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CHAPTER 02

NOVOS PARADIGMAS EM EDUCAÇÃO E TECNOLOGIAS: TRANSFORMANDO O ENSINO E A APRENDIZAGEM

NEW PARADIGMS IN EDUCATION AND TECHNOLOGIES: TRANSFORMING TEACHING AND LEARNING

NUEVOS PARADIGMAS EN EDUCACIÓN Y TECNOLOGÍAS: TRANSFORMANDO LA ENSEÑANZA Y EL APRENDIZAJE

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RESUMO

O tema central da pesquisa foi trazer à reflexão algumas contribuições do conhecimento teórico-científico sobre as possibilidades imanentes à utilização das tecnologias na sala de aula na busca por promover uma aprendizagem significativa. De modo que o principal objetivo do trabalho foi investigar, por meio de revisão bibliográfica e abordagem descritiva qualitativa, aspectos considerados relevantes acerca da temática proposta, enfatizando o campo educacional nos dias de hoje, utilizando-se um olhar multidisciplinar. Assim, o estudo buscou mostrar como a aprendizagem pode ser potencializada por meio do uso das tecnologias digitais no ambiente escolar. Cabe destacar também que foram levantados apontamentos no sentido de analisar os desafios e possibilidades da adoção das tecnologias pelo professor.

Palavras-chave: Educação. Tecnologias. Ensino-Aprendizagem.

ABSTRACT

The central theme of the research was to bring to reflection some contributions of theoretical-scientific knowledge about the possibilities inherent in the use of technologies in the classroom in the search for promoting meaningful learning. Thus, the main objective of the work was to investigate, through bibliographic review and qualitative descriptive approach, aspects considered relevant about the proposed theme, emphasizing the educational field today, using a multidisciplinary perspective. Thus, the study sought to show how learning can be enhanced through the use of digital technologies in the school environment. It is also worth noting that notes were raised in order to analyze the challenges and possibilities of the adoption of technologies by the teacher.

Keywords: Education. Technologies. Teaching-Learning.

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RESUMEN

El tema central de la investigación fue reflexionar sobre algunas contribuciones del conocimiento teórico-científico acerca de las posibilidades inherentes al uso de las tecnologías en el aula para promover el aprendizaje significativo. Por lo tanto, el objetivo principal del trabajo fue investigar, mediante una revisión bibliográfica y un enfoque descriptivo cualitativo, aspectos relevantes sobre el tema propuesto, con énfasis en el ámbito educativo actual y desde una perspectiva multidisciplinar. De esta manera, el estudio buscó mostrar cómo se puede potenciar el aprendizaje mediante el uso de las tecnologías digitales en el entorno escolar. Cabe destacar también que se elaboraron notas para analizar los desafíos y las posibilidades de la adopción de tecnologías por parte del profesorado.

Palabras clave: Educación. Tecnologías. Enseñanza-Aprendizaje.

INTRODUCTION

It is interesting to note, first of all, that the present study sought to weave a reflection having as a starting point two fundamental categories of analysis for thinking about the educational field today: education and technology. In this context, this study aims to discuss the interfaces between these two terms, analyzing how learning theories are articulated with the integration of technologies in contemporary pedagogical processes. Thus, the research was guided by a central question: "how to promote learning with the use of technologies in the face of the new rhythm of information?", unfolding in the investigation of how the student's learning process takes place and how digital technologies can act as facilitators in this path.

To answer this question, theoretical references from the specialized literature were mobilized, which allowed the articulation of conceptions about teaching and learning in the context of digital culture, anchored in different theoretical currents. For the purposes of this study, four of these theoretical approaches to learning are recurrently found in the bibliographic framework of the area today, in view, according to Siemens (2004), that learning occurs in a network, through connections in constant transformation. Thus, the analysis contemplates three classic approaches to learning, Behaviorism, Cognitivism and Contextualism, in addition to considering the emerging perspective of Connectivism.

The presence of digital technologies in everyday school life imposes new demands on the teaching-learning process, raising the need to understand how students learn and how technological resources can contribute to making learning more meaningful. From this perspective, based on authors such as Tapscott (2010), Illeris (2013), Behrens (2005), Miranda (2008; 2009) and Prensky (2001), it is highlighted that digital technologies reconfigure the relationship between students, teachers and knowledge. In the end, it is argued that there is a need for teacher training focused on significant pedagogical mediation with the use of technologies. In view of this, social and technological evolution, according to Kenski (2012), requires a new attitude from educators in the face of the use of technologies.

