

TEACHER TRAINING AND DIGITAL TECHNOLOGIES: REFLECTIONS ON PEDAGOGICAL PRACTICE IN BASIC EDUCATION



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ABSTRACT

This article presents an investigation on the perceptions of Basic Education teachers about the integration of Digital Information and Communication Technologies (DICT) in their pedagogical practices. The research is based on the observation that, although DICT offers great potential for innovation in teaching, its implementation faces several challenges. The objective is to analyze how teachers perceive these challenges; and to identify the benefits provided by digital technologies in the teaching-learning process. The research used a qualitative approach, based on interviews with a group of teachers, whose answers were analyzed through the content analysis technique. The results revealed that, despite the structural difficulties and the need for greater institutional support, teachers recognize the positive impact of DICT, especially in terms of personalization of teaching, increased student engagement and development of autonomy. It is concluded that the effective integration of DICT in the educational context depends on more effective and robust public policies, which guarantee equity in access to technologies and provide continuous and contextualized teacher training.

Keywords: Digital Technologies, Teacher Training, Basic Education, Pedagogical Practices.

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INTRODUCTION

Teacher training in Brazil has proven to be a topic of extreme relevance in educational discussions, especially in view of the transformations brought about by the advancement of Digital Information and Communication Technologies (DICT). In recent years, the educational context has been deeply impacted by the emergence of digital culture, which permeates not only the daily lives of students, but also school environments.

The integration of these technologies into pedagogical practices requires new skills on the part of educators, and also implies a critical review of the processes of initial and continuing education, with a view to preparing teachers for contemporary challenges. Traditional teaching methods, which were based on the transmission of information by teachers, were suitable at a time when access to information was limited. However, with the availability of courses and materials on the Internet, learning has become possible anywhere and at any time, involving several people. This new scenario presents complexities and challenges, since there are no consolidated models for flexible learning in a highly connected society (Almeida; Valente, 2012).

However, teacher training, especially in Basic Education, still faces significant obstacles with regard to the effective inclusion of digital technologies. Despite the expansion of access to digital resources, many teachers feel insecure about the pedagogical use of these tools, either due to the lack of adequate infrastructure in schools, or due to the absence of adequate specific training that promotes the critical and creative use of DICT.

It is also observed that, although schools with available tools, access to the internet and teachers with basic training in educational informatics are present, the integration of digital resources into pedagogical practices is not yet effective. For teachers to effectively integrate the use of these media into their professional practice and adapt it to the contemporary digital context, an effort beyond the basics is necessary. The goal is for both teachers and students to become digitally literate, appropriating technology in a critical and creative way, attributing meanings and functions to it, instead of using it passively (Freitas, 2010).

This gap between teacher training and practice with digital technologies is evidenced in the difficulty of many educators in adapting their methodologies to the digital context, which aggravates inequalities in access and limits pedagogical potential.

In view of this scenario, the present study seeks to investigate how Basic Education teachers perceive and experience the use of digital technologies in their teaching practices. The research problem that guides this investigation is: how does teacher training influence the use of Digital Technologies by teachers who work in Basic Education? This question arises from the need to understand the gaps and potentialities of teacher training with regard to the integration of digital technologies in the school environment.

The objective is, therefore, to present an experience report of teachers who work in Basic Education and who participated in training processes focused on the use of digital technologies in teaching. The research, with a qualitative approach, is based on semi-structured interviews with teachers, who share their perceptions, challenges and advances related to the use of DICT in their pedagogical practices.

And it is justified by the urgency of rethinking teacher training policies, especially with regard to the preparation of educators for the pedagogical use of digital technologies. In a context where hybrid education and remote teaching are becoming increasingly present, it is essential that teachers are trained to integrate DICT effectively, seeking to promote meaningful and inclusive learning for all.

The methodology adopted involves the collection of data through interviews with teachers who work in Basic Education, in order to capture their experiences and perceptions about the impact of teacher training on the use of DICT. The data analysis will be done through the content analysis technique proposed by Bardin (2016), with the objective of identifying categories and patterns that reveal both the challenges and the opportunities of training for the use of digital technologies.

