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WHEN TECHNOLOGY GETS IN THE WAY: INVISIBLE RISKS IN MODERN EDUCATION

QUANDO A TECNOLOGIA ATRAPALHA: RISCOS INVISÍVEIS NO ENSINO MODERNO

CUANDO LA TECNOLOGÍA SE INTERPONE EN EL CAMINO: RIESGOS INVISIBLES EN LA EDUCACIÓN MODERNA

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ABSTRACT

This article addresses the invisible risks of the increasing use of technology in modern education, which, despite its evident benefits such as broadening access to knowledge and personalizing teaching, can generate negative impacts on student performance and well-

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being. Among the main risks discussed are distractions caused by digital devices, reduced face-to-face social interactions, and technological dependence, which compromise attention, socio-emotional development, and critical autonomy. The physical and psychological impacts of excessive screen use are also examined, such as eye strain, sleep disorders, and anxiety, which harm students' health. The article highlights the consequences for learning, such as superficial teaching and difficulty in developing critical thinking, based on studies that demonstrate inadequate pedagogical practices. To mitigate these effects, it proposes strategies for balanced and conscious use of technology, emphasizing responsible pedagogical approaches, harmonious integration with traditional methods, and school policies that guide the safe use of digital resources. The final reflection highlights the importance of balancing technology and in-person teaching, valuing human interaction and the critical thinking development of students, and points to the need for future research that delves deeper into the impacts and innovative pedagogical strategies for the effective use of technology.

Keywords: Educational Technology. Technological Dependence. Socio-emotional Development. Critical Autonomy. Conscious Use of Technologies.

RESUMO

O artigo aborda os riscos invisíveis do uso crescente da tecnologia na educação moderna, que, apesar de seus benefícios evidentes, como a ampliação do acesso ao conhecimento e a personalização do ensino, pode gerar impactos negativos no desempenho e bem-estar dos estudantes. Entre os principais riscos discutidos estão as distrações causadas por dispositivos digitais, a redução das interações sociais presenciais e a dependência tecnológica, que comprometem a atenção, o desenvolvimento socioemocional e a autonomia crítica. Também são examinados os impactos físicos e psicológicos do uso excessivo de telas, como a fadiga ocular, distúrbios do sono e ansiedade, que prejudicam a saúde dos alunos. O artigo destaca as consequências para a aprendizagem, como o ensino superficial e a dificuldade no desenvolvimento do pensamento crítico, embasadas em estudos que evidenciam práticas pedagógicas inadequadas. Para mitigar esses efeitos, propõe estratégias de uso equilibrado e consciente da tecnologia, enfatizando propostas pedagógicas responsáveis, integração harmoniosa com métodos tradicionais e políticas escolares que orientem o uso seguro dos recursos digitais. A reflexão final ressalta a importância do equilíbrio entre tecnologia e ensino presencial, valorizando a interação humana e a formação crítica dos estudantes, e aponta para a necessidade de futuras pesquisas que aprofundem os impactos e estratégias pedagógicas inovadoras para uso eficaz da tecnologia.

Palavras-chave: Tecnologia Educativa. Dependência Tecnológica. Desenvolvimento Socioemocional. Autonomia Crítica. Uso Consciente das Tecnologias.

RESUMEN

Este artículo aborda los riesgos invisibles del creciente uso de la tecnología en la educación moderna, que, a pesar de sus evidentes beneficios, como la ampliación del acceso al conocimiento y la personalización de la enseñanza, puede generar impactos negativos en el rendimiento y el bienestar estudiantil. Entre los principales riesgos que se discuten se encuentran las distracciones causadas por dispositivos digitales, la reducción de las interacciones sociales presenciales y la dependencia tecnológica, que comprometen la atención, el desarrollo socioemocional y la autonomía crítica. También se examinan los impactos físicos y psicológicos del uso excesivo de pantallas, como la fatiga visual, los

