Revista ARACÊ
ISSN: 2358-2472

ARE WE EXPERIENCING A NEOTECHNICIST SCENARIO IN EDUCATION? A SURVEY ON THE USE OF DIGITAL TECHNOLOGIES IN PEDAGOGICAL WORK

https://doi.org/10.56238/arev6n3-051

Submitted on: 06/10/2024 **Publication date:** 06/11/2024

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ABSTRACT

The article examines the role of digital technologies in school education, addressing its possibilities, limits and contradictions in the pedagogical context, as well as its relationship with the neotechnicist approach, a strand of pedagogical technicism that had a significant influence in Brazil in the second half of the twentieth century. investigating the connection between the current use of these technologies in the school environment and the characteristic elements of the neotechnicist approach. The methodology used was the narrative literature review, with the analysis of articles related to the theme, available in the CAPES journal database. Studies were selected that explore the technicality in Brazilian education, public policies and official documents that guide the implementation of digital technologies in the educational context, as well as experiences of using these technologies as pedagogical tools. The investigation identified possibilities for the pedagogical use of digital technologies, alongside criticisms related to teacher training and available infrastructures, emphasizing the role of teachers in the pedagogical process and emphasizing digital technologies as a means, and not as an end in themselves.

Keywords: Digital Technologies. Neotechnicism. Education.

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INTRODUCTION

The incorporation of digital technologies into the pedagogical process is an expanding phenomenon in an increasingly connected society, presenting challenges both in terms of infrastructure and teaching methodologies. The popularization of the *internet* and the development of mobile devices has expanded the possibilities of access to a multiplicity of information in real time, which has impacted the way knowledge is acquired and transmitted.

With the Covid-19 pandemic, this trend has intensified, with the massive adoption of digital tools for remote teaching. This new context brought to light the need to reflect on the implications of the insertion of technologies in education, especially with regard to the role of teachers in the teaching-learning process, and the training of students influenced by digital culture[3].

The educational environment is influenced by the technological transformations that occur in society, which demands reflections on the teaching methodology. In this scenario, questions arise about the impact of technologies on the development of students' skills and abilities, as well as about the challenges that teachers face in integrating these tools effectively and critically. Teacher training is also central, since the pedagogical use of technologies requires not only technical knowledge, but also a critical understanding of their potentialities and limitations in the educational process.

The discussion about the role of digital technologies in education is relevant in the context of the development of Artificial Intelligence (AI) and the transformations that this technology enables in the search for information and the construction of knowledge. Given the current scenario, the question arises as to how the academic and school community understands the relationship between digital technologies and education? How are the different technological tools used in educational institutions? Can we identify that the use of digital technologies in education promotes a neotechnicist approach?

The idea that neotechnicist approaches are associated with the implementation of technologies in education is based on the perspective that technological tools are used as instruments for an uncritical education of students focused on the labor market. We

[3] According to Baratto and Crespo (2013), when exploring the concepts of digital culture or cyberculture, it can be understood as a set of values, symbols, practices and attitudes that arise with technological advancement. For the authors, this culture is in permanent change and is distinguished by the interconnection and sharing of information in a deterritorialized way.

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understand that the "new" technicism emphasizes the use of digital technologies as an end in itself, aimed at the development of market-oriented skills and abilities, to the detriment of an integrative and critical teaching approach.

The main objective of this research is to examine the impact of digital technologies in educational institutions, investigating the relationship between the use of contemporary technologies in the school environment and the aspects of pedagogical neotechnicism. Among the specific objectives, it seeks to identify the main characteristics and criticisms of the technicist period that influenced Brazilian education in the twentieth century and its relationship with the use of technologies; to explore the role of digital instruments in the pedagogical process, in line with the characteristics of neotechnicism; and, finally, to analyze articles that address the interaction between digital technologies and education, with the purpose of understanding how the academic and school community conceives and idealizes these tools.

To achieve the general objective, a qualitative research was carried out, including documentary and bibliographic sources that covered the complementary objectives. This process involved both access to physical works and searches in the database of journals of the Coordination for the Improvement of Higher Education Personnel of the Ministry of Education (CAPES), using the keywords "digital technologies" and "education", interconnected by the Boolean operator[4] "AND". The selection of articles occurred through the reading of titles and abstracts, followed by an analysis of relevance to the study and the full reading of the selected texts.

To identify the main characteristics of the technicist period in Brazilian education, studies were selected that deal with the foundations of this approach and the critique of pedagogical thinking, such as those by Saviani (2011), Silva (2017) and Freire (2019).

