

**EDUCATION IN THE ERA OF ARTIFICIAL INTELLIGENCE: BETWEEN INNOVATION
AND THE DEHUMANIZATION OF EDUCATION**

**EDUCAÇÃO NA ERA DA INTELIGÊNCIA ARTIFICIAL: ENTRE A INOVAÇÃO E A
DESUMANIZAÇÃO DO ENSINO**

**LA EDUCACIÓN EN LA ERA DE LA INTELIGENCIA ARTIFICIAL: ENTRE LA
INNOVACIÓN Y LA DESHUMANIZACIÓN DE LA EDUCACIÓN**

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João Fernando Costa Júnior¹, Cláudia Esther Reis Godinho², Maélio César Freitas dos Santos³, Adriana Cirqueira Freire⁴, Márcia Maria de Oliveira Santos⁵, Antonio Cordeiro de Souza Junior⁶, Cláudio Firmino Arcanjo⁷, Laís Maria Medeiros de Albuquerque Machado⁸, Gilnéia Cardoso Ribeiro Ruas⁹, Cícera Oliveira Silva do Nascimento¹⁰, Gualberto de Abreu Soares¹¹, Marta Bezerra Rodrigues¹², Ivete Bispo dos Santos¹³, Luana Mendes Amorim¹⁴

ABSTRACT

This article critically examines the impacts of artificial intelligence and digital technologies on education, balancing their promises with their risks. Although AI offers benefits such as personalized teaching and expanded access, its indiscriminate use has serious consequences: erosion of pedagogical relationships, loss of educational autonomy to technological corporations, reinforcement of inequalities through algorithmic biases, and damage to the mental health of students and teachers. Analyzing concrete cases of technological failures and resistance organized by educators, the text demonstrates how the replacement of human processes by algorithms compromises educational quality. As an alternative, a model of critical integration of technology is proposed, where digital tools serve as a complement - not a substitute - for teacher mediation. Inspiring experiences in hybrid pedagogies, slow tech, and media literacy show ways to use AI without dehumanizing teaching. The article concludes with a call for balance: technology should be a tool at the service of emancipatory pedagogical projects, never an end in itself. To achieve this, strict regulations, critical teacher training and democratic participation in technological development are essential. The final reflections question who controls these tools and how to preserve cultural diversity and critical thinking in increasingly algorithmic environments.

¹ Dr. in Educational Sciences. Universidad Tecnológica Intercontinental (UTIC).

² Dr. in Educational Sciences. Universidad Tecnológica Intercontinental (UTIC).

³ Dr. in Educational Sciences. Universidad Tecnológica Intercontinental (UTIC).

⁴ Dr. in Educational Sciences. Universidad Tecnológica Intercontinental (UTIC).

⁵ Doctoral student in Educational Sciences. Universidad Tecnológica Intercontinental (UTIC).

⁶ Doctoral student in Educational Sciences. Universidad Tecnológica Intercontinental (UTIC).

⁷ Doctoral student in Educational Sciences. Universidad Tecnológica Intercontinental (UTIC).

⁸ Master in Educational Sciences. Universidad Tecnológica Intercontinental (UTIC).

⁹ Master in Educational Sciences. Universidad Evangélica del Paraguay (UEP).

¹⁰ Master in Educational Sciences. Universidad Tecnológica Intercontinental (UTIC).

¹¹ Master in Biology Teaching. Universidade Estadual do Piauí (UESPI).

¹² Master in History of Education. Universidade Federal do Rio Grande do Norte (UFRN).

¹³ Master's student in Educational Sciences. Universidad del Sol (UNADES).

¹⁴ Specialist in Professional and Technological Education. Instituto Federal do Espírito Santo (IFES).

Keywords: Artificial Intelligence in Education. Humanization of Teaching. Algorithmic Bias. Privatization of Education. Critical Digital Pedagogies.