trastornos del sueño y la ansiedad, que perjudican la salud de los estudiantes. El artículo destaca las consecuencias para el aprendizaje, como la enseñanza superficial y la dificultad para desarrollar el pensamiento crítico, con base en estudios que demuestran prácticas pedagógicas inadecuadas. Para mitigar estos efectos, se proponen estrategias para un uso equilibrado y consciente de la tecnología, enfatizando enfoques pedagógicos responsables, la integración armoniosa con los métodos tradicionales y las políticas escolares que guían el uso seguro de los recursos digitales. La reflexión final destaca la importancia de equilibrar la tecnología y la enseñanza presencial, valorando la interacción humana y el desarrollo del pensamiento crítico de los estudiantes, y señala la necesidad de futuras investigaciones que profundicen en los impactos y las estrategias pedagógicas innovadoras para el uso efectivo de la tecnología.

Palabras clave: Tecnología Educativa. Dependencia Tecnológica. Desarrollo Socioemocional. Autonomía Crítica. Uso Consciente de las Tecnologías.

1 INTRODUCTION

Technology has become ubiquitous in the educational environment, transforming pedagogical practices and forms of interaction between teachers and students. While technological advances have introduced a number of benefits, such as easier access to information and the personalization of learning, they also bring risks that often remain invisible. These risks, ranging from distractions to impacts on students' health and cognitive development, deserve careful attention to ensure that technology does not become an impediment, but rather an enabler of education.

The purpose of this article is to critically review the existing literature on the risks associated with the use of technology in modern education, highlighting the invisible impacts that can compromise academic performance and student well-being. It is also intended to present strategies for the balanced and conscious use of technological resources, in order to promote an integration that values human interaction and effective pedagogical approaches.

In today's landscape, technology is widely used in education to expand the possibilities of teaching and learning. Digital tools facilitate access to diverse materials, promote collaboration, and offer interactive resources that enrich the educational process. The use of virtual platforms, educational applications and mobile devices is growing, which shows a movement towards the modernization of educational practices. The recognized benefits include the flexibility of learning time and space, encouragement of student protagonism and support for the personalization of teaching.

However, it is necessary to consider the side effects that accompany this technological expansion. The ease of access and the amount of digital stimuli can disperse students' attention, impairing concentration and the deepening of knowledge. In addition, the gradual replacement of face-to-face communication with screen-mediated interactions can negatively impact social and emotional aspects that are important for the integral development of students.

Another relevant point concerns the physical and mental health of students, often affected by the prolonged use of digital devices. Problems such as eye fatigue, changes in the sleep cycle, and increased anxiety are consequences that are increasingly documented in the literature. Such conditions, although not always apparent, directly interfere with the quality of learning and school performance.

Finally, it is essential that schools, educators, and families are aware of these challenges so that technology, although present, does not dominate or harm the educational process. The construction of pedagogical practices that consciously integrate digital resources, respecting human limits, is a promising way to ensure more effective and healthy teaching.

The methodology adopted in this article is the bibliographic review, through the critical analysis of academic publications, books and scientific articles related to the use of technology in education and its adverse effects. This approach allows the survey and synthesis of the main theoretical and empirical contributions on the subject, providing a broad and grounded view of the invisible risks and possibilities for a more balanced use of technology in teaching.

2 THEORETICAL FOUNDATION ON TECHNOLOGY AND EDUCATION

The use of technology in education has been widely discussed in various fields of knowledge, where different theories and pedagogical approaches seek to explain and guide this integration. This theoretical foundation seeks to present the main conceptions and developments that support the relationship between technology and teaching, providing a critical and historical understanding of the technological evolution applied to the educational process.

Theories related to technology in education include concepts of technological mediation and scientific paradigms that impact pedagogical practice. According to Adão *et al.* (2024), educational technology can be understood as a paradigm that involves shared beliefs, values, techniques, and theories, influenced by cultural, political, and social factors. For technological mediation to be effective, it is essential that educators recognize their limits and potential, promoting pedagogical innovation with responsibility and ethics. Other perspectives consider technologies as tools for inclusion and accessibility, highlighting universal design for learning (UDL) and assistive technology as complementary to ensure school inclusion (Melo *et al.*, 2024). In fact, it is important to emphasize that inclusion transcends the simple act of allowing everyone to participate; it is a commitment to equity, diversity, and respect for human dignity (Costa Júnior *et al.,* 2024).

