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Integration of information technologies in educational communication: A theoretical review

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ABSTRACT
With technological advancement and access to education evolving rapidly, the importance of renewing educational technologies is evident. The cell phone, often considered the biggest villain when it comes to classroom discipline, can be a new ally in new pedagogical practices. In this sense, traditional methods, such as chalkboard and chalk, are no longer enough to maintain interest in the classroom. Thus, a change in the educational scenario is necessary, contributing to more attractive classes.

Keywords: Educational technologies, Educational renewal, Pedagogical practices.

INTRODUCTION

With technological advancement and access to education evolving rapidly, the importance of renewing educational technologies is evident. The cell phone, often considered the biggest villain when it comes to classroom discipline, can be a new ally in new pedagogical practices. In this sense, traditional methods, such as chalkboard and chalk, are no longer enough to maintain interest in the classroom. Thus, a change in the educational scenario is necessary, contributing to more attractive classes.

The development of society is based on an advance in technological teaching and new methodologies, seeking a quality development in education, so that people increasingly consolidate their skills and potential. Information technologies (ICTs), if used correctly, can be great development tools in various areas, especially in education. According to Viegas (2018), we are currently experiencing a good phase with the arrival of technological resources that go far beyond the computer lab or the video room. Santos (2015) states that the appropriation of ICTs in spaces gives new meaning to the concept of knowledge. For these authors, it is through technological tools, based on active mediations, that potentialities emerge. Time and space are no longer problems, providing an education without distance, without time, leading the educational system to assume a role not only in the formation of citizens belonging to a space, but to a space of inclusive formation in a society of differences.

However, there are many restrictions on the use of information and communication technologies in the educational environment. The main theme of these discussions is whether or not to prohibit the use of

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certain technologies by students or even by faculty. The main argument of the proponents of the ban is the distraction of students, who often use these technologies incorrectly and not for pedagogical purposes. In view of this information, research and educational actions are necessary to understand the importance and difficulties that these technologies linked to the internet can offer to students. Many of these actions should be carried out as a source of research and playful activities, so that they can arouse the student's interest in this new pedagogical practice.

In addition, debates and research within the school and academic environment are of paramount importance, so that a new perspective can be created in relation to the use of information and communication technologies, enabling a dialogue between educators and students. Therefore, it is clear that there is a need to conduct research in the academic world on the inclusion of information technologies as tools for educational development. Given this scenario, understanding the importance of these technologies is of paramount importance. Therefore, the main objective of this work was to carry out a theoretical study through a bibliographic survey in articles published in annals of events and periodicals, scientific journals and books, to verify how ICTs corroborate in education.

OBJECTIVE

The general objective of this study was to analyze the use of information technologies as a form of communication in education, investigating its impact on the teaching-learning process and identifying challenges and opportunities associated with this integration.

The specific objectives were: to review the existing literature on the use of information technologies in educational communication, highlighting trends, benefits and challenges. Investigate how information technologies are currently used in different educational contexts, including schools, universities and distance learning institutions. Analyze the impact of information technologies on communication between teachers and students, exploring how these tools influence student engagement and teaching effectiveness.

METHODOLOGY

For the development of this work, a theoretical study was conducted using the databases of the *Scientific Electronic Library Online* (SCIELO) and Google Scholar. Research was carried out in articles published in journals and annals of events that addressed the theme in a clear, objective way and aligned with the objectives proposed by the work. During the research process, priority was given to the search for relevant and reliable literature, thus ensuring a solid basis for the analysis. Articles were selected between 2010 and 2024, taking into account the relevance of the content and the reputation of the authors and publications.

The body of the work was constructed from the narratives of the selected authors, complemented by their own interpretation and opinion on the topics addressed. This approach allowed for a critical and reflective analysis, adding value to the content presented. Throughout the writing process, objectivity and clarity were maintained in the exposition of ideas, ensuring that the text was accessible and understandable to the target audience. In addition, direct quotations and paraphrases were used appropriately, always respecting copyright and providing the appropriate bibliographic references.

Finally, careful revisions were carried out to ensure the cohesion and consistency of the text, as well as to correct any grammatical or typos. The final result reflects, therefore, a work based on evidence, based on a careful review of the available literature and enriched by the author's critical analysis and perspective.

