DIGITAL COMPETENCIES AND CONTINUING TEACHER EDUCATION: AN ANALYSIS IN LIGHT OF THE BNCC AND CETIC.BR INDICATORS

COMPETÊNCIAS DIGITAIS E FORMAÇÃO CONTINUADA DE PROFESSORES: UMA ANÁLISE À LUZ DA BNCC E DOS INDICADORES DO CETIC.BR

COMPETENCIAS DIGITALES Y FORMACIÓN DOCENTE CONTINUA: UN ANÁLISIS A LA LUZ DE LOS INDICADORES BNCC Y CETIC.BR

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ABSTRACT

This article analyzes teacher education for the use of Digital Information and Communication Technologies (DICT) in the context of digital culture, in light of the main legal documents that guide Brazilian education, such as the Federal Constitution, the Law of Guidelines and Bases of National Education (Lei de Diretrizes e Bases da Educação Nacional – LDB), the National Common Curricular Base (BNCC, 2018), and the National Teacher Education Guidelines (BNC-Formação, 2020). The study is grounded in the problem of understanding how educational policies and teacher education processes can contribute to the critical integration of digital technologies into pedagogical practices, promoting a more inclusive, innovative, and contemporary-oriented education. The objective of the research is to analyze the contributions of teacher education to the integration of DICT into the teaching–learning process, articulating theoretical frameworks, official documents, and empirical data from the ICT Education survey conducted by Cetic.br (2024). The study adopts a qualitative, exploratory, and bibliographic approach, drawing on authors such as Nóvoa, Tardif, Kenski, Moran, and Freire, as well as legislation and guidelines that structure initial and continuing teacher education. Data analysis reveals trends such as the expansion of access to digital technologies in Brazilian schools, the gradual adoption of active methodologies, and the recognition of continuing education as a strategy for strengthening teaching practice. The results indicate that teachers who engage in professional development programs show a greater predisposition toward pedagogical innovation and the critical and intentional use of digital resources. However, the findings also demonstrate that the availability of equipment and connectivity alone does not ensure pedagogical transformation, making teacher mediation and critical reflection essential. Thus, teacher education for the use of DICT is characterized as a critical-reflective and collaborative process, fundamental to strengthening the role of teachers as mediators of learning and agents of educational transformation in the 21st century.

Keywords: Digital Technologies. Teacher Education. Educational Policies.

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RESUMO
Este artigo analisa a formação docente para o uso das Tecnologias Digitais de Informação e Comunicação (TDIC) no contexto da cultura digital, à luz dos principais documentos legais que orientam a educação brasileira, como a Constituição Federal, a Lei de Diretrizes e Bases da Educação, a BNCC (2018) e a BNC-Formação (2020). Parte-se do problema de compreender de que modo as políticas educacionais e os processos formativos podem contribuir para a integração crítica das tecnologias às práticas pedagógicas, promovendo uma educação mais inclusiva, inovadora e alinhada às demandas contemporâneas. O objetivo da pesquisa é analisar as contribuições da formação docente para a inserção das TDIC no processo de ensino-aprendizagem, articulando referenciais teóricos, documentos oficiais e dados empíricos da pesquisa TIC Educação do Cetic.br (2024). A pesquisa caracteriza-se como qualitativa, de natureza exploratória e bibliográfica, fundamentada em autores como Nóvoa, Tardif, Kenski, Moran e Freire, além de legislações e diretrizes que estruturam a formação inicial e continuada de professores. A análise dos dados evidencia tendências como a ampliação do acesso às tecnologias digitais nas escolas brasileiras, a adoção gradual de metodologias ativas e a valorização da formação continuada como estratégia de fortalecimento da prática docente. Os resultados indicam que professores que participam de processos formativos apresentam maior predisposição à inovação pedagógica e ao uso crítico e intencional dos recursos digitais. Contudo, conclui-se que a disponibilidade de equipamentos e conectividade, por si só, não garante a transformação pedagógica, sendo indispensável a mediação docente e a reflexão crítica. Assim, a formação docente para o uso das TDIC configura-se como um processo crítico-reflexivo e colaborativo, essencial para o fortalecimento do papel do professor como mediador da aprendizagem e agente da transformação educacional no século XXI.

Palavras-chave: Tecnologias Digitais. Formação de Professores. Políticas Educacionais.

RESUMEN
Este artículo analiza la formación docente para el uso de las Tecnologías Digitales de la Información y la Comunicación (TDIC) en el contexto de la cultura digital, a la luz de los principales documentos legales que orientan la educación brasileña, como la Constitución Federal, la Ley de Directrices y Bases de la Educación Nacional (Lei de Diretrizes e Bases da Educação Nacional – LDB), la Base Nacional Común Curricular (BNCC, 2018) y la BNC-Formación (2020). El estudio parte del problema de comprender de qué manera las políticas educativas y los procesos formativos pueden contribuir a la integración crítica de las tecnologías digitales en las prácticas pedagógicas, promoviendo una educación más inclusiva, innovadora y alineada con las demandas contemporáneas. El objetivo de la investigación es analizar las contribuciones de la formación docente a la incorporación de las TDIC en el proceso de enseñanza-aprendizaje, articulando referentes teóricos, documentos oficiales y datos empíricos de la investigación TIC Educación del Cetic.br (2024). La investigación se caracteriza como cualitativa, de naturaleza exploratoria y bibliográfica, y se fundamenta en autores como Nóvoa, Tardif, Kenski, Moran y Freire, así como en legislaciones y directrices que estructuran la formación inicial y continua del profesorado. El análisis de los datos evidencia tendencias como la ampliación del acceso a las tecnologías digitales en las escuelas brasileñas, la adopción gradual de metodologías activas y la valorización de la formación continua como estrategia para el fortalecimiento de la práctica docente. Los resultados indican que los docentes que participan en procesos formativos presentan una mayor predisposición a la innovación pedagógica y al uso crítico e intencional de los recursos digitales. No obstante, se concluye que la disponibilidad de equipamientos y conectividad, por sí sola, no garantiza la transformación pedagógica, siendo