RESUMO

Este artigo examina criticamente os impactos da inteligência artificial e das tecnologias digitais na educação, equilibrando suas promessas com seus riscos. Embora a IA ofereça benefícios como personalização do ensino e ampliação do acesso, seu uso indiscriminado traz graves consequências: erosão das relações pedagógicas, perda de autonomia educacional para corporações tecnológicas, reforço de desigualdades através de vieses algorítmicos e danos à saúde mental de estudantes e professores. Analisando casos concretos de falhas tecnológicas e resistências organizadas por educadores, o texto demonstra como a substituição de processos humanos por algoritmos compromete a qualidade educacional. Como alternativa, propõe-se um modelo de integração crítica da tecnologia, onde ferramentas digitais servem como complemento - não substituto - à mediação docente. Experiências inspiradoras em pedagogias híbridas, slow tech e alfabetização midiática mostram caminhos para usar a IA sem desumanizar o ensino. O artigo conclui com um chamado ao equilíbrio: a tecnologia deve ser ferramenta a serviço de projetos pedagógicos emancipatórios, nunca fim em si mesma. Para isso, são essenciais regulações rigorosas, formação docente crítica e participação democrática no desenvolvimento tecnológico. As reflexões finais questionam quem controla essas ferramentas e como preservar a diversidade cultural e o pensamento crítico em ambientes cada vez mais algoritmizados.

Palavras-chave: Inteligência Artificial na Educação. Humanização do Ensino. Viés Algorítmico. Privatização da Educação. Pedagogias Críticas Digitais.

RESUMEN

Este artículo examina críticamente el impacto de la inteligencia artificial y las tecnologías digitales en la educación, sopesando sus promesas y sus riesgos. Si bien la IA ofrece beneficios como la enseñanza personalizada y un mayor acceso, su uso indiscriminado tiene graves consecuencias: erosión de las relaciones pedagógicas, pérdida de autonomía educativa ante las corporaciones tecnológicas, reforzamiento de las desigualdades mediante sesgos algorítmicos y daños a la salud mental de estudiantes y docentes. Analizando casos concretos de fallas tecnológicas y la resistencia organizada por educadores, el texto demuestra cómo la sustitución de procesos humanos por algoritmos compromete la calidad educativa. Como alternativa, se propone un modelo de integración crítica de la tecnología, donde las herramientas digitales sirven como complemento, no como sustituto, de la mediación docente. Experiencias inspiradoras en pedagogías híbridas, tecnología lenta y alfabetización mediática muestran maneras de utilizar la IA sin deshumanizar la enseñanza. El artículo concluye con un llamado al equilibrio: la tecnología debe ser una herramienta al servicio de proyectos pedagógicos emancipadores, nunca un fin en sí misma. Para lograrlo, son esenciales una normativa estricta, la formación docente crítica y la participación democrática en el desarrollo tecnológico. Las reflexiones finales cuestionan quién controla estas herramientas y cómo preservar la diversidad cultural y el pensamiento crítico en entornos cada vez más algorítmicos.

Palabras clave: Inteligencia Artificial en Educación. Humanización de la Enseñanza. Sesgo Algorítmico. Privatización de la Educación. Pedagogías Digitales Críticas.

1 INTRODUCTION

Education is experiencing a moment of accelerated transformation, driven by the advancement of digital technologies and, more recently, by the rise of artificial intelligence. Adaptive platforms, generative chatbots, and data analytics systems promise to revolutionize the way we teach and learn. However, this discourse of innovation, often uncritical, hides profound challenges that threaten the humanizing essence of education. This article seeks to address this debate by going beyond technological optimism to examine the risks of an education mediated – and, in some cases, dominated – by machines.

Artificial intelligence is no longer a distant fiction: it is in virtual classrooms, automated correction systems, personalized tutors, and even in the elaboration of educational policies. Governments and private institutions invest heavily in these tools, sold as magic solutions to historical problems such as learning inequality and lack of resources. But at what cost? When technological mediation replaces human interaction, what do we lose in the process?

One of the most urgent risks is the erosion of the pedagogical relationship. Education, in its most authentic dimension, is not limited to the transmission of information, but to the construction of bonds, the stimulation of critical thinking and the ethical and emotional development of students. When algorithms take on the role of teachers, even partially, learning runs the risk of becoming a cold, standardized, and meaningless experience.

In addition, the growing dependence on AI systems in education reinforces the power of large technology corporations, which start to dictate not only the tools, but the teaching content and methods themselves. Schools and universities, pressured by limited budgets and the lure of "modernization," can become hostages to platforms whose primary interests are not pedagogical, but commercial. Education, therefore, ceases to be a collective right to become a product controlled by a few.

