DIGITAL TECHNOLOGIES IN EDUCATION: A CRITICAL LOOK AT SOCIETY, TECHNOLOGY AND CULTURE

AS TECNOLOGIAS DIGITAIS NA EDUCAÇÃO: UM OLHAR CRÍTICO SOBRE SOCIEDADE, TECNOLOGIA E CULTURA

TECNOLOGÍAS DIGITALES EN LA EDUCACIÓN: UNA MIRADA CRÍTICA A LA SOCIEDAD, LA TECNOLOGÍA Y LA CULTURA

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ABSTRACT: In this article, we propose a critical analysis of the relations between society, technology, and culture, considering the challenges and opportunities that emerge in the contemporary context. The study is based on the perspective that digital technologies are not only support tools, but constitutive elements of social and cultural transformations that affect educational practices. The literature review dialogues with authors such as Kenski (2007), Brito and Purification (2015), Morozov (2018), and Pischetola *et al.* (2019), among others, that address the political, pedagogical, and epistemological implications of the use of digital technologies in education. The research was carried out through a bibliographic study of a qualitative nature and descriptive-explanatory design (Gil, 2008). The results point to the need for teachers to critically appropriate digital technologies, which enables the development of innovative, participatory, and dialogical pedagogical situations.

KEY-WORDS: Education. Digital technologies. Teacher training.

RESUMO*: Neste artigo, propomos uma análise crítica das relações entre sociedade, tecnologia e cultura, considerando os desafios e as oportunidades que emergem no contexto contemporâneo. O estudo fundamenta-se na perspectiva de que as tecnologias digitais não são apenas ferramentas de suporte, mas sim elementos constitutivos das transformações sociais e culturais que afetam as práticas educativas. A revisão de literatura dialoga com autores como Kenski (2007), Brito e Purificação (2015), Morozov (2018), Pischetola et al. (2019), entre outros, que abordam as implicações políticas, pedagógicas e epistemológicas do uso das tecnologias digitais na educação. A pesquisa caracteriza-se como um estudo bibliográfico de natureza qualitativa e delineamento descritivo-explicativo (Gil, 2008). Os resultados apontam para a necessidade de uma apropriação crítica das tecnologias digitais pelos docentes, que possibilite o desenvolvimento de situações pedagógicas inovadoras, participativas e dialógicas.*

PALAVRAS-CHAVE: *Educação. Tecnologias digitais. Formação docente.*

RESUMEN*: En este artículo, proponemos un análisis crítico de las relaciones entre la sociedad, la tecnologia y la cultura, considerando los desafíos y las oportunidades que surgen en el contexto contemporáneo. El estudio se basa en la perspectiva de que las tecnologías digitales no son solo herramientas de apoyo, sino también elementos constitutivos de las transformaciones sociales y culturales que afectan las prácticas educativas. Los diálogos de revisión de la literatura con autores como Kenski (2007), Brito y Purificación (2015), Morozov (2018), Pischetola et al. (2019), entre otros, que abordan las implicaciones políticas, pedagógicas y epistemológicas del uso de tecnologías digitales en la educación. La investigación se llevó a cabo a través de un estudio bibliográfico de naturaleza cualitativa y diseño descriptivo-explicativo (Gil, 2008). Los resultados apuntan a la necesidad de apropiación crítica de las tecnologías digitales por parte de los maestros, lo que permite el desarrollo de situaciones pedagógicas innovadoras, participativas y dialógicas.*

PALABRAS CLAVE: *Educación. Tecnologías digitales. Formación de profesores.*

Introduction

In this article, we propose a critical reflection on the relationship between society, technology, and culture in the contemporary context. The study is justified by the importance of understanding the social and cultural transformations resulting from the technological development of society. The text is part of the research "*O uso das tecnologias digitais nos anos iniciais do Ensino Fundamental: a voz das pesquisas* (The use of digital technologies in the early years of elementary school: the voice of research)", carried out at the State University of Northern Paraná (UENP), whose general objective was to investigate and analyze the pedagogical potential of digital technologies, as enhancers for learning in the early years of elementary school.

According to Brito and Purificação (2015, p. 22) it is strategic to recognize that "we live in a 'technologized' society, which generates demands of various kinds". People's daily lives, whether in the countryside or in the city, are permeated by situations in which technology is present and necessary. In education, particularly at school, teachers must be aware of their role in a technological society and not just know how to manipulate the tools. On the contrary, they must incorporate a critical appropriation of digital technologies into their reflections and teaching (Brito; Purificação, 2015).