Still, in learning theories, authors such as Dewey and Freire emphasize an active, democratic and critical education, which can be enhanced by the use of technology when it serves the emancipation of the student (Laurindo *et al.*, 2023).

Starting from the historical aspects, it is important to say that technological advancement in teaching has gone through different phases, from the initial use of audiovisual resources and personal computers to the adoption of digital technologies and distance education. The twentieth century saw the introduction of technologies such as radio, television, and video, which gradually took on an important role in pedagogical mediation. With the advent of the internet and mobile devices, teaching has gained new possibilities, including virtual learning environments and interactive resources. This technological evolution has brought profound transformations in the school structure and teaching methods, making technology an indispensable tool in the contemporary educational context.

The flexibility provided by the use of mobile devices, which offer communication and information anywhere and at any time, brings with it the idea of ubiquity, that is, being present everywhere at any time, being omnipresent:

> [...] Technological development has led me to the conviction that the contemporary condition of our existence is ubiquitous. Because of hypermobility, we become ubiquitous beings. We are, at the same time, somewhere and outside of it. We intermittently become present-absent people. Mobile devices offer us the possibility of perpetual presence, near or far, always presence. We are approached for any purpose at any time and we can be in contact with other people regardless of their location and tasks at the time, which gives us a feeling of omnipresence. Ubiquitous body, mind and life. Undoubtedly, this brings side effects, a certain state of frenzy caused by the paradox of presence and at the same time of the constant upheaval in the various physical, psychological and computational conditions (Santaella, 2013, p.16).

As for the pedagogical approaches that use technology, the integration of active methodologies stands out, where the student assumes a leading role and technology works as a support for knowledge construction processes. Hybrid or blended learning models combine face-to-face classes with virtual activities, seeking a balance between human interaction and digital resources (Casagrande; Maieski; Alonso, 2023). In addition, virtual learning environments (VLE) and educational platforms facilitate the personalization of content and individualized monitoring, promoting more flexible learning.

Wrapped in this scenario full of connections, Gabriel (2013, p. 15) makes a very blunt statement about being and being connected:

> Internet broadband enabled the important shift from "being connected" to "being connected." "Being" connected means that you eventually get in and out of the internet, [...] "Being" connected means that part of you is in the network – you live in symbiosis with it (p. 15).

These approaches show that technology, when aligned with well-founded pedagogical proposals, can enhance the critical, autonomous and collaborative training of students.

3 INVISIBLE RISKS OF TECHNOLOGY IN MODERN EDUCATION

The growing use of technology in the educational environment, despite its numerous advantages, presents a number of often hidden risks that negatively impact student learning and development. These invisible risks go beyond technical issues and involve cognitive, social and emotional aspects relevant to the educational process, requiring careful analysis so that their use is effectively beneficial.

Distractions caused by digital devices are one of the main concerns in contemporary education. The constant presence of notifications, messages, and multiple tabs open on computers and mobile devices tends to fragment students' attention, making it difficult to concentrate for the long time needed for deep learning. Although technologies offer tools that can enrich the classroom, inappropriate use can lead to dispersion and reduced ability to focus, leading to impairments in academic performance. The consequence is superficial learning, in which students are unable to fully absorb and process the content presented.

Another visible risk is the reduction of face-to-face social interactions between students and teachers due to the increase in digital mediation. This decrease in face-to-face coexistence compromises the socio-emotional development of students, which depends on direct interaction for the development of skills such as empathy, communication, and cooperation. The lack of personal exchange can cause a feeling of isolation and fragility in interpersonal relationships, affecting the school environment and the emotional well-being of students.

Lévy (1999, p. 7) points out his point of view in relation to this very complex theme:

> In general, they consider me an optimist. They are right. My optimism, however, does not promise that the Internet will magically solve all the cultural and social problems of the planet. It consists only in recognizing two facts. Firstly, that the growth of cyberspace is the result of an international movement of young people eager to experiment, collectively, with forms of communication different from those that the

> classical media propose to us. Secondly, that we are experiencing the opening of a new space of communication, and it is only up to us to explore the most positive potentialities of this space in the economic, political, cultural and human spheres (p. 7).