DEVELOPMENT

INFORMATION TECHNOLOGIES: CONTEXTUALIZATION

Information technologies have a clear and objective definition and are now recognized as one of the great tools for improving teaching and learning. Throughout history, these technologies have been consolidated and created a clear denomination and concept. Ricoy and Couto (2012) mention that the term "Information Technologies" is more recent, having emerged in the late 1990s - specifically in a document prepared by the British government. The aforementioned authors state that Information Technologies (IT) are technical means to manipulate information and promote communication, including the necessary hardware and software, and are associated with computer networks. They are also linked to telecommunication as a means of diffusion of communication, as well as to the elements that promote and enable the processing and transmission of communication in different formats.

The INFOJOVEM website (2019) defines IT as a set of technological resources that provide a new way of communicating. The website also mentions that Information and Communication Technologies (ICTs) emerged in the scenario of the Third Industrial Revolution and were gradually developed from the 70s, gaining attention, especially in the 1990s.

> Between the 70s and 90s, the main changes in the technological field took place. These changes revolutionized the entire social system and promoted world development, characterized by the immediate application of the technology generated. Thus, the world became connected through Information Technology and mainly due to the Internet. The evolution of IT has not only caused changes in the areas of technology and communication, but in several areas of human knowledge. (PEREIRA, SILVA, 2010, p. 21).

Information Technologies (IT) began to be widely disseminated from the advancement of science and technology, especially in the current century. Flores and Ramos (2017) state that the twenty-first century, strongly marked by information and communication technologies, has provoked a global

revolution in the most diverse vectors, including education, and can be considered the century of opportunities, change and equity, if the school, as a space for the formation and promotion of relationships, underpins updated references, consistent and aligned. In addition, Pereira and Silva (2010) believe that the changes caused in the development processes, and their consequences on democracy and citizenship, converge to a society characterized by the growing importance of technological resources and the advancement of Information Technologies (IT), with an impact on social and business relations and institutions.

> Some of the greatest characteristics of IT are agility, horizontality and the possibility of manipulating the content of communication and information through digitalization and communication in networks. This new dynamic of relationships between people has been drawing what is now conceptually known as the Information and Knowledge Society, based mainly on telephone and virtual communication networks (INFOJOVEM, 2019, p. 02).

For Frota and Borges (2004), the use of technology in basic education is thus strongly present in the official educational discourse, and should have already been incorporated into the discourse of basic education teachers.

> The globalized world has caused changes to affect the whole of society, including schools, education professionals and teaching materials. There is a demand from subjects who live immersed in the cibe culture, that is, they experience the use of computers, television, phones and tablets connected to the internet that takes them to any part of the globe in seconds. (RODRIGUES, 2015, p. 03)

Kampel et al. (2004) emphasize that in a technology-based society, with continuous changes at an accelerated pace, it is no longer possible to ignore the changes that information technologies (IT) cause in the way people see and apprehend the world, as well as to disregard the pedagogical potential that such technologies present when incorporated into education. Pontes (2010) argues that it is therefore appropriate to ask what IT is and what it brings to the process. The author concludes that, in his perspective, these technologies constitute both a fundamental means of access to information (Internet, databases) and an instrument for the transformation of information and the production of new information (whether expressed through text, image, sound, data, mathematical models or multimedia and hypermedia documents).

> At school, IT is a constituent element of the learning environment. They can support content learning and specific capacity building, both through educational software and commonly used tools. They allow the creation of spaces for interaction and sharing due to the possibilities they provide for communication and exchange of documents, they also represent a work tool for teachers and kindergarten teachers and an integral element of their professional culture, due to the alternative possibilities they provide for creative expression, project realization and critical reflection. (PONTE, 2002, p. 02)

Therefore, the inclusion of Information Technologies within educational environments is of great value, since it opens up a range of opportunities and knowledge for both the educator and the student. Marcolla (2012) assures that the introduction of technologies starts from their acceptance by the subjects, followed by the school's entry into the reality of IT, in order to establish an interaction with the various contexts, which virtually extrapolate the traditional teaching environment (classroom). For Souza (2019), the use of information technologies aims to extrapolate the methodology, aiming at the integration of content in a creative and meaningful way. Thus, it is necessary for the current school to seek quality in its pedagogical practice, and it is necessary to include media resources with methods, theories and techniques for a significant change in the teaching-learning process. For the aforementioned author, there are many advantages that IT can provide to people, especially in terms of quality, helping with the challenges and possible obstacles that arise in schooling. In this sense, Fredeirico and Gianotto (2014) emphasize that nowadays it is difficult to talk about development without referring to technologies. This is because the school, as well as many other segments of society, is permeated by them.

