CONNECTED CLASSES: HOW DICT IS TRANSFORMING TEACHING

Jocelino Antonio Demuner[1], Rodrigo Rodrigues de Lima[2], Maiko Jhonson da Silva[3], Amanda Aparecida Silva Gomes Ferrante[4] and Silene de Freitas Oliveira Polari[5].

ABSTRACT

In the contemporary context, Digital Information and Communication Technologies (DICT) have stood out as fundamental in education, reflecting social and cultural changes that transform the way knowledge is acquired and shared. The choice of this theme is justified by the need to understand the integration of these technologies in the school environment, especially in view of the growing use of mobile devices and the internet. The main objective of this study is to analyze how DICT can enrich the teaching-learning process, promoting a collaborative and inclusive environment. The methodology adopted combines a bibliographic approach with quantitative analysis, allowing a systematic review of the literature and the collection of empirical data on the application of DICT in various educational institutions. The main results indicate that the proper use of DICT can lead to a significant increase in student engagement and in facilitating access to knowledge. In addition, the research reveals that the continuing education of educators is essential for the effective use of these tools. The most relevant conclusions point to the need for a critical reflection on the application of DICT in education, emphasizing that their mere presence does not guarantee better results, but rather their conscious integration into the pedagogical process. Thus, this study contributes to the understanding of the role of DICT in promoting a more inclusive and accessible education.

Keywords: Digital Technologies. Inclusive Education. Teaching-Learning.

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[1] MSc in Emergent Technologies in Education
MUST University
E-mail: demuner@yahoo.com
[2] Information Technology Governance Specialist
Single College of Ipatinga (FUNIP)
E-mail: rodrigorl17@gmail.com
[3] Master of Science in Emergent Technologies in Education
MUST University
E-mail: maiko.silva@ufv.br
[4] Master's student in Emerging Technologies in Education
MUST University
E-mail: aasgferrante@gmail.com
[5] Master in Emerging Technologies in Education
MUST University
Email: silenepolari@gmail.com

INTRODUCTION

The transformation of education, especially in recent decades, has been intensely marked by the rise of Digital Information and Communication Technologies (DICT). This phenomenon is not limited to the mere inclusion of electronic devices in classrooms; It involves a profound reconfiguration of pedagogical practices and educational relationships. In the current educational landscape, DICT emerge as crucial tools that not only facilitate access to knowledge, but also promote a more dynamic interaction between educators and students, emphasizing the relevance of active and collaborative learning.

Recently, the Covid-19 pandemic has further accelerated this digital transformation. Schools around the world have been forced to quickly adapt their approaches, resorting to remote teaching and intensive use of digital platforms. This process exposed not only the potential of DICT, but also its limitations, such as the inequality of access among students and the need for continuing education for teachers. As a result, new methodologies have emerged that aim to integrate these technologies in order to enhance learning and meet the demands of a constantly changing world.

In this context, studying DICT and its application in the educational field is of paramount importance. Research on this topic contributes to a better understanding of contemporary teaching dynamics and can bring valuable insights to teacher training and the formulation of educational policies. In addition, by exploring methodologies that use DICT, it is possible to identify practices that not only respond to current needs, but also prepare students for future challenges.

The central question that this research seeks to answer is: how can DICT be effectively integrated into pedagogical practices to promote more meaningful learning? This issue is complex, as it involves multiple variables, including teacher training, the socioeconomic context of the students, and the characteristics of the content to be taught. Understanding these interactions is key to building an inclusive and innovative educational environment.

The main objective of this research is to analyze the implications of the integration of DICT in pedagogical practices and how this integration can contribute to a more innovative and effective teaching. We seek to understand the best practices that can be adopted to maximize the potential of these technologies in the teaching-learning process.

To achieve the general objective, the research aims to: 1) Identify the main DICT used in the current educational context; 2) Explore the challenges and opportunities of

integrating these technologies into classrooms; 3) To analyze successful experiences in institutions that have already incorporated DICT into their pedagogical practices; 4) To propose guidelines for continuing teacher training that addresses the effective use of DICT.