Thus, it is intended to contribute to the field of teacher training by highlighting the needs and challenges faced by teachers regarding the integration of digital technologies in the classroom, proposing reflections on how training can be improved to meet the demands of contemporary education.

THEORETICAL FRAMEWORK

Teacher training in the context of Basic Education has been deeply impacted by technological innovations. The use of digital technologies in teaching has become a necessity to meet the demands of a society in constant transformation, marked by digital culture and the ubiquity of technological devices. According to Sales and Kenski (2021), emerging technologies play a key role in promoting social inclusion and overcoming

inequalities, providing new training and learning opportunities, which become more flexible and autonomous. In this way, digital technologies can enrich the curriculum, and also enable innovative pedagogical practices, which break with traditional teaching models, historically guided by hierarchical structures and homogeneous content.

Technological artifacts have the potential to amplify creative practices when teachers use them in a critical and reflective way, encouraging the construction of new ideas and challenging pre-existing knowledge. Rather than serving only as a means for transmitting content, technologies should be employed to stimulate students' curiosity, questioning, and creativity. In this sense, it is essential that teachers assume a leading role in educational transformation, using these resources to foster pedagogical practices that promote student autonomy. In addition, digital technologies provide opportunities to deal with diversity and enable new interpretations of reality (Conte; Habowski, 2019).

The incorporation of digital technologies in the educational environment goes beyond the simple adoption of tools; it requires an epistemological reconfiguration of the teaching-learning processes. It is pointed out that the presence of these technologies, when combined with innovative pedagogical approaches, creates a more dynamic and flexible learning space, where the student becomes an active participant in the construction of their own knowledge. In this scenario, learning is built in a collaborative and contextualized way, expanding students' opportunities for cognitive and creative development.

The impact of digital technologies on education is not limited to the transformation of school curricula, but also involves teacher training. It is essential that teacher training prepares educators to deal with the demands of a world where technologies are an integral part of everyday school life. According to Boscaroli (2022), the continuing education of teachers should be a priority to ensure that these professionals acquire the digital skills necessary to criticize, evaluate, and produce relevant pedagogical content. The integration of technologies into the teaching-learning process, therefore, cannot be superficial or improvised, but must be planned based on public policies that guarantee access, infrastructure and adequate training.

The COVID-19 pandemic has accelerated the need for structural changes in the education system, highlighting the urgency of training teachers capable of using digital technologies effectively. For Félix (2021), the educational practices that emerged in this period brought to light the importance of discussing teacher training in the post-pandemic context. According to the author, it is necessary to rethink the use of digital technologies in

the interaction and learning processes, ensuring that these tools are used in a way that promotes a more humanized teaching adapted to new social realities. The technological instrumentalization of teachers, although necessary, should not be seen as the only focus of training. The pedagogical integration of technologies, according to Modelski, Giraffa and Casartelli (2019), should be a priority, allowing teachers to use these resources to organize their classes, communicate and develop innovative pedagogical practices.

Even so, the mere presence of technologies in schools does not guarantee the quality of pedagogical practices. For these tools to truly transform teaching, teachers need to be prepared to integrate them in a critical and reflective way.

As observed by Moran (2000), a qualitative change in teaching occurs when the teacher is able to combine innovative technologies and methodologies with a renewed pedagogical vision. In this sense, teacher training should foster not only the technical mastery of digital tools, but also the development of a critical pedagogical posture, which promotes inclusion, autonomy and protagonism of students.

In addition, digital technologies offer new possibilities for organizing teaching, which go beyond traditional classes. For Dias-Trindade and Ferreira (2022), it is essential that teacher training encompasses different methodologies and pedagogies that value multimodality and ubiquity, fundamental characteristics of contemporary education. Teacher training, in this context, must be dynamic and adaptive, enabling teachers to respond effectively to technological and social changes, developing pedagogical practices that dialogue with the needs of students and society.

According to Victorino da Silva (2020), it is essential that schools adopt an organized and planned approach to the insertion of DICT in pedagogical practices. It is not enough to offer superficial access to these technologies, either through the acquisition of equipment or the expansion of connectivity. It is necessary for society to develop programs aimed at the conscious and meaningful use of these resources, so that the possession of technologies by individuals can really contribute to social transformations.