The aim of this article is to reflect on the potential and challenges of information technology in education, as well as to warn against the misconceptions that can jeopardize the use of digital technologies in promoting meaningful learning[3] for students. The scientific and social importance of this study lies in the need to expand research in this area to contribute to advancing pedagogical knowledge.

In addition, contemporary society demands that we monitor and question the technologies that are part of people's daily lives, including the educational context. The research is characterized as a qualitative bibliographical study with a descriptive-explanatory design (Gil, 2008). As a technical procedure, we carried out a bibliographical survey to provide a theoretical basis for the object of study. The research involved reading, analyzing, and interpreting different types of material, such as books, articles, periodicals, and newspapers, in order to learn about different scientific contributions that would enable new interpretations.

[3] According to Moreira (2011, p. 26) "meaningful learning is the process by which new information (new knowledge) is related in a non-arbitrary and substantive (non-literal) way to the cognitive structure of the learner." We suggest you read it: Moreira, M. A. Meaningful learning: an underlying concept. Significant Learning in Review. V1 (3), p. 25-46, 2011. Available at: http://www.if.ufrgs.br/asr/artigos/Artigo_ID16/v1_n3_a2011.pdf. Accessed on: 04 Jul. 2023.

In discussing the implications of digital technologies for education, the text is divided into five sections that address different aspects of this theme. In the first section, we reflect on digital education and the challenges it poses. In the second section, we examine how technologies affect educational culture and ways of learning and teaching. In the third section, we investigate the nature of technology as a cultural artifact and its potential and limitations in the educational sphere. The fourth section discusses the relationship between technology, technique, and the pedagogical equipment used in educational practice. Finally, in the fifth section, we make some concluding remarks on the main issues raised by the article and point to possible avenues for future research.

Research paths: outlining objectives

In order to understand the object of study, a bibliographical survey was carried out to investigate the guiding problem of the work and thus seek to answer the proposed objectives. According to Gil (2008), research consists of choosing systematic procedures to describe and explain phenomena. This research will have a qualitative approach and a descriptive-explanatory design (Gil, 2008).

This is why we chose methodological procedures that make it possible to analyze the phenomenon in a particular way, which is characteristic of qualitative research. According to Minayo (2002, p. 21-22, our translation), qualitative research:

> In the social sciences, it is concerned with a level of reality that cannot be quantified. In other words, it works with the universe of meanings, motives, aspirations, beliefs, values, and attitudes, corresponding to a deeper space of relationships, processes, and phenomena that cannot be reduced to the operationalization of variables.

However, in light of the above, the theoretical conception of the qualitative approach studies specific issues of the object investigated, in order to explain or understand a phenomenon and process. Thus, from this perspective of analysis, the researcher's creativity and subjectivity are referenced when analyzing and identifying complex issues in a clear, coherent, concise, and systematic way in order to understand the functioning of relationships based on meanings and senses.

From the theoretical reflections, it was possible to critically analyze the relationships between society, technology, and culture, considering the challenges and opportunities that emerge in the contemporary context. According to Gil (2008), this model was chosen for "the

fact that it allows the investigator to cover a much wider range of phenomena than could be researched directly" (Gil, 2008, p. 50, our translation). In parallel, Lima and Mioto (2007) add the idea that:

> It is possible to state that in order to carry out bibliographical research, it is essential to follow non-random paths since this type of research requires a high degree of epistemological vigilance, observation, and care in choosing and following methodological procedures (Lima; Mioto, 2007, p. 44, or translation).

Even so, it can be understood that bibliographical research consists of selecting, analyzing, and reflecting on a theoretical study by renowned authors. From this perspective, books, and scientific articles from magazines, journals, and newspapers, among others, are selected, enabling the researcher to obtain countless data and specific details of a given phenomenon, from different types of material and scientific contributions on the subject, with a view to analyzing the information in depth, which will lead the research to new interpretations.

Therefore, this technical procedure allows us to draw from the works consulted and scientific contributions in order to understand the object under investigation. However, it requires the researcher to follow an orderly path of methodological procedures, return to the defined objectives, coherence in the studies, and definition of hypotheses or contributions, which could lead to further research.

The literature review dialogues with authors such as: Brito and Purificação (2015), Kenski (2003), Kenski (2007), Kenski (2015), Maciel and Faccin (2010), Moreira and Kramer (2007), Morozov (2018), Pischetola *et al.* (2019) and Soares (2016), who address the political, pedagogical and epistemological implications of the use of digital technologies in education.

