European influences, Brazil is inherently diverse. However, it is also deeply stratified, with access to education and prestigious labor market positions often determined by racial and economic background (Fleury, 2000). This stratification disproportionately affects historically marginalized groups, including women, Black and mixed-race individuals, Indigenous peoples, people with disabilities, and the LGBTQIA+ community.

The persistence of inequality in the labor market is rooted in a culture of privilege that denies full citizenship to those outside dominant social categories. This culture normalizes discrimination and reinforces social hierarchies, limiting access to rights such as decent work and equitable participation in economic development (Abramo, 2022). For transgender individuals, these dynamics are further intensified by cisnormative expectations and institutional exclusion.

In response to these challenges, the concept of equity has become increasingly relevant in corporate discussions. Unlike equality, which assumes uniform treatment, equity acknowledges that individuals have different starting points and require differentiated support to access the same opportunities. Equity-oriented policies seek to mitigate structural imbalances and ensure that all individuals can exercise their rights fully (Moragas, 2022).

To effectively implement diversity, equity, and inclusion (DEI) programs, organizations must align their workforce composition with the demographic realities of the country. Moreover, it is essential to cultivate work environments that genuinely value diversity, allowing individuals to express their identities freely and participate fully in professional development and career advancement (Silva & Castro, 2022).

These principles are particularly critical when addressing the inclusion of transgender individuals in the labor market. As Baggio (2017) points out, trans people challenge traditional frameworks of organizational diversity, requiring new approaches that recognize their unique experiences. Collins et al. (2015) emphasize the importance of critical interventions in human resource development to combat marginalization, while Rudin et al. (2016) advocate for educational strategies that transform organizational attitudes and promote the rights of transgender employees..

The acronym ESG, Environmental, Social, and Governance, has become a central framework for evaluating corporate responsibility and sustainability. Originating from English terminology, ESG encompasses a set of practices aimed at environmental preservation, social engagement, and transparent governance (Quartucci, 2022; Serviço Brasileiro de Apoio às Micro e Pequenas Empresas, 2022). Within the social dimension, key commitments include the promotion of labor rights, workplace health and safety, support for diversity and inclusion, corporate involvement in social causes, and active participation in community development.

By adopting ESG-oriented strategies, companies can contribute not only to environmental and economic sustainability but also to the social inclusion of underrepresented groups. These practices have the potential to expand access to education, healthcare, housing, and employment, offering new life perspectives to marginalized populations, including transgender individuals (Serviço Brasileiro de Apoio às Micro e Pequenas Empresas, 2022).

Despite the growing visibility of ESG in corporate discourse, challenges remain in its implementation. Many organizations still lack dedicated budgets and specialized teams

to operationalize ESG and diversity initiatives. It is common to observe companies that publicly support LGBTQIA+ causes through marketing campaigns while failing to reflect this commitment internally, an inconsistency known as “Diversity Washing” or “ESG Washing” (Gelenske, 2022). This disconnect between external messaging and internal practices undermines the credibility of corporate inclusion efforts and reinforces the need for structural change.

Building a corporate culture grounded in ESG principles requires sustained effort and genuine commitment. Although the process is complex, it is essential for fostering inclusive environments and promoting long-term benefits for all stakeholders. Integrating ESG with diversity, equity, and inclusion (DEI) strategies can enhance organizational resilience and social impact, particularly when these efforts are aligned with training and development programs.

The theoretical framework developed throughout this review highlights the interdependence between professional qualification, inclusive organizational culture, and ESG practices. For individuals with limited educational backgrounds, such as many trans people excluded from formal schooling due to systemic discrimination, training and development initiatives are crucial for labor market integration (Silva et al., 2020). These programs must be designed to address not only skill gaps but also the broader social barriers that hinder access to employment.

In this context, diversity and inclusion are not merely ethical imperatives but strategic components of sustainable business practices. They reflect the plurality of Brazilian society and respond to its pressing social inequalities. When implemented holistically, ESG and DEI frameworks can transform workplaces into spaces of equity, dignity, and opportunity, benefiting both individuals and the broader community.

This theoretical framework presented integrates key discussions on gender identity, organizational diversity, equity, and ESG practices, highlighting the structural and symbolic barriers that affect the inclusion of transgender individuals in the labor market. The literature reviewed underscores the importance of moving beyond binary and normative frameworks, adopting inclusive strategies that combine professional qualification, institutional transformation, and genuine commitment to diversity. These insights provide the foundation for analyzing how training and development programs can serve as effective tools for promoting equity and expanding opportunities for trans people in organizational contexts.

METHODOLOGY

Methodology, as defined by Gil (2019), refers to the set of procedures adopted to achieve the objectives of a study. It encompasses the decisions made to guide the research process and obtain valid and reliable results. According to Lakatos and Marconi (1992), research is not merely a search for truth, but a systematic activity that seeks to answer specific questions through scientific methods.

This study adopts an exploratory qualitative approach, which is appropriate for investigating complex social phenomena and understanding the lived experiences of marginalized groups (Gil, 2022). The research aims to explore the challenges faced by transgender individuals in accessing education and employment, and to analyze their perceptions regarding technical training programs as tools for inclusion in the formal labor market.

Two main procedures were employed: bibliographic research and semi-structured interviews. The bibliographic research was conducted using books, peer-reviewed articles, and online publications, selected for their relevance and credibility (Gil, 2019). Although the study does not follow a systematic review protocol, the selection of sources was guided by thematic relevance and academic rigor.

The interviews were designed to collect firsthand qualitative data from transgender individuals. The interview script was developed based on the literature reviewed, incorporating themes such as educational background, professional experiences, and perceptions of inclusion initiatives. The script consisted of nine open-ended questions, allowing participants to elaborate on their experiences and viewpoints.

Participants were recruited between July and August 2024 via the professional social network LinkedIn. A total of 58 individuals were contacted, and six agreed to participate in the study. Selection was based on self-identification as transgender, inferred from profile information such as LGBTQIA+ symbols or identifiers. Interviews were conducted remotely via Microsoft Teams, each lasting between 30 and 45 minutes.

The sample includes trans men, trans women, and travestis, aged between 23 and 33 years, residing in different Brazilian states. Although the sample size is limited, it aligns with the logic of qualitative sampling, which prioritizes depth over breadth and seeks data saturation rather than statistical representativeness (Gil, 2022).

The interviews were analyzed using content analysis, following the framework proposed by Bardin (2011). This technique allows for the systematic and objective interpretation of textual data, identifying patterns, themes, and categories relevant to the

research problem. The analysis was supported by NVivo software, which facilitated the coding, organization, and visualization of qualitative data (Alves, Figueiredo Filho, & Henrique, 2015).