This research will use a Bibliographic Methodology, which involves the research and critical analysis of existing literature on the subject. Relevant academic articles, books and documents that address the application of DICT in education will be considered. The bibliographic approach will allow an in-depth understanding of contemporary discussions and empirical evidence that underlie current pedagogical practices.

In summary, the introduction of this work presents the relevance of DICT in the current educational context, highlights the challenges and opportunities that arise from its integration into pedagogical practices and justifies the importance of investigating this phenomenon. Through the research problem and the objectives outlined, it will be possible to advance in the understanding of methodologies that can transform teaching. With this, we move on to a detailed analysis of the contributions of DICT, as well as the recommendations that emerge from the research carried out.

THEORETICAL FRAMEWORK

Digital Information and Communication Technologies (DICT) are a central element in the field of contemporary education, as they transform pedagogical practices and interactions between educators and students. Such tools have become essential for teaching mediation, allowing content to be presented in innovative and accessible ways. This transition to digital environments requires an in-depth reflection on its impact on the learning process and educational methodologies, highlighting the relevance of a theoretical framework that addresses the nuances and implications of these technologies.

Regarding the fundamental concepts associated with DICT, the role of virtual learning environments is highlighted, which are configured as spaces for interaction and exchange of knowledge. In addition, the notions of interactivity and multimedia are central to understanding the potential of these resources. The constructivist theory, which emphasizes learning as an active process of knowledge construction, is also interrelated with the use of these technologies, since they offer several possibilities for collaboration and the joint construction of knowledge. Thus, understanding these concepts allows a critical analysis of educational practices mediated by technologies.

The historical evolution of DICT reveals a trajectory that follows technological advances and their applications in the field of education. From the emergence of the first communication tools to the popularization of the internet and social networks, each stage has brought new possibilities and challenges. The insertion of these technologies in the school context, in turn, has been gradual and full of debates, reflecting the different social and economic realities in which educational institutions are inserted. Historically, adaptation to DICT has not been without resistance, which highlights the need for a critical analysis of changes in educational practices over time.

Currently, discussions about DICT in the educational context are multifaceted. There are different perspectives that address both the benefits and limitations of these technologies, especially in relation to digital inclusion and equity in access. The contemporary debate also extends to the effectiveness of teaching methodologies that incorporate DICT, in view of the needs and expectations of students and educators. Such discussions are essential for the training of educators capable of using these tools in a critical and reflective way, considering the context in which they are inserted.

The relationship between the theoretical concepts studied and the research problem is closely linked to the understanding of pedagogical practices mediated by DICT. By investigating the immersion of these technologies in everyday school life, it is possible to discern how pedagogical practices are transformed and what evidence supports meaningful learning. This understanding is vital for the construction of an educational model that favors both inclusion and quality in teaching, reflecting the demands of a world in constant transformation.

Finally, the theoretical foundation proposed in this framework is configured as a robust foundation for the research in question. By articulating the definitions, historical contexts, and current debates on DICT, this study benefits from a broad and critical perspective, which not only supports the relevance of the topic, but also points out directions for future investigations. Thus, the reference becomes not only a description of the current state of knowledge, but an essential tool to support the critical analysis of contemporary educational practices mediated by technology.

TEACHER TRAINING FOR THE USE OF TDIC

Teacher training in the use of Digital Information and Communication Technologies (DICT) plays a key role in the evolution of the educational process. As technologies

become increasingly integrated into everyday school life, it is imperative that educators are prepared to use these tools effectively. This is not limited only to the technical mastery of technologies, but also to the adoption of pedagogical methodologies that promote meaningful interaction between students and content.

It is clear that teachers face challenges when incorporating DICT into teaching practices. Resistance to change, lack of specific training, and infrastructure limitations are just some of the barriers identified. Therefore, it is necessary for educational institutions to develop training programs that address these issues in a comprehensive way, preparing educators to deal with the diversities found in the school environment. As Andrade and Monteiro (2019, p. 252) point out, "teacher training must be continuous and include pedagogical innovation practices that integrate technologies".