indispensable la mediación docente y la reflexión crítica. De este modo, la formación docente para el uso de las TDIC se configura como un proceso crítico-reflexivo y colaborativo, esencial para fortalecer el papel del profesorado como mediador del aprendizaje y agente de la transformación educativa en el siglo XXI.

Palabras clave: Tecnologías Digitales. Formación Docente. Políticas Educativas.

1 INTRODUCTION

The accelerated development of digital technologies in recent decades has promoted relevant transformations in multiple social sectors, particularly in the educational field. From this new configuration emerges the so-called "Digital Age", where the growing presence of digital devices, interactive resources and virtual platforms has reconfigured the way knowledge is accessed, produced and shared (Gómez, 2015).

The insertion of digital technologies in the daily life of contemporary society has profoundly transformed the forms of interaction, communication and production of knowledge, configuring what is called digital culture (Lévy, 1999). This culture goes beyond the simple use of technological devices, as it involves a set of social practices mediated by digital technologies, directly impacting education.

Given this scenario, it is essential to rethink teacher training, so that teachers are prepared to incorporate, in a critical and creative way, digital technologies in the teaching-learning process. Thus, the school, as an institution inserted in this context, needs according to Moran (2015) to rethink its pedagogical practices to meet the new demands of teaching and learning, since the internet and digital technologies allow access to content at any time, making a more flexible, integrated and connected education necessary.

In this process, the National Common Curricular Base (BNCC, 2018) stands out as a guiding document, which brings as one of its general competencies to be developed the "digital culture", with the objective that the student develops the ability to understand, use and create digital information and communication technologies in an ethical, critical and reflective way, applying them in different social and school contexts to favor communication, the dissemination of information, the production of knowledge, the resolution of problems and the autonomous and authorial action of the subjects, because according to the BNCC:

> Digital Culture: involves learning aimed at a more conscious and democratic participation through digital technologies, which presupposes the understanding of the impacts of the digital revolution and the advances of the digital world in contemporary society, the construction of a critical, ethical and responsible attitude in relation to the multiplicity of media and digital offers, the possible uses of different technologies and the content conveyed by them, and, also, to fluency in the use of digital technology to express solutions and cultural manifestations in a contextualized and critical way. (Brazil, 2018, p. 474)

From an increasingly digital reality, Bacich and Moran (2018) highlight new teaching strategies, such as active methodologies combined with digital technologies that promote the construction of knowledge in a critical and reflective way and that develop student protagonism for innovative education. In this context, knowledge is built through problem

solving, project-based learning, and the creative use of digital technologies, which demands a new, more reflective and collaborative teacher profile.

The school, as a dynamic and socially situated space, is challenged to keep up with technological changes and new educational demands, because in this scenario, the continuing education of teachers assumes a strategic role to promote the development of pedagogical skills that value innovation, technological mediation and the collaborative construction of knowledge. According to Moran (2013, p.13):

> An innovative education is based on a set of proposals with some major axes that serve as a guide and basis: integrative and innovative knowledge; the development of self-esteem and self-knowledge (valuing everyone); the formation of entrepreneurial students (creative, with initiative) and the construction of student-citizens (with individual and social values).

Teacher training becomes a central element in this process of integration of digital technologies as an instrument of pedagogical mediation. For this, it will be necessary for teachers to develop skills that allow them to act critically in the face of the changes provided by the digital environment. Initial training, for Imbernón (2011) often distant from the reality of the classroom, needs to be complemented by continuing education programs that offer teachers opportunities to reflect on their practice, experiment with new methodologies and appropriate digital resources in a meaningful way.

Thus, the present research proposes to reflect on the following problem: How does the integration of digital technologies contribute in teacher training to the development of new strategies in the teaching-learning process? The general objective will be to investigate the continuing education of teachers and the integration of digital technologies in the teaching-learning process, and as specific objectives: a) to raise contributions of digital technologies to pedagogical mediation in the school context; b) to discuss the challenges and possibilities of continuing education of teachers in the face of digital culture; c) to identify digital skills considered essential for teaching in the twenty-first century; d) to reflect on innovative pedagogical practices that incorporate technologies in the teaching-learning process.

This study seeks to understand how teacher training can be resignified through the use of digital technologies, for the promotion of more interactive, meaningful and innovative pedagogical practices.

2 THEORETICAL FRAMEWORK

The present work will be developed in four main axes: Digital Culture, based on the studies of Kenski and Moran, which address the educational transformations caused by

technologies; the Innovative Classroom and Active Methodologies, highlighted by Cortelazzo and Moran, who defend the active participation of students and the resignification of the teaching role; Teacher Training, discussed by Tardif and Nóvoa, which emphasize the construction of knowledge and the need for critical and collaborative training; and, finally, the Legal Documents and Guidelines for Teacher Training, analyzed from the Constitution, the LDB and the BNCC, which establish the normative bases for pedagogical practice. In this context, continuing education is understood as an essential element for the meaningful integration of digital technologies into education.