The categorization process was conducted a posteriori, based on emergent themes from the participants' narratives. This inductive approach enabled the identification of recurring issues such as institutional transphobia, educational barriers, and perceptions of training programs. NVivo was used to manage the data corpus, apply codes, and generate frequency tables and thematic maps, enhancing the analytical depth and transparency of the process.

All stages of the research were conducted in accordance with ethical principles for studies involving human subjects. Participants were contacted voluntarily, informed about the study's objectives, and provided informed consent prior to the interviews. Their identities were anonymized to ensure privacy and confidentiality. No personal identifiers are disclosed in the final report, and the study complies with ethical guidelines as outlined by Witiuk et al. (2018).

RESULTS AND DISCUSSION

The qualitative data collected through six interviews with transgender individuals, comprising four trans women, one travesti, and one trans man, revealed recurring patterns that reflect the structural and symbolic barriers faced by this population in accessing education and formal employment. The participants, aged between 23 and 33 years, reside in the states of São Paulo, Minas Gerais, Goiás, and Rio Grande do Sul, and present diverse educational and professional trajectories.

To ensure confidentiality and protect the identities of the participants, all interviewees were anonymized and are referred to as E1 through E6 throughout the study. The six individuals interviewed represent a diverse range of backgrounds in terms of age, gender identity, education, professional fields, and career trajectories.

In terms of education, three participants had completed higher education, two were currently enrolled in undergraduate programs, and one had not completed tertiary education. Professionally, four interviewees worked in data-related fields, one in human resources, and one in technology. All had formal work experience, although half of them had previously engaged in informal or low-skilled jobs to gain access to better opportunities. This finding aligns with the literature that highlights the precarious insertion of trans individuals in the labor market, often marked by informal employment and

underutilization of skills (Santos & Fajardo, 2020; Centro de Estudos de Cultura Contemporânea, 2021).

None of the participants transitioned during basic education, which prevented direct experiences of school dropout during that period. However, all reported having faced disrespect toward their gender identity, particularly through the refusal to use their social name, a form of symbolic violence that reinforces institutional transphobia (Jesus, 2012; Spagna, 2022). Two participants (E5 and E6) experienced explicit transphobia in the workplace, including dismissal and repeated relocations, while others (E4 and E5) reported compounded discrimination due to racial and geographic factors, consistent with intersectional analyses of exclusion (Abramo, 2022).

All interviewees expressed a positive view of professional training programs aimed at subsequent hiring, recognizing their potential to increase trans representation in the labor market. However, concerns were raised regarding the nature of these opportunities. Participants noted that such programs often direct trans individuals to positions with limited career advancement or impose excessively high entry requirements, which contradict the inclusive intent of these initiatives. These critiques echo the findings of E3, who emphasized the mismatch between affirmative action discourse and the actual structure of recruitment processes.

Moreover, the lack of organizational preparedness to receive trans employees was a recurring theme. Participants cited issues such as refusal to use social names, incorrect pronoun usage, and inappropriate or disrespectful questions during hiring and onboarding. These experiences suggest that inclusion efforts must go beyond recruitment and encompass organizational literacy, cultural sensitivity, and structural support mechanisms (Silva & Castro, 2022; Gelenske, 2022).

The word frequency analysis presented in Table 1 reinforces the thematic centrality of gender identity, education, and employment in the participants' narratives. These elements are not only recurrent but also interdependent, shaping the lived experiences of trans individuals in their pursuit of professional inclusion.

Table 1 - Word Frequency Analysis.

Word	Count	Percentage (%)	Similar Words
Trans	33	0,93457%	Transgender, travesti Employment
Work	22	0,62305%	
Education	18	0,50977%	
Transition	15	0,44248%	
Graduation	14	0,39648%	

Source: Developed by the authors using Bardin (2011) as a reference and NVivo software (Alves, Figueiredo Filho, & Henrique, 2015).

The data support the argument that technical training, while valuable, must be integrated into broader strategies that address systemic exclusion and promote equity in organizational contexts (Fleury, 2000; Moragas, 2022).

INDIVIDUAL EXPERIENCES: ANALYTICAL CATEGORIES

To deepen understanding of the lived experiences of transgender individuals in the labor market, the interviews were analyzed using emergent categories derived from the data. These categories, educational trajectory, professional inclusion and exclusion, organizational preparedness, and perceptions of training programs, reveal the complexity and intersectionality of the barriers faced by trans people.

Educational Trajectory and Access: participants E1, E2, and E3 emphasized the role of education in shaping their professional paths. E1, a trans woman and Business Administration student, highlighted the institutional resistance to using her social name, even after legal rectification. E2, a lawyer with postgraduate training, reported high dropout rates among trans individuals due to classroom discrimination, reinforcing findings by Teixeira (2019) and Santos & Fajardo (2020). E3, who transitioned during university, noted the lack of institutional support and limited access to affirmative policies, such as entrance exams with restricted spots. These accounts confirm that educational exclusion is not merely a result of academic performance but is deeply tied to systemic transphobia and lack of institutional preparedness (Jesus, 2012; Moreira, 2015).

Professional Inclusion and Exclusion: All participants had formal work experience, but several reported exclusionary practices. E5 was dismissed after disclosing her trans identity and mental health condition, while E6 faced repeated relocations despite meeting performance targets. E4, a Black trans woman, described undergoing 56 job interviews before securing her first opportunity, illustrating the compounded effects of racism and transphobia (Abramo, 2022). These narratives reflect the findings of Centro de Estudos de Cultura Contemporânea (2021), which indicate that trans individuals are often relegated to

informal or precarious work, and that appearance and racial identity significantly influence employability (Pizzi, Pereira, & Rodrigues, 2017).

Organizational Preparedness and Workplace Culture: participants consistently reported a lack of organizational readiness to receive trans employees. Common issues included refusal to use social names, incorrect pronoun usage, and inappropriate questions during recruitment. E2 recounted a phone interview that ended abruptly after the recruiter heard her voice, highlighting the persistence of passability as a discriminatory filter. Such experiences underscore the need for organizational literacy and inclusive practices beyond hiring, as discussed by Silva & Castro (2022) and Gelenske (2022). Inclusion must be embedded in workplace culture, not limited to symbolic gestures or superficial policies.

Perceptions of Training Programs: All interviewees viewed training programs positively, recognizing their potential to increase trans representation. However, concerns were raised about being directed to low-growth positions or facing unrealistic entry requirements. E3 criticized the mismatch between the inclusive discourse and the technical demands of entry-level roles, which often require advanced degrees or fluency in English. This critique aligns with Mantovani et al. (2022), who argue that companies have become increasingly selective, sidelining internal development efforts. For trans individuals, such selectivity reinforces exclusion rather than promoting equity.

These findings demonstrate that while technical training is a valuable tool, its effectiveness depends on broader structural changes. Inclusion must be accompanied by retention strategies, mentorship, and the dismantling of cisnormative and racialized barriers that persist in organizational environments.