The technological transformations that have occurred in the last two decades have not been linear, but disruptive, bringing significant changes in practices and understandings, often leading to the loss of technological repositories due to the evolution of digital media. These changes, which affect all levels of global society, impact individuals as well as social groups and institutions, radically transforming values, behaviors, and cultural processes. However, these digital advances do not ensure social well-being or

universal access to communication and employment, often generating conflict and inequalities on a global scale (Kenski, 2023).

The great impact of digital technologies in recent decades and their influence on all aspects of society, including values, behaviors, and cultural processes, is highlighted. In this regard, it is possible to see that educators need to adapt to a constantly evolving scenario. Teacher training should, therefore, prepare teachers not only for the instrumental use of technologies, but to understand the profound social and educational changes that they entail.

In this context, teacher training needs to go beyond simple familiarization with digital tools. It is essential that teachers develop skills to deal with the challenges imposed by these disruptive changes, such as combating misinformation and promoting pedagogical practices that minimize technological inequalities. In addition, teacher training should encourage critical reflection on the impacts of these technologies on education, so that teachers can integrate them consciously, promoting inclusive and innovative learning environments that respond to the needs of a global digital society.

In summary, teacher training for the use of digital technologies in basic education should be understood as a continuous and multifaceted process. In order for teachers to be able to effectively integrate these tools in a meaningful way into their pedagogical practices, it is necessary that public policies ensure not only the instrumentalization, but also the development of a critical and reflective training, which enables teachers to use technologies to promote innovative and inclusive learning.

METHODOLOGY

The present qualitative study was developed with the objective of understanding the perceptions and experiences of Basic Education teachers in relation to the use of Digital Information and Communication Technologies (DICT) in their pedagogical practices, as well as investigating the impact of teacher training in this process. In this sense, the choice for a qualitative approach is justified by the exploratory nature of the research, which seeks to delve into the subjective experiences of teachers, considering the context in which they are inserted and their interactions with digital technologies (Flick, 2004).

The study adopted an exploratory approach, since it aims to describe and analyze how Basic Education teachers, with different levels of training and performance in Fortaleza and the Metropolitan Region, incorporate DICT in their teaching practices. The research

was organized in three main stages: (i) planning and elaboration of the data collection instrument; (ii) conducting interviews with the participating teachers; and (iii) analysis of the data collected.

The research participants were selected through intentional sampling, with the objective of obtaining a diverse group of teachers in terms of location, academic background and experience with the use of technologies in the classroom. 15 Basic Education teachers were interviewed, from different locations that make up the so-called Metropolitan Region of Fortaleza, composed of 19 municipalities, with teaching time ranging from 5 to 30 years. All teachers participated in courses or continuing education programs focused on the pedagogical use of digital technologies.

For data collection, a semi-structured interview script was used, consisting of 10 open questions. The questions were designed to explore aspects related to teacher training, the use of DICT in the classroom, the difficulties faced by teachers and perceptions about the impacts of technologies on teaching-learning. The semi-structured format was chosen to allow greater flexibility during the interviews, allowing the interviewees to deepen their answers and explore aspects that they considered relevant (Gil, 2002).

The interviews were conducted remotely, using videoconferencing platforms, due to the geographic dispersion of the participants. Each interview lasted an average of 45 to 60 minutes, and all were recorded, with the consent of the interviewees, for later transcription and analysis. The interviews were conducted over three months, from February to April 2024, and followed by a review and validation of the data through triangulation with the interviewees themselves, to ensure the reliability of the information collected.

The collected data were analyzed through the content analysis technique, as proposed by Bardin (2016). This technique was chosen because it allows a systematization of the interviewees' answers, identifying categories and recurrent patterns in the statements, which allows a deeper understanding of the meanings attributed by teachers to the use of DICT and its training.

The analysis was carried out in three main stages: a) pre-analysis, with floating reading and initial categorization of the answers; b) exploration of the material, with the coding and thematic categorization of the statements; and c) treatment of the results, with the interpretation of the data in the light of the theoretical framework.

The research followed the recommended ethical procedures for studies involving human beings. All participants were informed about the objectives of the research and

signed the Informed Consent Form (ICF), ensuring the anonymity and confidentiality of the information provided. In addition, the data were treated in a way that respected the integrity of the interviewees, and the recordings of the interviews were stored in a secure environment, accessible only to the researchers involved in the study.