2.1 DIGITAL CULTURE

Digital culture is characterized by the intensification of the use of digital technologies as mediators of social, communicational, and cognitive relations, directly impacting the modes of production and circulation of knowledge. According to Kenski (2012), technology has always been associated with power and knowledge, shaping social behaviors and forms of access to information, being, in contemporary times, enhanced by digital language and the internet.

Pierre Lévy (1999) defines cyberspace as "the new means of communication that emerges from the worldwide interconnection of computers" (p.17), in which processes of collective intelligence are developed, favoring collaborative learning and the shared construction of knowledge. This scenario, Lévy (1999, p.172) describes as "a profound mutation in the relationship with knowledge", demanding from education new forms of pedagogical mediation, more flexible, open and participatory.

In the educational field, Moran (2015) highlights that school institutions are challenged to rethink their pedagogical models to keep up with the transformations of the digital society. According to the author, the incorporation of active methodologies, such as project-based teaching, hybrid teaching and the flipped classroom, represents a possible response to the need to make the student the protagonist of the learning process.

The insertion of digital technologies, however, does not guarantee, by itself, pedagogical innovation. According to Contreras (2002, p. 97), teaching practice is crossed by complex and singular situations, which demand critical reflection and adaptability. In this sense, digital culture redefines the role of the teacher, who is no longer a mere transmitter of content to act as a mediator, advisor and articulator of knowledge in collaborative contexts.

As Lévy (1999, p.208) points out, "allowing human beings to combine their imaginations and intelligences at the service of people's development and emancipation is the best possible use of digital technologies". This conception shows that digital culture is not

restricted to the introduction of technological resources in the school context, but implies a reconfiguration of pedagogical practices and teaching work, demanding the performance of teachers capable of inspiring, connecting and mediating knowledge in collaborative learning environments. In this sense, a critical, collective and contextualized education is indispensable, capable of responding to the educational demands of contemporary society.

2.2 DIGITAL SKILLS AND TEACHER TRAINING

At the same time that digital technologies present themselves as potential allies of pedagogical innovation, it is necessary to recognize the risks of their appropriation in a superficial or merely instrumentalized way. As Barreto (2009, p. 3) warns:

> Technologies are not mere transparent tools; they do not allow themselves to be used in any way: they are, in the final analysis, the materialization of the rationality of a certain culture and of a "global model of the organization of power.

The author highlights that the critical appropriation of technologies must take into account their historical, social and political determinations, seeking emancipatory educational practices. Although technologies have the potential to drive new pedagogical practices, their adoption must be at the service of an emancipatory education, and not a simple adaptation to generalist educational models. Thus, the need for teacher training that goes beyond the technical domain is reinforced, valuing critical reflection and the construction of transformative educational practices (Barreto, 2009).

In this scenario, the role of the teacher is also transformed: he is no longer a mere transmitter of content to become a curator, caregiver and advisor of learning. The teacher must be able to organize personalized training paths, encourage collaborative learning and promote student autonomy, using technologies as tools for mediation and expansion of the educational process (Moran, 2015).

In this horizon, Tardif (2014) proposes that teaching knowledge is historically constructed in everyday school life, being the product of social experiences and interactions. For the author, such knowledge is not static, but is constituted in a dynamic way, based on professional experience and the dialogue between theory and practice. Thus, teacher training needs to consider the real contexts of the school, the specific demands of students, and the possibilities that technologies offer to enhance teaching. This articulation between scientific knowledge, practical experience and digital resources creates conditions for a more meaningful pedagogical practice, contextualized and aligned with the challenges of contemporary society.

For Tardif (2014), teaching knowledge is composed of different dimensions, such as disciplinary, curricular, experiential and pedagogical knowledge. Disciplinary knowledge refers to the mastery of the specific content of the area of activity; the curricula are linked to the understanding of the objectives, contents and methods proposed in the programs and guidelines; the experiential ones derive from daily practice, constituting the interaction with students, colleagues and the school community; and pedagogical refer to knowledge about teaching methods, strategies and processes. From the perspective of digital culture, this knowledge expands, requiring the teacher to also develop technological skills that dialogue with all these dimensions, in a critical and creative way.

As Nóvoa (2002, p. 63) points out, "it is not possible to learn the teaching profession without the presence, support and collaboration of other teachers", emphasizing the collective and reflective character of continuing education. Tardif (2014) observes that "teaching knowledge is a plural knowledge, formed by the amalgam, more or less coherent, of knowledge from professional training and disciplinary, curricular and experiential knowledge" (Tardif, 2014, p. 36), highlighting the variety and dynamism of these dimensions in the educational routine. In this context, the incorporation of digital technologies implies a profound repositioning of the functions of teachers and students, a movement that goes beyond the mere use of tools to consolidate a conscious, critical and contextualized use of technological resources. In this sense, Kenski (2003) reinforces that technology should be understood as pedagogical mediation, that is, "a means that broadens the horizons of learning, and not an end in itself" (an interpretation based on his proposal of technological conception). Thus, when based on the knowledge historically constructed by teachers and supported by continuing education policies aligned with practice, the integration of digital technologies favors more autonomous, participatory and contextualized learning environments, sufficiently sensitive to legal requirements, social demands and the pedagogical possibilities of digital culture.