TECHNOLOGIES AND THEIR DEVELOPMENT IN EDUCATION

Bringing to education, for Hening and Prado (2016) considering the current debate on the insertion of information technologies and the intense discussion on teaching resulting, among other factors, from curricular reforms, we seek to investigate the articulation of History, Philosophy and Teaching of Physics and ICT in the context of high school. The National Common Curricular Base, in the curricular component of Physics - BNCC (2018), emphasizes that students should:

> Investigate problem situations and evaluate applications of scientific and technological knowledge and their implications in the world, using procedures and languages of the Natural Sciences, to propose solutions that consider local, regional and/or global demands, and to communicate their findings and conclusions to various audiences, in different contexts and through different media and digital information and communication technologies (DICT).

In this context, the importance of the use of information technologies in the school environment has already been demonstrated. Also in this context, Loureiro (2019) states that with the advent of the digital world, the potential that can be achieved by using IT in teaching is remarkable, in order to demystify some disciplines, considered difficult to understand, given that they deal with nature and its phenomena, which should be easy to understand given their presence in man's daily life. The new information technologies have undergone considerable advances and, consequently, new directions and possibilities are emerging in several areas, where there is a wide variety of programs and games on computers that offer a special meaning in the construction of knowledge (RIBEIRO; PAZ, 2016, p. 12). Castro (2001) apud Ribeiro et al. (2016) states that information technology can be used to compensate for

what conventional systems are unable to offer. In addition, there are several softwares that provide interaction between people and the machine and, therefore, usually draw a lot of attention due to the agility and development of functions (RIBEIRO ET AL., 2017, p. 03). The INFOJOVEM website (2019) exemplifies IT in practice as: Personal computers (PCs); Computer video and photo cameras or Webcams; Home burning of CDs and DVDs; Supports to store and port data such as hard drives or HDs, memory cards, pendrives, zipdrives, among others. For the above-mentioned authors, one of the arguments for the insertion of Information Technologies is the use of technological resources for the labor market.

Therefore, there are still great challenges in the implementation and use of Information Technologies, but it is known that these technologies are of great value in attracting and facilitating them. Dalto et al. (2018) conclude in their work that the use of information technologies as a resource has much to add, not only in education, but also in professional practice.

FINAL THOUGHTS

The integration of Information and Communication Technologies (ICTs) in education has been a topic of great relevance and interest in recent years, and this article sought to explore and analyze the impact of these technologies on the educational process. As we move towards an increasingly digitized society, it is imperative to understand how ICTs can be leveraged effectively to improve the quality of education and promote meaningful learning.

Throughout this study, it is evident that several aspects related to the use of ICTs in education are pertinent. From the advantages they offer, such as access to a vast array of educational resources and the promotion of student collaboration and engagement, to the challenges they face, such as the need to ensure digital inclusion and online safety.

Among the main information and communication technologies used in the educational environment, the following stand out: computers and mobile devices (tablets, smartphones); internet and social networks; distance learning platforms (EAD); *Educational software* and specific applications for education; and audiovisual resources, such as videos and digital presentations; online collaboration tools, such as forums and wikis, and such tools corroborate the performance of the consolidation of skills and potentialities by students.

On this occasion, it became clear that ICTs have the potential to profoundly transform teaching and learning methods, allowing for greater personalization of teaching, the development of 21st century skills, and the preparation of students for the challenges of the modern world. However, it is important to point out that the mere introduction of technology into the classroom does not automatically guarantee an improvement in the quality of education. It is critical that educators receive the necessary support to

effectively integrate ICTs into their pedagogical practices, as well as that adequate resources and infrastructure are provided to facilitate this integration.

Additionally, it is crucial to consider the ethical and social issues associated with the use of ICTs in education, including concerns about privacy, security, and equity in access. As we move into the future, it is essential that we continue to explore and evaluate the role of ICTs in education, seeking ways to maximize the benefits they offer while mitigating the associated challenges and risks.

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