

Research article

# The impact of platforms on teaching modalities in the digital transformation in education paradigm

## El impacto de las plataformas en las modalidades de enseñanza en el paradigma de la transformación digital en la educación

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## Abstract

**Introduction:** This study examines the transformation of education driven by digitalization, highlighting the impact of digital platforms on teaching and learning dynamics. Digitalization has fostered new forms of access to knowledge, with platforms playing a central role in implementing modalities such as e-learning, b-learning, and m-learning. These tools not only facilitate access to educational content but also encourage interaction and collaboration between students and teachers, adapting to individual learners' needs and promoting more personalized and flexible learning experiences. **Methodology:** The research is based on a qualitative, hermeneutic-interpretive methodology, aimed at understanding the meanings and interpretations expressed in texts and documents. This approach enables the analysis of the complexity of the educational phenomenon and the interpretation of how different actors construct meanings regarding the use of digital technologies in pedagogical practices. **Results and Discussion:** The analysis reveals both potentialities and challenges of teaching modalities mediated by digital platforms, emphasizing their impact on pedagogical practices, interaction dynamics, and the changes in teaching and learning processes. **Conclusions:** It is concluded that digital platforms act as transformative agents in education, fostering new pedagogical paradigms within the broader context of digital transformation.

**Keywords:** education; teaching modalities; digital transformation; learning platforms; technology; digital pedagogy; online learning; educational innovation.

## Resumen

**Introducción:** Este estudio examina la transformación de la educación impulsada por la digitalización, destacando el impacto de las plataformas digitales en las dinámicas de enseñanza y aprendizaje. La digitalización ha fomentado nuevas formas de acceso al conocimiento, en las que las plataformas desempeñan un papel central en la implementación de modalidades como el e-learning, el b-learning y el m-learning. Estas herramientas no solo facilitan el acceso a contenidos educativos, sino que también promueven la interacción y la colaboración entre estudiantes y docentes, adaptándose a las necesidades individuales de los usuarios y favoreciendo experiencias de aprendizaje más personalizadas y flexibles. **Metodología:** La investigación se basa en una metodología cualitativa de carácter hermenéutico-interpretativo, orientada a la comprensión de los significados y sentidos presentes en textos y documentos. Este enfoque permite analizar la complejidad del fenómeno educativo e interpretar cómo los distintos actores construyen significados en torno al uso de las tecnologías digitales en las prácticas pedagógicas. **Resultados y discusión:** El análisis pone de manifiesto tanto las potencialidades como los desafíos de las modalidades de enseñanza mediadas por plataformas digitales, destacando su impacto en las prácticas pedagógicas, las dinámicas de interacción y los cambios en los procesos de enseñanza y aprendizaje. **Conclusiones:** Se concluye que las plataformas digitales actúan como agentes transformadores de la educación, promoviendo nuevos paradigmas pedagógicos en el marco más amplio de la transformación digital.

**Palabras clave:** educación; modalidades de enseñanza; transformación digital; plataformas de aprendizaje; tecnología; pedagogía digital; aprendizaje en línea; innovación educativa.

## 1. Introduction

We live in times of profound cultural, economic, and social change, and the evolution of information and communication technologies is evident today. Consequently, we face the challenge of competitiveness for excellence and the establishment of quality and success goals, as well as the adoption of organizational criteria for instrumentation for asynchronous learning and the capacity for research at the service of the community, its promotion and transformation. As Dias Sobrinho (2015), alludes, the mission and overarching premise of the university is to:

building, on a daily basis, the quality of processes without losing sight of their essential purposes. This means carrying out their training and knowledge-processing activities with the highest possible degree of academic, scientific, technical, moral, political, and social quality. [...]; in the formation of individual citizens endowed with civic values and technically and scientifically relevant and socially pertinent knowledge. (Dias Sobrinho, 2015, p. 583).

In our opinion, all research and teaching activities can and should maintain an umbilical connection to form a cohesive, sustained, and balanced whole in terms of intervention and community outreach. This balance and articulation should guide and, in a way, establish the functional profile of a researcher and professor in this field, under these conditions, and in these times. Therefore, “the university has responsibility for the development model of global society. [...] It is important that this new development model be based on knowledge that reaches everyone and fuels the realization of dreams of freedom and happiness” (Dias Sobrinho, 2015, p. 596).

Distance learning models and their associated digital platforms are redefining education, offering a variety of options that meet the needs of different student profiles. From e-learning to b-learning and m-learning, these tools provide flexibility, accessibility, and a personalized learning experience. However, it is crucial that teachers and students develop digital skills and use these platforms critically and effectively, ensuring that the potential of these technologies is fully explored (Borges Gouveia, 2011).