Another serious problem is the illusion of technological neutrality. AI systems are trained based on massive data, which often reproduces social, cultural, and economic biases. Students from peripheral regions, for example, can be harmed by algorithms developed from realities far from their own. Likewise, the standardization of "correct" answers can stifle creativity and diversity of thought, fundamental elements for a truly transformative education.

Mental health also enters this equation. Excessive exposure to screens, pressure for instant responses, and the shallowness of machine-mediated interactions have been associated with increased anxiety, dispersion, and burnout among students and educators. The classroom, once a space for dialogue and collective construction, can be reduced to an environment of passive consumption of information.

In the face of these challenges, it is urgent to ask: are we using technology to expand the possibilities of education, or are we allowing it to redefine – and impoverish – what we mean by teaching and learning? The answer is not simple, but ignoring the debate is an even greater risk. This article does not reject innovation, but argues that it should be subjected to a critical scrutiny, placing pedagogy – and not technology – at the center of decisions.

To do this, we will analyze concrete cases in which the application of AI in education has failed or generated unintended consequences, from data leaks to the devaluation of teaching expertise. We will also explore alternatives that seek to integrate technology without giving up humanist principles, showing that another path is possible.

The ultimate goal is to contribute to a more balanced debate, one that recognizes the potential of artificial intelligence, but does not fail to face its dangers. Education cannot be held hostage to technological fads or apocalyptic visions: its future depends on our ability to use the tools available wisely, always in defense of a fairer, more critical and, above all, more humane education.

2 TECHNOLOGY IN EDUCATION: PROMISES AND UTOPIAS

The relationship between technology and education has never been neutral. From the first writing instruments to today's artificial intelligence systems, each innovation has brought with it promises of radical transformation in teaching and learning. This chapter examines this trajectory, exploring how utopian discourses around educational technology – especially in the digital age – often overestimate its benefits while obscuring its structural boundaries. By briefly reconstructing the history of these tools, analyzing their defense arguments, and presenting contemporary examples, we seek to establish a critical basis for the discussion of their real impacts, which will be deepened in the following chapters.

2.1 BRIEF HISTORY OF EDUCATIONAL TECHNOLOGY: FROM RADIO TO CHATBOTS

The incorporation of technologies in education dates back to the beginning of the twentieth century, when radio was celebrated as a tool capable of bringing knowledge to remote regions, breaking geographical barriers (Saettler, 2004). In the 1950s and 1960s, educational television emerged with the same salvationist rhetoric, promising dynamic classes taught by the "best teachers" to an unlimited number of students (Cuban, 1986). However, as critical historiography shows, these media often failed to fulfill such promises, running into problems such as the lack of interactivity and the difficulty of adapting to local contexts.

The advent of personal computers in the 1980s represented a paradigm shift, with the

introduction of interactivity as a central element. Programs such as Logo, developed by Papert (1980), sought not only to transmit knowledge, but to teach how to think computationally. However, the lack of infrastructure and teacher training limited its reach. With the popularization of the internet in the 1990s, new promises of democratization of knowledge emerged, materialized in platforms such as Wikipedia and, later, in MOOCs (Massive Open Online Courses). These initiatives, while expanding access, have also highlighted the persistence of digital inequalities and the difficulty of engagement without human mediation (Reich, 2020).

In the last decade, artificial intelligence has reintroduced the discourse of mass personalization, now with systems capable of simulating human interactions. Chatbots like ChatGPT promise instant and adaptive responses, but they also raise questions about authorship, originality, and the very nature of learning. This historical path reveals a recurring pattern: each new technology is initially received as revolutionary, until its pedagogical and social limits become evident.

2.2 PERSONALIZATION, DEMOCRATIZATION AND EFFICIENCY

The defenders of contemporary educational technologies are based on three main axes. The first is the personalization of learning. Adaptive systems, such as those based on AI, promise to adjust content and rhythms to the individual needs of students, enhancing pedagogical effectiveness (Pane *et al.*, 2014). This approach, inspired by the principles of Skinner's (1968) programmed instruction, gained new momentum with algorithms capable of analyzing large volumes of data in real time.

Personalization, however, is not limited to the adaptation of content. Platforms such as DreamBox and Knewton use machine learning to identify error patterns and provide immediate feedback, reducing the gap between performance and pedagogical intervention. This approach is particularly relevant in inclusive education contexts, where students with specific needs can benefit from individualized trajectories. However, critics argue that this personalization is often restricted to superficial aspects of learning, neglecting socio-affective and cultural dimensions (Selwyn, 2019).