CONCLUSION

This study investigated the challenges faced by transgender individuals in accessing education and formal employment in Brazil, with a particular focus on the role of technical training programs as mechanisms for productive inclusion. Grounded in a qualitative approach, the research combined bibliographic analysis and interviews with six transgender individuals from different Brazilian states, aiming to understand how structural and symbolic barriers, such as school dropout, institutional transphobia, racial and geographic exclusion, and unrealistic prerequisites for employment, affects their employability.

The findings revealed that, despite the participants' resilience and qualifications, they continue to face significant exclusion in recruitment processes and workplace

environments. Technical training programs were positively evaluated by all interviewees, especially when aligned with their social and economic realities.

However, the study demonstrated that such programs alone are insufficient to guarantee equitable inclusion. Their effectiveness depends on being integrated into broader organizational strategies that include diversity, equity, and inclusion (DEI) policies, ESG-oriented practices, and structural actions such as organizational literacy, retention mechanisms, and real opportunities for career advancement.

By articulating theory and practice, this research contributes to the academic and professional debate on trans inclusion, offering a grounded diagnosis of the limits and possibilities of training as a tool for equity. It provides actionable insights for companies, public administrators, and civil society organizations committed to building inclusive and sustainable work environments.

Nonetheless, the study presents limitations. The small sample size and concentration in specific regions restrict the generalizability of the findings. Additionally, the qualitative nature of the data does not allow for longitudinal analysis of the impact of training programs.

Future research should expand the sample, incorporate intersectional dimensions such as race, class, and disability, and explore the perspectives of employers and HR professionals. Investigating the medium and long-term effects of inclusion programs will be essential to assess their sustainability and to strengthen institutional transformation toward equitable labor market access.

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ASSISTIVE TECHNOLOGIES IN THE SPECIALIZED EDUCATIONAL SERVICE OF STUDENTS WITH DEAFBLINDNESS

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ABSTRACT

Specialized educational services are rights for students in need of special and inclusive education, which, according to the National Policy for Inclusive Special Education, includes students with deafblindness. Assistive technologies are essential support tools for effective specialized education, as demonstrated by case studies and confirmed through the Specialized Educational Service Plan and the Individualized Educational Plan, focusing on student personalization. The use of assistive technologies in caring for deafblind students varies depending on the severity of their hearing and visual impairments. Understanding relevant legislation and possessing specific knowledge about deafblindness are crucial for selecting appropriate assistive technologies. Communication and social interaction often pose significant challenges for deafblind students, requiring effective theoretical frameworks in specialized teaching. From Skinner to Piaget and others, different developmental stages are addressed, with Jan van Dijk's coercive approach—tailored for students with deafblindness—serving as a fundamental support for teaching strategies and overcoming communication barriers. Recognizing the unique needs of deafblind students enhances the accurate selection of assistive technologies to support daily activities, including alternative and augmentative communication, adapted technology, pedagogical tools, physical and sensory environments, and materials for orientation and mobility.

Keywords: Assistive technologies. Specialized educational service. Deafblindness.

INTRODUCTION

In 2025, the Brazilian Law for the Inclusion of Persons with Disabilities (LBI) – Law No. 13,146/2015 – completed 10 years. Enacted on July 6, 2015, the LBI became known as the Statute of Persons with Disabilities, which came into force on January 3, 2016 (Brasil, 2015). Thus, 10 years have passed, both from the enactment and the effectiveness of the Law, and the question arises: does the effectiveness of the LBI in the daily lives of people with disabilities follow the same temporality with regard to inclusive rights?

The purpose of the LBI is summarized in its article 1 as being "aimed at ensuring and promoting, under equal conditions, the exercise of fundamental rights and freedoms by persons with disabilities, aiming at their social inclusion and citizenship" (Brasil, 2015). Article 2 of the same Law prescribes the person with disabilities (PwD) as "one who has a long-term physical, mental, intellectual or sensory impediment, which, in interaction with one or more barriers, may obstruct their full and effective participation in society on an equal basis with other people" (Brasil, 2015).

As necessary as the singularization of the different disabilities, it is necessary to consider the rights provided for in article 8 of the Statute of Persons with Disabilities which, established by the principle of equality and non-discrimination, incorporate the rights of the Person with Disabilities

to life, health, sexuality, paternity and maternity, food, housing, **education, professionalization**, work, social security, habilitation and rehabilitation, transportation, accessibility, culture, sports, tourism, leisure, information, communication, scientific and technological advances, dignity, respect, freedom, family and community life, among others arising from the Federal Constitution, the Convention on the Rights of Persons with Disabilities and its Optional Protocol, and laws and other norms that guarantee their personal, social and economic well-being (Brasil, 2015, emphasis added).

Historically, with regard to the right to education for all, the National Policy on Special Education in the Perspective of Inclusive Education (PNEEPEI), instituted in 2008 by the Ministry of Education (MEC), through the Secretariat of Continuing Education, Literacy, Diversity and Inclusion (SECADI) at the time, signed by Decree No. 7,611/2011, resulted from the global movement for inclusive education as being "a political, cultural, social and pedagogical action, triggered in defense of the right of all students to be together, learning and participating, without any type of discrimination" (Brasil, 2008a, p. 1). From this point of view, since 2008, inclusive education has been officially recognized as "an educational paradigm based on the conception of human rights that combines equality and difference as inseparable values and advances in relation to the idea of formal equity" (Brasil, 2008a, p. 1), considering the historical contextualization of the production of exclusion inside and outside the school for PwD.

Decree No. 12,686, of October 20, 2025, amended by Decree No. 12,773/2025, instituted the National Policy for Inclusive Special Education (PNEEI) and the National Network for Inclusive Special Education (RNEEI), in which Specialized Educational Service (SES) is part of the organization and provision of Inclusive Special Education. As

stated in article 7 of Decree No. 12,686/2025, SEA must be integrated with the political-pedagogical project of the educational institution, with the participation of the family and the student, whose guarantee will be regulated by the MEC. The offer of SEA and assistive technologies is part of the PNEEI guidelines established in the aforementioned Decree. Specifically, assistive technologies should be defined according to the needs of each student in the learning, communication or socialization process, in interaction with educational contexts (Brasil, 2025a, 2025b).

By analyzing the PNEEI, it is possible to identify technical-conceptual chronological advances, even accompanied by setbacks and ambiguities, as occurred in the enactment of Decree No. 10,502/2020, whose syllabus summarized the greatest desire for special education policies – "Equitable, Inclusive and with Lifelong Learning" (Brasil, 2020). However, the content of the Decree expressed a significant setback to inclusion, as it reproduces practices of segregation and integration that, in special education, correspond to educational exclusion.