To investigate the role of digital technologies in the education of students and in the interaction between teachers and students, studies that explore the use of these tools in various educational contexts were considered, such as those by Kenski (2007), Vieira and Restivo (2014) and Hernandes and Sousa (2024). In addition, public policies and official documents that guide the implementation of digital technologies in the educational environment were analyzed.

[4] Boolean operators are resources used to create more precise and coherent search expressions in databases and scientific search engines. An example is the "AND" operator, which retrieves results that include all the indicated terms (Amorim et al., 2022).

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In the analysis of the formation of a neotechnicist paradigm in the relationship between digital technologies and education, the perspectives on the use of technological tools were examined, as well as the characteristics and criticisms of the neotechnicist pedagogical approach.

This article is organized into three sections: the first addresses the technicality in Brazilian education in the twentieth century; the second examines the use of digital technologies in the educational environment; and the third discusses the use of digital technologies in the pedagogical process and its relationship with the neotechnicist approach, ending with the final considerations.

THEORETICAL FOUNDATIONS

TECHNICISM IN BRAZILIAN EDUCATION AND ITS CONSEQUENCES ON PEDAGOGICAL THINKING

The technicist approach in education, according to Saviani (2011), is based on the principles of scientific neutrality, rationality, efficiency and productivity, seeking to reorganize the educational process in an objective and operational way. Inspired by factory functioning, technicist pedagogy, according to Demerval Saviani, intends to reduce the subjectivity of pedagogical work, implementing strict control through the standardization and specialization of functions.

The focus of this approach is on learning to do, in which the role of the teacher and the student is secondary, both being executors of a process planned and controlled by specialists. This model aims to ensure efficiency in the educational process, although it has generated, in practice, fragmentation and discontinuity in the educational field (Saviani, 2011).

> In fact, technicist pedagogy, when trying to transpose the way the factory system works to the school, lost sight of the specificity of education, ignoring that the articulation between school and the productive process occurs indirectly and through complex mediations. Moreover, in educational practice, the technicist orientation crossed with the traditional conditions prevailing in schools, as well as with the influence of the new pedagogy, which exerted a powerful attraction on educators. Under these conditions, technicist pedagogy ended up contributing to increasing chaos in the educational field, generating such a level of discontinuity, heterogeneity and fragmentation that it practically makes pedagogical work unfeasible (Saviani, 2011, p. 383-384).

Similarly, Silva (2017) deepens this criticism by highlighting that technicist pedagogy, by focusing on fragmented objectives and standardized techniques, generates an inversion

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in the pedagogical process, in which the means — that is, teaching techniques and audiovisual resources — begin to determine educational ends.

For the author, there is thus an extreme rationalization of teaching, where the control and mechanization of pedagogical activities become the main pillars of the educational system, which compromises the quality of teaching and empties the critical and creative role of education.

In agreement with Saviani (2011), the work of Silva (2017) argues that technicist pedagogy is consolidated from the influence of models of rationalization of production, such as Taylorism and Fordism, which aimed to increase efficiency and control over workers. The transposition of these principles to education resulted in a highly bureaucratized and depersonalized teaching, in which both teachers and students became mere executors of a standardized and predetermined process.

As a consequence, technicist pedagogy contributed to the creation of an instrumental education, aimed solely at preparing individuals fit for the job market, without considering broader training needs, such as the critical and reflective development of subjects (Silva, 2017).

Another author critical of the technicist pedagogical approach was Paulo Freire, who rejected the reductionist view of education, which transforms the pedagogical process into a mere transfer of information and instructions, devoid of critical reflection.

For Freire (2019), technicism sins by reducing both teachers and students to passive executors of pre-defined procedures, with no room for creativity or reflection on knowledge. For him, technicist pedagogy inhibits curiosity and critical thinking, essential elements for the formation of an emancipatory and truly transformative education.

> Hence the hopeless, fatalistic, anti-utopian character of such an ideology in which a coldly technicist education is forged and an educator who is excellent in the task of accommodating to the world and not in its transformation is required. An educator with very little of a trainer, with much more of a trainer, a transferor of knowledge, an exerciser of skills (Freire, 2019, p. 140).

Technicist pedagogy, when confronted with the pre-existing conditions in schools and with the influence of the new pedagogy, ended up increasing the problems in the educational system even more, leading to a crisis and the development of critical approaches, such as the critical-reproductionist view, which emerged to question the real functions of educational policy (Saviani, 2011). This critical approach revealed how the

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official political-pedagogical discourse masked the true functions of education, exposing the reproductive and dominant role of the system.