In addition, technological dependence can lead to the loss of critical autonomy and decreased problem-solving skills. Overuse of digital tools such as search engines and quick-response apps can reduce students' ability to think independently, reflect critically, and solve problems on their own. Such dependence harms cognitive development and weakens student protagonism, making teaching a mechanical and unreflective process.

4 PHYSICAL AND PSYCHOLOGICAL IMPACTS OF EXCESSIVE SCREEN USE

The intensive and prolonged use of digital devices has raised growing concerns regarding the physical and psychological impacts on students' health. Although these devices offer several facilities for teaching and learning, excessive exposure can cause adverse effects that compromise general well-being and academic performance. The main impacts identified in the literature are discussed below.

Digital eye strain, also known as computer vision syndrome, is a common problem associated with prolonged screen use and has been widely researched in recent years due to the growth in the use of electronic devices. CVS is characterized by a set of visual and ocular symptoms resulting from prolonged exposure to screens. These symptoms include eye strain, dryness, blurred vision, headaches, and visual discomfort. Constant exposure to blue light emitted by digital devices can impair the circadian cycle, affect sleep quality, and lead to progressive myopia, particularly in children and young people (Edem *et al.,* 2024). According to *Binda et al.* (2025), this condition includes symptoms such as irritation, dry eyes, feeling tired, blurred vision, and headache, resulting mainly from continuous exposure to the blue light emitted by devices and the lack of adequate breaks. The phenomenon is aggravated by poor posture and reduced blinking while using screens, culminating in visual discomfort and potential aggravation of eye problems such as myopia and dry eye syndrome. Preventive strategies such as regular breaks, correct ergonomics, and blue light filters are recommended to minimize these impacts.

Binda *et al.*, (2025), when they point out that the excessive use of electronic devices is directly linked to visual and systemic symptoms, such as eye strain, dryness, headache, and sleep problems. In addition, prolonged exposure to blue light, decreased blinking

frequency, and inadequate ergonomic factors contribute significantly to the worsening of these symptoms, making CVS an emerging public health issue.

As for sleep disorders, exposure to the lights emitted by screens, especially at night, interferes with the production of melatonin, a sleep-regulating hormone. According to Aquino and Fonseca (2025), this interference causes delays in sleep onset, lower quality of rest, and increased daytime sleepiness. The excessive use of digital devices in the hours close to bedtime has been associated with difficulties in falling asleep and a reduction in total rest time, which directly affects students' concentration and cognitive performance.

In addition to the physical effects, the psychological impacts of excessive use of technology are also evident. Excessive screen time is correlated with high levels of anxiety, stress, and depressive symptoms among children and adolescents Continuous use, especially on social networks and virtual environments, can generate social pressures, harmful comparisons, and isolation, aggravating emotional distress. The lack of balance between online and offline time contributes to mental overload and decreased ability to manage emotions, compromising students' mental health and academic performance.

While the physical and psychological impacts of long-term use of digital devices are widely recognized, it is critical to go beyond diagnosing these issues to implement effective solutions in the educational context. The promotion of healthy habits, such as regular breaks during the use of screens, visual hygiene practices, and the encouragement of outdoor activities, should be systematically incorporated into the school routine. In addition, teacher training needs to include strategies to identify signs of digital fatigue and emotional discomfort, equipping them to act preventively. Clear school policies and the continuous awareness of students and families are also essential to control the time and quality of device use, avoiding the exacerbation of symptoms.

Another critical aspect is the challenge of balancing the use of technology with the development of students' socio-emotional and cognitive skills. Excessive use of screens and continuous exposure to virtual environments can impair the ability to concentrate, cause social isolation, and inhibit the development of important life skills, such as empathy, resilience, and communication. In this sense, technology should be a mediated resource, which complements face-to-face interactions and enriches pedagogical practices, without replacing them. The school should seek to provide learning contexts that integrate the digital with the human, valuing active participation, dialogue, and critical thinking.