Of particular note are the works of Kenski (2007), who studies the evolution of technologies in all eras and different contexts in their time and space; Brito and Purificação (2015), who invite us to rethink the technologies available in a technological society and which are a reality in many schools; and Pischetola *et al.* (2019) recognize technologies as cultural artifacts, the fruit of culture and the product of human needs. Based on these theoretical aids, filling in some gaps on the subject that interests us is possible.

Education and digital technologies

At the end of the 20th century, major transformations took place in society, giving rise to a new paradigm of existence and global perception, engendered in a particular context. Moreira and Kramer's (2007) argument unequivocally reinforces that globalization has reverberated in various areas, including the educational sphere, where global parameters have become established as a guide. These globally established guidelines project their influence noticeably into classrooms.

In this context, Kenski (2003, p. 430, our translation) states with solid foundations that "[...] we have witnessed profound transformations in various spheres of society [...]". In this sense, the school institution cannot remain indifferent to the metamorphoses in the current social fabric to which it belongs. The relevance of this understanding finds support in the words of Soares (2016), who states that: "the school needs to recognize that students are already immersed in technology in their daily lives, and the educational environment cannot remain oblivious to this; it is crucial to keep up with the changes that occur in society and that also affect the socio-educational context" (p. 4-5, our translation).

In line with this, Kenski (2015) broadens this view by arguing that "the ubiquitous adoption of digital media around the globe has brought with it a profusion of changes that have reconfigured reality in all areas of contemporary society" [...] (p. 430, our translation). The imperative need, therefore, arises for a school that adapts and evolves, taking an active role in promoting an education that is in line with the dynamic and interconnected scenario of the 21st century.

The considerations made by Soares (2016) add fruitful perspectives to this reflection. For the author, incorporating digital technologies is an inextricable component of students' socio-cultural experience. Given that teachers and students have technological tools at their disposal daily, the importance of collaborative dialogue between educators and students in using this technological arsenal is highlighted, whose contribution reverberates in the socialization of knowledge (Soares, 2016).

According to Kenski (2003), today's Digital Information and Communication Technologies (DICT) lead us to new ways of learning and, as a result, direct people towards innovative and socially relevant advances. From this perspective, it is worth noting that, in addition to the discussions surrounding the use of the technologies in force in each period, the author postulates that in this evolutionary stage, reconfigured learning needs emerge. "[...] in addition to the 'need to transmit accumulated knowledge to new generations', there is an urgent

need to solidify values, principles, ethics, respect for human beings and the environment, self-knowledge, healthy coexistence and civic engagement" (Kenski, 2015, p. 427, our translation).

Within this intensifying contemporary profile, digital technologies are widely present in many Brazilian schools. However, Demo (2011, our translation) points out that "[...] there is often resistance on the part of teachers [...]" to adopting digital electronic media as teaching tools in their pedagogical approaches. It is also important to emphasize that it is necessary to adopt new attitudes that are in line with the current socio-cultural context. In this context, the question arises: how can digital media effectively contribute to education? Kenski (2015) sheds light on this issue, stating that:

> Through access to and fluent use of multiple digital means of communication, the possibility of overcoming the physical and temporal limits of classrooms and reaching people who want to, are interested in, and are connected to the same tune, regardless of the time and space in which they find themselves (Kenski, 2015, p. 427, our translation).

Kenski (2003) also points out that: "[...] the integration of these technologies for pedagogical purposes requires a broad understanding of their technological and communicational specificities, which must be harmonized with a deep knowledge of teaching methodologies and learning processes [...]" (p. 5, our translation).

Broadening the discussion, Moreira and Kramer (2007) delve into the varied perspectives of authors, from the most radical to the least extreme, on technology, going beyond pessimistic or excessively optimistic approaches. This approach is critical in considering society's current stage of development and recognizing the contribution of new technological devices to the community. They state that: "[...] what emerges as most dangerous is to deny recognition of the transformations and new technological tools that shape and inform a generation [...]" (2007, p. 1048, our translation).

It is also essential to understand digital technologies as partners in the teaching-learning process. In this approach, "extremes do not fit, either rigid resistance or uncritical adoption" (Demo, 2011, p. 15, our translation). The result of this reflection shows that the school needs to adjust to the new social fabric, forging new teaching-learning approaches and, above all, showing openness to the changes that emanate from the society in which it is inserted.