LITERATURE REVIEW

It is unassailable to assert that with the advancement of digital technologies, it becomes increasingly evident that such resources should not be treated as auxiliary instruments, but as constitutive elements of educational processes, as emphasized by Illeris (2013) who reinforces the idea of a flexible intelligence developed in digital environments. In this way, contemporary education is crossed by technological transformations that challenge traditional teaching models. In this scenario, Prensky (2001) argues that "digital natives",

which are individuals born in the midst of technologies, bring with them skills and competencies that should be used in the construction of more engaging educational proposals. The role of the teacher becomes that of an advisor who instigates, accompanies and collaborates with students, no longer that of an exclusive transmitter of knowledge (KENSKI, 2012).

> Teacher training is an essential factor for the school to be able to improve the capacity of the communicating citizen, since the teacher can adopt in his daily practice a posture that subsidizes and encourages the student to reflect on what it means to communicate in our society, as well as to learn to technically manipulate languages and technology (CHIAPINNI, 2005. p.278).

It is worth noting that technological innovations have profoundly transformed the way we live, interact and, consequently, learn. The quality of teaching, in this context, depends on the articulation between contents, methodologies, educational objectives and didactic resources (MIRANDA, 2009). In this sense, it is essential that teachers are prepared to integrate new pedagogical strategies based on the critical and creative use of technologies. With this, it is imperative to agree with Tapscott (2010) when he states that the intentional use of technologies can intensify active and meaningful learning, promoting the development of competencies and skills. Complementing this view, Illeris (2013) highlights that digital immersion stimulates flexible intelligence, which favors problem-solving, decision-making, and learning through discovery.

INTERFACES BETWEEN THEORIES OF LEARNING IN CONTEMPORARY TIMES FROM

Revisiting the main theoretical approaches to learning, four conceptions stand out: behaviorism, cognitivism, contextualism, and connectivism. Behaviorism contributes to the sequential organization of tasks; cognitivism, with strategies that involve logical reasoning and problem solving; contextualism, with collaborative and meaningful practices; and connectivism, with the use of digital networks as learning spaces. The choice of the most appropriate approach should consider the students' profile, learning objectives and social context. As Libâneo (2012) points out, efficient pedagogical practice is one that articulates different theories and methods in favor of learning.

> We, educators, have to prepare ourselves and our students to face the demands of this new technology, and of all those around them - TV, video, cell phones. Informatics applied to education has deeper dimensions that do not appear at first glance (ALMEIDA, 2000. p. 78).

Behaviorism, the first approach analyzed, is based on the relationship between stimuli and responses. Learning, in this model, is understood as behavioral modification, being reinforced by rewards. In this context, Skinner (1954), cited by Miranda (2008), proposed the use of the computer as a "teaching machine", with immediate and personalized responses, characterizing the first computerized systems based on programmed teaching. This logic persists in many instructional educational software, which are still based on repetitive practices and immediate feedback, such as in Computer-Aided Teaching (CAS), which prioritize repetition and skill training.

Cognitivism, in turn, shifts the focus to the subject's internal mental processes. Learning is understood as the reorganization of cognitive structures and the acquisition of new meanings. For Papert, creator of the Logo language and defender of the constructionist theory, the student should be placed in situations that stimulate the production of knowledge, problem solving and research. Based on Piaget's ideas, Papert proposes active and reflective learning, supported by the use of interactive technologies, proposing an education based on learning through discovery (MIRANDA, 2008). Such fundamentals are reflected in computational environments that promote autonomy and critical thinking.

Contextualism, the third theoretical perspective, understands learning as the result of the subject's participation in communities of social practices. In this approach, knowledge is collectively constructed and linked to meaningful contexts of interaction. Miranda (2008) highlights that the student, by integrating himself into discursive practices, develops competencies through collaboration, problem solving and cultural mediation, that is, the aforementioned author points out that knowledge is collectively constructed. Jonassen's (2007) taxonomy reinforces the idea that computers can be used as cognitive tools, promoting critical and creative thinking through meaningful learning, integrating hypertext as a resource for learning in interactive environments.

More recently, connectivism has emerged, proposed by Siemens (2004), as an attempt to respond to the educational demands of the digital age. From this perspective, knowledge is understood as distributed in networks, and learning occurs through connections between individuals and sources of information. Although connectivism lacks theoretical consolidation, being considered by some authors as a proto-theory (MIRANDA, 2008), it proposes a dynamic and decentralized view of the learning process, aligned with the realities of virtual environments. It is an emerging theory that emphasizes connections and interactions in digital environments. Miranda (2008) points out that this approach still lacks conceptual rigor, but points out ways to think about learning in the twenty-first century.