The continuous evolution of these platforms promises even more innovations in the educational field, expanding learning opportunities for all (Borges Gouveia, 2016).

## 2. Methodological

The present study adopts a qualitative methodology of an interpretive and comprehensive nature, aimed at understanding the meanings and interpretations attributed by educational actors to the use of digital platforms and to the emerging teaching modalities within the context of the digital transformation in education. This methodological framework seeks to interpret educational reality as a socially constructed phenomenon, whose understanding requires the analysis of the experiences, discourses, and practices of the subjects involved (Creswell & Poth, 2018; Denzin & Lincoln, 2018).

With regard to the sample, the study was based on a directed documentary corpus composed of scientific and institutional references selected according to four criteria: thematic relevance, timeliness, academic recognition of the sources, and direct relation to the object of analysis: the impact of digital platforms on teaching modalities. This option is intertwined with the reflective nature of the article, insofar as it prioritizes documents with explanatory capacity to support a critical reading of the phenomenon under study.

The data collection procedure took place in three complementary stages: identification of theoretical descriptors (digital platforms, e-learning, b-learning, m-learning, digital transformation, and digital pedagogy); literature search and selection in reference databases and works; and analytical organization of the materials according to thematic axes. Subsequently, the documents were subjected to full reading and systematic recording of meaning units to ensure interpretive traceability and consistency between objectives, corpus, and analysis.

Regarding the method of analysis, an interpretative thematic content analysis was employed, appropriate for identifying regularities, tensions, and emerging categories in scientific and institutional discourse (Flick, 2018). This methodological choice is justified by its capacity to articulate a priori categories derived from the theoretical framework with categories emerging from the corpus, thereby strengthening analytical coherence and the reproducibility of the research process.

The research follows a hermeneutic-interpretive approach, grounded in the premise that educational understanding is a process of interpretation mediated by language, culture, and historicity. Inspired by the hermeneutic tradition of Gadamer (1975) and Ricoeur (1976), this approach assumes that the interpretation of texts, documents, and discourses produced in educational contexts involves a fusion of horizons, where the intended meaning of the authors is articulated with the critical perspective of the researcher.

In the field of Education, this interpretive perspective allows for a deeper understanding of teachers' and students' representations and perceptions regarding the impact of digital platforms on teaching modalities—face-to-face, blended, and distance—and how these influence pedagogical practices and learning mediation. Thus, the analysis of bibliographic and documentary sources, complemented by the critical examination of institutional discourses, educational policies, and previous studies, enables the interpretation of the pedagogical and social meanings associated with the digital transformation process (Bogdan & Biklen, 1994; Flick, 2018).

### **3. Findings and Discussion**

#### ***3.1. Science, Technology, Society and Innovation***

The relationship between Science, Technology, Society and Innovation becomes essential when it comes to combating poverty, economic, social, cultural, intellectual and political deficiencies (Júnior & Coutinho, 2007; Morgado, 2014; Dias Sobrinho, 2015). They are essentially central elements of:

social citizenship, which requires the conscious exercise of rights in their entirety: civil, political, economic, social, and cultural. Therefore, they are connected to the ideals of freedom and equity, principles that reject exclusion of all kinds, prejudice, intolerance, oppression, poverty, possessive individualism, and indifference toward all exercises and practices of thought and action that oppose human dignity. (Dias Sobrinho, 2015, p. 592).

Thus, combining the dimensions of technology, education, science, culture, art, heritage, identity, and memory is a sign of a commitment to quality education that has technology as the basis for both know-how and know-how with a specific purpose (Grinspun, 1999).

In other words, “both the construction of knowledge to generate technology and the production and evaluation of technology are tasks that require education as a foundation and principle for achieving their objectives” (Grinspun, 1999, p. 55). “Like everything public, education is a right of each and every individual. Right-duty, thus intertwined, is a constituent of human life.

Like any other human right, the common good depends on the effort and cooperation of all” (Dias Sobrinho, 2018, p. 739). In this context, Nóvoa (2007, p. 2) introduces teachers as “irreplaceable elements not only in promoting learning, but also in developing integration processes that respond to the challenges of diversity and appropriate methods of using new technologies”.

Distance learning models and their respective digital platforms, when well-integrated into the educational process, offer great opportunities to democratize access to knowledge, personalize learning and make teaching more flexible (Anderson, 2008; Moore & Kearsley, 2011), but it is crucial to guarantee universal access to these technologies and balance their use with pedagogical practices that value human interaction (Johnson et al., 2015).