In the technicist context, technologies are presented as central tools to ensure efficiency and productivity. According to Silva (2017), technological resources are integrated into the educational process, emphasizing the use of manuals, textbooks, teaching modules, and audiovisual resources. These resources are seen as a way to "minimize subjective interferences" and standardize teaching, seeking uniform results and greater rationality in the pedagogical process.

For Saviani (2011), technologies, when integrated into the educational context, aimed to optimize the teaching process, but at the same time ended up dehumanizing the teaching work and subordinating teachers and students to the logic of control and efficiency of the manufacturing system.

For the author, this technicist organization, by focusing on the efficiency of results, relegated the role of the teacher and the student to a secondary position, with the control of pedagogical practices being carried out, in large part, by specialists and technologies aimed at maximizing educational productivity

Paulo Freire is not opposed to the use of technologies per se, but criticizes the way they can be used in a technical and superficial way, transforming pedagogical practice into a mere transfer of knowledge, disregarding the complexity and creativity of the educational process (Freire, 2019).

According to Freire (2019), education must go beyond the technicality and mechanization of teaching. For him, the use of technologies must be associated with the critical development of students, so that they are active and reflective agents in the learning process.

According to the author, technology when used properly can stimulate students' curiosity and creativity, however, its use in a technical way reinforces a banking education, where knowledge is transmitted passively, without questioning (Freire, 2019).

In the next section, the use of technologies in Brazilian education will be discussed, exploring their insertion in the context of public policies and their implications for pedagogical practices. The main aspects involving the implementation of technological resources in the school environment will be analyzed, as well as the relationship between government guidelines and the adoption of technologies, seeking to understand how these policies shape educational practices in Brazil.

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THE USE OF DIGITAL TECHNOLOGIES IN BRAZILIAN EDUCATION: EDUCATIONAL SKILLS, OPINIONS AND PRACTICES

In Brazil, several policies and official documents guide the integration of digital technologies in education. An example is the National Education Plan (PNE), of 2014, which establishes guidelines, goals, and strategies for the country's educational development until 2025 (Brasil, 2024). Among its goals, Goal 7, which aims to improve the quality of basic education, includes Strategy 7.20, which defines the need to,

> Provide equipment and digital technological resources for pedagogical use in the school environment to all public schools of basic education, including creating mechanisms for the implementation of the necessary conditions for the universalization of libraries in educational institutions, with access to digital computer networks, including the internet (Brasil, 2014).

The interest in digital resources as a tool in the pedagogical process is reiterated in the proposal for the PNE 2024-2034, sent by the Ministry of Education to the National Congress. Among the objectives, the goal of "promoting digital education for the critical, reflective and ethical use of information and communication technologies, for the exercise of citizenship" (MEC, 2024, *online*) stands out.

The National Common Curricular Base - BNCC, in turn, includes, among its general competencies, number 5, which seeks to develop in students the ability to

> Understand, use, and create digital information and communication technologies in a critical, meaningful, reflective, and ethical way in the various social practices (including school ones) to communicate, access and disseminate information, produce knowledge, solve problems, and exercise protagonism and authorship in personal and collective life (Brasil, 2017, p. 4).

In 2022, the Ministry of Education presented CNE/CEB Opinion No. 2/2022, which established rules on the inclusion of computing in basic education, complementing the BNCC. This opinion defined the contents and skills related to digital education, regulated by CNE/CEB Resolution No. 1/2022 (Brasil, 2022).

The Opinion deliberates that, in Elementary School, the teaching of computing should be guided by competencies that allow students to understand computing as an area of knowledge relevant to the explanation of the contemporary world and to the critical and active performance of individuals in society.

Among the main points, the understanding of the social, environmental and ethical impacts of computing stand out, as well as the use of technologies to solve problems in

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various areas of knowledge in a critical and responsible way. Digital security and respect for copyright and privacy are also emphasized as a fundamental part of the development of students' technological skills.

The document does not centralize digital technologies as a fundamental instrument for the teaching-learning process, but their relevance in the work of knowledge construction. Kenski (2007) argues that digital technologies should be inserted into the educational process as a means of enriching pedagogical practices, not as a solution in itself. She reinforces that the focus should be on the interaction between students, teachers and knowledge, and that technologies should support this interaction in a dynamic way.

In agreement with Vani Kenski, Vieira and Restivo (2014) state that technologies have an instrumental character and do not replace creativity and the central role of the teacher in the teaching-learning process. Educational activity continues to depend on the teacher, who must use technologies strategically and aimed at clear educational objectives.