The digital skills required by the BNCC and legal documents point to a repositioning of the teacher's role. Nóvoa (2022) describes that:

> The cycle of professional development is completed with continuing education. Given the dimension of the current problems and challenges of education, we need, more than ever, to strengthen the collective dimensions of the teachers. The image of a teacher standing next to the blackboard, giving his class to a class of seated students, perhaps the most striking image of the school model, is being replaced by the image of several teachers working in open spaces with students and groups of students (Nóvoa, 2022, p. 67).

In this sense, it is highlighted that continuous training is one of the essential skills for education professionals, as it guarantees constant updating and development of new skills, such as the management of pedagogical processes, collective work, the incorporation of technologies and ethical reflection. Teaching work, therefore, must articulate digital skills with pedagogical and social commitment, enabling practices that respond to the challenges of a changing world (Perrenoud, 2000 apud Corrêa; Fernandes, 2014, p. 3).

2.3 CONSTITUTION AND LAW OF GUIDELINES AND BASES OF EDUCATION AND OFFICIAL DOCUMENTS ON TEACHER TRAINING

Teacher training in Brazil is guided by a set of legal provisions that ensure the valorization of teaching and the qualification of teaching, in line with contemporary social and technological transformations. The Federal Constitution of 1988 establishes, in its article 206, the valorization of school education professionals as one of the principles of teaching, linking educational quality to teacher training and professional development (Brasil, 1988).

The Law of Guidelines and Bases of National Education (Law No. 9,394/1996) reinforces this principle by providing, in its articles 62 and 67, higher education for the exercise of teaching in basic education and the guarantee of continuing education as part of the valorization of education professionals. These devices show the understanding that teacher training must articulate theoretical knowledge, pedagogical practice and permanent updating.

The LDB, updated by Law No. 14,533/2023, advances even further by formally incorporating digital education among the duties of the State. According to the new item XII of article 4:

> Digital education, with the guarantee of connectivity of all public institutions of basic and higher education to the internet at high speed, suitable for pedagogical use, with the development of skills aimed at the digital literacy of young people and adults, creation of digital content, communication and collaboration, security and problem solving. (Brazil, 2023)

In addition, the sole paragraph of the same article adds:

> The relationship between teaching and digital learning should provide for digital techniques, tools and resources that strengthen the teaching and learning roles of the teacher and the student and that create collective spaces for mutual development. (Brazil, 2023).

With this update promoted by Law No. 14,533/2023, the LDB explicitly incorporates digital education as a duty of the State, ensuring the connectivity of educational institutions and the development of skills related to digital literacy, content creation, communication, collaboration, security, and problem solving. Such normative advancement reinforces the centrality of digital technologies in education and the need to prepare teachers for their critical pedagogical integration.

In this context, the National Common Curriculum Base (BNCC, 2018) highlights digital culture as one of the general competencies of basic education, guiding the development of skills related to the ethical, critical, and responsible use of digital technologies. The document emphasizes that it is necessary to "prepare them for professions that do not yet exist, to use technologies that have not yet been invented, and to solve problems that we do not yet know" (Brasil, 2018, p. 473), highlighting the urgency of training subjects capable of dealing with a world in constant transformation.

Thus, the legal documents that structure Brazilian education show that the initial and continuing training of teachers is a central element for the effectiveness of innovative pedagogical practices aligned with the demands of the digital society, overcoming a merely instrumental approach to technologies.

2.3.1 BNC – training

Teacher training in Brazil is supported by legal provisions that seek to align teaching practice with the contemporary demands of education. After the approval of the National Common Curricular Base (BNCC) in 2017, different versions and opinions emerged aimed at the adequacy of initial and continuing teacher training. In this process, Resolution CNE/CP No. 1/2020 stands out, which provides for the National Curriculum Guidelines for continuing education and establishes the National Common Base for the Continuing Education of Basic Education Teachers (BNC-Formation). However, as Freitas (2020) observes, the preparation of these documents took place largely without broad dialogue with academic, scientific, and union entities in the area, in a period marked by the health crisis of the COVID-19 pandemic, which generated tensions and criticism about their legitimacy.

Along the same lines, Pucci, Lima, and Souza (2022) point out that the implementation of the BNCC required articulated actions by municipal networks, which have been organizing themselves to adapt their curricula and offer guidance and training to teachers and school managers. Thus, it is evident that normative documents not only regulate, but also guide the curricular organization and professional training, constituting structuring axes of pedagogical practice in the country.

CNE/CP Resolution No. 1/2020 emphasizes that continuing education must be aligned with the real needs of school contexts, configuring itself as an essential component of teacher professionalization and valuing the teacher as a formative agent of knowledge and cultures. The document establishes that professional competencies must integrate three interdependent dimensions: professional knowledge, professional practice and professional engagement; guiding the teaching work towards a critical, ethical, and socially responsible performance (BRASIL, 2020, p. 2). In addition, it provides that continuing education policies respect constitutional foundations, ensure collaborative work among peers, incorporate active learning methodologies and maintain coherence with other educational policies, curricula and career plans.

Another highlight refers to the encouragement of lifelong learning, organized in flexible and modular programs, aimed at meeting the demands of teaching practice in different contexts. This perspective includes everything from refresher and improvement courses to graduate studies, as well as mentoring and tutoring processes. Such actions enable the exchange of experiences between more experienced teachers and those in the process of professional development, strengthening communities of practice and expanding the collective pedagogical repertoire (BRASIL, 2020, p. 6).

