Digital Technologies and Education: challenges in the teaching and learning process

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Abstract
The aim is to understand the challenges encountered in the teaching and learning process and their relationship with access to and use of digital technologies. This is a qualitative, exploratory investigation in the form of field research, conducted with 142 teachers who work in basic education. The information was collected with a questionnaire and analyzed by Discursive Textual Analysis, resulting in three final categories. In this study, the category was discussed: Access to digital technologies, supported by the following intermediate categories: Access to the Internet and physical technological resources; Access to technologies due to social conditions; and, Appropriate physical space for the use of technologies. The analysis highlighted the essential importance of investments in technological resources and in the continuing education of teachers, since, based on the availability of such resources and the knowledge of teachers, there is an environment that that will enhance educational practices and to facilitate student learning.

Keywords
digital technologies; teaching and learning; access to technological resources.

Tecnologias Digitais e Educação: desafios no processo de ensino e aprendizagem

Resumo
Objetiva-se compreender os desafios encontrados no processo de ensino e aprendizagem e sua relação com o acesso e utilização das tecnologias digitais. Trata-se de uma investigação de cunho qualitativo, do tipo exploratória na forma de pesquisa de campo, realizada com 142 professores que atuam na educação básica. As informações foram coletadas com um questionário e analisadas pela Análise Textual Discursiva, emergindo três categorias finais. Neste estudo, discutiu-se a categoria: acesso às tecnologias digitais, sustentada pelas seguintes categorias intermediárias: acesso à internet e aos recursos tecnológicos físicos; acesso às tecnologias devido a condições sociais; e espaço físico apropriado para o uso das tecnologias. A análise evidenciou a essencialidade de investimentos em recursos tecnológicos e na formação continuada dos professores, já que, a partir da disponibilidade de tais recursos e do conhecimento dos professores, tem-se um ambiente que contribuirá para qualificar as ações educativas e para facilitar a aprendizagem dos estudantes.

Palavras-chave
tecnologias digitais; ensino e aprendizagem; acesso aos recursos tecnológicos.

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Tecnologías Digitales y Educación:

desafíos en el proceso de enseñanza y aprendizaje

Resumen

El objetivo es comprender los retos encontrados en el proceso de enseñanza y aprendizaje y su relación con el acceso y uso de las tecnologías digitales. Se trata de una investigación cualitativa, exploratoria, de tipo investigación de campo, realizada con 142 docentes que trabajan en educación básica. La información fue recolectada mediante un cuestionario y analizada mediante Análisis Textual Discursivo, dando como resultado tres categorías finales. En este estudio, se analizó la categoría: acceso a tecnologías digitales, sustentada en las siguientes categorías intermedias: acceso a internet y recursos tecnológicos físicos; acceso a las tecnologías debido a las condiciones sociales; y espacio físico apropiado para el uso de tecnologías. El análisis destacó la importancia esencial de las inversiones en recursos tecnológicos y en la formación permanente de los docentes, ya que, a partir de la disponibilidad de dichos recursos y del conocimiento de los docentes, favorecer un entorno que mejore que contribuirá a cualificar las acciones educativas y facilitar el aprendizaje de los estudiantes.

Palabras clave

tecnologías digitales; enseñanza y aprendizaje; acceso a recursos tecnológicos.

1 Introduction

In the contemporary context, digital technologies (DTs) play a central role in virtually every aspect of modern life. From the computer revolution in the 1980s and 1990s to the ubiquity of *smartphones* and internet-connected devices today, the evolution of DTs has been remarkable (Borba; Scucuglia; Gadanidis, 2015). From increasingly complex inventions, DTs have progressed to become an integral and almost indispensable part of everyday life.