It is considered that the research has some limitations that should be considered in the interpretation of the results. The sampling, because it is intentional and restricted to a specific group of teachers, may not reflect the totality of teaching experiences and practices. In addition, the use of remote interviews may have limited data collection due to internet fluctuations, which may have influenced teachers' perceptions in some way. However, these limitations are recognized and suggest the need for future studies with larger and more diverse samples.

ANALYSIS AND DISCUSSION

The analysis was carried out in the light of the content analysis technique, as proposed by Bardin (2016), categorizing the participants' responses into main themes: teacher training, challenges and benefits of using DICT, and impact on teaching-learning.

The teachers interviewed present a diversity of profiles that directly influence their perceptions and practices in relation to the use of DICT. These profiles include variables such as age, gender, academic background, and length of teaching experience. Chart 1 below summarizes this information, allowing a clear view of the participating group.

Table 1. Profile of the Interviewed Professors

| Professor | Age | Teaching time (years) | Initial training | Experience with DICT |
|-----------|-----|-----------------------|-------------------------------|----------------------|
| P1 | 35 | 10 | Degree in Mathematics | Moderate |
| P2 | 42 | 18 | BSc | Discharge |
| P3 | 29 | 5 | Pedagogy | Low |
| P4 | 50 | 25 | Degree in Portuguese Language | Discharge |
| P5 | 37 | 12 | Bachelor of Arts in History | Moderate |
| P6 | 45 | 20 | Degree in Geography | Low |
| P7 | 33 | 8 | Degree in Physical Education | Moderate |
| P8 | 55 | 30 | BSc in Chemistry | Discharge |

Source: Prepared by the authors

One of the central themes addressed in the interviews was teacher training for the use of digital technologies. It was observed that, although all teachers participated in continuing education courses focused on DICT, most reported dissatisfaction with the quality and depth of these programs. The interviewees highlighted the superficiality of the training offered, often decontextualized from the reality of the schools and the needs of the daily teaching routine.

As can be seen in Chart 2, the teachers' perception of the need for more practical training applied to the classroom context was one of the most emphasized points. Teacher training, according to the reports, has focused on specific technological tools, without a theoretical deepening on how to integrate them efficiently into the curriculum.

Table 2. Teacher Perception

| Parent Topic | Teachers' Perception | Extract Comments |
|---|---|--|
| Positive Impact | Most teachers highlighted the potential of DICT to diversify teaching methodologies, increase student engagement, and personalize learning. | "Technologies allow students to have more autonomy in learning." (P2) "With digital platforms, I can better track the individual progress of each student." (P5) |
| Difficulties in Implementation | Many teachers face challenges related to inadequate infrastructure and lack of technical support in schools. | "In my school, access to the internet is very limited, which makes it difficult to implement digital activities." (P4) |
| Need for Continuing Education | There is a consensus on the need for more continuing education programs focused on the pedagogical use of digital technologies. | "I feel that the training courses I attended are very superficial and do not address the day-to-day life of the classroom." (P6) |
| Differentiated Impact among Students | Teachers realize that the use of DICT can accentuate inequalities among students, especially in vulnerable socioeconomic contexts. | "Not all students have access to devices or the internet at home, which creates a significant difference in learning." (P1) |

Source: Prepared by the authors

One of the biggest challenges identified by teachers refers to the lack of technological infrastructure in schools, as shown in Table 1. Most participants reported problems related to unstable internet connection and insufficient digital devices for all students. This scenario has a direct impact on the effectiveness of the use of DICT, since teachers, even willing to innovate in their practices, are limited by the structural conditions of educational institutions.

In addition, the resistance of some students to the use of technologies was also mentioned by 40% of the teachers, as demonstrated. Teachers who work in poorer regions

reported that many students do not have regular access to technological devices at home, which makes it difficult to continue the activities started in the classroom. This factor generates an inequality of opportunities in the teaching-learning process, accentuating the already existing disparities.