Technologies and educational culture

DICTs are intrinsic elements of society that have not only reconfigured the way people receive information, but have also left their mark on the communication of specific social groups. Kenski (2007), a researcher with a PhD in education, examines technological advances over different eras and in various contexts of social relations. For Kenski, these transformations have contributed to the enrichment and cultural development of humanity. However, the current technological landscape is dominated by the latest technologies and their implications for the social reality of different people and places. According to her, "[...] a new geography is emerging, where the place of residence of each individual is no longer crucial, but rather their conditions of access to the new technological realities [...]" (Kenski, 2007, p. 18, our translation). This allows us to say that technologies have been created and incorporated throughout society's evolutionary process.

In this context, Maciel and Faccin (2010) present the concept of culture as a lens through which to understand the evolution of society. They highlight the need to revise fundamental elements of the human being and the construction of cultural identity, while maintaining intrinsic values. "Culture manifests itself in specific spaces and times, becoming dependent on the events and facts generated by humanity, the environment in which it is inserted, and the defined time" (Maciel; Faccin, 2010, p. 90). They also add that in each era, humanity develops new forms of intellectual, moral, and cultural expression, which partly justify the individual and social transformations in the contemporary world (2010, p. 90).

In this way, society is impacted by changes resulting from individual and collective actions. In addition, the intrinsic interaction between the individual and the social environment often determines and extends their cultural mastery. In this way, through the various forms of communication that exist, human beings constantly enrich their existence (Maciel; Faccin, 2010, p. 91). Similarly, Kenski (2007) observes: "Human beings move culturally through contemporary technologies. They transform the way you think, feel and act" (Kenski, 2007, p. 21, our translation). This emphasizes that new technologies have an impact on ways of life in society, broadening and determining people's cultural sphere. On this basis, we can consider technologies as cultural products. It is, therefore, vital to recognize that Digital Information and Communication Technologies are manifestations of contemporary culture, shaping and being shaped by society in constant evolution.

The book *Educação e novas tecnologias: um repensar* (Education and new technologies: a rethink) (2015) by Brito and Purificação makes a significant contribution to this

debate. According to the authors, we are immersed in a technologically advanced society in which the presence and usefulness of technology are evident in certain situations. Furthermore, in the general context, DICTs interfere with daily human activities. This point is supported by Kenski (2007), who states that "technologies are so integrated and omnipresent that we hardly notice their unnaturalness" (Kenski, 2007, p. 24, our translation). It is clear that ICTs are used intrinsically and are part of the human sociocultural fabric. Deepening this discussion, we understand that technologies have been gradually conceived and adopted throughout the development of society, constituting a cultural product inserted into the human sociocultural reality.

In this context, there is an emerging understanding that new conceptions of education are on the rise, where the latest digital technologies are employed for more effective and improved learning (Kenski, 2007). The insertion of these technologies goes beyond the mere adoption of tools; it represents a fundamental reconfiguration of educational dynamics, reflecting the search for more effective teaching adapted to the demands of a technological society. This educational paradigm, highlighted by Kenski, recognizes the cultural changes driven by technological advancement and offers a critical approach to reflecting the complex interactions between society, technology, and culture in contemporary times.

Furthermore, there is an emerging understanding of the school as an institution that integrates and is integrated into society. According to Kenski (2007), it is defined as a development space for young people and all age groups. The same author emphasizes a double challenge imposed on education: the need to adapt to technological developments and, at the same time, to guide all individuals in their quest to master and critically appreciate these new resources (Kenski, 2007). From this perspective, it is clear that schools cannot remain oblivious to the changes in the society they belong to. Against the backdrop of new socio-technological contexts, the growing presence of DICTs has exerted a prominent influence on everyday school life. In relation to the school, Maciel and Faccin (2010) state that:

> When school becomes an opportunity for students to reflect on their lives and experiences, it recognizes that they are capable of acting and reacting, claiming, building, questioning, and understanding that the world in which they live is the result of a process that is subject to transformation and can be interfered with as the subject of these changes, because it is a process arising from the social relations established by the actions of men and women. Therefore, it is a process of development of humanity in a society that elaborates the continuity of its existence through culture (Maciel; Faccin, 2010, p. 89, our translation).