With regard to general teaching competencies, the Resolution points out the need to research, investigate and critically reflect on pedagogical practices, using creativity and technological solutions to plan challenging and meaningful proposals; to use different languages (verbal, body, visual, sound and digital) in order to favor the expression and sharing of experiences among students; to understand, use and create digital technologies in a critical and ethical way in educational practices; and to permanently value professional training, seeking updating and new knowledge that sustains the autonomy, citizenship and social responsibility of teachers (BRASIL, 2020, p. 8).

The articulation between the BNCC, the CNE Opinions, the LDB and the BNC-Formação show that the initial and continuing training of teachers cannot be restricted to the instrumental domain of digital tools, but must contemplate their pedagogical and critical appropriation. In order for the digital skills provided for in the BNCC to be effectively developed, the teacher needs to mobilize knowledge, skills, and attitudes that transform computational thinking, the digital world, and digital culture into contextualized, meaningful learning experiences aligned with the demands of contemporary society. In this horizon, Resolution CNE/CP No. 1/2020, which establishes the BNC-Formation, reinforces the need for teacher training to be continuous, collaborative and aligned with the real needs of school

contexts, structuring itself as an essential component of teacher professionalization and valorization.

Therefore, the legal documents analyzed here not only confer legitimacy, but also drive the modernization of pedagogical practices, especially with regard to teacher training and performance. The presence of technologies in the school context, when integrated with criticality and intentionality, contributes to the realization of the educational rights provided for in Brazilian legislation and to the construction of a school more connected with the challenges of the present and the future.

2.4 CONTINUING EDUCATION FOR THE USE OF DIGITAL TECHNOLOGIES

Continuing education is a key element for the meaningful integration of digital technologies into teaching practice. For Freire (1996, p. 39), "in the permanent training of teachers, the fundamental moment is that of critical reflection on their practice", allowing the teacher to understand, question and transform their pedagogical actions.

From this perspective, Nóvoa (2002; 2019; 2022) emphasizes that teacher professional development occurs in a collective and situated way, through dialogue between teachers and the shared construction of knowledge. Continuing education, therefore, cannot be conceived as a punctual or merely normative action, but as a permanent process, articulated with the real demands of the school context. Complementing this view, the author argues that continuing education should not be conceived as a punctual or merely normative action, but as a permanent process, articulated with practice and sustained by the teacher's commitment to his own learning. This means creating training paths that are relevant to the context of the teacher's work and that value their professional experience, while challenging them to explore new methodologies and languages.

Another important aspect highlighted by Tardif (2014) is that teaching knowledge is socially constructed, which implies recognizing the importance of exchanges and collaborative work among teachers. In this sense, continuing education should create spaces that favor the sharing of experiences, the collective construction of solutions and joint reflection on pedagogical practices mediated by technologies. The appropriation of digital resources, when discussed and experienced collectively, enhances innovation and strengthens the ability of teachers to respond to the needs and expectations of students in contemporary society.

In this way, the school must provide training that includes the development of new skills, attitudes and values, enabling individuals to use technologies in a critical and conscious way. However, education needs to overcome pedagogical practices that disregard the

communicative and interactive specificities of technology-mediated teaching, as the degree of interaction between participants is pointed out as fundamental for the quality of the educational process. (Moran, 2015)

Thus, continuing education in the use of digital technologies must go beyond the technical mastery of tools, incorporating ethical, pedagogical and collaborative dimensions. When organized in a reflective and collective way, training contributes to the strengthening of teacher autonomy, to pedagogical innovation and to the construction of more meaningful, inclusive educational practices aligned with the challenges of the twenty-first century.

3 METHODOLOGY

To meet the objectives of this article, regarding the methodological approach, qualitative research was chosen, since it focuses on significant contexts that involve the understanding of reality and the interpretation of phenomena in their natural environments, without manipulation of variables.

In this approach, qualitative research favors a critical understanding of the educational processes mediated by digital technologies, allowing the multiple dimensions of the phenomenon studied to be considered. The qualitative look is focused on the interpretation of the meanings attributed by the subjects to their practices, relationships and experiences in the contemporary educational environment. Thus, the study favors the analysis of interactions between teachers, technologies and pedagogical practices, considering the complexity and dynamics of current school contexts. This type of investigation does not propose to generalize results, but to deepen the analysis of relevant aspects of the educational reality.

The study is also characterized as exploratory, as it seeks to better understand a phenomenon still in the process of theoretical and practical consolidation in the field of education, contributing to the deepening of knowledge about teacher training in the face of the challenges of digital culture. For Sampieri, Collado and Lucio (1991), exploratory research seeks to understand phenomena that have been little studied, to collect preliminary information that allows for more detailed analyses and to guide the formulation of subsequent studies.

As an instrument of data collection, bibliographic research was adopted, based on the survey, analysis and interpretation of published works, such as books, scientific articles, official documents, dissertations, theses and institutional publications. According to Lima and Mioto (2007), bibliographic research is an essential methodological procedure in the construction of scientific knowledge, as it allows the researcher to identify, systematize and

dialogue with different theoretical perspectives on a given object of study. Such a choice is consistent with the objective of the research, which proposes to critically reflect on the role of digital technologies in teacher training and in the teaching and learning processes, based on already consolidated references. Bibliographic research, in this sense, allows us to gather a theoretical framework that supports the proposed analysis and reflection, enabling a more in-depth and grounded look at the theme.