It is important to note that the 2008 PNEEPEI and the corresponding Decree No. 7,611/2011 were not revoked by the Decree that threatened the advancement of Brazilian special and inclusive education – Decree No. 10,502/2020 –, which allowed the continuity of the inclusive practices already established, including the SEA. As a result of the efforts of those who ensure the advancement of special and inclusive education, the Decree was short-lived – approximately two years and three months in force, being revoked by Decree No. 11,370/2023. Thus, Decree No. 12,686/2025 emerged "with the purpose of guaranteeing the right to education in an inclusive educational system for students with disabilities, autism spectrum disorder and high abilities or giftedness, without discrimination and based on equal opportunities", as provided for in its article 1 (Brasil, 2025a).

Turning our gaze to students with disabilities, especially those with deafblindness, it is possible to infer that the solidity of the current legislation – constitutionally based, guided by international recommendations and confirmed by jurisprudence¹ – and the current PNEEI do not ensure, by themselves, the organization and quality intended in the educational inclusion of PwD. This reality refers to the thought of Eduardo Galeano (2022,

¹ Jurisprudence of the Federal Supreme Court – judgment of ADI 5357/DF (Rel. Min. Dias Toffoli, j. 24.02.2021) –, consolidating "the understanding that inclusive education is a constitutional duty of the State and that no infra-legal norm can authorize the exclusion of students with disabilities from regular education", reaffirming "that coexistence in diversity is an essential condition for citizenship formation and that the principle of prohibition of social regression protects inclusive policies against regressive changes" (Autistas Brasil, 2025).

p. 458), when the author, when referring to the Universal Declaration of Human Rights, expressed: "the Declaration proclaims, reality betrays". The same thought applies to the PNEEI, considering that the reality experienced by the students targeted by the Plan shows that the effectiveness of the existing legal provisions has not yet been achieved. Compliance with the right to quality education, added to compliance with legal standards, depends on the engagement of the people involved, demanding joint actions between school, family and society.

Knowledge of the legislation merely does not ensure special and inclusive education. Access to quality education, as provided for in Sustainable Development Goal (SDG) 4 – "to ensure inclusive and equitable quality education, and to promote lifelong learning opportunities for all" (UN, 2015) – requires human commitment, attitudinal values and technical-scientific knowledge, to comply with and enforce the provisions of the corresponding legislation. In this scenario, assistive technologies as part of the SEA, provided for and implemented in the Specialized Educational Service Plan² (PAEE) and in the Individualized Educational Plan³ (PEI), constitute effective instruments for learning, communication and socialization intended for the inclusion of deafblind students from early childhood education to higher education.

THE DEAFBLIND STUDENT

Understanding the student with deafblindness requires an initial understanding of the condition of the PwD who presents different degrees of impairment of visual and auditory acuity, without corresponding to the sum of sensory deficits – consensus among several authors (Writer⁴, 1987; Freeman⁵ 1991; Wheeler; Griffin⁶ 1997; McInnes⁷ 1999, *apud* Cader-Nascimento; Costa, 2010). The elucidation of the conceptual aspects about the deaf person with low vision or deafblind person and the spelling of the word deafblindness

² Planning of SEA strategies and resources, prepared by the teacher responsible for the SES, containing the activities to be developed in the multifunctional resource room or equivalent.

³ Planning of curricular and pedagogical adaptations, to be developed in the common classroom, under the responsibility of the regent teacher.

⁴ WRITER, J. A movement-based approach to the education of students who are sensory impaired/multihandicapped. *In*: GOETZ, L.; GUESS, D.; STRENEL-CAMPBELL, K. **Innovative program design for individuals with dual sensory impairments**. Translated by Antonio Ballesteros Jaraiz. Baltimore: Paul H. Brookes, 1987. p. 191-223.

⁵ FREEMAN, P. **El bebé sordo ciego**. Um programa de atención temprana. Madrid: Editora ONCE, 1991.

⁶ WHEELER, L.; GRIFFIN, H. C. A movement based approach to language development in children who are deaf-blind. **American Annals of deaf**, Washington-DC, v. 142, n. 5, p. 387-390, December 1997.

⁷ MCINNES, J. M. Deaf blindness: a unique disability. *In*: MCINNES, J. M. (Org.). **A guide to planning and support for individuals who are deaf blind**. Toronto-Canada: University of Toronto Press Incorporated, 1999.

without hyphenation gives those who do so a human, real and objective look, both of the sensory condition and of the person with deafblindness.

The use of the spelling of the word deafblindness without hyphenation in Brazil, as recorded by Costa (2023), followed the initiative of the *International Association for the Education of the Deafblind*, noting that, until 1991, the word deafblindness was written with a hyphen. Writing with a hyphen demonstrated the classification of deafblindness "in the set of multiple disabilities", instead of its current "single disability character" (Costa, 2023, p. 19). The proposal of writing without the hyphen was presented by Salvatore Lagati, during the IX World Örebro Conference, in Sweden, in 1991, as he understood the existence of difficulties in deafblindness that went beyond auditory and visual impairment, with a multiplicative impact and not a sum of double damage (Batista, 2021).

Deafblindness is a unique condition that affects, together, the auditory and visual capacity in different degrees, compromising the acquisition of information at short and long distances and interfering with communication, spatial orientation and the mobility of the person – "a form of disability with specific problems that require special solutions" (Monteiro, 1996, p. 2). In the view of Cader-Nascimento and Costa (2010), the impairment characteristic of deafblindness leads to the "categorization of deafblind people into two levels: sensory and educational. The first describes the characteristics of the disability, while the second emphasizes the educational aspect, defining the most appropriate care for the deafblind person" (Cader-Nascimento; Costa, 2010, p. 20).

Batista (2021, p. 39), when exposing conceptual, classificatory, and etiological aspects of deafblindness, warns of the tendency to anchor deafblindness in the biomedical model, which favors the characterization of sensory impairment based on limitations and disabilities. The adoption of the social model, which guides educational care, contributes to the "understanding of the possibilities, potentialities, and singularities of deafblind people" – guiding elements of the SEA. Maia and Araóz (2001), when reporting the unique characteristics of deafblindness, emphasize the need for specific educational care and support for deafblind students.

Lagatti (1995), a professional in the field of deafblindness at the Pedagogical Consulting Service in Trento, Italy, when recognizing the specific and unique characteristics of deafblindness and proposing the spelling without hyphenation, argued that the deafblind person demands a series of strategies and specific resources in the process of communication, interaction and social action. In this sense, the statement of Cruickshank and Johnson (1979, p. 12), when praising the work of people and educators who contributed

to the advancement of education aimed at deafblind people, expressed that "it is auspicious that, in each decade and in each culture, there are certain people who speak without hesitation in the interest of certain causes that, when understood, constitute breaking down barriers from the *plateau* that had been reached."

Costa (2023, p. 19), when considering the social interaction of deafblind people, emphasizes that, in the educational environment, given the different profiles and the possibility of more challenging situations, there may be "the need for differentiated teaching processes in relation to their peers, with continuous and intense support, in addition to an alternative curriculum that meets their real needs".