> Our experience of reality is transformed when we use instruments {Human Being > (machine) > World}. Through the instrument there is a selection of certain aspects of reality, with expansions and reductions. Amplification is the most salient aspect and can leave us awestruck, amazed, as we experience things (or aspects of known objects) that we didn't know before, with our naked senses. Reduction, on the contrary, is recessive and can go unnoticed, since it does not necessarily occupy our consciousness, impressed by the new (CYSNEIROS, 1999, p. 21).

It is important to highlight that these approaches do not cancel each other out, but can be articulated according to the pedagogical objectives, the profile of the students and the educational context. Behaviorism contributes to the systematization and sequencing of content, cognitivism emphasizes the active construction of meanings, contextualism values the sociocultural dimension, and connectivism broadens the understanding of network learning. In this sense, although they present different assumptions, these theories can be integrated in a complementary way in teaching planning. Pedagogical practice can thus incorporate elements of these different theories to make the teaching-learning process more dynamic, meaningful and aligned with the demands of contemporary society[2].

THEORETICAL PERSPECTIVES ON EDUCATION AND TECHNOLOGIES

The relationship between education and technology has come to occupy a central place in the pedagogical debate today[3]. Digital technologies have not only changed the ways of accessing information, but have reconfigured the very concept of knowledge, now marked by fluidity, connectivity and the collaborative aspect. According to Lévy (1999), we live in a "collective intelligence", in which knowledge is distributed in networks, profoundly transforming the role of the school and the teacher. Authors such as Moran (2004; 2015) and Behrens (2005) reinforce that technologies expand pedagogical possibilities, as long as they are used critically and intentionally. They can favor active, meaningful and personalized learning, bringing the educational process closer to the students' reality and stimulating the development of skills, which are required in this societal model of the twenty-first century.

Digital technologies have substantially changed the logic of the educational process, in which the teacher is no longer the only holder of knowledge, and the student assumes the role of an active subject in the construction of knowledge. In this new paradigm, the teacher becomes a mediator and facilitator of learning (KENSKI, 2012), while the student participates in an interactive and collaborative way, critically appropriating the available information.

[2] The rapid pace of technological innovations requires an educational system capable of stimulating students' interest in learning. And that this interest in new knowledge and techniques is maintained throughout his professional life, which will probably tend to be carried out in different areas of a productive activity increasingly subject to the impact of new technologies (SANCHO, 1998. p. 41).
[3] The presence of technology in all sectors of society is one of the arguments that prove the need for its presence in school and, mainly, in the formation of a competent citizen in terms of its technical instruments, but mainly with regard to human interaction and ethical values (BASTOS, 2010, p. 75).

According to Almeida (2005), the student must develop an investigative, critical and autonomous posture, carrying out processes of analysis, creation, reorganization and re-elaboration of knowledge. Overcoming the passive posture requires that learning be conceived as an active, contextualized and meaningful experience, as Behrens (2005) points out.

> The teacher creates interdisciplinary learning environments, proposes challenges and explorations that can lead to discoveries and promote the construction of knowledge using the computer and its programs (software) to problematize and implement projects (ALMEIDA, 2010. p.71).

Thus, teaching consists of creating problem-solving learning environments, in which the student can process, interpret and reframe information. In this context, Miranda (2008) observes that human learning remains a complex and multifaceted phenomenon, being understood as an adaptive process that establishes connections between stimuli and responses, promoting a greater integration of the subject with the environment. Thus, the concept of education, understood by Tonet (2006) as a tool to transform reality, needs to keep up with contemporary social and cultural changes. For Illeris (2013), learning is a continuous process of acquisition and expansion of knowledge, in which teachers and students interact and develop mutually.

In fact, the advancement of technologies imposes new challenges on teaching practice. The contemporary teacher needs to assume a role of mediator, organizer of learning environments and facilitator of the construction of knowledge. For Silva (2020), the teacher must master not only the contents, but also the technological languages, understanding their pedagogical uses and their social and cultural impacts. In fact, teacher training, in this sense, should prioritize the development of digital and methodological skills, promoting the critical appropriation of technologies. As Bacich and Moran (2018) point out, the teacher of the twenty-first century needs to be a designer of learning experiences, capable of integrating different media and resources into didactic planning.