Table 1. Challenges Reported by Teachers

| Difficulty Category | Percentage |
|--|-------------------|
| Lack of technological infrastructure | 66,7% |
| Students' resistance to the use of DICT | 40% |
| Lack of adequate continuing education | 46,7% |
| Difficulty in integrating DICT into the curriculum | 33,3% |
| Overload of teaching work | 53,3% |

Source: Prepared by the authors

Another important point concerns the overload of teaching work. More than half of the teachers interviewed mentioned that the integration of DICT into the planning and execution of classes requires more time and effort, in addition to the already extensive daily responsibilities.

Despite the challenges, teachers recognize numerous benefits in the use of DICT in their pedagogical practices. As illustrated in Chart 3, the use of digital technologies has provided greater student engagement in classroom activities, since digital resources, such as interactive videos and teaching platforms, make learning more dynamic and interesting for students.

Table 3. Summary of Teachers' Perceptions of the Impact of DICT

| Category | Teachers' Perception | Extract Comments |
|---------------------------------------|---|--|
| Positive Impact | Most teachers highlighted the potential of DICT to diversify teaching methodologies, increase student engagement, and personalize learning. | "Technologies allow students to have more autonomy in learning." (P2) "With digital platforms, I can better track the individual progress of each student." (P5) |
| Difficulties in Implementation | Many teachers face challenges related to inadequate infrastructure and lack of technical support in schools. | "In my school, access to the internet is very limited, which makes it difficult to implement digital activities." (P4) |
| Need for Continuing Education | There is a consensus on the need for more continuing education programs focused on the pedagogical use of digital technologies. | "I feel that the training courses I attended are very superficial and do not address the day-to-day life of the classroom." (P6) |

| | | |
|--|---|--|
| <p>Differentiated Impact among Students</p> | <p>Teachers realize that the use of DICT can accentuate inequalities among students, especially in vulnerable socioeconomic contexts.</p> | <p>"Not all students have access to devices or the internet at home, which creates a significant difference in learning." (P1)</p> |
|--|---|--|

Source: Prepared by the authors

Another benefit highlighted was the possibility of personalizing teaching. Teachers reported that, with the help of digital platforms, it is possible to adapt activities and assessments to the individual needs of each student, which promotes more inclusive and student-centered learning. This personalization, which emerges as one of the most promising advantages of DICT, allows students to advance at their own pace, favoring the development of cognitive skills in a differentiated way.

The data also indicate that digital technologies have facilitated the evaluation process. The use of *interactive quizzes, for example, allows teachers to get immediate feedback on student progress, adjusting their pedagogical strategies on an ongoing basis.*

A relevant point observed in the interviews was the impact of DICT on the development of students' autonomy. The teachers reported that technological tools, by allowing access to content autonomously, encourage students to explore knowledge on their own. Thus, the use of DICT tends to foster curiosity and self-directed learning, enabling increasingly digital and self-taught learning.

However, teachers also warn of the risks that this autonomy will be undermined by inequalities in access to technologies. As mentioned earlier, many students do not have devices or unlimited internet access, which can influence autonomous development and reinforce disparities between students from different socioeconomic backgrounds.

The challenges faced by teachers when integrating DICT into pedagogical practices highlight the gap between teacher training and critical use of these tools. As pointed out by Moran (2000), the effectiveness of the adoption of DICT depends not only on the availability of resources, but also on a methodological reformulation that stimulates the autonomy of students and promotes more active and collaborative learning. This critical view was not fully observed among the teachers interviewed, who, despite recognizing the potential of technologies, reported difficulties in transforming their pedagogical practices in a significant way.

Another aspect highlighted is the insufficiency of continuing education for the use of DICT, corroborating the analyses of Modelski, Giraffa and Casartelli (2019), who emphasize the need to train teachers to use technologies in a reflective way, going beyond the

technical domain. The survey data indicate that most teachers feel the need for deeper training, focusing on the integration of technologies into the curriculum in a contextualized and effective way. This training gap reinforces the urgency of public policies aimed at critical teacher training, as suggested by Victorino da Silva (2020).

In turn, the benefits reported by teachers regarding the use of DICT, such as increased student engagement and personalization of teaching, are in line with the perspectives of Sales and Kenski (2021). They point out that technologies, when well integrated, can promote inclusion and enrich pedagogical practices. However, reports of inequality of access to the internet and devices among students demonstrate the importance of a closer look at the conditions of infrastructure and institutional support, without which the potential of DICT is limited.

