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THE BOOK AS A PEDAGOGICAL TOOL: TRANSFORMATION AND EVOLUTION IN THE DIGITAL AGE

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ABSTRACT

The continuous advancement of artificial intelligence and augmented reality has introduced new dynamics into the field of education, influencing both learning processes and educational practices. The book, as a traditional medium of learning, finds itself at the center of this transformation. Although the comprehension of digital technologies and the integration of artificial intelligence pose the challenge of the book's potential displacement, the relationship is more complex. Contemporary educational approaches suggest that the book is not being replaced but rather transformed into a component of the learning experience.

An examination of the changing role of the book reveals that, while artificial intelligence enables the creation of more personalized and adaptive learning experiences, the book remains a crucial tool for developing critical thinking and the ability to evaluate information. Despite the increasing availability of technological support, the book does not lose its relevance but instead assumes a different role in the educational process, enhancing learners' capacity to interact with knowledge in a more targeted and individualized manner.

Research indicates that the integration of digital tools does not displace the printed book; rather, it positions both within a dynamic collaboration, where the need for different media depends on the demands of the learning process. Physical interaction with a book offers value that digital media cannot fully replicate, such as enhanced concentration and deeper comprehension of content.

A qualitative analysis of the literature and contemporary trends in educational technology reveals a tendency toward coexistence and collaboration between printed and digital books, aiming to create an educational framework that leverages the potential of both media. In the future, the book remains a vital learning tool, embedded within a broader educational system that combines traditional and modern means, allowing for a more holistic learning experience.

Keywords: Digital book, printed book, critical thinking, artificial intelligence, digital and print media, educational technology

1.0 INTRODUCTION

The historical development of the schoolbook as a central tool in the learning process reflects its profound influence on the European educational landscape. The advent of printing technology shaped pedagogical approaches by assigning the book the role of a guardian of knowledge and an integral element of educational practice (Eisenstein, 1983). Within the

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framework of forming national education systems, the schoolbook contributed to cultural cohesion and the construction of collective identity, shaping how European societies approached the concept of organized learning (Furet, 1983).

The introduction of artificial intelligence and augmented reality technologies into the educational process represents a profound transformation with wide-ranging and multi-layered implications. The redefinition of the schoolbook's role in the digital learning era raises questions about how traditional forms of teaching can adapt to these new conditions (Selwyn, 2019). The shift from the written transmission of knowledge to the interactive nature of digital education alters not only how information is received but also the cognitive processes of learners (Kress, 2003).

The composition of schoolbooks now faces new challenges, as academic writing teams must consider how to balance structured linear narratives with the dynamic forms of learning promoted by digital environments (Buckingham, 2007). The use of diverse modes of presenting knowledge, adapting the curriculum to individual student needs, and incorporating interactive elements are key considerations that shape contemporary textbook design (Lankshear & Knobel, 2006).

A critical assessment of the transition to the digital era highlights the contradictions arising from the coexistence of traditional and digital media. The need for stability and organized knowledge is juxtaposed with demands for flexibility, interactivity, and adaptation to new technological realities. Technological innovation is enhancing the educational process, offering opportunities for personalized learning and the dynamic adjustment of content (Selwyn, 2021). However, moving away from structured reading practices may impact the development of critical thinking and coherent understanding, particularly in a context where access to information is fragmented and not always scientifically validated (Carr, 2011).

Digital transformation is shaping an educational environment in which interaction with text is radically altered, underscoring the need for ongoing evaluation of its impact on educational processes. In European educational policy, a key concern remains the integration of technology in ways that do not degrade structured knowledge but rather complement it, reinforcing students' skills through a combination of traditional and modern teaching methods (Dimitrov, 2020).

The integration of digital technologies into education has brought significant changes in knowledge management and teaching practices. Personalized learning, the enhancement of experiential approaches, and multisensory teaching have introduced new possibilities for shaping educational experiences (Selwyn, 2019). The adaptation of educational tools to global educational developments has influenced students' relationship with the schoolbook, which is no longer the sole source of knowledge (Mayer, 2020). The growing use of digital media introduces new conditions regarding the form and function of the book, raising questions about how print materials interact with modern technological applications (Buckingham, 2007).