In the educational field, DTs act as a transformative and innovative agent. From the introduction of the first computers in classrooms to the proliferation of features such as mobile devices, educational *software*, and *onlinelearning* platforms, DTs have revolutionized the way knowledge is mediated and constructed. They provide a more dynamic, interactive and personalized learning environment, allowing teachers to adapt teaching methods to the needs of students. In addition, they facilitate access to several multimedia resources, enriching the learning process and making it more engaging (Maier; Frizon, 2021; Moran, 2013; Scheffer; Sperandio; Battisti, 2021).

In addition, it is important to consider that the use of DTs can sometimes become limited if teachers do not have training for pedagogical use. Another factor is related to the access of DTs in school environments, so that they do not always have appropriate physical space and adequate equipment, as well as access to quality internet (Carraro; Ostemberg; Santos, 2020; Ferreira; Carvalho; Iocca, 2022). Thus, it is crucial to emphasize the importance of a conscious and pedagogically effective integration of DTs in the educational context, in order to add possible contributions to the teaching and learning process.

In order to understand the challenges encountered in the teaching and learning process and its relationship with the access and use of DTs, in the present study a field research was carried out with teachers who work in basic education. The information was produced from a questionnaire and analyzed using the Discursive Textual Analysis (DTA) method. Subsequently, some theoretical discussions on the topic discussed here are presented, followed by the methodology, the understandings that emerged in the analysis and the final considerations.

2 TD in the teaching and learning process

Given the current scenario, there are many factors that indicate the creation of a new way of understanding the school and educational spaces. Moran (2013) states that we learn by creating habits, by stimulating, by motivating someone, by pleasure, because we like a subject, a media, an individual. Thus, it is understood that learning is better when we experience, establish bonds, help make information meaningful, integrating what was disconnected in a new context, seeking meaning.

Technology is an ally to share knowledge and enhance our ability to communicate and innovate, as we interact with others in an affectionate, patient, permanent, continuous and confident learning process. In this context, the school can become a set of rich spaces of meaningful learning, which motivate students to actively learn, to research, to be proactive, to know how to take initiatives and to interact supported by technologies (Moran, 2013).

In this sense, understanding the potential of technologies contributes to not losing sight of the greater purpose of education, which, for Belloni (2009), is to train the competent citizen for life in society, promoting the critical and creative appropriation of these technologies by teachers and students. Also, according to the author, the integration of DTs into education only makes sense if carried out in its double dimension: as a pedagogical tool and as an object of study so that teaching methods and strategies can be adapted.

The use of DTs depends on the intention of the educator to recognize their role in teaching, which, in addition to rethinking pedagogical practice, is capable of modifying it. There was a time when it was thought that technology would replace the teacher, as stated by Borba and Penteado (2010, p. 55): "[...] at the end of the 70s, when the discussion about the use of computer technology in education began, it was imagined that one of the implications of its insertion in school would be teacher unemployment". However, it is clear that currently the teacher continues to actively participate in the teaching and learning process, although it is appropriate to recognize that DTs are instruments that facilitate teaching practice, since they allow agility in access to information and the dynamization of classes.

Over time, the intensification of DTs in the classroom has brought new challenges to the teacher, who, in addition to mastering the content, needs to be constantly updated and, at the same time, prepared to deal with unexpected events inherent to the use of this tool. As students can have access to technologies in real time, new situations can arise, as well as doubts and questions. Thus, it is important that both the teacher and the students are clear about the need to understand the DTs as a possibility for new discoveries.

According to Borba and Penteado (2010), the teacher who moves through the comfort zone, mastering the content and having the answers ready, is challenged to walk the risk zone. In this way, the educator will benefit from the potential of technologies in the teaching and learning process, in which all the subjects involved interact and grow together (Borba; Penteado, 2010). Furthermore, according to Borba, Scucuglia and Gadanidis (2015, p. 42):

> Technologies are changing the very notion of what it is to be human. Mobile digital technologies - *internet*, mobile, *tablets* - are changing the norms we live by, the values associated with certain actions. Again, this happens at a different pace outside and inside the school. Thus, the gap between practices that students and teachers have outside the school and within the same institution increases.