The analysis of the data allows us to conclude that, although digital technologies offer great possibilities for pedagogical innovation and the improvement of teaching-learning, their effective implementation depends on several factors, such as adequate infrastructure, institutional support and continuous teacher training. The use of DICT should be accompanied by a critical reflection on teaching conditions, as well as on the inequalities that permeate access to technologies.

The need for a more robust and practical training for teachers is evident in the reports analyzed. Without adequate support, teachers face difficulties in integrating technologies into the curriculum efficiently, which limits the potential of DICT in the educational context. In this sense, it is essential that public policies aimed at digital education be expanded and reinforced, in order to ensure equitable conditions for the use of technologies in the classroom.

FINAL CONSIDERATIONS

The present study sought to understand the perceptions of Basic Education teachers about the integration of DICT in their pedagogical practices, as well as the challenges and benefits related to this implementation. The analysis of the data revealed that, although DICT offer numerous possibilities for innovation and dynamization of teaching, its effective use in the classroom still encounters several barriers, such as the lack of adequate infrastructure, the insufficiency of continuing teacher training and inequalities in access to technologies among students.

One of the central points discussed refers to teacher training. Despite the participation of teachers in training courses, these were considered insufficient for an effective practical application of technologies in the educational context. The lack of a more critical and reflective approach to how to integrate DICT into the curriculum demonstrates the need for training programs that not only present the technological tools, but also address their pedagogical implications in a deeper way.

Structural challenges, such as the absence of a stable internet connection and the insufficiency of devices for all students, were also recurrent in the participants' statements. These problems limit the possibilities of a truly technology-mediated education, especially in poorer regions. In addition, the resistance of some students to the use of DICT reinforces the need for public policies that promote equity in access to technologies.

On the other hand, the benefits identified by the teachers show the transformative potential of DICT in teaching and learning. The personalization of teaching, the increase in student engagement, and the facilitation of the evaluation process are positive aspects that demonstrate the importance of digital technologies in promoting more inclusive and dynamic learning. The development of student autonomy, encouraged by the use of DICT, is also a relevant factor, allowing students to explore knowledge in an independent and personalized way.

It is evident that the integration of DICT in the educational sphere, although promising, still faces significant barriers, especially with regard to teacher training and the structural conditions of schools. The results showed that, although teachers recognize the positive impact of technologies on the teaching-learning process — especially with regard to the personalization of teaching and the increase of student engagement — such benefits are not fully explored. Thus, there is a need for training programs to move beyond technical instrumentalization, encompassing a critical and reflective approach that enables educators to integrate DICT in a more effective and meaningful way.

Furthermore, the analysis of teachers' perceptions reinforces the argument that the use of DICT should not be considered only as a supplementary tool, but as a central component in pedagogical transformation, requiring a review of traditional teaching practices. However, for this transformation to occur equitably, it is essential to establish robust public policies that guarantee not only universal access to technologies, but also the reduction of educational inequalities. Therefore, it is considered that the true potential of DICT will only be achieved through a joint effort between managers, teachers and public

policies that aim to promote an inclusive, innovative educational environment prepared for the challenges of contemporaneity.

In view of the considerations made, it is concluded that the integration of DICT in Basic Education is a complex process, which requires investments in infrastructure, quality continuous training and adequate institutional support. The promotion of a digital culture in schools, based on the conscious and critical use of technologies, is essential for DICT to actually contribute to the improvement of public education in Brazil. In this sense, it is necessary that broader educational policies be implemented, aiming to ensure equitable access to technologies and providing adequate conditions for teachers to use these tools effectively and meaningfully.

As recommendations for future studies, it is suggested to expand the sample of teachers and investigate more deeply the impacts of DICT on students' academic performance. In addition, further research could explore the relationship between DICT and the promotion of socio-emotional skills, considering the role of technologies in the integral education of students. In short, the potential of digital technologies in education is vast, but for it to be fully realized, a joint effort between teachers, managers, and the public authorities is essential to create a more prepared and inclusive educational environment.

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