In this context, it is imperative for schools to recognize the intrinsic presence of technologies in the socio-cultural scenario of students, who are immersed in this constantly changing environment. In addition, it is crucial to give due value to digital culture and start from the experiences of these individuals. Therefore, there is no denying the need to establish a solid connection between society and the school institution in the context of educational practices. From this perspective, the authors Brito and Purificação (2015) point to a pertinent dilemma for schools: the decision to "reject such advances and try to remain on the sidelines of the process" or, alternatively, to "take control of these processes" and integrate them into the pedagogical dynamic. When addressing the insertion of TDIC in schools, these authors emphasize that:

> [...] We believe in the importance of pedagogical work in which teachers reflect on their school actions and effectively design and implement educational projects, with the inclusion of information and communication technologies (ICTs) in the educational process, seeking to integrate them into pedagogical action in the intra- and extra-school community and make them clearly explicit in the school's educational proposal (Brito; Purificação, 2015, p. 25).

From this perspective, technology is an opportunity to enhance learning and teaching processes. This requires schools and education professionals to be aware of new pedagogical approaches and adapt to them; otherwise, they run the risk of becoming obsolete in the face of contemporary educational transformations. It is, therefore, unacceptable for academic institutions to remain oblivious to social reality, exposing themselves to the risk of becoming outdated in relation to Digital Information and Communication Technologies (DICT). On the contrary, they must engage in a reflective and proactive process, using these technologies in a meaningful way. This requires an open attitude connected to current demands, as well as encouraging experimentation and the implementation of innovative educational projects (Brito; Purificação, 2015).

Following the line of thought of Maciel and Faccin (2010), it is imperative that the educational system be rethought. Depriving students of the opportunity to use technology at school is tantamount to denying them the right to recognize contemporary cultural products, thus inhibiting the development of their human capacities (Maciel; Faccin, 2010). From this perspective, it is understood that technologies represent cultural products of a specific era, developed and incorporated into society to meet human needs and, above all, improve quality

of life. In addition, there is an intrinsic relationship between society and the school, both of which are part of the same contemporary socio-technological context.

Brito and Purificação (2015) add that by choosing a technology to be used in the classroom; we are opting for a type of culture that reflects the social, political, and economic moment in which we live. Given this, it is clear that the educational culture anchored in traditional models is no longer sufficient to meet the demands of education in the current century.

In the book *BigTech: The rise of data and the death of politics* (2018), author Morozov presents a compilation of texts written over the period from 2013 to 2018. These writings offer concrete evidence of how the data culture and the digital age have had a profound impact on our daily lives. Morozov describes the current "technological world" as a "feudal domain clearly shared between technology companies and intelligence services" (Morozov, 2018, p. 15, our translation), shaping and influencing the behavior of contemporary society. The author argues that the real adversary is not the technology itself, but the economic and political system of a capitalist and neoliberal nature, characterized by a "savage combination of the military-industrial complex and the out-of-control banking and advertising sectors" (Morozov, 2018, p. 30, our translation), which uses current technologies as a means of achieving its profit objectives.

Amid the era of surveillance capitalism, Morozov (2018, p. 34) questions the model of "dadocentric capitalism", in which all data is treated as economically relevant, converting every aspect of our daily lives into profitable assets, from our relationships to our sleep. The author analyses the growing algorithmization of life, the result of the coordinated action of the five technology giants (*Google, Microsoft, Apple, Amazon, and Facebook*), as interactions with social networks and digital platforms increasingly shape our experiences. The influence of these corporations is not limited to the digital realm but permeates and shapes society in its social, cultural, and political aspects. This context challenges society to reflect not only on immediate privacy issues, but also on the deeper ethical implications of algorithmization on individual autonomy and the construction of identity.

Morozov (2018) adopts a critical perspective on technology, going beyond mere technological enchantment. He points out that building this critical stance is achieved through in-depth analysis and understanding of the historical, economic, and political aspects that underpin technological artifacts and from which technologies emerge. Therefore, it is pertinent to state that, by considering technologies as cultural products resulting from social interactions

over different periods, it is clear that schools and society are treading a path toward technological advancement. However, the uncritical adoption of these tools does not facilitate the integration of ICT in the classroom; on the contrary, critical understanding enables teachers to act, think, and teach in a more informed way. It is, therefore, imperative to rethink the role of schools and teachers in the face of new conceptions of school education and, in particular, to seek a deeper connection with students' socio-cultural reality.

Technology: conceptual approach

In contemporary times, the concept of technology encompasses not only the way human beings use tools, but also how they apply their knowledge to shape the environment in which they live. In addition, it is worth noting that functionality is a central feature of technology, being more about the repetition of use by individuals than about its materiality.