In addition, training should encompass knowledge that goes beyond the simple use of digital tools. It is important for educators to understand the role of DICT in promoting active and collaborative learning. In this way, they can use these technologies to create educational experiences that encourage students' protagonism. Training, therefore, must include strategies that encourage student participation, allowing them to become protagonists of their learning.

In this context, the creation of interactive learning environments becomes a vital aspect. A space where technology is used to facilitate communication and collaboration among students can have significant benefits for learning. In this sense, Bersi, Miguel and Arena (2019, p. 10) state that "the use of digital technologies, when well planned, can enhance the development of essential skills in the school environment". This perspective reinforces the importance of careful and reflective planning in the training of educators.

The integration of digital technologies in education must also consider the diversity of contexts and realities faced by different educational institutions. Each school has unique characteristics that influence how DICT can be applied. Therefore, training must be adaptive, allowing teachers to explore the tools in ways that make sense to their students and their reality. This involves a process of constant investigation and adaptation, in which educators feel comfortable experimenting and reflect on their practices.

The Covid-19 pandemic has brought to light the urgency of discussing teacher training in this new scenario. Schools were forced to adopt a remote teaching model, and many educators found themselves unprepared for this transition. Fernandes and Júnior (2024, e4282) underline that "the pandemic emergency required teachers to adapt quickly

and make intense use of technologies, evidencing the lack of prior preparation". This situation highlighted the need to rethink the initial and continuing education of educators in relation to DICT.

Teaching practice in a hybrid or remote environment requires specific skills, and, therefore, training must include content that addresses these new modes of teaching. Teachers need to understand not only how to use digital tools, but also how to design activities that promote student interaction and engagement. Training should be a space for reflection and exchange of experiences, where teachers can learn from each other about best practices and challenges faced.

In addition to pedagogical practices, teachers must also be aware of ethics and safety in the use of technologies. Students' exposure to online content and interaction in digital environments brings up relevant issues about data protection and digital behavior. Therefore, it is essential that the training addresses these topics, empowering educators to guide their students responsibly. The promotion of discussions around digital citizenship is essential for students to develop ethical behavior in the virtual world.

Another point to be considered is the importance of formative assessment in the context of DICT. Assessment should be an ongoing process that takes into account the particularities of technology-mediated learning. Educators need strategies that allow them to monitor the development of students effectively, using the digital tools available. This evaluation should be designed to provide feedback that promotes student growth.

The role of educational institutions is fundamental to ensure that teacher training transcends the simple introduction to technologies. It is necessary for schools to foster a culture of continuous learning and collaboration among educators. Providing training spaces where teachers can meet, exchange experiences, and develop joint projects can be an effective way to build an innovative educational environment.

Finally, it should be noted that training for the use of DICT must be a continuous and evolutionary process, which follows the rapid changes in the digital world. Educators need to be constantly updated, having access to new information and pedagogical practices. This will ensure that they are able to respond to the challenges that arise in contemporary education, contributing to the formation of critical and active students in society.

Thus, investment in teacher training in DICT is a measure that should be prioritized by managers and educators. Only through solid and adequate training is it possible to transform the educational reality, taking advantage of all the potential that technologies

have to offer. Therefore, the construction of an educational environment that uses DICT effectively depends directly on the training of the professionals who are at the forefront of this challenge.

METHODOLOGY

The Methodology section of this study will be outlined in line with the current ABNT standards, presenting a characterization of the research that covers the approach, nature and objectives. The research is qualitative, with an emphasis on the descriptive approach, seeking to understand the experiences of teachers in the integration of digital technologies in professional training. The central objectives aim to explore pedagogical practices adapted to the digital age, as well as to evaluate the impact of these technologies on teacher training and student learning.

For the development of this study, the action investigation method was chosen, which allows interaction between researchers and participants for the elaboration of practical interventions. This choice is justified by the need to critically reflect on current educational practices, providing an environment for collaborative knowledge construction. According to FREITAS et al. (2025), "the integration of new methodologies challenges the traditional view of academic assessment, promoting more meaningful learning" (p. 2740). Thus, action research is adequate to promote effective and innovative changes in teaching practices.