In alignment with previous studies, these findings converge with the view that the mere availability of technology does not, in itself, produce pedagogical improvement; educational impact depends on didactic intentionality, teacher mediation, and the quality of instructional design (Kirkwood & Price, 2014). Likewise, the flexibility and accessibility of digital environments only translate into meaningful learning when accompanied by consistent support structures, interaction, and sustained guidance (Anderson, 2008; Moore & Kearsley, 2011).

In this sense, more than ever, faculty assume an increasingly decisive and important role in the constant updating of content, which, a fortiori, should be the core of university routine (Morgado et al., 2024a; Morgado et al., 2024b). To this end, they must be continually attentive to all developments in science and technological challenges, thus reinforcing the crucial importance of research in the continuous and ongoing learning process, as a way of opening doors to new, more stimulating learning methodologies that present or predict better results.

This task can facilitate the entire process of monitoring and guiding students and their own learning process. And, no less importantly, resulting from this practice, it can foster good peer relationships in the classroom for the smooth functioning of their pedagogical work (Morgado et al., 2024b). In this sense, the sharing and implementation of this practice facilitates the pedagogical-scientific relationship, as well as making the exposition and sharing of ideas by curriculum recipients more cohesive and sustained, as it takes place in an environment conducive to the active participation of all.

In this context of sharing and implementing new strategies and methodologies, students play an equally decisive role in the quality of teaching. Therefore, alongside teachers, they must embrace the development of fundamental learning for 21<sup>st</sup> century professionals. In our understanding, this entails a necessary appropriation of knowledge to reconstruct it, giving it new meaning, typical of the learner, contextualized with the knowledge they already possess, tailored to their future profession, and meeting current and future demands and trends in the job market.

In turn, academia needs to motivate, promote, and deepen research as a fundamental part of quality professional training, instigating and teaching investigative practice with a view to developing critical thinking and solving humanity's problems. The same is required in the assessment field, where diversity and alternatives must adapt to the times and challenges, and provide an opportunity for science and research to truly combine efforts to prepare teachers and students to solve problems at the most diverse and varied levels and degrees of impact on today's society. In other words,

Assessment must be understood as a process that, to be fair and meaningful, requires diversity. Varying techniques allows for individual differences within the class group. Modern technology alone does not solve educational learning and development problems and must be understood as a collaborative tool for activities. (Lacerda & Santos, 2018, p. 624)

As Estrela (2014), Barnard and Sedio (2025) alludes, the knowledge society expects teachers to be able to introduce ICT in a way that provides them with the skills it demands. On the one hand, it aims to prevent potential negative social effects and, on the other hand, simultaneously help ensure that this combination of resources promotes an environment of collaboration, equality, and excellence (Estrela, 2014; Barnard & Sedio, 2025). This will ensure a more proactive, pedagogical-didactic role for teaching and learning in a constantly changing society.

Recent studies corroborate this perspective. Research focusing on teachers' digital competence and the pedagogical integration of technology shows that digital transformation goes beyond mere technical proficiency, also requiring the ability to critically select resources, ensure ethical regulation of practices, and adapt methodologies to different learning contexts (\*\*Mark Falloon, 2020; Howard et al., 2021).

In line with this, international reports emphasize that the benefits associated with digital platforms depend on ensuring equitable access, providing teachers with pedagogical training, and establishing consistent and sustained institutional policies (UNESCO, 2022; OECD, 2023). Distance learning models and digital platforms have played an increasingly central role in contemporary education, offering new ways to disseminate, construct, and share knowledge.

From a knowledge perspective, these digital tools provide an innovative means of accessing information and learning resources, while from the user's perspective - that is, teachers and students - they profoundly transform the way teaching and learning occur. Thus, the problem can be seen as a matter of pedagogical adaptation and technological resource management, seeking to balance the opportunities and challenges that digital platforms bring to the educational process.

### ***3.2. Digital Platforms: Modalities and Advantages***

Digital platforms have played an increasingly central role in contemporary education, offering new ways to disseminate, construct, and share knowledge. From a knowledge perspective, these digital tools constitute an innovative means of accessing information and educational resources. From the user's perspective, that is, teachers and students, they profoundly transform the way we teach and learn. From a knowledge perspective, digital platforms democratize access to information and learning resources.

Previously, knowledge was limited to physical materials and in-person classrooms (Siemens, 2005; Anderson, 2008; Bates, 2019). With the advancement of technology, it has become globally accessible, anytime, anywhere.

Platforms such as Khan Academy, Coursera, and edX offer a wide range of courses and video lessons that allow anyone with internet access to learn about a variety of topics, often for free. This phenomenon facilitates self-directed learning, allowing students to search for specific content according to their needs and interests.