The choice of the Cetic.br platform (Regional Center for Studies for the Development of the Information Society) as the object of analysis is justified by its national and international credibility, recognized by bodies such as UNESCO, which designated it as a Regional Center for Studies (Cetic.br, 2023), and by the Federal Government, which uses its indicators to support digital transformation policies (Brazil, 2025). Linked to CGI.br and NIC.br, the Cetic.br produces research such as ICT Education, widely used in academic studies and by institutions. Its scientific relevance stems from the adoption of methodologies aligned with international standards (Observatório da imprensa, 2012), ensuring reliable data to understand the integration of digital technologies in education and their relationship with Brazilian public policies. These data constitute, therefore, the empirical basis that will be analyzed in the results of this work, allowing the articulation between the legal, theoretical and practical dimensions of teacher training for the use of digital technologies.

4 ANALYSIS OF RESULTS

Linked to the Brazilian Internet Steering Committee (CGI.br) and maintained by the Brazilian Network Information and Coordination Center (NIC.br), the Cetic.br is responsible for producing statistics and indicators on the access and use of information and communication technologies (ICTs) in the country. Its credibility is recognized by different agencies, being a reference for researchers, public managers and international institutions.

The Cetic.br has been designated by UNESCO as a Category 2 Centre, i.e. under its auspices and linked to the Communication and Information Sector (IC), one of the five UNESCO areas (CETIC.BR, 2023). This international link confers legitimacy to its studies and positions Brazil among countries that develop solid methodologies for measuring the information society. In addition, Cetic.br contributed to the formulation of the Internet Universality Indicators, approved by UNESCO, and participated in their pilot application in Brazil, reaffirming its technical and methodological authority (CETIC.BR, 2019).

In the national field, Cetic.br is widely used by government agencies in the formulation and monitoring of public policies related to digital inclusion, education, and digital transformation of the State. Reports such as the ICT Education and ICT Domiciles surveys

are recurrent references for the construction of diagnoses on digital inequalities and technological infrastructure in Brazil, subsidizing actions by the government. According to the Federal Government (2025), Cetic.br data have been fundamental to guide digital transformation strategies within the scope of public administration, evidencing institutional confidence in its indicators.

The credibility of the Cetic.br is also highlighted in academic and scientific circles. The Press Observatory (2012) highlighted that the Center has consolidated itself as a national reference in research on ICTs, adopting methodologies aligned with international standards, such as the Observatory of the Information Society in Latin America and the Caribbean (OSILAC) and the United Nations Economic Commission for Latin America (ECLAC).

In this sense, by adopting the 2024 data, being the most current, produced by the Cetic.br as an object of analysis, the present work is supported by highly reliable information, recognized both by international bodies, such as UNESCO, and by national bodies linked to education and public management. This guarantees not only the academic relevance of the choice, but also the scientific and social legitimacy of the results discussed.

4.1 CONTINUING EDUCATION: ADHERENCE AND GAPS

The data in Table 1 below, point to 54% of teachers with participation in continuing education in the last year and 46% without participation, reveal a partial adherence that points to relevant gaps for the training policy. This table shows that, despite the legal provisions (LDB; BNCC) and the guidelines that insist on continuous training, a significant portion of the teaching profession remains without effective access to training in digital technologies. The literature indicates that this gap compromises the implementation of the digital skills provided for in the BNCC, as the mere normative prescription does not guarantee the pedagogical appropriation of DICT by teachers (Nóvoa, 2019; Tardif, 2014).

Table 1

H3 - teachers who have participated in continuing education on the use of digital technologies in teaching and learning activities in the last 12 months

Participation in continuing education	Percentage (%)
Yes	54
No	46

Source: Adapted from Cetic.br, 2024.

Table 2 below reinforces the importance of training by pointing out that 76% of teachers report the contribution of training to the adoption of new practices and 69% show adaptation of teaching to the needs of students. These percentages indicate that when there

is training, the impact is considerable, which validates Nóvoa (2022) and Freire (1996) when they state that continuing education, when situated and reflective, promotes concrete changes in teaching practice. However, the difference between the reported effectiveness (Table 2) and the non-participation rate (Table 1) indicates a coverage deficit: the training that transforms practices does not reach all teachers, generating inequalities in the implementation of curricular guidelines.

Table 2

H9 - teachers, by perception of the level of contribution of continuing education activities carried out in the last 12 months to the adoption of new teaching and learning methodologies and practices mediated by digital technologies

Reported impact	Level of contribution	Percentage (%)
Guiding students on how to use digital technologies critically, safely, and responsibly	Very much	67
	Little	26
	Nothing	7
Support students when any sensitive situation occurs on the internet, such as cyberbullying, discrimination, or other situations	Very much	60
	Little	27
	Nothing	12
Teaching students how to protect their personal data, their digital identity and privacy on the Internet	Very much	51
	Little	31
	Nothing	19
Use digital technologies to adapt activities to students' learning rhythms	Very much	69
	Little	26
	Nothing	5
Adopt new teaching and learning methodologies and practices through digital technologies	Very much	76
	Little	22
	Nothing	1

Source: Adapted from Cetic.br, 2024.