In order to know the deafblind person, it is appropriate to draw a comparison between the deaf, blind, and deafblind person. There are characteristics common to each condition. However, each deaf, blind, or deafblind person has their singularities, traced by their own life history. In general terms, Batista (2021, p. 40) expresses it as follows:

While the deaf person establishes interactions with the environment through the visual-spatial field and the blind person interacts through the auditory-temporal field, the deafblind person needs the other senses and peculiar forms of communication to interact in their social context. Touch, smell and taste are the senses that remain as a source of information for the deafblind child, they play a fundamental role in the development of skills, from everyday to the most complex, and learning.

In view of the uniqueness of deafblindness, knowing and recognizing its specificities is a basic criterion for the SEA of the deafblind student, and can be favored through assistive technologies, since "it demands an even more careful and differentiated pedagogical process" (Batista, 2021, p. 40), when compared to deaf or blind students, to which the author ponders:

One cannot think of the junction of two methodologies for teaching: one for the deaf and the other for the blind. This understanding provokes us, as teachers and researchers in the field, to think and act with great creativity and willingness to deal with adverse situations that the social and pedagogical contexts demand so much from our profession. A great and important challenge (Batista, 2021, p. 40).

The challenge of implementing SEA for students with deafblindness consists in eliminating communication barriers, so that equal opportunities among students are present. Thus, the role of the guide-interpreter is fundamental, acting as a mediator of the inclusion of deafblind students. An essential point to be considered, as it favors the teaching

and learning process, both in the performance of the guide interpreter and in the activities provided for in the SEA, is the identification of the causes and the possible classification of deafblindness, basically differentiated between congenital and acquired.

Considering the different degrees of hearing and visual impairment of deafblindness, several authors have dedicated themselves to the work of classifying it (Jurgens, 1977; McInnes; Treffry, 1997; Tirado; Palacios, 1997), seeking to establish guiding criteria for the education of deafblind people. Cader-Nascimento and Costa (2010, p. 31) assess that none of the classifications established are sufficient to specify the amplitude of the "different degrees of deafness, nor the visual impairment." For the authors, there are

[...] the need for research that delimits more objective criteria, such as: degree of deafness, period of onset, specificity of visual loss, presence or absence of associated impairments, visual efficiency and performance in physical, cognitive, social, communicative and self-care activities. Thus, it may be possible to contribute to a classification closer to reality, addressing sensory and educational aspects (Cader-Nascimento; Costa, 2010, p. 31).

In a combination between the period of onset, the degrees of hearing and visual loss, and the prevalence of one or the other, Cader-Nascimento (2012) proposes the educational classification of deafblindness, supported by possible situations, ordered as follows: (a) moderate deafness associated with blindness (congenital or acquired); (b) moderate deafness associated with low vision (congenital or acquired); (c) severe deafness associated with blindness (congenital or acquired); (d) severe deafness associated with low vision (congenital or acquired); (e) profound deafness associated with blindness (congenital or acquired); and, (f) profound deafness, blindness, and physical disability (congenital or acquired). Each situation of deafblindness requires specific adaptations, through the use of a set of strategies and resources, aimed at the uniqueness of the deafblind person contemplated in the SEA. The current consensus is that, regardless of the existing classifications, there is a behavioral singularity of each deafblind person, depending on "how they establish contact with the environment and vice versa, what resource they use to communicate and whether they can be understood and understand the demands of their family, school, social and cultural universes" (Cader-Nascimento; Costa, 2010, p. 33).

Regarding the singularities of deafblind people, Telford and Sawrey (1988, p. 517) argue that "formal labels and categories are of some use, but they can never replace information concerning the individual person under study". Thus, the care of each student

with deafblindness requires a careful prior survey of the sensory aspects compromised and the respective forms of compensation, to be "considered at the time of evaluation and pedagogical intervention" (Cader-Nascimento; Costa, p. 2010, p. 32).

A careful preliminary evaluation, carried out by members of the pedagogical team, contributes to the elaboration of accurate and efficient SEA. In SEA, the specific needs of each student are contemplated, with equally specific educational strategies and resources, based on their own theoretical approaches. Amaral (2002) presents four of the main approaches in the education of deafblind students, with different theoretical perspectives, namely: (1) Piaget's theory of development; (2) Skinner's theory of behavioral modification; (3) the functional approach based on Brown, Certo and Gruenewald; and, Jan van Dijk's coercive approach.

Of the approaches mentioned above, the approach of educator van Dijk is the only one specifically constituted for deafblind students, based on studies developed with children who had severe communicative difficulties, resulting from congenital rubella syndrome, aiming at the development of the interactive process and communication. According to Nascimento, (2006, p. 17) van Dijk argues "that the motor experiences carried out by the child, together with the teacher, through coercive movement constitute the foundation and basis of development and learning", as it quantitatively and qualitatively favors interactions with objects and events and interpersonal relationships.

The coercive approach aims to "provide reference points that allow the child to organize his world, stimulating and motivating him to communicate and relate to the world around him" (Nascimento 2006, p.17), having as a central element the child's corporeality, added to his needs, desires and interests, which contributes to the development of teacher/student communication. Van Dijk's approach advances in six non-exclusive or exclusive phases, which can manifest itself simultaneously or sequentially, namely: (1) attachment and trust relationship; (2) resonance phenomenon; (3) coercive movement; (4) non-representative reference; (5) imitation; and, (6) natural gestures. By emphasizing the relevance of van Dijk's approach, Nascimento (2006, p. 43) asserts:

Its approach is based on the principle that the proposed activities/actions need to be carried out together, that is, the mediator (teacher, caregiver, parents, relatives or friends) and the child must perform movements and actions simultaneously. The performance of the activities must start from the child's interest, which is experienced and shared by the mediator. Considering the child's interests is extremely important, as it makes them share, understand and expand the reality in which they find themselves.

The coercive strategy occurs through sensory stimulation, which includes, among

other actions, frequent touches, attempts to maintain eye contact (even if the child is blind, it is important to develop the posture of the eyeball), stimulation of participation in children's games, joint mobility with the adult, union of motor activities between the deafblind child and the mediator and constant use of diversified forms of communication (speech, gesture, muscle tension or relaxation, body posture, sign, objects, verbal intonation, facial expression).

Having previous knowledge about van Dijk's approach contributes to the elaboration of the SEA, starting with the registration of students' interests, a factor that favors learning, by expanding the child's communication potential. Thus, it will be possible to develop an effective SEA, in which assistive technologies are inserted and can favor the intended learning.

SPECIALIZED EDUCATIONAL SERVICE: WHAT IS IT?