Furthermore, these platforms promote collaborative knowledge construction. Tools such as wikis, discussion forums, and academic social networks enable students and experts from diverse fields to share ideas, collaborate on projects, and co-create new knowledge. This process of exchanging information and experiences ensures that knowledge is constantly evolving and updated, more dynamically than with traditional methods (Scardamalia & Bereiter, 2006; Dron & Anderson, 2014; Redecker & Punie, 2017).

Another relevant aspect is the personalization of teaching, many of these platforms use artificial intelligence (AI) and data analysis to adapt the content to the progress and individual needs of each student, thus allowing more efficient and targeted learning (Luckin et al., 2016; Timms, 2016; Morgado et al., 2025), of course, this method contrasts with conventional models, which follow fixed and homogeneous curricula.

From the perspective of users—teachers and students—digital platforms offer greater flexibility and autonomy. For teachers, these tools enable the creation of more dynamic and interactive content, such as videos, simulations, and online quizzes, making classes more engaging. Furthermore, they allow for better organization and management of the teaching process, allowing educators to monitor student progress in detail and in real time. For students, these platforms offer the advantage of studying at their own pace and schedule, promoting personalized learning. They also guarantee continuous access to content, discussion forums for clarifying questions, and the ability to review material whenever necessary—something the traditional classroom model does not offer (Ally, 2009; Bonk & Graham, 2012; Hrastinski, 2019).

For example, in the context of e-learning, platforms such as Moodle, Blackboard, and Canvas stand out. These Learning Management Systems (LMS) enable the creation and management of fully online courses, where students can access materials, participate in discussion forums, and complete assessments asynchronously (Siemens, 2005; Garrison & Vaughan, 2008; Bates, 2018). Furthermore, platforms such as Coursera, edX, and Udemy offer MOOCs covering a wide range of subjects, allowing students to learn at their own pace, anytime, anywhere (Liyanagunawardena et al., 2019).

B-learning combines in-person and online elements, creating a richer and more diverse learning experience. Platforms such as Google Classroom and Microsoft Teams are widely used in this model, allowing teachers to integrate online activities with in-person classes. These tools facilitate content organization and communication between students and educators, fostering a collaborative environment (Bonk & Graham, 2012; Hrastinski, 2019). Additionally, virtual learning environments, such as Blackboard Collaborate, provide support for videoconferencing and real-time interaction, enriching the student experience.

M-learning has gained prominence with the growth in the use of mobile devices, enabling learning to occur anywhere (Ally, 2009). Platforms such as Duolingo and Khan Academy provide applications that facilitate learning on the go through interactive and gamified content (Sharples et al., 2009). M-learning has proven particularly effective in language learning and reinforcing concepts in various disciplines, taking advantage of the accessibility of smartphones and tablets (Traxler, 2007; Crompton, 2013).

One of the major advantages of using these platforms and their respective models is the democratization of access to knowledge. Digital e-learning platforms, for example, allow students to access educational content from anywhere in the world, without time or space limitations. This is particularly important to ensure that students in remote regions or with limited access to educational resources can participate in quality education programs (Garrison & Anderson, 2003; Borges Gouveia & Moreira, 2009; Bates, 2015).

Furthermore, the platforms offer the possibility of personalizing the learning experience, adapting to the pace and individual needs of each student, which contributes to greater knowledge retention and comprehension (Salmon, 2011; Laurillard, 2012).

Another significant advantage is the flexibility these platforms provide (Garrison & Anderson, 2003; Siemens, 2005). B-learning, which combines in-person and online learning, is a model that allows for a seamless transition between face-to-face and digital interaction, fostering a balance between individual student support and the use of digital resources. M-learning, in turn, offers the ability to access educational content via mobile devices, facilitating learning anytime, anywhere, and fostering student autonomy.

#### **4. Final considerations and Recommendations**

Digital platforms are redefining education, offering a variety of options that meet the needs of different student profiles (Kirkwood & Price, 2014; Selwyn, 2016; Bates, 2019). These tools provide flexibility, accessibility, and a personalized learning experience (Passey & Higgins, 2011). However, it is crucial that educators and students develop digital skills and use these platforms critically and effectively, ensuring that the potential of these technologies is fully explored (Ferrari, 2013; Jansen et al., 2013; Redecker & Puni, 2017; Heitink et al., 2017; Law et al., 2018; Falloon, 2020; Howard et al., 2021).

In education, digital platforms, from both the knowledge and user perspectives, have a profound and transformative impact. They democratize access to knowledge, enable more personalized learning, and offer new pedagogical possibilities (Anderson & Dron, 2011; Kirkwood & Price, 2014; Bond et al., 2018).