In this context of multiple meanings, the concept of technology as an artifact is presented by Pischetola *et al.* (2019). They describe artifacts as instruments capable of mediating the interaction between human beings and the objects or phenomena with which they interact, a process that involves an "*appropriation that involves an interaction*" (Pischetola *et al.*, 2019, p. 14, emphasis in original). In this way, artifacts function as intentional mediators assigned by individuals to certain human activities. From a functional perspective, Pischetola *et al.* (2019) clarify that:

> [...] Intentionality, in this context, corresponds to a fundamental characteristic of artifacts: for us to consider them in this way, they must have been intentionally enabled for a specific function, even if, over time, this function changes, adapting to uses. In this way, artifacts can be seen as material and socially standardized manifestations of human activities. This sociocultural standardization is highlighted not only by their attributes or materiality, but by the repeated uses attributed to them by individuals or groups of individuals. In other words, by its functionality (Pischetola *et al.*, 2019, p. 14, our translation).

Furthermore, these functions may or may not be shared culturally, and the perception of strangeness or recognition is influenced by the degree of experience available in everyday practices. For example, buildings intended to serve as shelters are widely recognizable, regardless of culture. On the other hand, digital technologies, such as apps and specific devices, may have less obvious functions in particular cultural contexts (Pischetola *et al.*, 2019).

In light of these considerations, we turned to the studies by Pischetola *et al.* (2019) to understand how an object becomes an artifact and how it is able to mediate actions between subjects. In fact, an artifact is part of a culture, part of the whole resulting from constant human learning, and also acts as a potential mediator between human beings and their sociocultural environment. It can therefore be inferred that technology is not restricted solely to the role of instrumental mediator, but also involves the knowledge (and learning) needed to enable effective mediation. Artifacts refer to "crystallized knowledge"; they emerge, transform, and evolve by incorporating improvements resulting from planned activities mediated by human action. Within this approach, all technology can be considered an artifact, although not every artifact can be classified as technology, since both are intrinsically linked to culture and broader sociocultural systems (Pischetola *et al.*, 2019).

The thinking of Pischetola *et al.* (2019) proposes an anthropological perspective to consider technology as an artifact. Two categories of analysis emerge from this perspective when applied to the school context, often manifested by dichotomous approaches: technical artifact and cultural artifact. The first view concerns the uncritical and decontextualized use of technology, transforming it into a mere tool, resource, or support for the teacher's action. The second category sees transformations as the result of culture, immersed in people's sociocultural environment. In this sense, teachers, students, and the school context must accept the presence of artifacts, as this "implies openness to the new, the unknown, the unforeseen that this interpretation brings to pedagogical practice" (Pischetola *et al.*, 2019, p. 27, our translation). Thus, understanding these approaches helps to understand how these interpretations influence the school environment.

Common, everyday usage often associates the term "technology" with equipment and devices. Kenski (2007) guides us by stating that technology is present everywhere, is an intrinsic part of our lives, and is not just limited to "machines." It encompasses all the creativity of the human intellect that has manifested itself throughout the different eras, including its forms of use and functionalities that contribute to the improvement of the human condition. The author also argues that overcoming the narrow and simplistic view of this concept is essential, as it is often portrayed in science fiction films, which often evoke feelings of apprehension. However, this representation does not capture the complexity of the term. This highlights the difficulty of defining technology and the imperative need to reflect on its meaning in the educational context (Kenski, 2007).

When we examined the analyses by Brito and Purificação (2015), we found that some authors base their understanding of the concept of technology on the concept of technique, and there is often confusion between the two. This leads to a certain ambiguity about the terms and a wide range of interpretations. From this broad perspective, the authors argue that technology transcends the mere existence of devices. It permeates all aspects of our lives, including intangible aspects (Brito; Purificação, 2015).

In the book *Tecnologias, pensamento sistêmico e os fundamentos da inovação pedagógica (Technologies, systemic thinking and the foundations of pedagogical innovation)* (2019), a study carried out by the Teacher Training and Technologies research group (*ForTec*) between 2014 and 2019 made significant contributions to education research. The authors state that the word "technology" can be considered an "empty signifier" - emptied of its meanings - and can acquire various definitions in different contexts.

Of Greek origin, the word "technology" derives from the combination of "*techné*", which refers to skill, art, or craft, and the suffix "*-logia*", which denotes knowledge. Thus, more than its material or utilitarian dimension, "[...] the word 'technology' reflects, etymologically, an intrinsic relationship with the *development of knowledge*. It goes beyond being merely 'a product' or 'a doing', involving the way in which human beings apply their knowledge to adapt to the environment in which they live" (Pischetola *et al.*, 2019, p. 13, emphasis in original, our translation).