More than the legal provision, the SEA expresses the existential understanding of human uniqueness and unrepeatability. Each person is a unique and unrepeatable Being in the uniqueness of their existence and in the uniqueness of their essence (Frankl, 2010) – which applies to people with or without disabilities. Corroborating existential thinking, Batista (2021, p. 29) writes: "the emphasis on the individual and his uniqueness is essential when individuals with deafblindness are being considered". Directing the gaze to each student with deafblindness is a precondition in the SES, recognizing each deafblind student as a person who, despite sensory impairments and peculiar needs, is endowed with potentialities, possibilities and their own way of learning.

Different ways of learning require different ways of teaching. This statement summarizes the SEA which, designed for students with deafblindness, prioritizes accessibility in the broad sense and the adequacy of educational materials. In legal terms, the mandatory nature of SEA was established by the Constitution of the Federative Republic of Brazil of 1988, in its article 208, item III, determining as a duty of the State the "specialized educational service to the disabled⁸, preferably in the regular school system", valid for public and private educational institutions. Following the constitutional precept, the National Education Plan (PNE) of 2001, in goal 8, when dealing with special education, among other aspects, provided for specific care for each student, with the improvement of the qualification of teachers and the expansion of the offer of specialized training courses by universities and normal schools (Brasil, 2001).

⁸ Transcribed as it appears in the constitutional text, expressing the nomenclature of the time.

In the PNE established in 2014 for the 2014-2024 decade, special education constituted theme 4 with the following goal: "to universalize, for the population aged four to seventeen with disabilities, global developmental disorders and high abilities or giftedness, access to basic education and specialized educational service, preferably in the regular school system, with the guarantee of an inclusive educational system, multifunctional resource rooms, classes, schools or specialized services, public or contracted" (Brasil, 2014, p. 33).

The PNE for the 2025-2035 decade, among the 19 proposed objectives, provides for the provision of SEA in objective 10, concatenated with the access, permanence and learning of special education students and students who are the target audience of bilingual education for the deaf, which applies to deaf students with low vision.

Regarding the linguistic accessibility provided for students with deafblindness, according to the degree of impairment, Law No. 10,436/02 recognizes the Brazilian Sign Language as a legal means of communication and expression (Brasil, 2002a); Ordinance No. 2,678/02 approves guidelines and standards for the use, teaching, production and dissemination of the Braille system in all teaching modalities (Brasil, 2002b); and, Decree No. 5,626/05 provides for the inclusion of Libras as a curricular subject, the training and certification of teachers, instructors and translators and interpreters of Libras (Brasil, 2005).

In Decree No. 12,686/2025, the organization and provision of SEA are ordered in Chapter II which, among other provisions, as stated in article 11, paragraph 7, are no longer conditioned "to the requirement of diagnosis, report, report or any other document issued by a health professional", due to the didactic-pedagogical and curricular value of the SEA, whose specific knowledge is the domain of education professionals. In this aspect, the normative act denotes the appreciation and recognition of teaching knowledge.

In summary, the SEA is highlighted in the normative act – Decree No. 12,686/2025 – for:

- reaffirm SEA "as an articulating component of the educational process, and not a substitute for regular schooling (art. 8)";
- represent "an important instrument of individualized and collaborative planning, integrating the school's political-pedagogical project", with the participation of the family and the student (art. 12);

- innovate in the insertion of the case study with a "pedagogical and non-diagnostic focus", as a "legitimate mechanism for contextual observation and support planning, consistent with the social model of disability"; e,
- recognize the "school support professional (arts. 14 and 15) as an agent of the educational process", which "expands institutional co-responsibility and values care as a dimension of inclusion" (Autistas Brasil, 2025).

The relevance of SEA is confirmed in the normative act in reference, requiring the double enrollment of each student – one enrolled in SEA and the other in the regular class (art. 8). Article 9 of Decree 12,686/2025 establishes that, exceptionally, SEA may "be carried out in a Specialized Educational Service Center of the public school system or non-profit institutions, agreed with the Department of Education or with an equivalent body of the States, the Federal District or the Municipalities" (Brasil, 2025a). Nevertheless, to safeguard the uniqueness and uniqueness of each deafblind student, the performance of SEA in the school attended by the student ensures superiority in terms of knowing the person, strengthening bonds, sharing information and ensuring the effectiveness of educational inclusion. To this end, the school needs to ensure the updating and improvement of its SEA teachers, an aspect highlighted in the normative act, providing for the obligation to carry out continuing education courses, with a minimum workload of 360 hours. There is also the provision of a school support professional, with initial training at the secondary level and continuing education with a minimum workload of 180 hours, working in locomotion, hygiene, food, social interaction, communication, the use of assistive technologies and auxiliary resources, supported by individualization as part of SEA in all activities and school spaces inherent to students who are the target audience of special and inclusive education (Brasil, 2025a).

For students with deafblindness, in addition to the curricular and didactic-pedagogical aspects, the SEA must contemplate the issue of accessibility in the broad sense, including in the case study, in the PAEE and in the PEI – both derived from the case study. According to Decree No. 12,686/2025, article 6, accessibility is part of the objectives of the SES, aiming to encompass the qualification of the conditions of "access, permanence, participation and learning of students", in addition to the development and organization of resources "of accessibility that ensure access, permanence, learning and participation of students in all educational activities" (Brasil, 2025a).

The case study provided for in the SEA aims to identify each student, allowing to know the uniqueness of the life history of the deafblind student and, as established in Decree No. 12/686, art. 11, constitutes "methodology for producing, systematizing and recording information and strategies related to the SEA" (Brasil, 2025a). Therefore, the case study is carried out in the initial stage of the SEA, preceding the PAEE and the PEI; that is, the result of the case study is the basis for the PAEE and the PEI, with the effective involvement of the student with deafblindness and the family or guardians who participate in the care and daily monitoring of the student.

Bearing in mind that SEA gathers personal information, ethical care in the collection, storage and processing of data is essential, imposing the need for confidentiality and secrecy, as well as the terms of consent of parents or guardians of students, children or adolescents. Such prerogative is imbued with ethical and legal value, in view of the protection of personal data and sensitive information, provided for in Law No. 13,709/2018, the General Law for the Protection of Personal Data (Brasil, 2018), updated by Law No. 13,853/2019 (Brasil, 2019).

As for the case study, as stated in Decree No. 12,686/2025, article 11, paragraph 1, it must follow the "following steps: I - initial identification of individual demands and barriers; II - analysis of barriers and the school context; III - identification of potentialities and demands for student support; and, IV - definition of accessibility strategies and resources to eliminate barriers" (Brasil, 2025a). Pursuant to article 11, paragraph 6 of the aforementioned normative act, "the biopsychosocial assessment of disability may be used as a subsidiary document to the case study" (Brasil, 2025a). However, the exemption of reports or other documents issued by health professionals prevails.