The changes arising from the transition to digital environments raise issues related to reading behavior and information processing. The dominance of fragmented forms of knowledge, as encountered in digital contexts, has been associated with reduced focused reading and limited development of critical thinking (Urquhart & Weir, 1998; Carr, 2011). The way students

engage with texts in environments that incorporate multiple media (text, image, sound, video, etc.) differs significantly from traditional reading practices, leading to discussions about the consequences of digitization on comprehension and structured thinking (Friesen, 2017). Investigating the cognitive mechanisms activated during the processing of information across different media contributes to understanding the transformations occurring in the learning process (Kress, 2003).

Academic writing teams are actively involved in designing new educational tools that combine the linear narration of knowledge with the possibilities offered by interactive environments. Challenges related to maintaining content coherence, adapting material to different cognitive demands, and preserving the pedagogical value of the book remain central to educational design (Buckingham, 2007). Reassessing how technology is integrated into the classroom has raised questions about striking a balance between structured knowledge and interactive learning (Lankshear & Knobel, 2006).

Developments in the European educational sphere influence strategies concerning the integration of digital technologies in teaching. The adaptation of schoolbooks to new conditions has sparked debates about the significance of both print and digital media in the educational process (European Commission, n.d.). The way education systems conceptualize the relationship between technology and knowledge shapes trends in learning environment design (Selwyn, 2021). As technology continues to reshape educational practices, the evolution of educational policy brings forth varying approaches regarding the role of the schoolbook in the digital age, highlighting the need for a more flexible and continuously evolving role within the educational process.

2.0 THE BOOK AS AN EDUCATIONAL TOOL - HISTORICAL DEVELOPMENT, ROLE, AND CONTEMPORARY SCHOOL TEXTBOOK AUTHORSHIP

The book is a central component of the European educational tradition, linking the dissemination of knowledge to the establishment of institutionalized forms of learning. The development of printing in the 15th century was not merely a technological innovation but a mechanism for the democratization of knowledge, broadening access to educational, scientific, and religious texts. The capacity for mass production of books promoted the spread of formal education, contributing to the creation of systematic teaching approaches and shared cognitive standards (Baron, 2015).

The printed format of the book enabled the unification of educational practices within European nation-states, serving as a means of constructing collective representations and institutional stability. Educational textbooks incorporated not only the dominant scientific and pedagogical views of each era but also the ideological and cultural objectives of state mechanisms, thus positioning education as a field of both knowledge and social formation (Mangen & Kuiken, 2014). The historical trajectory of the book reveals its dynamic function as a vehicle for transmitting knowledge and values, acting as both a stabilizing and transformative factor in educational practices (Singer & Alexander, 2017).

The recent introduction of artificial intelligence (AI) and augmented reality (AR) technologies is reshaping the relationship between books and learning, offering new methods for receiving and managing educational content. Digital applications facilitate the personalization of

instruction, enhance multisensory experiences, and make the learning process more interactive and adaptable to each student's needs. However, increased reliance on digital sources may impact linear reading and the development of critical thinking, as students are exposed to vast amounts of information that often lack coherent structure (Schneider et al., 2018).

The evolution of educational processes is not limited to the shift from print to digital formats but also concerns the quest for balance between different forms of knowledge and learning. Maintaining the book as a fundamental learning medium is crucial, as printed material fosters concentration and analytical thinking, offering a stable and often more organized representation of knowledge. As a learning medium, the book remains tied to the historical continuity of knowledge, preserving the capacity for in-depth and long-term engagement with content, elements often neglected in digital environments (Wolf, 2018).

Nonetheless, despite the value of the book, integrating new technologies such as AI and AR require acknowledgment of the advantages offered by multidimensional and personalized learning. Striking a balance between traditional and modern media can enhance the learning experience without negating the value of classical learning methods (Van den Akker et al., 2004).

Europe is currently undergoing a crucial re-evaluation of the processes involved in the production and design of school textbooks. Modern educational policies of the European Union emphasize the creation of textbooks that combine the stability of printed knowledge with the flexibility of new technologies. This synthesis aims to enhance students' ability to manage information and develop critical awareness, preparing them for the demands of a digitally evolving society.