In a research on the use of Digital Information Technologies – ICT in rural education in Altamira-PA, Leonel, Albuquerque and Castro (2023) highlighted the precariousness of the structural and technological conditions of rural schools, as well as the lack of continuing education of teachers in ICTs. It was observed that 90% of teachers do not use digital technologies in the classroom, and the few who do use them are restricted to devices such as television, with sporadic use.

The study by Leonel, Albuquerque, and Castro (2023) highlights the distance between teaching practices and Brazilian legal requirements for the integration of ICTs in education, emphasizing the need for public policies for digital inclusion for rural communities.

In a research on the use of digital technologies during emergency remote teaching, resulting from the Covid-19 pandemic, the study by Xavier *et al.* (2023) reveals that the pandemic has exposed several limitations of the Brazilian education system, including the precariousness of infrastructure, the insufficiency of continuing education for teachers, and inequalities in access to digital resources.

Through a bibliometric analysis carried out on the Brazilian Portal of Scientific Publications in Open Access – OASISBR, and content analysis, the research showed difficulties in adapting to remote teaching and in the inclusion of digital technologies in pedagogical practices, especially in regions with less technological development and limited access to the internet (Xavier *et al.*, 2023).

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Despite the challenges, the study also identified possibilities for pedagogical innovation and the development of digital skills in teachers, suggesting that the use of digital technologies can promote new teaching practices that benefit education after the pandemic.

The article by Fragas and Vianna (2024) investigates how the use of Digital Information and Communication Technologies - TDIC, especially the QR *Code*, can contribute to the promotion of Environmental Education in a transdisciplinary perspective, in the context of a school garden. The study was carried out through an extension course in the format of Distance Education - EaD, taught on the *Moodle platform* for ten students, with synchronous and asynchronous meetings, totaling twenty hours.

The methodology chosen was participatory action research, and data were collected through initial diagnostic questionnaires, records in debate forums and semi-structured interviews. The results indicate that digital technologies, such as the QR *Code*, enable the expansion of pedagogical practices beyond the physical space of the school, as long as the technologies are humanized and used as means to facilitate the teaching-learning process, instead of becoming an end in themselves (Fragas; Vianna, 2024).

The work of Paulista and Alves (2022) examines the possibilities, innovations, challenges, and barriers related to the use of digital technologies in Brazilian higher education through a literature review. The authors highlight that, although digital technologies offer significant benefits for the quality of teaching and facilitate access and flexibility in learning, their integration is slow due to the lack of investment in infrastructure, technical support and adequate training for teachers.

Issues such as information overload and students' concentration difficulties are also mentioned as challenges in the use of technology in teaching. The results indicate that, in addition to infrastructure, it is important to invest in the continuous training of teachers and in the development of new pedagogical approaches that maximize the potential of digital technologies in education (Paulista; Alves, 2022).

The last article analyzed, by Hernandes and Sousa (2024), explores the impact of digital technologies on higher education, with an emphasis on future perspectives for digital transformation in the educational context. The study highlights the role of online learning platforms, as well as virtual reality, augmented reality and Artificial Intelligence.

The research uses a systematic literature review and case study analysis to highlight how these technologies can enrich teaching, improve accessibility and relevance of

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learning. However, it also points out challenges, such as the need to ensure academic integrity and empower educators, highlighting the importance of continuous professional development in digital education.

RESULTS AND DISCUSSIONS

ARE DIGITAL TECHNOLOGIES THE SOLUTION FOR SCHOOL EDUCATION?

Technological instruments were, at a certain point, considered a central means in the evaluation and control processes of the educational system, with an emphasis on productivity and efficiency. According to Saviani (2011), the instrumental use of technologies as a form of control, characterizing neotechnicism, emerged in Brazilian education in the context of the educational reforms of the 1990s, replacing the rigid control of pedagogical processes with a results-oriented focus.

Within this perspective, educational technologies and evaluation methods were used as tools to monitor and condition the allocation of resources according to performance and productivity criteria, characterizing a "pedagogy of total quality" that aimed to meet the demands of specific market niches and integrate the subjectivity of workers with business objectives.

In the same sense, Silva (2017) points out that, in recent decades, traditional technicism has been transformed, adapting to the demands of contemporary society, especially in relation to efficiency and productivity in education. From the perspective of neotechnicism, teaching began to emphasize even more results and quality, now based on the intensive use of digital technologies.

The article by Gonzalez (2024) characterizes neotechnicism as a reconfiguration of the original technicism, adapted to the context of economic and social transformations, with an emphasis on the use of technologies to develop competencies and skills applicable to the labor market.

According to the author, traditional technicism focused on efficiency and productivity in the factory style, neotechnicism is aligned with the concept of neoproductivism and the pedagogy of competencies, being influenced by development theories, such as behaviorism and constructivism.