The integration of technologies into the educational process cannot be superficially conceived as a mere transmission of content. A balance is needed between what is proposed in the curricula and the real needs of students, who, on a daily basis, live connected to DTs, while at school, use is often still restricted. Tezani (2017) indicates that basic education students can be considered digital natives, understood as those born from the 1990s, and that, since their birth, DTs have been part of their daily lives. Therefore, teachers need to take advantage of the potential they have in order to contribute to teaching practice and the teaching and learning process.

In view of this, Maier and Frizon (2021) reinforce the need for teachers to become familiar with the DTs present in their context, in order to rethink, modify and/or adapt their pedagogical practices. The authors add that:

> Pedagogical use consists of making digital technologies effectively integrated into the curriculum and more improved pedagogical practices. It is necessary to think about the use of digital technologies, in the sense of what they can provide, as a cultural element, of what they can offer from a pedagogical point of view (Maier; Frizon, 2021, p. 198).

In addition, Scheffer, Sperandio and Battisti (2021, p. 151) mention that the impact arising from the insertion of technologies in teaching implies “[...] reflection on the teaching action and the conceptions of teaching and learning, because it is in this action that the performance of teachers who benefit from virtual environments, influencers of teaching practice, is reflected”. Faced with this, teachers need to continuously evaluate the actions they develop in the classroom, looking for training that proposes new alternatives for teaching.

When conducting a study with a group of teachers working in basic education in different regions of Brazil, Teixeira and Oliveira (2024) explore digital culture as a possibility in teaching and learning. As a result, they indicate that, during the training processes, teachers seek to develop technological skills, adapt pedagogical practices, collaborate with colleagues and innovate in their teaching methodologies. This demands that continuing education be comprehensive and dynamic, contemplating critical

reflection, integration between theory and practice, collaboration and innovation, which contributes to teacher qualification for the promotion of digital culture in the different actions it develops in its practice.

Teachers aim for better strategies to provide learning spaces. Thus, it is understood that the relationship with the other, constant listening, collaborative planning, interdisciplinary relationships, among other actions, will need to be present, building networks of interaction between teachers and, especially, between teacher and students. According to Tardif (2002, p. 49-50):

> The teacher rarely acts alone. He is in interaction with other people, starting with the students. The teaching activity is not exercised on an object, on a phenomenon to be known or a work to be produced. It is carried out concretely in a network of interactions with other people, in a context where the human element is determinant and dominant and where symbols, values, feelings, attitudes that are subject to interpretation and decision are present.

Thus, it is noted that the collective interaction between the different subjects who experience the teaching and learning process is a pillar of support, allowing the integral development of students. Bonilla (2009) considers that contemporaneity is requiring the school to propose pedagogical dynamics that are not limited to the transmission or availability of information, inserting in these dynamics the DTs, in order to restructure the closed curricular organization and the content perspectives that have been characterizing it. He adds that the school needs to be an environment that discusses the various information to which students have access and knowledge, present in their daily lives, having the DTs as a basis for the planning and development of new practices.

Next, the guiding methodological aspects of the research and the process of choosing the participants, producing and analyzing the information are presented.

3 Methodological Aspects

The present work has a qualitative approach, understood by Minayo (2010, p. 57) as “[...] one that applies to the study of history, relationships, representations, beliefs, perceptions and opinions, products of the interpretations that humans make about how they live”. In qualitative research, we seek to deepen the understanding of social phenomena, highlighting the different singularities, narrated by subjects from their

contexts and experiences (Bicudo, 2020). Godoy (1995) states that qualitative research, as an exercise of research, is not presented as a rigidly structured proposal, it allows imagination and creativity to lead researchers to propose works that explore new paths.

As for the objectives, this research can be classified as exploratory, since it allows greater familiarity and understanding of the research problem. Regarding the procedures, it is related to field research, that is, one in which the information is obtained directly from the reality of the individuals (Gil, 2002).