The effective participation of the deafblind student and the family or guardians in the preparation of the case study favors the accuracy in recording the history of the strategies already developed, the existing demands and barriers, the potentialities and the process of monitoring and supporting the implementation of SEA in its entirety. The dialogue with intersectoral professionals (protection network, transportation, social assistance and health, among others) contributes to the expansion of the resources provided for in the SEA, aiming at the care of each student in their integrality of Being. Specifically, regarding accessibility resources in education, Decree No. 12,686/2025, art. 11, § 5, emphasizes "access to the curriculum, participation in school activities and development of learning," covering "technologies, services, strategies and adaptations that eliminate barriers in materials, environments, transportation, furniture and equipment,

communication and information systems and other dimensions of school life" (Brasil, 2025a).

The second component of the SEA is the PAEE, which, together with the PEI, aims to guide the activities of the SES, developed in the multifunctional resource room (SRM) and in the common classroom, respectively. The dialogue, interactive capacity and collaborative potential of the SEA teacher with the teacher of the common classroom, as well as the intersectoral articulation actions are essential for the success of special and inclusive education. The elaboration of the PAEE must follow the same standards as the elaboration of the PEI, as established by the education networks, and, in the face of students with deafblindness, each educational institution must issue a pedagogical opinion that defines "the use of portable digital devices, as an instrument of assistive technology in the learning, communication or socialization process", as provided for in Decree No. 12,686/2025, art. 12, § 4 (Brasil, 2025a).

As for the IEP, it is of variable periodicity, starting with the recording of information on usual communication, learning channels, existing barriers, personal interests, and necessary adaptations, based on educational and life history, in line with what is contained in the case study. The second aspect to be scored in the IEP gathers information on adaptive skills, with an emphasis on intellectual, conceptual, social, and practical skills. Next, the learning objectives are outlined, constituting the third step of the IEP, taking into account the environment, observable behaviors, and the characteristics of "communication, interaction, autonomy, mobility, and cognition" (Batista, 2021, p. 108) of the student.

Dee Fink's (2013) taxonomy of meaningful learning, duly adapted to students with deafblindness, is an effective reference in the definition of learning objectives, as it is focused on more striking and lasting learning experiences. The difference between the learning objectives and the educational objectives of Bloom's taxonomy consists of student centrality, since the objectives proposed by Fink should be focused on student interest and not on content.

Thus, Fink's taxonomy of meaningful learning is guided by six categories – fundamental knowledge, application, integration, the human dimension (the self and others), care (interests, values and feelings) and learning to learn (Fink, 2013). As Fink (2013, p. 273) ponders, education "needs the perspective that links teaching and learning to the quality of human life" – a perspective that is also primordial to the SEA of students with deafblindness.

Once the learning objectives have been defined, the fourth step of the IEP consists of describing the activities to be worked on, with a "detailed description of all the behaviors necessary to carry out a given task. The activities should be motivating and, preferably, carried out in the natural environment" (Batista, 2021, p. 108).

The fifth step comprises the recording of the instruction procedures, describing the development of each activity so that the student acquires the desired skill, with clear statements to be explained in detail, with the steps of the activity presented in the guided practice, with the activity that the student must develop alone (independent practice) and the substantial generalization to the repetition of the activity in other situations.

The penultimate step of the IEP corresponds to the evaluation strategies, with emphasis on continuous evaluation, centered on the proposed activities and on the acquisition of student skills in different contexts. The finalization of the elaboration of the IEP is carried out with the presentation of the list of materials and equipment necessary for the development of the skills to be taught, which, in most cases, includes materials found in the contexts corresponding to activities of daily living at home, at school and in the community.

ASSISTIVE TECHNOLOGIES INDICATED FOR STUDENTS WITH DEAFBLINDNESS

WHEN ASSESSING THE COMMUNICATION PATTERN OF STUDENTS WITH DEAFBLINDNESS, EACH ONE HAS THEIR OWN CHARACTERISTICS, GIVEN THE DIFFERENCES INHERENT TO DEAFBLINDNESS. THE SET OF ASSISTIVE TECHNOLOGIES EMERGES AS "AN IMPORTANT MEDIATOR IN THE COMMUNICATION OF DEAFBLINDNESS" (VILELA, 2020, P. 73). According to the Statute of Persons with Disabilities, as stated in its article 3, item III, assistive technology or technical help is defined as being

products, equipment, devices, resources, methodologies, strategies, practices and services that aim to promote functionality, related to the activity and participation of people with disabilities or reduced mobility, aiming at their autonomy, independence, quality of life and social inclusion (Brasil, 2015).

This concept reproduced the conception expressed by the Technical Aids Committee (CAT) which, established by Ordinance No. 142/2006 of the Special Secretariat for Human Rights of the Presidency of the Republic, recognized assistive technologies as

an area of knowledge, with an interdisciplinary characteristic, aiming to advance accessibility strategies, equal opportunities, and the inclusion of people with disabilities and reduced mobility (Sartoretto; Bersch, 2026; Brazil, 2006). Vilela (2020, p. 73) ponders that "instead of imagining complicated systems and latent difficulties, it is possible to think of assistive technology as an instrument that brings lightness and unique possibilities to people lacking some sensory senses, in this case, the deafblind". The author cites the human mediation of narratives as an integral part of assistive technologies, including the services, equipment, materials, and resources necessary for the SEA of the deafblind student.

In the objectives of the AEE, contemplated in Decree No. 12,686/2025, article 4, the development and organization of didactic-pedagogical and accessibility resources, as well as pedagogical strategies are highlighted, providing for the use of assistive technologies, duly constituted in educational institutions. Assistive technologies are ordered into five categories: (1) alternative and augmentative communication; (2) adapted computing; (3) pedagogical resources; (4) physical structure and sensory environment; and, (5) materials to support orientation and mobility.

Alternative and augmentative communication (AAC) is essential for establishing a dialogue with the deafblind. The following are materials, resources or equipment aimed at AAC: routine cards or calendars, with textures or symbols in high relief for time organization; reference objects to represent correlated activities, such as a personal hygiene or kitchen product to represent hygiene or eating activities, respectively; communication boards with tactical or embossed symbols; communication glove (Libras tactile), used by the guide-interpreter for communication by touch in the hands of the deafblind student; and the Braille machine, for writing in tactile Braille.

As for adapted computing, it corresponds to the category of assistive technology for access to information, including screen readers for computers and notebooks, such as Virtual Vision®, Jaws® – Job Access With Speech – and NVDA® – NonVisual Desktop Access, among others. There is also the Braille Display® device that translates the text of the computer screen into tactile Braille, as well as the printed Braille for the production of materials. The adapted keyboard, enlarged or with a honeycomb, is a resource that increases the precision of touch, facilitating typing. For the digitization and conversion of printed texts into audio, there is the scanner with voice and, for students with low vision, the electronic magnifying glass is a resource of great help.