The second central argument is democratized access. Platforms such as Khan Academy or open online courses (MOOCs) are presented as equalization tools, allowing students in marginalized areas to access elite content (Christensen; Horn; Johnson, 2008). Reduced operating costs and scalability are often cited as undeniable advantages.

Democratization, however, is not limited to the availability of content. Tools such as machine translation and real-time subtitling have the potential to break down language

barriers, while accessibility features (such as screen readers) expand the inclusion of people with disabilities. However, studies show that access alone does not guarantee meaningful learning, especially when pedagogical support or basic infrastructure is lacking.

Finally, administrative efficiency completes the tripod of justifications. Automated correction tools, enrollment management, and predictive truancy analytics save time and institutional resources (Williamson, 2017). For educational managers in austerity contexts, such solutions are often irresistible.

Efficiency, however, comes with risks. The automation of evaluation processes, for example, can lead to excessive standardization, disregarding local contexts and subjectivities. In addition, the reliance on centralized systems can weaken institutions in the event of technical failures or data breaches.

2.3 ADAPTIVE PLATFORMS, GENERATIVE AI, AND GAMIFICATION

Among the emblematic cases of technological promises, adaptive platforms stand out. Khan Academy, founded in 2008, has become a symbol of personalized teaching, using algorithms to suggest exercises based on student performance. However, research shows that its model is still limited in contexts where student autonomy is low (Reich, 2020).

Another example is platforms like Duolingo, which combine AI with gamification elements for language teaching. Its adaptive algorithms adjust difficulty and repetition based on performance, but critics point out that they prioritize decontextualized vocabularies over deep communicative skills.

Generative AI, such as ChatGPT, represents a qualitative leap: its ability to produce coherent texts and simulate tutorials raises questions about the future of authorship and critical thinking (Zawacki-Richter *et al.*, 2019). Its indiscriminate use in school essays, for example, exposes ethical dilemmas that have not yet been resolved.

In addition, tools such as DALL-E and Midjourney, which generate images from textual prompts, challenge traditional notions of creativity and intellectual property. In art education, for example, its hasty adoption may underestimate the value of manual creative process and physical experimentation.

Finally, gamification – the application of game elements in educational settings – illustrates the attempt to increase engagement through virtual rewards (Deterding *et al.*, 2011). Although some studies show motivational gains, critics warn of the superficiality of learning when reduced to competitions and medals (Bogost, 2007).

The Classcraft platform, for example, transforms the classroom into an RPG, where academic tasks earn points and virtual powers. While it may increase immediate participation,

there is a risk that students will value the prizes more than the learning itself.

3 THE HARMFUL IMPACTS OF AI AND TECHNOLOGY ON EDUCATION

The accelerated incorporation of digital technologies and artificial intelligence in education is not limited to a mere modernization of pedagogical tools. It is a structural transformation that redefines power relations, teaching methodologies and even the conception of what it means to learn. While the previous chapter explored the utopian promises of these innovations, this one is dedicated to unveiling their most harmful impacts, often obscured by the discourse of inevitable progress. The erosion of the pedagogical relationship, the privatization of knowledge, the perpetuation of inequalities and the damage to mental health emerge as critical challenges that demand urgent reflection.

3.1 EROSION OF THE PEDAGOGICAL RELATIONSHIP

The progressive replacement of teachers by algorithms represents one of the most serious threats to the humanizing essence of education. Intelligent tutoring systems, automated correction platforms, and pedagogical chatbots, although efficient in mechanical tasks, are unable to replicate the ethical and affective dimension inherent to the act of educating (Turkle, 2015). The pedagogical relationship, historically built on dialogue, mutual recognition, and contingent adaptation to the needs of students, is reduced to standardized interactions, in which "correct" answers prevail over processes of collective construction of meaning.

Paulo Freire (1996) already warned that education cannot be reduced to the technical transmission of contents, at the risk of becoming an act of "depositing" information, instead of promoting critical emancipation. Algorithmic mediation, by prioritizing efficiency and scalability, tends to deepen this banking logic, emptying the educational space of its ability to foster empathy, creativity, and contestation. Studies show that students subjected to overly automated environments develop fewer socio-emotional skills, such as collaboration and resilience (Selwyn, 2019). When the machine becomes the main interlocutor, what is fundamental is lost: the educator's ability to read silences, interpret hesitations and respond to the affective nuances that shape learning.