The research problem is: what is shown about the challenges encountered in the teaching and learning process and its relationship with the access and use of DTs? In this sense, the production of information was carried out from an *onlinequestionnaire*, whose answers were analyzed using the DTA method, proposed by Moraes and Galiazzi (2016). Subsequently, a detail of the information production and analysis process is presented.

3.1 Characterization of the investigative field

To characterize the investigative field of the study, the Departments of Education of the municipalities of Rio Grande and Bagé, in Rio Grande do Sul (RS), were asked to send teachers, belonging to these education networks, a link that referred to a questionnaire. In addition, the same request was made to the Regional Education Coordinators of the state of Santa Catarina (SC). According to Andrade (2009), a questionnaire consists of a set of ordered questions, which must be answered by the research participants, without the need for the physical presence of the interviewer.

The online questionnaire, entitled "Perspectives and possibilities of using digital technologies in educational spaces", built through the Google Form platform, was chosen because it is an instrument capable of reaching teachers belonging to the different geographic regions considered in this study. In the initial part of the questionnaire, a free and informed consent form was made available, in which the objective of the research was explained, leaving the participants aware that their identity would be kept confidential. In addition, it was clarified that the acceptance to participate in the study would imply the agreement that the results of the research would be disclosed in scientific publications.

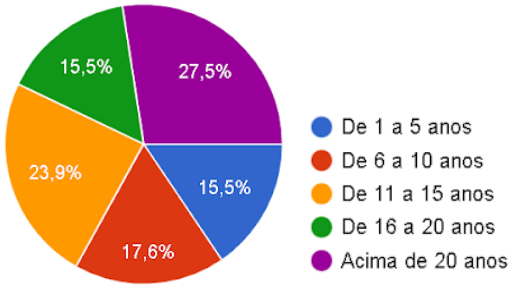
Subsequently, participants were asked to inform the city in which they taught, gender, age, academic background, teaching time, level of education in which they worked and weekly workload. In addition, issues involving the use of technologies during the Covid-19 pandemic and the return of face-to-face activities were addressed, as well as the training offered to them regarding the use of digital resources. Each participant was also asked to indicate topics of their interest focused on the technological area that could be present in continuing education programs. Finally, we inquired about the impact and challenges related to the use of digital technologies (DTs), in the teaching and learning process, in addition to the technological resources most used during remote teaching and that continue to be used in face-to-face teaching.

3.2 Characterization of research participants

The present research involved 142 participants, basic education teachers, who work in the public network, who have graduated in different areas of knowledge; the largest number is concentrated in Pedagogy (41), Mathematics (33), Letters - Portuguese (English/Spanish/French) (26), Biological Sciences (21), Physical Education (11) and History (10) courses. In addition, it was noticed that 40.85% of the participants have more than one undergraduate course.

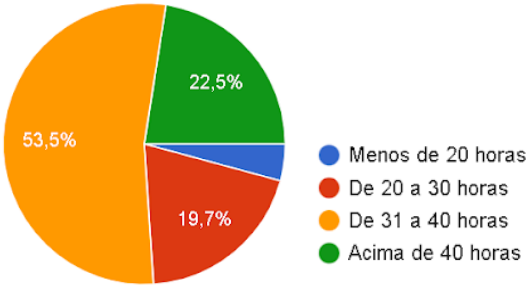
Regarding the time of professional experience in the area of Education, considering intervals of five years, a relatively balanced number was observed, and most participants have more than 20 years of professional experience, as observed in Graph 1.

Graph 1 – Time working in the area of Education



Source: Authors (2025).

Graph 2 – Weekly workload



Source: Authors (2025).

Also, according to Graph 2, in relation to the weekly workload, most participants work from 31 to 40 hours. It is also possible to notice a considerable number of teachers who exceed 40 hours per week.