> It is essential today to think about the curriculum of each course as a whole and plan the time of physical presence in the classroom and the time of virtual learning. Most subjects can partially use distance learning activities. Some that require less lab or less physical presence may have a greater load of virtual activities and time. The flexibility of the management of time, spaces and activities is necessary, especially in higher education that is still so plastered, bureaucratized and confined to the monotony of the teacher's speech in a single space that is the classroom (MORAN, 2004, p. 08).

Therefore, the impact of technologies on education is undeniable, they have the potential to transform not only the means, but the very ends of educational practice. However, this transformation requires pedagogical intentionality, continuous teacher training,

and public policies that promote equity in the access and use of technologies. Learning theories continue to be essential references to guide this integration, as long as they are adapted to new realities, since both teachers and students exchange information and knowledge, developing each other. Therefore, it is important that the teacher understands the different ways of using technologies in the classroom. In this horizon, in an increasingly digital and interconnected world, it is necessary to reinvent the school, valuing student protagonism, teacher mediation and the collective construction of knowledge[4].

From this analytical basis, we sought to analyze the contribution of technologies in the educational process in the light of learning theories and the role of the teacher as a mediator. In this way, according to authors such as Behrens (2005) and Almeida (2005), the paradigmatic change requires teachers to become mediators who promote interactive learning environments, exploring technologies in a critical and creative way. Students, in turn, should be encouraged to "learn to learn", developing autonomy, creativity and problem-solving skills. In short, such questions guided this study, which proposed a critical and theoretical analysis of the integration of digital technologies in education, articulating it with the main currents of learning psychology and didactics.

METHODOLOGY

The methodological procedure adopted is qualitative, based on a theoretical support through a bibliographic review on the subject, based on the reading of articles, books and theses. In this way, to support the conceptual bases of the study, we sought to review the theoretical framework of authors with relevant scientific production on the subject. The research is of a bibliographic nature, based on contemporary theorists in the educational area. Thus, in order to advance in the mastery and systematization of what is being produced in this area of knowledge, we resorted to authors who offer important contributions to the understanding of the theme. With this, the analysis of the sources was used as a methodology, which made it possible to reach conclusions that can serve as a basis for future research.

Without intending to exhaust the possibilities of discussion on the subject, some aspects considered relevant were highlighted, taking into account the sociocultural context of production and circulation of these sources. In this sense, the theoretical-methodological conceptions that support the present study can be found in authors such as Behrens, Moran, Lévy, Kenski, Siemens, Jonassen, among other researchers on this theme, since fruitful

[4] We are in a world in which technologies interfere in everyday life, and it is therefore relevant that education also involves the democratization of access to knowledge, the production and interpretation of technologies (BRITO and PURIFICAÇÃO, 2008, p. 23).

critical reflections were found in these authors. Thus, the study is based on the reading of a current scientific production related to the theme in the scope of educational technologies, its perspectives, challenges and possibilities, constituting the analytical support on the theme of investigation.

FINAL CONSIDERATIONS

By way of conclusion, it is relevant to point out that this study sought to reflect on different theoretical approaches to learning that can be favored with the use of technologies. The analysis showed that, more than auxiliary instruments, technologies are configured as structuring elements of current pedagogical practice. Thus, in the cognitivist perspective, learning is modifying mental structures through understanding and interpretation. The behaviorist approach, in turn, conceives learning as a change in behavior resulting from stimuli and responses. Contextualism, on the other hand, understands learning as a social process, mediated by culture and interaction in communities of practice. Finally, connectivism, proposed by Siemens (2004), postulates that knowledge is distributed in networks and is not located in isolated individuals.

> The computer increasingly allows us to research, simulate situations, test specific knowledge, discover new concepts, places and ideas. With the Internet, it is easier to modify the way of teaching and learning. Seek to establish an empathetic relationship with students, seeking to know their interests, training and perspectives for the future. The form of teacher/student relationship is important for pedagogical success (MORAN, MASETTO and BEHRENS, 2006. p. 16).

In view of all that has been exposed, the discussion on education and technology highlights the need for student-centered teaching, supported by different pedagogical approaches and sustained by the appropriate pedagogical use of technologies by teachers. Thus, it was evident that the articulation between theory and practice requires pedagogical planning that is coherent with the learning objectives and the profile of the students. In the face of such reflections, it is essential that the educational process be reoriented to place the student at the center, as the protagonist of their own learning, and that the teacher assumes the role of mediator, capable of integrating knowledge, technologies and diverse contexts in favor of a transformative education.

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