The didactic-pedagogical and adapted resources are manipulable materials to favor the learning of reading, writing and mathematics, such as table and punch slates for manual

writing in Braille, the Soroban® for calculation, the movable alphabet in relief with different textures, the adapted teaching materials with relief engravings, models, concrete objects, as well as adapted educational games with different textures and high contrast, from bingo to dominoes and card or memory games.

With regard to the physical structure and sensory environment, the furniture accessible to the student must include comfortable chairs and work tables with height adjustment, aiming at the ergonomic protection of the deafblind student. The organization of the environment in terms of size, lighting and non-slip flooring constitutes care to prevent physical injuries, aiming at the physical protection of the student. The environments intended for students must also be provided with cabinets and shelves for the storage of materials for specific use always in the same places, in order to promote student autonomy with regard to being able to make use of the materials without depending on someone to locate them.

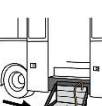
In order to favor autonomous locomotion, the materials to support orientation and mobility should include the long cane and sensory cues with changes in texture on the floor to indicate specific paths or areas. The sensory stimulation space is also recommended to the SEA of deafblind students, provided with a mattress, cushions and a ball of pillars for vestibular stimulation.

In a more detailed view, for didactic purposes, Sartoretto and Bersch (2026) order assistive technologies into 11 topics – aids for daily living, AAC, computer accessibility resources, environment control system, architectural projects for accessibility, orthoses and prostheses, postural adjustment, mobility aids, aid for the blind or with low vision, aids for the deaf or hearing impaired, and adaptations in vehicles (Chart 1). For students with deafblindness, assistive technologies will be applied in accordance with the provisions of the SEA, respecting the principle of individualization.

TABLE 1 – CLASSIFICATION OF ASSISTIVE TECHNOLOGIES: NOMENCLATURES, ARASAAC©SYMBOLS ⁹ AND DEFINITIONS

1 Aids for daily living		Materials and products to help with routine tasks such as eating, cooking, dressing, bathing and performing personal needs, home maintenance, among others.
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⁹ ARASAAC: Aragonese Center for Augmentative and Alternative Communication. Gobierno de Aragón (Spain), 2022.

2 AAC Augmentative and alternative communication		Resources, electronic or not, that allow expressive and receptive communication of people without speech or with limitations. Communication boards with the symbols ARASAAC, SymbolStix, Widgit, PCS or Bliss are used, as well as vocalizers and software dedicated to this purpose.
3 Computer accessibility features		Input and output equipment (speech synthesis, Braille), alternative access aids (head tips, light tips), modified or alternative keyboards, triggers and software (voice synthesis and recognition, among others) that allow people with disabilities to successfully access the computer.
4 Ambient control systems		Electronic systems that allow people with motor/locomotor limitations to remotely control electronic devices, door, window, curtain and similar opening systems, security, among others, located in the domestic and professional environments.
5 Architectural Designs for Accessibility		Structural adaptations and renovations in the home and/or work environment, through ramps, elevators, bathroom adaptations, among others, which remove or reduce physical barriers, facilitating the movement and use of these areas by people with disabilities.
6 Orthotics and prostheses		Exchange or adjustment of missing or compromised body parts for artificial limbs or other orthopedic resources (splints, supports, among others). Prosthetics are included to assist with cognitive deficits or limitations, such as magnetic or digital tape recorders that function as instant reminders.
7 Postural Adequacy		Adaptations for wheelchairs or other seating systems aiming at comfort and adequate distribution of pressure on the skin surface (special cushions, anatomical seats and backrests), as well as positioners and containers that provide greater stability and adequate body posture through support and positioning of the trunk/head/limbs.
8 Mobility aids		Manual and motorized wheelchairs, mobile bases, walkers, <i>scooters</i> and any other vehicle used to improve personal mobility.
9 Aids for the blind or with low vision		Resources that include magnifying glasses and lenses, Braille for equipment with voice synthesis, large printing screens, TV system with magnification for reading documents, Braille dot printers and embossed printers for publications, etc. Animals trained to accompany people in their daily lives are included.
10 Aids for the deaf or hard of hearing		Aids that include various equipment (infrared, FM), devices for deafness, telephones with keypad — teletype (TTY), systems with tactile-visual alert, light bells, among others.
11 Adaptations in vehicles		Vehicle accessories and adaptations that enable access to and driving of the vehicle, such as pedal arrangements, handlebar accessories, ramps and wheelchair lifts, in buses, vans and other motor vehicles modified for use in personal transportation.

SOURCE: Sartoretto and Bersch (2026).¹⁰

¹⁰ Content made freely available, and may be reproduced, in whole or in part, as long as the source is cited.

For Sartoretto and Bersch (2026), the importance of classifications in the field of assistive technology is due to the promotion of the organization of this area of knowledge", added to the contribution "to the study, research, development, promotion of public policies, organization of services, cataloguing and formation of a database to identify the most appropriate resources to serve" students with long-term functional needs. For students with deafblindness, assistive technologies are present in adapted didactic-pedagogical resources, in AAC, in the adaptation of games and play, in aid equipment for blind or deaf people and people with low vision or hearing deficit (Vilela, 2020).

Finally, it should be noted that the SRM were implemented in 2008 by Decree No. 6,571/2008, as spaces for the provision of SEA, "equipped with equipment, furniture, and didactic and pedagogical materials" (Brasil, 2008b) and reaffirmed in Decree No. 7,611/2011 – revoked by Decree No. 12,686/2025. The prerogative contained in Decrees No. 6,571/2008 and No. 7,611/2011 favored the concentration of assistive technologies in SRM, when students are also in regular classrooms. The limitation of assistive technologies to SRM does not meet what is intended in special and inclusive education.

Thus, Decree No. 12,686/2025 emphasizes the need for didactic-pedagogical resources and equipment related to assistive technology, without mentioning SRM, emphasizing classrooms and spaces for SEA. Thus, it is concluded that assistive technologies should be where students are and, being intended for student work, do not constitute support for teaching work. As for investment in assistive technologies, there is a provision for funding through the Direct Money at School Program (PDDE). Added to the resources of the Articulated Action Plan (PAA) and RNEEI, they also finance the continuing education programs of SEA teachers and school support professionals, under the terms provided for in the aforementioned Decree (Brasil, 2025a).

Assistive technologies, applied in the education of deafblind students, expand functional skills that, in addition to the educational process guided by SEA, favor personal autonomy, directed to the highest possible degree of independent life and to the fullness of educational and social inclusion. The effectiveness of SEA favors the appropriate choice of assistive technologies, through didactic-pedagogical resources that, by reducing or eliminating existing barriers, favor progressive access to curricular activities. The joint work between SEA teachers and the common classroom, with the direct participation of the student and the family, creating and recreating new resources and possibilities, requires commitment, professional competence and extensive knowledge in constant construction, based on student individualization.

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