Table 2 shows that training can transform practice; however, Table 1 highlighted the urgency of expanding coverage and ensuring equity in access to these trainings.

This scenario requires a critical reading of public policies: it is not enough to offer courses; it is necessary to guarantee access, continuity and institutional conditions for training to be effective (BNC-Formation; CNE/CP Resolution No. 1/2020). The presence of legislation that encourages continuing education dialogues with the data (BRASIL, 2020), but the divergence reveals implementation failures that may result from problems of time, funding, workload, and school prioritization, which must be investigated and addressed.

Furthermore, the articulation between these data and authors such as Perrenoud (2000) and Gadotti (2005) points to the need to rethink training as a continuous process, part of the professional routine and articulated with collaborative and reflective practices.

4.2 CULTURE OF COLLABORATION AND PROFESSIONAL DEVELOPMENT

Table 3 below indicates that 92% of teachers sought some professional development and 77% helped other educators, signaling a strong culture of self-development and peer cooperation. These data contribute to the idea of collective construction of teaching knowledge defended by Nóvoa (2002; 2019) and Tardif (2014), who see professional exchanges as a central space for training. The high rate of peer support reveals that professional self-organization is a real and present strategy among teachers, acting as a mechanism for the dissemination of practices and innovations.

Table 3

C4 - teachers, for the use of digital technologies in professional practice - professional development

Activity carried out	Percentage (%)
Sought professional development	92
They helped other educators	77

Source: Adapted from Cetic.br, 2024.

Table 4 below shows that 91% of teachers had to resort to videos/tutorials and other self-training resources, which shows a very strong phenomenon of informal and autonomous learning, the so-called lifelong learning. Although this behavior demonstrates proactivity, it refers to Freire's (2002) reflections: self-learning needs to be mediated by critical reflection and not only by technical consumption of procedures. The prevalence of videos and tutorials can produce instrumental competences, but it runs the risk of not developing critical pedagogical appropriation if it is not complemented by spaces for debate and collective experimentation.

Table 4

H1 - teachers, through self-training or in-service training on the use of digital technologies

Resource used	Percentage (%)
Training by the pedagogical coordinator or school principal	52
Training by other organisations outside the school	55
Online videos or tutorials	91
Courses from the government or other organizations	66

Source: Adapted from Cetic.br, 2024.

The articulation between self-education (Table 4) and peer support (Table 3) suggests that informal communities of practice play a central role in the diffusion of technological innovations. This phenomenon can be considered positive when it feeds reflexive exchanges that problematize the use of technology, which Tardif (2014) and Perrenoud already highlight:

learning from others enriches the professional repertoire and transforms experiential knowledge into socially validated knowledge.

However, the predominance of self-training also indicates the fragility of institutional systems of continuing education. The BNC-Formação and the CNE guidelines point to the need for mentoring, tutoring and modulated programs that complement and qualify this self-learning; without this, many teachers appropriate fragmented content of questionable quality (BRASIL, 2020). In practical terms, the data suggest the need for policies that articulate standardized resources (such as videos) with spaces for discussion, deepening and pedagogical supervision.

4.3 FORMATS AND THEMES OF TEACHER TRAINING

Table 5 below reveals a diversity of training formats such as: video classes; lectures; workshops; extension courses; among others, which indicates methodological flexibility in the offers. This plurality is in line with the recommendation of the BNC-Formação to adopt various training programs (BRASIL, 2020). Moran (2015) and Cortelazzo et al. (2018) advocate the combination of face-to-face and remote formats (blended learning) and active methodologies to promote more effective learning; Thus, the diversity found is positive if there is articulation between the formats and pedagogical intentionality.

Table 5

H4 - teachers, by type of continuing education activities in which they have participated in the last 12 months

Type of activity	Percentage (%)
Video lessons	84
Lectures with experts	61
Workshops or trainings	67
Extension courses	46

Source: Adapted from Cetic.br, 2024.

As for the themes present in Table 6 below: (use of technologies in evaluation, creation of digital content, media education, artificial intelligence, data protection), there is direct convergence with the digital competencies provided for in the BNCC (computational thinking, digital world, digital culture). Kenski (2012) and Barreto (2009) warn, however, that the treatment of these issues needs to be critical and contextualized, contemplating the ethical and political dimensions of technology (e.g., data protection, biases in AI). The presence of AI and data protection among the most worked on topics points to a formative response to emerging demands, which is positive from a curricular point of view.

Table 6

H7 - teachers, by themes of continuing education activities in which they have participated in the last 12 months

Theme worked	Percentage (%)
Use of technologies in the evaluation of student performance	75
Ways to guide students on the safe use of the computer, cell phone and the Internet	69
Educational content creation platforms, computer programs, or applications	82
Assessing the veracity of information and news and responsibly sharing content and opinions on the Internet	61
Protection of privacy and personal data in the use of the Internet	58
Computing, programming or robotics in education	39
Use of Artificial Intelligence in educational activities	59
Media education and critical use of media in the classroom	68
Use of digital technologies to adapt activities to students' learning rhythms	79

Source: Adapted from Cetic.br, 2024.

Despite this thematic correspondence, it is necessary to evaluate the depth with which each theme is worked: short workshops and tutorials can introduce tools, but they do not guarantee consolidated pedagogical understanding. Gadotti (2005) and Freire (2002) remind us that training should foster reflection, research and experimentation through modalities that require a more elaborate training organization than mere technical training.