Finally, the mental health of students requires special attention in the face of the

impacts of hyperconnectivity. The feelings of anxiety, stress and social pressures derived from the intensive use of networks and the digital environment reinforce the need for multidisciplinary interventions involving educators, psychologists and families. Emotional and digital education programs should be incorporated into school practices to strengthen students' autonomy in managing time online and offline, promoting balance between different aspects of life. The future of education depends on the ability of the educational system to promote a conscious and healthy use of technology, ensuring the integral well-being of students.

5 CONSEQUENCES FOR LEARNING AND TEACHING

The massive introduction of technologies in the educational environment has brought numerous changes, but it has also highlighted problems that affect the quality of teaching and learning. Among the main challenges, superficial teaching and the difficulty of developing complex cognitive skills, such as critical thinking, stand out. These negative impacts stem, in large part, from the inappropriate and decontextualized use of technology, which can reduce the depth of knowledge and autonomy of students.

Superficial teaching is a frequent consequence of the misuse of technology in education. As addressed by Corti and Silva (2022), many contents are treated quickly, in little depth, and with a bias very close to the popular language of social networks, focusing more on quantity than on the quality of learning. This happens, for example, when the use of technologies replaces reflective study with ready-made and superficial information, making it difficult to internalize concepts. Such an approach compromises the student's comprehensive education and preparation to face complex challenges.

Additionally, misused technology can hinder the development of critical thinking and other essential cognitive skills. The excessive dependence on digital resources that offer instant answers tends to reduce the capacity for analysis, synthesis and autonomous problem solving. The student, instead of building knowledge, starts to act passively, which limits his intellectual and critical growth. Encouraging the reflective and active use of technology is, therefore, essential to reverse this situation. If we go further and consider the skills relevant to the twenty-first century, according to Bray and McClaskey (2015, p. 7), they would be the set of essential skills for success in the digital age, including "critical thinking, creativity, collaboration, communication, and digital literacy".

It is known that, in certain schools, there is a predominance of activities mediated by

repetitive slides and videos, which do not stimulate the active participation of students. In addition, the superficiality of digital materials was associated with low content retention and demotivation in deeper investigations. This evidence indicates the need to rethink technological integration to promote more meaningful teaching.

The excessive use of technologies in the educational environment has created a scenario of transformations and challenges that require deep and critical reflection. It is essential to recognize that the introduction of technology cannot be seen as a magic solution that will automatically guarantee the improvement of teaching. The excessive emphasis on the use of digital resources, without the proper pedagogical contextualization, generates a superficial form of teaching, where the amount of information prevails over the significant construction of knowledge. Easy access to ready-made answers, widely available through digital tools, often limits the development of critical thinking, which is crucial for forming autonomous and reflective students.

It is also perceived that, in environments where technology is widely present (referring here to conditions where children and young people handle digital devices) the deep reading of books or even slightly more elaborate excerpts of texts, these same individuals do not present their totality in terms of learning and content retention. In this sense, Júnior *et al.*, (2023) highlights that reading plays a fundamental role in the development of cognitive areas, such as memory, attention, and language. Reading challenges us to store and retrieve information, which improves our ability to memorize and retain knowledge. This works as an exercise for the brain, activating neural functions (synapses). In this way, reading stimulates concentrated attention, since focus and concentration are necessary to understand the text.

In addition, the role of the teacher in this context gains even more relevance, as he needs to act in a mediating and creative way to prevent technology from transforming the classroom into a mechanical and repetitive environment. Teacher training is, therefore, essential for the educator to know how to combine the best of digital solutions with practices that encourage the active participation of students, dialogue and the deepening of the themes. Without continuous training and aligned pedagogical planning, technology can reinforce passive and demotivating methods, hindering effective learning.

It is necessary to be aware that "in the daily pedagogical practice of teachers, the way of using technology must be rethought in order to offer students tools that enable a more complete and current training. The contemporary teacher must break the paradigms

of traditional pedagogy and readapt to new trends" (Costa Júnior *et al.,* 2022, p. 58).