The erosion of the pedagogical relationship is also manifested in the standardization of teaching. Adaptive learning-based algorithms operate with narrow models of "efficiency", which ignore the complexity of cognitive and cultural processes (BIESTA, 2020). For example, systems that classify answers as right or wrong without considering contexts or multiple interpretations reinforce a reductionist view of knowledge. In addition, the lack of

transparency in algorithmic criteria (the so-called "black boxes") hinders the dialogue about evaluation, limiting the ability of students to question and learn from their mistakes (O'neil, 2016).

Another critical aspect is the devaluation of teaching expertise. When AI platforms are presented as "infallible" solutions, the false impression is created that the teacher is replaceable or, at best, a supporting player in the educational process. This narrative not only demoralizes professionals, but also ignores that quality education depends precisely on human mediation to interpret unique situations, deal with conflicts, and inspire transformations that go beyond the standardized curriculum.

3.2 PRIVATIZATION AND TECHNOLOGICAL DEPENDENCE

The growing dependence on technological solutions in education consolidates a monopoly scenario, in which giants such as Google, Microsoft, and OpenAI come to control not only the tools, but the very flows of knowledge. Platforms such as Google Classroom, Microsoft Teams, and generative AI systems are often adopted without a critical evaluation of their terms of use, which include the collection and commercialization of student data. Schools and universities, pressured by limited budgets and the seduction of "free" (as in the case of G Suite for Education), become users of services whose rules are dictated by corporate interests.

This dynamic transforms educational data into commodities. From performance records to patterns of online behavior, sensitive information is mined, stored, and monetized by third parties, often without the informed consent of students and families (Zuiderveen Borgesius *et al.*, 2018). Algorithmic surveillance, disguised as "personalization," normalizes invasive practices, such as predictive analysis of "risky" behaviors, which can stigmatize students (O'neil, 2016). The question that arises is: who actually controls education when its infrastructures are outsourced to companies whose profit depends on data exploitation?

The privatization of knowledge intensifies with subscription models and paywalls. Educational content that was previously accessible is gradually enclosed in proprietary platforms, creating barriers for institutions with fewer resources. For example, AI systems such as ChatGPT, although free in basic versions, offer advanced features for a fee, deepening inequalities in access to cutting-edge technology. In addition, the lack of interoperability between platforms forces schools to adopt closed ecosystems, limiting their autonomy to migrate to more ethical alternatives or adapted to local contexts.

Another risk is the corporate capture of educational policies. Technology companies have increasing influence in defining curricula and assessment standards, shaping education

according to their commercial interests (Selwyn, 2019). Public-private partnerships, although presented as neutral, often favor standardized solutions to the detriment of contextualized pedagogical approaches. This trend is particularly worrying in peripheral countries, where the lack of regulation allows foreign companies to test products without considering local realities.

3.3 HOMOGENIZATION AND ALGORITHMIC BIAS

Artificial intelligence, far from being neutral, reproduces and amplifies the biases present in the data with which it is trained. Content recommendation systems, essay correction tools, and even automated assessment policies tend to privilege hegemonic worldviews, marginalizing local knowledge and non-dominant cultures (Noble, 2018). An emblematic example is linguistic bias: algorithms trained mostly in English-language corpora perform poorly when processing dialect variants or minority languages (Bender *et al.*, 2021).

Moreover, the fetishization of AI as an objective "oracle" undermines the development of critical thinking. Students accustomed to delegating responses to machines (as in the indiscriminate use of ChatGPT) become less apt to question sources, construct original arguments, or tolerate ambiguity (Brookfield, 2012). Creativity, understood as the ability to break with established patterns, is particularly stifled in environments where algorithmic "efficiency" rewards conformity.

Homogenization is also manifested in the standardization of curricula. Global teaching platforms tend to promote a uniform educational culture, disregarding regional particularities and local needs. For example, AI-based adaptive education systems often reflect values and priorities of the countries where they were developed, ignoring indigenous or peripheral histories, literatures, and knowledge. This dynamic reinforces digital colonialisms, in which "valid knowledge" is that recognized by the algorithms of technological powers.