From this reflection, it is possible to say that technologies not only permeate all daily activities, but also have a marked presence in schools. This understanding is essential to overcome the limited and simplistic view of the term, which is often reduced to mere devices and equipment. In this context, the task of defining technology within the technological environment in which we find ourselves becomes urgent. Kenski (2007, p. 24) adds that:

> [...] We need products and equipment that are the result of specific studies, planning, and construction in the search for better ways of living. We call the set of scientific knowledge and principles that apply to the knowledge, construction, and use of equipment in a particular type of activity "technologies". To build any piece of equipment - a ballpoint pen or a computer - people need to research, plan, and create the product, the service, the process. We call all of this technology (Kenski, 2007, p. 24, our translation).

It's clear that technologies transcend the simplistic notion of being just "products" or "actions", and are intrinsically linked to a set of essential knowledge to adapt to the

environment. Therefore, an understanding of technologies encompasses their ability to facilitate, organize, and enhance human life in various places and scenarios. It is noticeable that all schools, in general, have technologies that aim to optimize interaction with students. Kenski (2007) offers some examples, such as pencils, notebooks, pens, blackboards, chalk, and a variety of products, devices, and processes designed for reading, writing, teaching, and learning. However, we infer that the school needs to fully understand this definition in order to incorporate the new technologies fully into the school routine (Kenski, 2007).

The concept of "new technologies" varies over time, as it is intrinsically linked to the specific reality of a given period and context. In this way, the concept is reconfigured in the face of countless technological advances. Kenski (2007) draws attention to the frequent confusion between this concept and that of innovation. This makes it complex to determine which technologies are old and which are new, as they emerge from new technological contexts.

The speed of today's technological development makes it difficult to classify emerging knowledge, tools, and procedures as "new" (p. 25). Furthermore, the criteria for identifying "new" technologies can involve technical aspects, adoption, and use strategies. In this sense, it is pertinent to reflect on which technologies are old and which are new at school, such as the blackboard, a revitalized technology, but not entirely new (Kenski, 2007). From this perspective, everyday practice confirms that technology plays a significant role in the teacher's work during teaching situations. Furthermore, it is crucial to point out that the way in which any technology is employed to carry out tasks or activities is defined as a technique by Kenski (2007).

These techniques are passed down from generation to generation and incorporated into specific groups' customs and social habits. Some are simple and easy to assimilate, while others can vary considerably between different peoples, thus identifying different cultures (Kenski, 2007). Since ancient times, the process of technological development has been intrinsically linked to socio-cultural developments. As man changes his techniques, he is inevitably also influenced by these changes. This cycle of innovation is continuous, with no end point to the possibilities for change. This constant development of techniques and cultures shapes the socio-cultural environment of individuals (Pischetola *et al.*, 2019).

From this perspective, technologies not only encompass a body of knowledge needed to plan, build, and create equipment, processes, or products, but also help human beings adapt to new scenarios. On the other hand, technique can be interpreted as the ability or method to use

the equipment developed and created by man over different eras. Products, processes, and services created in response to human needs are categorized as equipment (Kenski, 2007).

When pondering the meaning attributed to the expression "new" technologies, Kenski (2007) points out that the adjective "new" refers to processes and products that are associated with technological advances in various contexts and scenarios, enabling new ways of using DICTs, such as informing and communicating. Technologies are characterized by being progressive, as they are constantly evolving, and also by having an intangible nature, i.e. they are not limited to physical machines and equipment. In this context, Kenski (2007) adds that "[...] with the generalization of the use of these technologies, the adjective 'new' ends up being neglected, and they are all referred to as ICTs, regardless of their individual characteristics. However, each one has its specificities [...]" (Kenski, 2007, p. 28, our translation). Therefore, the term "new" is used to distinguish a technology from its predecessors (Kenski, 2007, p. 28).

Based on the existing literature, various possibilities of interaction with technological artifacts are identified, as well as their social and cultural relations. Kenski (2007) explains that the creation and incorporation of new technologies happen gradually, as this process leads to changes in all sectors of everyday life, representing the current stage of society.