In fact, Allegretti and Jimena maintain that the challenges faced by teachers when integrating technologies are related to three fundamental issues:

> [...] the need for the teacher to be aware that he should be the only source of information for the student; that the appropriation of a new technological resource requires knowledge of the technical and communicational potential of this resource, and to recognize to what extent the same applies to the pedagogical approach used (2007, p. 4).

Finally, it is essential to consider that access to technology is not uniform in all educational contexts, which widens inequalities and can compromise initiatives that seek innovation. School infrastructure, training and pedagogical support need to go hand in hand so that technology is an ally in building quality education. Rethinking technological integration with a focus on the depth of learning, critical formation, and student protagonism is an urgent and necessary path to face the contemporary challenges of education.

6 STRATEGIES FOR THE BALANCED AND CONSCIOUS USE OF TECHNOLOGY

To mitigate the invisible risks of technology in education, it is necessary to adopt strategies that promote the balanced and conscious use of digital resources. These strategies involve responsible pedagogical proposals, the harmonious integration of technology with traditional methods, and the implementation of school policies that guide and limit potential negative effects. The objective is to ensure that technology positively complements the teaching-learning process, without replacing human interaction and efficient pedagogical practices.

Pedagogical proposals for the responsible use of digital resources argue that technology should be incorporated into educational planning in an intentional and critical way. According to Fanti (2019), the role of the teacher is fundamental to mediate the use of technologies, promoting activities that stimulate reflection, creativity and active participation of students. Technology needs to serve as a means to achieve clear learning objectives, valuing student interaction and engagement, avoiding mechanical or merely substitutive use of traditional methods.

It should be said that technological resources should help to build "knowledge by making impossible or very discouraging operations or manipulations accessible" if reduced to pencil and paper (Perrenoud, 2000, p. 133).

Marins (2024) also highlights that it is necessary to reflect on this topic, because, although the connectivity offered by technology is considered a facilitator to overcome the physical and conventional barriers of classrooms and traditional teaching, the enormous amount of information available in the digital environment can have the opposite effect in relation to learning.

The integration of technology with traditional methods and human interaction is pointed out as an effective way to maximize educational benefits. Silva, Bilessimo and Machado (2021) highlight that hybrid models, which combine face-to-face teaching with digital resources, promote richer learning by favoring direct contact between teachers and students, expanded by technological tools that personalize teaching. This approach values the development of socio-emotional and cognitive skills, ensuring that technology does not become an impediment to building interpersonal relationships in the school environment.

Coll (2007) makes a very relevant point on the subject when he says that

> [...] the incorporation of ICT into classroom activities is not necessarily, and not in itself, a factor of transformation and innovation in educational practices. On the contrary, ICT reveals itself rather as a reinforcing element of existing educational practices, which is to say that they only reinforce or promote innovation when they are inserted in a broader dynamic of educational change (Coll, 2007, p. 124).

Finally, school policies play a crucial role in limiting the risks of indiscriminate use of technology. It is necessary to implement regulations that guide the use of digital devices, such as rules for exposure time, moments of disconnection, and training of educators for the qualified pedagogical use of technologies. Such policies aim not only to protect the health and well-being of students, but also to ensure that technology is used ethically, responsibly, and in line with institutional educational objectives.

7 FINAL CONSIDERATIONS

We have witnessed a society that values the immediate and faces the acceleration of time. Despite this constant social movement, which has been experienced throughout the ages, with entries and exits marked by crises, we experience everything in a more cyclical and fast way. Bauman (2001) describes that we live in a time of "liquid modernity", in which relationships, values and institutions become progressively fluid and unsolid, and in which speed and instability predominate in everyday experiences. Exactly for this reason such a subject deserves and needs to be widely and constantly discussed, since education

is a field that needs depth, and this, unfortunately, is enemy number one of the most popular scenarios in which we find technology.

Therefore, and in the expectation of making relevant notes on the aspects surrounding technology, this article addressed the invisible risks associated with the growing use of technology in modern education, highlighting the cognitive, social, physical and psychological impacts that can harm the educational process. The problem of digital distractions, the reduction of face-to-face interactions and technological dependence that affect students' critical autonomy was analyzed.