3.3 Production and analysis of information

The information produced and analyzed in this article comes from the questionnaire and refers to what the participants reported about the main difficulties encountered in the teaching and learning process and their relationship with the use of technologies. To encode the information produced, the participant's pseudonym is mentioned, identified by a letter of the alphabet, followed by a number ranging from 1 to 10. The code was defined by the order in which the participant answered the questionnaire, that is, A1 is the code of the first teacher who answered, A2 of the second, and so on. When arriving at A10, the next code is B1, following the order again, to the code O2, which indicates the last participant who answered the questionnaire.

Data analysis was performed using the DTA method. The process begins with unitarization, characterized in three distinct moments: “1 - fragmentation of texts and coding of units; 2 - rewriting so that it conveys a meaning as complete and self-contained as possible; 3 - attribution of a name or title for each unit thus produced” (Moraes; Galiazzi, 2016, p. 41). After this movement, from a recursive reading, relationships are established between the units, in a comparison process, making groupings through similarities, which constitutes the categorization process. Finally, the researchers' understandings are expressed through the writing of interpretative texts, called metatexts (Moraes; Galiazzi, 2016).

Thus, using DTA, some understandings are presented in relation to what the research participants answered about the main challenges encountered in the teaching and learning process and their relationship with the use of DT. In the course of the categorization movement, the initial categories emerged, which made it possible to elaborate the intermediate categories, based on a recursive process of analysis by the researchers. Finally, three final categories emerged, namely: access to digital technologies; demand for training; and challenges of teaching action in the teaching and learning process. In this work, the category access to digital technologies will be discussed, consisting of three intermediate categories, as shown in Table 1.

Table 1 – Intermediate categories and their respective final category

Intermediate categories	Final category
Access to the internet and physical technological resources	Access to digital technologies
Access to technologies due to social conditions	
Physical space appropriate for the use of technologies	

Source: Authors (2025).

Continuing the analysis, the writing of the metatext is presented, which "[...] corresponds to new understandings, new theoretical perspectives on the researched themes, the final result of the research process practiced" (Moraes; Galiazzi, 2016, p. 235). At this moment, the researchers express their understandings and produce new meanings, through a reconstruction process, in dialogue with the research participants and with the theoretical framework. Therefore, the following is the metatext entitled "Access to digital technologies". In order to identify the intermediate categories, simple underlining is used.

4 Access to digital technologies

In contemporary times, technologies have played a prominent role, being understood as mediators in the teaching and learning processes in the school environment, implying new perspectives for teachers and students. In this sense, the school is provoked to provide spaces, seeking to transform the different information into knowledge, which is accessed through DTs.

Moran (2013, p. 13) highlights that "[...] mobile technologies, which reach students and teachers, bring immense challenges in how to organize these processes in an interesting, attractive and efficient way inside and outside the classroom, taking advantage of the best of each environment, face-to-face and digital". Thus, it is necessary to support these teachers and students in order to ensure the quality of access to DTs, as well as the updating of learning for/with pedagogical use in the classroom.

Considering the analysis of the information produced with the research participants, it was noticed that access to the *internet* and physical technological resources was one of the challenges encountered in the teaching and learning process. As highlighted by H8 (2022), "[...] *the difficulties are internet access and the mastery of technologies. With the containment of expenses and human resources, the school's computer lab was deactivated, making it impossible to carry out many projects involving technology*. "

Such considerations are in line with what was exposed by Ferreira, Carvalho and Iocca (2022), when they indicate that DTs are not yet fully adopted in the classroom, due to insecurity and lack of mastery in the technological area by teachers and students. In addition, they point out the lack of equipment and computer labs, which implies difficulties in developing methodological practices with the use of these tools. Thus, it is noted the difficulty of access to technological resources, as well as the lack of autonomy for the pedagogical use of DTs.