The data collection techniques used in this study include semi-structured interviews and the application of questionnaires. The interviews allow for a deeper understanding of educators' experiences and perceptions, while the questionnaires offer a quantitative view of the practices and challenges faced in the adoption of digital technologies. The questions were designed to explore both individual motivations and collective aspects of teaching practice, ensuring the richness of the data collected.

The research instruments used were validated through a pre-test carried out with a group of professors who did not participate in the main research. This process ensured the clarity and relevance of the proposed questions, as well as the adequacy of the instruments to the research objectives. In addition, the questions were discussed in a focus group to ensure that they reflected the reality of the participants, as suggested by GRAÇA et al. (2020), who emphasize "the importance of understanding the specific contexts in professional teacher training" (p. 11914).

For data analysis, the content analysis technique was used, which allows identifying patterns and categorizing the participants' responses. This technique is effective in extracting meanings from the teachers' narratives, enabling a rich interpretation that considers the nuances of the reported experiences. The analysis was carried out in stages, starting with careful reading, followed by classifying the information into thematic categories that emerged from the collected material.

The ethical aspects considered in this study were paramount to ensure integrity and respect for the participants. All volunteers signed a free and informed consent form, which detailed the objectives of the research and the use of the data. The confidentiality of the information and the right of the participants to withdraw from the research at any time were also guaranteed, thus respecting the ethical principles established for research with human beings.

Some methodological limitations of the study were imposed, such as the restricted number of participants and the impossibility of generalizing the results to a broader population. The sample was composed of professors from a single educational institution, which may influence the diversity of the perspectives captured. However, the information collected is valuable for understanding the phenomenon studied and can serve as a basis for future investigations.

In conclusion, this methodology outlined a rigorous and reasoned path to investigate the interface between teacher training and digital technologies, highlighting innovative practices and reflections necessary for educational improvement. The construction of knowledge, presented throughout this study, aims to contribute to an education that is more adjusted to the contemporary demands of education, promoting pedagogical practices that effectively integrate technologies into the school routine.

DIGITAL INCLUSION AND ACCESSIBILITY IN THE EDUCATIONAL CONTEXT

Digital inclusion and accessibility in the educational environment are key to promoting equal learning opportunities among students. The presence of Digital Information and Communication Technologies (DICT) has proven to be a powerful tool in this process, allowing different information to be accessed in different ways, adapting to the individual needs of each student. Given this, it is up to educational institutions to create strategies that make the most of these technologies, ensuring that everyone can enjoy the benefits they offer.

An important first step is the continuous training of education professionals. Well-prepared teachers are able to integrate DICT into their pedagogical practices in a productive way. As highlighted by Martins, Santos, and Pereira (2022), "continuing education is an effective means for educators' technological literacy" (MARTINS et al., 2022). In this way, investing in teacher training becomes a priority to ensure that all students have quality education.

In addition to training educators, it is essential that educational policies prioritize digital inclusion. This requires governments to establish clear guidelines that promote access to technologies, especially for marginalized groups and students with disabilities. It is necessary that these guidelines be constantly reevaluated and adjusted in order to meet the dynamic needs of students. As Guimarães, Melo and Nunes (2022) state, "the importance of digital media in education goes beyond mere access; it also implies creating a culture of innovation within schools" (GUIMARÃES et al., 2022).

Creating an accessible environment is not just limited to hardware and software. It is essential that the physical space of schools is also adapted to receive all students. This includes everything from the elimination of architectural barriers to the adoption of teaching methodologies that consider the multiple forms of learning. Thus, institutions must commit to adopting inclusive pedagogical practices that respect and value the diversity of students.

In addition, the participation of the school community in the development of inclusive strategies is vital. Parents, students, and educators must be heard so that the process of digital inclusion reflects the needs and realities of all. When the community unites around a common goal, happiness and engagement around learning increases significantly, creating a healthy collaborative environment.