In addition, the effects of excessive use of screens on eye health, sleep disorders and psychological disorders were discussed, showing the complexity of the consequences for students. There was also a reflection on the negative implications for learning, such as superficial teaching and the weakening of critical thinking, supported by studies that show insufficient pedagogical practices. Finally, strategies for the balanced and conscious use of technology were presented, including pedagogical guidelines, integration with traditional methods and school policies that limit risks.

Reflecting pragmatically, the balance between technology and face-to-face teaching is essential to enhance educational benefits without compromising essential aspects of human development. Technology should be perceived as a resource that complements, not replaces, the direct interaction between teachers and students, which is irreplaceable for social-emotional learning and the critical construction of knowledge. The adoption of hybrid models, which combine face-to-face teaching with digital resources, is a viable alternative to combine flexibility and quality, as long as there is adequate pedagogical planning, continuous teacher training and sufficient infrastructure. This balance also contributes to the promotion of digital inclusion, considering the different socioeconomic realities of students.

The healthy process of integrating technology in education depends on continuous and critical teacher training that provides skills for the effective and reflective use of digital resources. This training should go beyond technical learning and address the pedagogical, ethical, and social aspects involved in technological mediation. Training teachers for hybrid and flexible environments is not only about teaching the use of tools, but about developing the ability to rethink traditional methodologies, promoting teaching that values critical thinking, collaboration, and student autonomy.

Teacher training combined with clear school policies favors the construction of

pedagogical practices that avoid superficial teaching, stimulating the active participation of students and the critical appropriation of knowledge. In addition, schools that encourage student awareness of the risks of excessive use of screens contribute to comprehensive education, taking care of the student's physical and mental health. It is in this balance between technology and human care that the school can become a healthy learning space, where digital complements and does not replace personal interaction.

It is important to highlight that teacher training must consider the rapid technological and social transformations, offering permanent support for teachers to update their practices according to contemporary demands. Lack of preparation can result in inappropriate use of technology, reinforcing the passive and fragmented model of learning. Investing in critical training is, therefore, also investing in pedagogical innovation that enhances students' protagonism and reflection.

In addition, school policies need to establish clear guidelines for the balanced use of technologies, defining adequate times, advising on breaks, and promoting practices that minimize negative impacts on students' health and performance. This set of strategies forms an educational environment that promotes well-being and meaningful learning, aligning technology with well-defined pedagogical objectives.

Finally, raising awareness among the school community, including teachers, students, and families, is essential for technology to be used in a critical, ethical, and healthy way. From the collaboration and dialogue between these actors, it is possible to build a school culture that values the balance between the digital world and human needs, preparing students to act competently and responsibly in an increasingly connected society.

For future research, it is crucial to deepen empirical investigations on the impact of new educational technologies in different school contexts and age groups, evaluating their effects on student performance and well-being. Innovative strategies that enhance active, collaborative, and critical learning should also be explored, taking advantage of the best in digital tools. From the point of view of educational practices, inclusive policies are recommended that enable equitable access to technological resources, permanent teacher training and clear protocols to limit the negative effects of technology, ensuring an education that adapts to the challenges of the twenty-first century without losing its human character.

REFERENCES

Adão, J. M., & et al. (2024). Abordagem paradigmática da tecnologia educacional na educação: Análise e novas perspectivas. Caderno Pedagógico, 21(6), Article e4789. https://doi.org/10.54033/cadpedv21n6-061

Aquino, F. S., & Fonseca, H. P. M. da. (2025). Impacto do uso prolongado de telas na saúde visual e neurológica de crianças e adolescentes: Uma revisão integrativa. Bionorte, 14(1), 10–20. https://doi.org/10.47822/bn.v14iSuppl.1.1257

Bauman, Z. (2001). Modernidade líquida. Jorge Zahar Editor.