Idem and Scucuglia (2021), based on a study carried out with academics from a mathematics degree course, discuss how the integration of DTs occurs during the teaching and learning process. The results point to a concern associated with the teachers' difficulties in integrating DTs into the teaching action, due to the lack of resources, the large number of students per classroom, the digital exclusion, the plastering of the curriculum and intolerance to change. The authors consider "[...] the integration of digital technologies important for students' mathematical learning, but consider that teachers and schools are unprepared for this integration" (Idem; Scucuglia, 2021, p. 17).

When analyzing the main advantages and difficulties found by teachers regarding the use of platforms and DT in school activities, Fialho, Cid and Coppi (2023) point out

that the obsolescence and insufficiency of the computer park, in addition to the difficulties of access to the internet, presented themselves as two of the main problems. Given this, it is necessary that new investments are made, and continuously, since physical technological resources have a useful life and undergo innovations, as well as, over time, become useless.

In the context of the Covid-19 pandemic, teachers encountered several difficulties in the field of professional activity, but the highlight was attributed to the lack of training for the pedagogical use of DTs and also adequate infrastructure (Hoepers; Vanzuita; Martins, 2024; Sousa; Madeira, 2022). It was a time when society had to reorganize itself in a very light way, and at school it was no different. Depending on the geographic region, these difficulties were perceived more intensely, especially in areas far from large urban centers. This situation can be observed in the speech of K3 (2022):

> *As I work in the countryside, the biggest difficulty is the lack of a good internet, and most students do not have access to the internet. Lack of computers for students to learn the basics of technologies at school, such as lack of a qualified professional in this area to assist us*.

In this sense, it is clear that the period allowed us to visualize and experience a scenario with challenges associated with accessing and not mastering DTs.

With regard to the appropriate physical space for the use of DTs, the need for investments in adequate spaces and equipment was evident, so that classes would not be limited to the teacher-centered teaching model. Participant F7 (2022) points out that, "[...] *at the moment, in our school, the computer room is not working. It would be very good to make use of this room for students to do research, guided by the teacher*". That is, it feels the need to have available additional means of access to information, in which research is an ally to arouse the interest, curiosity and autonomy of the student. Another participant also mentions the lack of equipment and the lack of internet when reporting: "*The lack of structure in public schools, such as, for example, outdated equipment, lack of internet, minimum number of tablets*" (J10, 2022).

When talking about DTs in education and educational processes during the Covid-19 pandemic, Carraro, Ostemberg and Santos (2020) point out the need for new public policies to be addressed, studied and implemented in order to meet educational demands that tend to undergo transformations. In addition, they indicate that "[...] another

important point concerns the technological infrastructures of schools and educational spaces" (Carraro; Ostemberg; Santos, 2020, p. 9), not discarding digital inclusion policies for both families and school environments. Although the authors mention the pandemic, it is understood that public policies must be dynamic and implemented with the intention of minimizing differences, respecting a horizontality.

As already mentioned by Tezani (2017), basic education students are considered digital natives and know a lot about DTs. In this sense, they bring with them a baggage of knowledge and experiences that are (re)constituting themselves continuously. Therefore, it is necessary to think about the pedagogical use of DTs by students, so that it is an artifact that enhances learning. Thus, it is also important to think about teacher training with emphasis on the use of DTs, contemplating the use in teaching practice in the classroom. For this, it is necessary for government agencies to propose public policies that address DTs to meet the needs of the different subjects who are part of the school environment.

Another relevant factor that needs to be considered is access to DTs due to social conditions, since the social condition of a student should not be a reason for difficulty in accessing information and consequently new knowledge. Throughout the pandemic, economic inequalities were very evident, as reported by M8 (2022): "*Students without adequate internet, several brothers having to compete for a single cell phone, insufficient number of students who followed the classes and explanations through Meet*".