However, the adoption of technologies is not capable of including everyone digitally, since "those who don't have the 'access password' to enter this reality of ours are the excluded, the 'underdeveloped'. In all countries, rich or poor, in some more and others less, these groups - the included and the excluded - manifest themselves in quite similar ways" (Kenski, 2007, p. 18, our translation). From this perspective, we can see a dynamic in the interaction between society, technologies, and culture, based on the social disparities evident in the different forms of use and conditions of access to equipment.

In summary, it is essential to emphasize that the concept of technology encompasses a broad definition, which requires an analysis that goes beyond a superficial and simplistic view. When discussing DICTs, especially in the school environment, it becomes clear that, however old-fashioned a technology may seem, someone will always be willing to use it. Therefore, we suggest a critical review of the term to understand its presence in everyday education. In addition, the concept of technology needs to be re-evaluated, since all technology, whether old or new, plays a significant role in education by integrating itself into the reality of various schools.

Ultimately, it is considered that society is constantly changing, and the school, in particular, must seek approaches in line with its contemporaneity, adopting new ways of

teaching and learning, as well as remaining receptive to change. Technologies, in turn, are the result of a gradual process of insertion and incorporation, adjusting to the evolution of human needs. It is also understood that culture manifests itself in specific contexts and moments, while humanity continues to develop new forms of existence and promote transformations. In this scenario, it is essential to recognize the political dimension that permeates these changes, evidenced by the discrepancies and difficulties of access to digital artifacts in social interactions, often imposed by the capitalist system.

Final considerations

This study sets out to understand, through bibliographical analysis, the intricate relationship between society, technology, education, and culture, with the aim of offering critical theoretical contributions. In examining technological advances, it becomes imperative not only to decipher the dialectical movement of society, but also to take in the cultural artifacts and knowledge accumulated throughout human history. In this endeavor, diverging from the technological dazzle, we chose not to adopt an excessively optimistic vision that places technology as a panacea for all educational challenges, nor a pessimistic perspective that portrays it as a villain or heroine. In this context, the question arises: who should Digital Information and Communication Technologies (DICT) serve?

In this way, the school context, in an environment conducive to digitalization, should not be perceived as a space of backwardness, and educators should take ownership of technological advances. The use of DICTs, especially *smartphones*, which once faced some resistance in the school environment, is now ingrained and allied to teaching practices. To this end, it is essential that practices in the school environment are shaped by a critical and emancipatory approach when integrating technologies, allowing effective participation between teachers and students, who learn together.

The course of the research contributes to elucidating the problem in question in the following way: with regard to teachers' perceptions of digital technologies, it can be observed that broad generalizations are unfeasible, considering the nature of a bibliographical study. Even so, the theoretical foundations underpinning the ICT approach reveal that they continue to be predominantly perceived as support tools or partners in teaching practice. They are often treated as objects that produce predictable effects or are shaped by the actions of the subject, without a critical analysis in the context of school culture. In this scenario, faced with the

technologies available in a society permeated by technological innovation, both analog and digital, there is an urgent need for in-depth reflection on teaching practice and the pedagogical strategies to be adopted. The aim should be to incorporate technologies in a critical and reflective manner, transcending their mere functional use.

The preponderant challenge for educators in this century lies in their ability to adapt to the transformations inherent in their daily reality, to critically reflect on digital and analog resources for educational purposes, to develop digital skills and knowledge, and to educate their students in such a way as to provide effective learning. However, it is worth pointing out that this commitment comes up against a dynamic in society, which is based on social disparities, generating different realities in the school environment and disparate conditions of access to technological resources.

Generally speaking, it can be said that when undertaking a critical analysis of ICT in education, the aim is to understand that society and the school are constantly evolving socially and that technologies accompany this trajectory, generating new knowledge to adapt to the environment they serve. Culture, in turn, emerges as a product of the new ways of living and acting in the world while we realize the disparities and obstacles faced in accessing digital tools.

In this context, we explore the understanding that technology itself is not intrinsically problematic, but the political and economic system, especially capitalism and neoliberalism, shapes the dynamics around technological artifacts. As mentioned, this criticism is directly related to large corporations, which have a monopoly on user data and exploit current technologies to achieve their profit interests. In addition, we see an opportunity to acquire knowledge from the current social scenario, with a particular focus on the application of TDIC to reimagine, reinvent, or reconfigure the educational environment.

However, it is essential to emphasize that this article is not intended to offer definitive conclusions, but rather results that are susceptible to revision, with the aim of stimulating new research on this subject in the field of education. In future work, it will be important to examine the impact of contextual inequality on educators' and students' access to ICT during the pandemic.

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