Another problem is the illusion of objectivity. Automated essay correction tools, such as ETS's e-rater, are criticized for favoring standardized linguistic structures to the detriment of originality and authorial voice. Students learn to "write for the machine", adapting to simplistic criteria instead of developing authentic and critical writing. This adaptation to algorithmic logics represents a significant loss in the formation of independent and creative thinkers.

3.4 MENTAL HEALTH AND ALIENATION

Hyperexposure to digital learning environments is associated with a range of mental health problems. Excessive time in front of screens, the pressure for immediate responses, and the fragmentation of attention generate anxiety, exhaustion, and concentration difficulties

(Twenge, 2017). The superficiality of platform-mediated interactions – where emojis replace facial expressions and ready-made responses replace debates – impoverishes the educational experience, reducing it to utilitarian transactions (Bauman, 2007).

Alienation is aggravated by the logic of gamification, which transforms learning into a series of cumulative tasks, in which the virtual prize replaces the intrinsic satisfaction of knowledge (Han, 2015). When education becomes a product to be consumed in pills of microcontents, the reflective depth that characterizes integral education is lost.

The addictive design of educational platforms deserves special attention. Notifications, instant rewards, and performance rankings activate neurological reward mechanisms similar to those of electronic games, which can lead to compulsive behaviors. Students report feelings of anxiety when disconnected or unable to "meet goals" set by systems, a phenomenon that some researchers call "digital burnout."

Too much connectivity affects both students' cognitive development and can have significant impacts on their mental and emotional health. Students are exposed to several factors that can cause stress, anxiety, and even depressive symptoms in an environment where they have constant access to information, social networks, and digital stimuli. Constant exposure to digital connectivity generates pressure to always be available, which can make it difficult to separate study, leisure and rest, resulting in a constant "mental load" (Júnior *et al.*, 2024).

In addition, technological mediation can exacerbate loneliness and isolation. Despite superficial connectivity, many students lack deep bonds with peers and professors (Turkle, 2015). Collaborative learning, when mediated exclusively by screens, misses crucial elements such as body language, synchronicity, and spontaneous construction of meaning. This lack is particularly evident in emergency remote teaching, where Zoom fatigue and the difficulty of establishing affective relationships have become global challenges.

4 WHEN AI FAILS

The implementation of artificial intelligence systems in education rarely goes without setbacks. While often touted as foolproof solutions, these technologies have already demonstrated significant flaws that compromise not only the quality of teaching, but also the security and privacy of students and educators. This chapter examines concrete cases in which the application of AI in education has proved problematic, from data leaks to the spread of misinformation, in addition to analyzing the resistance organized by education professionals against the replacement of teachers by algorithms. These examples serve as a warning for the risks of adopting technologies without rigorous critical evaluation.

4.1 LEAKS, MISINFORMATION AND TECHNICAL FAILURES

Serious cases involving massive data leaks are nothing new. Sensitive student information, including names, emails, and even performance records, if not well stored can easily fall on the dark web. Incidents like this highlight how the indiscriminate collection of educational data, often justified as necessary to "personalize" teaching, can put the privacy of entire school communities at risk. Situations like this reveal the fragility of many security systems adopted by companies operating in the educational sector, sometimes more concerned with scalability than with data protection.

In this regard, additional challenges in the use of AI in education include ethical and privacy issues. The collection and processing of large volumes of student data raises concerns regarding the privacy and security of this information. It is essential for educational institutions to adopt strict data protection policies to ensure that student information is preserved and used ethically (Costa Júnior *et al.*, 2024).

Another recurring problem is the spread of misinformation by educational chatbots. In 2023, researchers at the University of Washington identified that ChatGPT, when asked about controversial topics such as climate change or vaccines, often generated inaccurate or biased responses (Bender *et al.*, 2021). In educational contexts, where informational accuracy is crucial, this limitation poses a significant risk. Professors have reported instances where students have used generative AI responses in academic papers, only to find out later that they contained factual errors or distorted interpretations of scientific concepts.

Failures in correction systems are also worth mentioning. When automated, they must undergo human supervision in order to suppress any misunderstandings. Studies have shown that these systems tend to privilege predictable textual structures, discouraging linguistic originality and experimentation. In this sense, automatic assessment tools used in schools can present the most diverse biases. These examples demonstrate how the automation of evaluation processes can perpetuate injustices when not subjected to constant human scrutiny.