According to Cordenonsi *et al*. (2021), it was possible to see that, in a remote teaching context, it is necessary to reduce the digital divide, since it is often necessary for students to share the device, have access to the internet or even have outdated equipment. Although it is not currently in a remote teaching context, it is important that actions aimed at teaching prioritize equity among students. As Arruda (2021, p. 6) points out, “[...] exclusion is one of the cruelest faces of social inequality; it begins with economic differences and disparities, but extends to other spheres, such as educational, cultural, digital, etc.”.

Brazil is a country with a wide territory, in which economic inequality cannot be denied. It is very likely that there is no single solution to the problem of access to DTs due to social conditions, however one way to face this large problem may be in the

articulation of different initiatives, which does not exempt the existence of public policies. In addition, Chirinéa and Barreiro (2009, p. 12-13) reinforce the need to look at educational quality by mentioning that:

> [...] it is important to review the issue of educational quality on a broader basis, in order to recognize that everyone has the right to 'good quality' education, even those who cannot afford to pay for it. And the recognition goes beyond the discourse, passing mainly through teacher training and school management, which has in its principles the function of promoting and ensuring the quality of the teaching-learning process.

It should be noted that, although it is not the responsibility of the teacher, because he is immersed in this context, he feels challenged to seek alternatives to expand the students' learning possibilities, so that the classroom space is one of knowledge production. In this sense, continuing education has been a way that teachers have found to know new methodologies appropriate to the reality of students, allied to the confrontation of issues related to the physical and technological resources they have. "*The main difficulty continues to be the low supply of technology equipment in schools, dimensioning of the internet network and training for teachers*" (E9, 2022). Thus, an alternative to reduce social inequalities may lie in greater investments in teacher technological training.

Although the pandemic was an atypical period, the evidence is clear regarding the need for the teacher to be prepared to work in the classroom, presenting students with content approaches aligned with the interests of society. Considering the social conditions of students and the limitations of access to DTs, both with regard to the internet and physical technological resources, in addition to precarious infrastructure conditions, the use of DTs in the classroom becomes a challenge. Even so, it is important that teachers use those who are available, given the potential contributor in the teaching and learning process. Thus, training for/with the use of DTs is presented as a way to share experiences and knowledge in the search for new practices that meet not only the interests of students, but that boost the professional development of teachers.

5 Final considerations

In order to understand the challenges encountered in the teaching and learning process and its relationship with the access and use of DTs, during 2022, an investigation was carried out through a questionnaire, in which teachers working in basic education expressed their perceptions regarding the possibilities of exploring different technological resources in the classroom. Issues related to limitations of internet access, physical technological resources and access to technologies due to social conditions emerged from the present study, in addition to the appropriate physical space for the use of technologies.

In this context, the analysis showed that continuous investments in physical technological resources are essential, since such equipment has a limited useful life and becomes progressively obsolete over time. Another highlight is teacher training, which is essential for teachers to develop pedagogical proposals involving DTs, which can be used in the classroom, favoring the protagonism of students. To this end, it is essential that government agencies promote public policies that contemplate DTs, in order to meet the demands of individuals involved in the school context.

Therefore, continuing education is a successful alternative with regard to the use of pedagogical proposals based on DTs in the classroom, since it is a means by which teachers can learn about new methodologies, as well as seek strategies to face difficulties regarding the availability of physical and technological resources. Thus, the combination of investments and training is shown as a way to qualify educational actions and facilitate student learning, because, as pointed out in the other final categories that emerged in the analysis, but which were not the focus of this study, teachers demand training and indicate challenges in the teaching and learning process.

In this sense, it emerges from the research that the study on the possibilities of DTs in the classroom must be continuous and the teacher needs to follow technological advances. In addition, it is necessary that school institutions provide sufficient resources to the teaching and learning process, so that they are permeated by contemporary instruments and capable of attracting students. Thus, the results of this study indicate the

potential for more integrated and collaborative practices, in addition to enriching the academic field, benefiting the entire community involved.

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