Therefore, the centrality of themes related to evaluation, content production and media education signals a trend oriented towards daily teaching practice, which reinforces that training needs to dialogue with the real needs of classrooms, as already addressed by Tardif (2014), and not only with abstract technological trends. Training policies must ensure didactic sequence between learning about tools and their consequence in meaningful pedagogical practices.

4.4 PEDAGOGICAL PRACTICE WITH TECHNOLOGIES: PRESENCE AND DEPTH

Table 7 below indicates that 100% of teachers report using digital technologies in professional practice, a fact that confirms the real insertion of DICT in daily school life. However, the universality of use does not ensure the quality of this mediation: as Kenski (2003) and Contreras (2002) warn, it is essential to distinguish between instrumental use and intentional pedagogical integration. The widespread presence of technologies opens opportunities for active methodologies and personalization, but it can also disguise reproductive practices if there is no pedagogical reflection on purposes and effects.

Table 7

C20 - teachers, for the use of digital technologies in professional practice

Use of digital technologies	Percentage (%)
Yes, they use	100
Do not use	0

Source: Adapted from Cetic.br, 2024.

However, in an integrated way, the synthesis presented in Table 8 below shows that teacher training in Brazil, although expanding, still faces inequalities in access and limitations regarding the universalization of participation in formal continuing education programs.

Table 8

Synthesis of results on continuing education and the use of digital technologies by teachers (Cetic.br, 2024)

Thematic axis	Key findings	Evidence (Cetic.br, 2024)
Continuing education	Significant, but not universal, participation.	54% participated in the last year; 46% did not participate (Table 1).
Impacts of training	Direct repercussion on pedagogical innovation and adaptation to the needs of students.	76% have adopted new practices; 69% adapted teaching; (Table 2).
Professional development	Strong engagement in search of updating and collaboration among peers.	92% sought development; 77% supported other teachers (Table 3).
Teacher self-training	Digital resources are the most used to learn autonomously.	91% use online videos/tutorials; while a lower percentage sought other resources (Table 4).
Training activities	Predominance of video lessons	84% participated in video classes while a smaller percentage participated in other types of training activities (Table 5).
Training topics	Emphasis on the use of digital technologies, content production and evaluation.	75% cited the use of technologies in performance evaluation; 79% mentioned the use of technologies in the adaptation of activities (Table 6).
Use of digital technologies	Universalization of the use of DICT in the exercise of teaching.	100% reported using technologies (Table 7).

Source: the author, based on Cetic.br (2024).

Thus, it was demonstrated that the impacts reported in Table 2 (76% adoption of new practices; 69% adaptation of teaching) show that continuous training contributes significantly to transform practices. This confirms Nóvoa's (2022) thesis on the power of situated and collaborative training for pedagogical innovation. However, critical analysis must recognize that real transformation demands not only training, but changes in working conditions, pedagogical time and institutional support, elements that public policies need to consider.

The integration of DICT into the assessment, communication and production of content as demonstrated in (Table 6 and Table 7) requires multiple skills from teachers (Tardif, 2014): disciplinary mastery, technological skills, pedagogical knowledge and ethical mediation capacity (Barreto, 2009). The comparison of widespread use and impact reports signals advances, but the literature indicates that these advances are only consolidated when there are processes of monitoring, mentoring, and communities of practice that sustain changes in daily life (BRASIL, 2020; Freire, 2002).

The growing centrality of digital technologies in training processes is noted, both in face-to-face and online courses and in self-training practices, such as the use of videos and online tutorials. This scenario confirms Kenski's (2012) perspective, when he states that technologies profoundly reconfigure social and educational dynamics, requiring the school to adopt new attitudes towards digital culture.

5 FINAL CONSIDERATIONS

The data obtained in this research reinforce Moran's (2015) defense of the relevance of active and innovative methodologies, since they show that teachers who participate in continuing education tend to adopt new pedagogical practices, adapting teaching to the needs of students and expanding the use of DICT. This movement, however, is not limited to access to resources or tools, but requires pedagogical intentionality and critical reflection, as Freire (2002) points out, when he understands training as a process of awareness and transformation of practice.

In this sense, the universalization of the use of digital technologies, pointed out by Cetic.br (2024), needs to be understood beyond the simple presence of devices in the classroom. Nóvoa (2019, 2022) and Tardif (2014) recall that teacher training is a collective, historical practice marked by plural knowledge, built in the interaction between teachers, school contexts, and educational policies. Thus, training should not be reduced to a technical dimension, but conceived as a space for collaboration, sharing and reflection that enables the construction of transformative pedagogical practices.

The results of this research demonstrate that teacher training, when it critically integrates digital technologies, contributes not only to meeting the legal requirements expressed in the BNCC (2018) and BNC-Formação (2020), but also to the strengthening of inclusive, collaborative pedagogical practices aligned with contemporary challenges. The high rate of adherence to self-training methodologies and peer support also reveal the importance of communities of practice and the appreciation of teaching experience as central elements in the construction of professional knowledge.

Finally, the analysis shows that continuing education focused on the use of DICT cannot be understood as a punctual or merely normative action, but as a permanent, critical and reflective process, which recognizes the teacher as an active subject in his or her formative trajectory. By promoting conditions for teachers to develop digital skills in an ethical, meaningful and creative way, teacher training contributes to the construction of an innovative education, committed to the democratization of knowledge and prepared for the challenges of the 21st century.

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