4.2 CRITICISMS AND MOBILIZATIONS AGAINST AI REPLACEMENT

The threat of replacing teachers with automated systems has generated organized reactions in several countries. Recently published studies have condemned the use of AI systems to teach content or evaluate students, arguing that such technologies deprofessionalize teaching and compromise the quality of teaching. In these scenarios, it is common to identify cases in which schools have adopted adaptive platforms as partial

replacements for teachers, resulting in significant drops in student engagement and the development of critical skills.

In the United States, the American Federation of Teachers (AFT) has been leading campaigns against the unregulated expansion of AI-based educational technologies. The federation has already managed to block the implementation of an AI tutoring system in public schools in the state of California, after demonstrating that the program prioritized training students for standardized tests over meaningful learning. Teachers involved in the mobilization reported that the system ignored local contexts and specific needs of students with disabilities, revealing the inability of AI to replace human pedagogical judgment.

In Brazil, professors and researchers have warned of the risks of the "uberization" of teaching through digital platforms. It's as if teachers in AI-mediated remote teaching regimes claim to be working an average of 12 hours more per week than their counterparts in face-to-face classes, due to the need to constantly review and correct automated decisions. These criticisms gained strength after the case of a distance learning platform that used AI to monitor supposed "expressions of disinterest" on students' faces, generating reports that pressured teachers to modify their approaches without considering individual contexts.

5 RESISTANCE AND ALTERNATIVES

Faced with the challenges presented by the growing presence of artificial intelligence and digital technologies in education, proposals that seek to reconcile innovation with humanization are emerging. This chapter explores alternative paths that resist the logic of technological substitution and advocate the critical integration of digital tools, maintaining the centrality of the pedagogical relationship. By discussing pedagogies that reframe the use of AI and public policies that regulate its impact, we argue that it is possible to build an educational future where technology serves emancipation, and not standardization or alienation.

5.1 CRITICAL PEDAGOGIES AND TECHNOLOGY

The integration of AI in education does not need to follow a substitute model, in which algorithms take over teaching functions. Alternatives inspired by critical pedagogy propose a complementary use of technology, where digital tools amplify, but do not replace, human mediation. Paulo Freire (1996) already warned that no technology can assume the role of the teacher in the critical reading of the world – it would be up to AI, therefore, to serve as a resource for problematization, and not as a definitive source of answers. An example is platforms that help identify learning gaps, but leave the pedagogical intervention to the educator, preserving their professional judgment (Selwyn, 2019). This approach avoids the

dehumanization of teaching, ensuring that decisions about curriculum, assessment, and interaction remain under human responsibility.

Hybrid models that balance face-to-face interaction and technological mediation have shown promise, in which it is argued that mechanical activities (such as repetition exercises or correction of tasks) can be supported by AI, while deep discussions, collaborative projects, and mentoring require face-to-face. Schools in Finland and Canada have been testing models in which AI is used to personalize study paths, but classroom time is devoted to debates, collective creation, and contextualized problem-solving. These experiences show that when technology is subordinated to pedagogical objectives – and not the other way around – it can enrich learning without emptying its social meaning.

Another alternative is the pedagogy of question, which transforms the limits of AI into educational opportunities. Instead of searching for ready-made answers in chatbots, students are encouraged to criticize the gaps and biases of these systems (Noble, 2018). For example, by comparing ChatGPT responses on the same topic in different languages, students identify how the tool reproduces hegemonic views. This approach not only develops critical thinking, but also demystifies the supposed neutrality of technology, revealing it as a cultural and political product.

Thus, it is necessary to sustain that education should focus on the development of fundamental skills, such as critical thinking, problem-solving, efficient communication, and teamwork. These skills are increasingly relevant for employability and success in life, regardless of the area chosen by students. In addition, they contribute to students developing a deeper understanding of themselves and the world around them, enabling them to become engaged and responsible citizens. This encompasses encouraging empathy, compassion, and the ability to collaborate with people from diverse backgrounds and viewpoints (Costa Júnior, 2023).