Binda, I. C. S., & et al. (2025). Impacto das telas e uso excessivo de dispositivos digitais na saúde ocular: Uma revisão sobre a Síndrome da Visão Computacional. Brazilian Journal of Biological Sciences, 12(26), Article e153. https://doi.org/10.21472/bjbs.v12n26-008

Bray, B., & McClaskey, K. (2015). Make learning personal: The what, who, WOW, where, and why. Corwin.

Casagrande, A. L., Maieski, A., & Alonso, K. M. (2023). Tecnologias digitais na educação pós-pandemia e educação híbrida: Efeitos, lições e possibilidades. EmRede - Revista de Educação a Distância, 10. https://doi.org/10.53628/emrede.v10i.970

Coll, C. (2007). Aprender e ensinar com as TIC: Expectativa, realidade e potencialidade. In R. Carneiro, J. C. Toscano, & T. Diaz (Orgs.), Os desafios das TIC para as mudanças na educação. OEI & Fundação Santillana.

Corti, A. P., & Silva, J. A. (2024). A aula virou slide: O ensino de Sociologia entre telas e resistências. #Tear: Revista de Educação, Ciência e Tecnologia, 13(2). https://doi.org/10.35819/tear.v13.n2.a7446

Costa Júnior, J. F., & et al. (2024). A inteligência artificial como ferramenta de apoio à inclusão. Cuadernos de Educación y Desarrollo, 16(4), Article e4076. https://doi.org/10.55905/cuadv16n4-161

Costa Júnior, J. F., Moraes, L. S., & Lopes, L. C. L. (2022). Reflexões sobre as TICs - Tecnologias da Informação e Comunicação e as Metodologias Ativas no Processo de Ensino-aprendizagem. In C. N. Cavalheiro & L. K. A. Lima (Orgs.), Caminhos da Educação: Concepções e Desdobramentos (Vol. 2, pp. 41–62). Editora MultiAtual. https://educapes.capes.gov.br/handle/capes/717446

Edem, G. D., & et al. (2024). The impact of blue light on eye health: A brief review. Clinical Research and Clinical Reports, 3(12). https://doi.org/10.31579/2835-8325/110

Fanti, R. (2019). Utilização de tecnologias como instrumento de aprendizagem no ensino fundamental: Reflexões sobre práticas pedagógicas. Revista Científica Multidisciplinar Núcleo do Conhecimento, (8, Vol. 07), 116–134.

Gabriel, M. (2013). Educ@ar: E (r)evolução digital na educação. Saraiva.

Júnior, J. F. C., & et al. (2023). Os impactos da leitura na cognição e no desenvolvimento do pensamento crítico. Revista Educação, Humanidades e Ciências Sociais, Article e00106.

Laurindo, A. P., & et al. (2023). Diálogos e reflexões sobre teorias da aprendizagem: Dewey e Freire – Uma discussão para o Ensino CTS (Ciência, Tecnologia e Sociedade). IPÊ ROXO, 5(1). https://doi.org/10.61389/iproxo.v5i1.6596

Lévy, P. (1999). Cibercultura. Ed.34.

Marins, G. C. S. de. (2024). Tecnologia e educação: Desafios e oportunidades. Revista Científica Multidisciplinar Núcleo do Conhecimento, (3, Vol. 01). https://doi.org/10.32749/nucleodoconhecimento.com.br/letras/tecnologia-e-educacao-desafios

Melo, L. C., Serra, A. R. C., & Veras, W. A. (2024). As inter-relações entre desenho universal para aprendizagem e da tecnologia assistiva na perspectiva da educação inclusiva. Quaestio - Revista de Estudos em Educação, 26, Article e024037. https://doi.org/10.22483/2177-5796.2024v26id5449

Perrenoud, P. (2000). Dez novas competências para ensinar. Artmed Editora.

Santaella, L. (2013). Comunicação ubíqua: Repercussões na cultura e na educação. Paulus.

Silva, J. B. da, Bilessimo, S. M. S., & Machado, L. R. (2021). Integração de tecnologia na educação: Proposta de modelo para capacitação docente inspirada no TPACK. Educação em Revista. https://periodicos.ufmg.br/index.php/edrevista/article/view/37433