However, their success depends on a careful balance between the use of technology and human interactions (Cuban, 2001; Garrison & Anderson, 2003; Laurillard, 2012; Selwyn, 2016), as well as universal access to these resources. Ultimately, when well integrated, digital platforms can revolutionize teaching and learning, preparing students for the challenges of the contemporary world (Fullan & Langworthy, 2014; Veletsianos & Moe, 2017; Horizon Report, 2018; Behrens, 2024).

Despite their advantages, digital platforms also present challenges. The digital divide remains a significant barrier for many students, especially in regions with poor infrastructure (Baturay, 2015; Silva et al., 2018; Horizon Report, 2020). Furthermore, the excessive use of technology in education can reduce human interactions, which are essential for the development of social and emotional skills (Prensky, 2010).

However, it is crucial to ensure universal access to these technologies and balance their use with pedagogical practices that value human interaction (Laurillard, 2012).

In recent decades, there has been a curricular reconfiguration that prioritizes the development of transversal skills, namely problem-solving, reading comprehension and collaboration, as argued by Priestley and Biesta (2013). However, Young (2007), Wheelahan (2010), Rata (2024a) and Surma et al. (2025) warn, in a critical and well-founded way, that this epistemological orientation tends to subordinate disciplinary knowledge, treating it as a secondary element or capable of being acquired implicitly, exclusively through the practice of these skills.

Empirical studies indicate that this trend has led to a progressive erosion of the specificity of curricular content and a blurring of the value given to structured knowledge (Priestley & Sinnema, 2014). The continued deterioration in literacy, science, and mathematics performance in several OECD countries (OECD, 2023) strongly suggests the pressing need to refocus knowledge as the foundation for the development of higher cognitive skills.

In recent years, the OECD has been reformulating its conceptual framework, recognizing disciplinary knowledge as a structuring axis for promoting educational equity (OECD, 2019, 2021), a clear shift from previous reports that predominantly emphasized the development of generic skills (Hughson & Wood, 2022). This reorientation suggests a growing recognition of the importance of systematized knowledge in building more rigorous, equitable, and intellectually enriching curricula. As Crato (2021):

First, everything starts with the curriculum. This is the education founding document. It can be national, federal, regional, or established at local levels. It can be more detailed or less specific, it can be later translated in standards or contain them, but without clear learning goals no education system can progress. Second, the curriculum, or curricular structure if it is made from different pieces, ought to be ambitious, demanding, and set clear objectives. These objectives must be sequenced, setting solid foundations for students' progress. Knowledge is a necessary foundation to develop skills and values. Third, everything needs to be coherent around curricular goals. It does not make sense that assessment instruments evaluate some learning goals, textbooks stress others, and schools are rewarded for attaining still different student goals. (Crato, 2021, p. 20)

Advances in artificial intelligence (AI) amplify the implications of curricular change, requiring critical reflection on the relationship between generic competencies and disciplinary knowledge (Barrett, 2024; Rata, 2024a; Surma et al., 2025). AI, particularly through tools such as language models and automation systems, has demonstrated an impressive ability to perform generic skill-based tasks such as problem-solving or data analysis (Priestley & Biesta, 2013). However, for these tools to be used effectively and ethically, it is essential that users possess deep and specific knowledge of the areas in which they apply these technologies (Young, 2007; Wheelahan, 2010).

The devaluation of disciplinary knowledge in the curriculum can lead to an overreliance on AI as a substitute for human knowledge, producing professionals with superficial skills who do not fully understand the limits, risks, and ethical implications of these technologies (Priestley & Sinnema, 2014). On the other hand, a curriculum rich in specific knowledge allows students to develop a solid foundation for questioning, interpreting, and contextualizing the responses generated by AI, promoting more responsible and informed use (Hirsch, 2016; Morgado et al., 2025).

Furthermore, AI exacerbates inequality in access to knowledge. Advanced tools tend to benefit those who already have a solid foundation of knowledge and technological literacy, widening educational disparities. Furthermore, building an equitable curriculum [70], with broad and deep content, is essential to ensure that all students, regardless of socioeconomic background, can equally benefit from the benefits of AI (Barrett, 2024; Rata, 2024a; Surma et al., 2025).

Thus, while AI promises to transform education and work, it also highlights the importance of a balance between generic competencies and disciplinary knowledge. A well-structured curriculum, based on deep content, not only empowers individuals to critically interact with emerging technologies but also contributes to a more inclusive and informed society (Wheelahan, 2010; Hirsch, 2016; UNESCO, 2022) in a world increasingly mediated by AI.

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