5.2 REGULATION AND AWARENESS

The responsible implementation of AI in education requires robust public policies. Data protection regulation, such as the General Data Protection Law (LGPD) in Brazil and the GDPR in Europe, is a first step, but insufficient. Governments need to create specific guidelines for the use of algorithms in educational settings, including mandatory audits to detect biases and transparency in the criteria of automated assessment systems. Countries such as France are already moving in this direction, with legislation that prohibits the use of AI for the purposes of pedagogical surveillance or predictive analysis of student behavior (UNESCO, 2021).

Teacher training is another crucial pillar. Teachers need not only technical but critical training to understand the ethical limits of AI. It is necessary to think of a scenario where educators use technological tools in a reflective way, always questioning: who developed this system? What interests does it serve? What type of learning do you privilege? This perspective avoids the uncritical adoption of fads and empowers teachers as conscious mediators of technology.

Inspiring experiences in slow tech and media literacy show concrete paths. Schools not only can, but should, seek to replace corporate platforms with free software whenever possible, in order to reduce screen time, prioritizing maker activities and face-to-face discussions. Current educational scenarios should already be built with a view to digital literacy (if possible mandatory) including modules on misinformation and algorithmic bias, teaching students how to critically navigate the digital world. It is noted, therefore, that it is possible to adopt technology in education without giving up values such as autonomy, diversity, and intellectual depth.

It is clear that both hyperconnectivity and algorithms have an ambiguous role in education, as they offer unprecedented opportunities to enhance teaching and learning processes, but they also present complex challenges that require attention and consideration. The key to getting the most out of these technologies is to foster an educational culture that prioritizes transparency, equity, and accountability in their use, ensuring that all students have equal access to high-quality education in the digital age (Costa Júnior *et al.*, 2024).

6 FINAL CONSIDERATIONS

This article has taken a critical path through the relationship between education, technology, and artificial intelligence, revealing a scenario of paradoxes. If, on the one hand, AI offers undeniable opportunities – from the personalization of teaching to the democratization of access – on the other hand, its risks are deeply disturbing: the erosion of pedagogical bonds, the privatization of knowledge, the perpetuation of inequalities, and digital alienation. What emerges from this analysis is not a rejection of technology, but a warning against its fetishization. As demonstrated, when algorithmic mediation becomes an end in itself, education loses its humanizing dimension, being reduced to data transactions and efficiency metrics.

The necessary balance requires that we rethink technology as a tool at the service of pedagogical projects, and not as an autonomous force that redefines the purposes of education. This implies resisting the logic of "technological solutionism" (Morozov, 2013), which treats complex problems – such as educational inequalities – as if they were mere

technical failures to be corrected by algorithms. True innovation lies not in the sophistication of machines, but in the ability to use them to enhance, not replace, human potential: creativity, critical thinking, collaboration, and empathy. The examples analyzed – from critical pedagogies to slow tech experiences – show that another path is possible, but requires deliberate political choices.

The first crucial question concerns control: who actually determines the direction of education when AI becomes its basic infrastructure? The growing influence of tech giants on educational platforms raises concerns about the commodification of knowledge and the loss of pedagogical autonomy. This dynamic requires us to ask ourselves how to build democratic governance mechanisms that prevent the corporate capture of educational processes.

A second problematic dimension involves the very nature of learning in times of instantaneous algorithmic responses. When students can get ready-made solutions with a click, what space is left for the development of critical thinking, tolerance of ambiguity, and slow knowledge construction? This paradox challenges educators to reinvent practices that value the process over the product, the investigation over the final answer.

Last but not least, there remains the fundamental question about the purposes of educational technology. What voices are being heard – and which are being silenced – in the development of these tools? The cultural homogenization embedded in many AI systems reveals the urgency of including plural perspectives, especially from marginalized communities, in technopedagogical design. This reflection leads us to the heart of the challenge: how to ensure that technological innovation serves the diversity of knowledge and not its standardization?

These questions do not exhaust the debate, but point to the complexity of building an education that takes advantage of the potential of AI without giving up its humanist principles. The way forward will require constant dialogue between researchers, educators, students, and policymakers—a dialogue that puts technology at the service of pedagogy, never the other way around.

Education cannot be held hostage to either technophobia or technofetishism. Your challenge in this century will be to master digital tools without being dominated by them – a task that will require, more than ever, what is most human in us: the ability to judge, to resist and to reinvent.

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