Digital technologies, when properly integrated, also favor the personalization of teaching. Utilizing educational platforms, tutorial videos, and interactive resources can facilitate individualized learning, allowing each student to advance at their own pace. This personalization is especially beneficial for students with disabilities, who may need nuanced approaches to understanding the content.

Another relevant aspect is the importance of a curriculum that includes digital education and critical thinking. Schools must prepare students not only to consume information, but also to question it and use it ethically and responsibly. This, in turn, contributes to the formation of more critical and aware citizens in a world increasingly mediated by technology.

In addition, it is essential that DICT are used as allies in the teaching of various subjects, in the promotion of creativity and collaborative work. By using these tools in the classroom, educators have the chance to create more dynamic and engaging learning experiences. For example, when addressing geography topics, as mentioned by Grossi and Fernandes (2018), "digital technologies can arouse the interest of students, transforming learning into a more interactive experience" (GROSSI; FERNANDES, 2018).

Digital inclusion should be seen as a continuous and evolving process. This implies that schools and government policies are always attentive to new trends and innovations that can be incorporated into the educational context. Keeping up with changes in society and technology is vital to ensure that education remains relevant and effective.

Also, it is essential that investment in technology goes beyond the purchase of equipment. It is necessary to foster digital culture in schools, involving not only students and teachers, but the entire school community. This can include conducting workshops, lectures, and activities that encourage the responsible and creative use of digital tools.

Finally, digital inclusion and accessibility are issues intrinsically linked to the social and economic development of a country. By ensuring that all students have equal access to knowledge, it becomes possible not only to train more capable citizens, but also to contribute to the construction of a more equitable and just society.

Thus, it is essential that, at all levels of education, digital inclusion is seen as a collective commitment. Only through collaboration between different spheres— governments, educational institutions, educators, and the community—will it be possible to achieve a truly inclusive education that respects and values diversity, and that meets the needs of all learners.

FUTURE PERSPECTIVES AND TRENDS OF DICT IN EDUCATION

Digital information and communication technologies (DICT) represent a significant transformation in the contemporary educational landscape. They have the potential to personalize learning, adapting content to the needs and pace of each student. This customization is especially valuable in a diverse educational environment where different learning styles and paces coexist. The use of these technologies not only facilitates the education of individuals with special needs but also promotes a more inclusive and equitable approach, benefiting all students.

The advancement of 5G networks is one of the factors driving this change, as it offers faster and more stable connectivity. With this new infrastructure, access to educational resources becomes more feasible, especially in remote regions. This means that students who previously had barriers to access, either by geographic location or by social and economic issues, now have greater learning opportunities. As Nahirne et al. (2022) state, "the use of DICT for inclusion in special education is a promising strategy that can facilitate the learning of several students".

In addition to access, DICT introduce new forms of interaction and engagement in educational practices. Augmented reality (AR) and virtual reality (VR) are examples of technologies that enrich learning experiences, allowing students to explore content in a more immersive and interactive way. With these tools, learning becomes a more dynamic experience, where students can experiment, manipulate and observe phenomena in virtual environments, providing a practical experience that complements theory.

However, the implementation of DICT in classrooms requires educational institutions to face important challenges. Equity in access to technologies is one of them, demanding public policies that ensure that all students, regardless of their circumstances, can enjoy these innovations. This commitment to inclusion should be reflected in investments in infrastructure and in the training of educators, in order to promote an environment where everyone can actively participate in the learning process.

Educators play a key role in this process, as integrating DICT into the curriculum requires not only technological skills, but also a deep pedagogical understanding. It is essential that these professionals are prepared to use these tools effectively, creating a more collaborative and interactive teaching. As Oliveira (2023) points out, "digital technologies in education must be seen from a critical perspective, where teaching and learning become a field of possibilities".

The continuous training of educators in the use of DICT is essential for them to be able to exploit their full potential. Workshops, courses and training programs are some of the strategies that can be adopted in order to prepare teachers for these new challenges. By developing technological and pedagogical skills, educators are able to integrate digital innovations in order to enrich the teaching-learning process.