The study by Gonzalez (2024) points out that neotechnicism maintains the intensive use of technologies in education, promoting a learning perspective focused on flexibility and

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adaptation to the demands of the labor market, rather than the integral and critical development of the individual.

> One path to be followed is to resume the critical and radical reflection on technologies and educational purposes, in addition to thinking about the human beings that are intended to be formed and the relationship between politics, education and society, going against the conceptions that defend this reflection is a counterproductive act or that a "paradigm shift" is enough for teachers (Gonzalez, 2024, p. 342).

According to the author's analysis, education must go beyond the mere incorporation of new technologies and methodologies, emphasizing a critical and ethical analysis that questions how these technologies impact human and social development and whether they are really aligned with the educational objectives of integral and emancipatory education of students, in agreement with Freire (2019).

Regarding the relationship between digital technologies in the school context, Fragas and Vianna (2024) and Xavier et al. (2023) highlight the potential that these tools offer to promote an innovative teaching methodology aligned with contemporary demands.

In line with the possibilities provided by technologies in pedagogical practice, Leonel, Albuquerque, and Castro (2023) emphasize the importance of a critical immersion in the use of these technologies, alerting to the need for a reflective and responsible approach in rural education.

> In addition, we think that technologies should be used in the pedagogical, political, social and cultural dimensions, forming critical and more participatory subjects. From this culture arises the need to integrate the school with cyberspace, bringing concerns to the rural school, to the teacher regarding the practices, which must be changed and rethought in relation to this new way of interacting with knowledge (Leonel; Albuquerque; Castro, 2023, p. 13918-13919).

The article by Hernandes and Sousa (2024) presents several criticisms of the use of digital technologies in education, especially in the context of Artificial Intelligence, emphasizing that, despite the numerous possibilities offered, these technologies also impose complex challenges. Among these challenges, the need for training educators, the protection of privacy and data security, the risk of technological dependence, and inequalities in access to these resources stand out.

The use of AI in education is a recent phenomenon, but its possibilities in the field of personalization of learning are already noticeable. According to Hernandes and Sousa (2024), technology makes it possible to identify individual patterns and make specific

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adjustments for each student, promoting teaching that is more adapted to the particular needs of students.

However, ethics and responsibility in the use of a tool that simulates autonomous thinking are essential issues, in addition to the professional training necessary for critical and responsible use, configuring contemporary challenges.

In the articles analyzed, digital technologies are presented as tools with great potential to enrich the pedagogical process, as long as they are applied in a critical, inclusive, dialogical (Freire, 2019) and reflective way. It is necessary that the use of technologies goes beyond a simple teaching resource, promoting the development of skills that stimulate critical thinking and the active participation of students.

The studies also presented challenges related to infrastructure, such as limited access to the internet and the lack of digital equipment in classrooms. In addition, the lack of training of teachers to deal with these digital tools is identified as an obstacle that hinders the full integration of technologies into daily school life.

Finally, the possibilities and criticisms of the use of digital technologies in the school environment, as presented in the analyzed articles, highlight their role as a means of learning and not as an end in itself, aimed exclusively at the assimilation of competencies and skills directed to the labor market. This perspective distances itself from the neotechnicist approach and the idea that such technologies can, in isolation, act as a "solution" to the challenges of Brazilian education.

FINAL CONSIDERATIONS

The proposal of the BNCC and the PNE to foster digital skills among students reflects a movement that seeks to increase the efficiency and adaptability of teaching to contemporary demands. This emphasis on digital instrumentalization can be observed in the orientation for the development of technological skills, which aims to prepare students for the job market and the digital society, resonating with the concept of neoproductivism.

On the other hand, although contemporary educational policies promote the use of digital technologies, they also introduce guidelines aimed at the critical, reflective, and ethical use of digital tools, as highlighted by the BNCC. This concern with the integral and ethical education of students suggests an attempt to balance the neotechnicist logic, in which the use of technologies is highly functional, with a more humanizing and critical approach.

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The analyzed works highlighted the use of digital technologies as a possibility of integration and innovation in the pedagogical process, and not in the sense of efficiency and assimilation of skills for the labor market. They also emphasized the importance of professional training in relation to technologies for the pedagogical work of critical training with students.

Thus, studies point to the relevance of education professionals in mediating the use of digital technologies in the classroom. Although educational systems prioritize the efficiency of learning through processes mediated by digital technologies, the teacher, critically and technically trained and supported by an adequate infrastructure, emerges as an essential element for the improvement of Brazilian education.

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