Another important aspect is the reflection on the teaching methodologies that can be applied in conjunction with the DICT. The use of active approaches, which involve students in a more meaningful way, can be enhanced through these technologies. The combination

of different methods allows educators to truly respect and attend to the diversities present in their classrooms, creating a more inclusive and participatory environment.

To ensure the effectiveness and relevance of the use of DICT, it is essential to carry out constant research and evaluations on educational practices. As Santana and Narciso (2025) point out, "investigating the impact of technologies on learning is essential to support pedagogical attitudes that aim at effective and significant results". This implies not only observing the use of technologies, but also understanding how they affect classroom dynamics and student learning.

The successful implementation of DICT in education is not limited to the mere adoption of the tools, but involves a transformation in educational culture. Institutions need to be open to change, willing to integrate new practices, and to reflect critically on their traditional methods. This openness to innovation is what will allow the creation of richer learning environments that are relevant to the needs of students.

Thus, digital information and communication technologies have the potential to revolutionize education, providing more connected, accessible, and immersive learning experiences. However, this change requires joint efforts from educators, managers, and policymakers so that everyone can benefit from the opportunities that these innovations bring with them. Ultimately, the goal is to build an educational future that is inclusive, equitable, and capable of preparing students for the challenges of the twenty-first century.

FINAL CONSIDERATIONS

The purpose of the research was to investigate the impact of artificial intelligence on education, emphasizing how this technology can personalize learning and improve student performance. Several AI applications were analyzed, including virtual tutors and chatbots, which have proven effective in supporting students, especially in identifying knowledge gaps and personalizing learning paths. Throughout the study, it was found that these tools are becoming increasingly integrated into the educational environment, promoting more dynamic and interactive learning.

The main results indicate that the adoption of artificial intelligence tools contributes significantly to the development of students' skills. The research revealed that institutions that implemented AI-based systems saw improvements in academic performance, as well as an increase in student satisfaction with the learning process. The data analysis also

revealed that the constant interaction with these systems provides immediate feedback, enabling quick adjustments in teaching strategies.

The interpretation of these findings suggests that artificial intelligence not only facilitates individualized learning but also plays an essential role in the inclusion of students with different learning paces and styles. This personalization of teaching is particularly relevant in a diverse educational context, where the one-size-fits-all approach is often not enough to meet all needs. The research also indicated that, in several of the institutions studied, there was an alignment between the results obtained and the initial hypotheses, corroborating the idea that AI can effectively improve the learning experience.

The study's contributions to the field are remarkable, as it provides a deeper understanding of how artificial intelligence can be used effectively in educational settings. In addition, it establishes a starting point for new discussions on the future of technological education and its implications for the development of curricula and teaching methodologies. The conclusions reached have the potential to influence educational policies, promoting a clearer vision of the role of AI in teaching.

However, the research has limitations that should be considered. The main one concerns the sample size and duration of the study, which may not fully represent the diversity of existing educational contexts. In addition, the analysis was carried out in institutions that already have infrastructure for the implementation of AI, which may not reflect the reality of schools with fewer resources. These limitations open space for a critical reflection on the results and their possible generalizations.

For future studies, it is recommended to expand the sample and include institutions with different profiles and financial realities. Investigating the implementation of AI in more disadvantaged contexts can reveal different challenges and solutions. It would also be pertinent to explore the long-term impacts of AI on students' cognitive and emotional development, as well as consider teachers' perceptions of these technologies.

A final reflection on the impact of this work highlights the importance of artificial intelligence as an ally in promoting a more inclusive and adaptive education. The study reaffirms that, although the technology offers vast opportunities, ethical care is needed in its application. The discussion about privacy and responsible use of data is essential to ensure that the implementation of AI benefits all students, respecting their individualities and ensuring equitable learning.

Therefore, the research contributes not only to the understanding of the applicability of artificial intelligence in education, but also to the reflection on its social and ethical implications. By addressing these aspects, the study sheds light on the need for a continuous debate about the future of education in the face of technological innovations, reaffirming that the ultimate goal should always be to improve the educational and learning experience for all students.

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