The position of the book as a foundational educational tool in Europe has been shaped by its long historical trajectory. From the Renaissance to the Enlightenment, the use of books in the classroom marked a transition from oral and memorization-based teaching to the written documentation and systematization of knowledge. Through the standardization of instruction via books, students acquired a stable reference point around which school education and academic assessment were organized. Current educational approaches promoted by the EU seek to combine the best features of both traditional and contemporary tools, enriching learning experiences within the modern digital environment (Eurydice, 2019).

Over the centuries, the role of the schoolbook has evolved into a key component of educational policy. Particularly in Europe, from the 19th century onward, the creation of textbooks gained critical importance, directly linked to educational reforms and broader political developments. European countries, through organized committees and writing teams, assumed responsibility for producing textbooks that would meet students' educational needs while also reinforcing social and national cohesion. The function of schoolbooks extended beyond the transmission of knowledge to the construction of national narratives and identities that shaped social structures and political stability (Hobsbawm, 1992).

The writing and inclusion of school textbooks became a valuable tool for restructuring educational systems in Europe, aiming to create a unified and organized educational environment. Textbooks supported not only educational reforms but also the dissemination of

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national discourse and the promotion of ideologies that strengthened a sense of shared national interest (Anderson, 1991).

By establishing specialized committees responsible for textbook production, European countries sought to unify teaching and educational practices, aiming to foster shared values and a collective national consciousness. The goal of educational strategy was to reinforce homogeneity in the education system, creating a tradition that would integrate the essential elements of shared European history and cultural achievements, making them fundamental to the education of future generations (Smith, 1991).

The scientific validation of the educational process played a pivotal role in the formation of the writing teams responsible for textbook writing. These teams included educators, subject experts, and psychologists, ensuring that the books would meet criteria of usability, comprehensibility, and pedagogical appropriateness. Especially from the mid-20th century onwards, textbook writing became closely aligned with developments in pedagogical and psychological theories, which also shaped the content. The emergence of cognitive psychology and constructivist theories, as developed by Piaget and Vygotsky, emphasizing students' active engagement in learning, greatly influenced the design of schoolbooks. The shift focused on cultivating critical thinking, autonomy, and independent understanding, moving beyond mere transmission of information. Authors shaped textbook content to include activities that promote student participation and support the development of critical thinking (Piaget, 1952; Vygotsky, 1980).

Collaboration among scientists from diverse fields during the textbook writing process ensured that the books would be pedagogically sound and responsive to contemporary social needs. The integration of pedagogical and psychological theories with the needs of students ensured that textbooks moved beyond the simple conveyance of knowledge, promoting instead critical thinking and reflection (Dewey, 1938). The interdisciplinary approach to textbook authorship fostered an educational process in which students take an active role in constructing their knowledge.

Modern European schoolbooks must meet criteria of usability, comprehensibility, and pedagogical effectiveness to meaningfully support the learning process. As education evolves and learning needs diversify, it becomes essential for textbook content to reflect students' cognitive abilities and developmental needs. Studies have shown that textbooks designed according to learners' cognitive profiles significantly enhance the learning process and improve student performance (Van den Akker et al., 2006). The use of clear and simple language is essential for students' comprehension of content, while visual representations (such as images, diagrams, tables, etc.) function as supportive tools, offering a multidimensional depiction of learning and facilitating the understanding of complex concepts (Mayer, 2005).

The necessary adaptation of content to students' age and developmental levels transforms schoolbooks into tools not merely for knowledge transmission but also for fostering cognitive and emotional development. Composing content requires combining scientific and pedagogical approaches to produce books that support learning through both knowledge acquisition and the cultivation of critical thinking and creativity. The effectiveness of school textbooks is directly linked to interdisciplinary collaboration that incorporates theories from psychology, cognitive

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science, and pedagogy to ensure a learning experience that is comprehensible, engaging, and effective for students (Brusilovsky & Millán, 2007).

The ongoing evolution of pedagogical and cognitive theories makes textbook composition a dynamic and continually developing practice. Authors and editors must respond to modern educational needs and technological advances. For instance, digital technologies and the possibility for interactive learning offer new opportunities to restructure textbook content, allowing for the creation of learning tools that incorporate multimedia and interactive applications tailored to contemporary student needs (Sirkemaa & Varpelaide, 2018).

With the entry of the 21st century and the diffusion of new technologies into the educational process, the traditional dominance of the printed book began to be challenged. In this context, digital technology has introduced both new challenges and opportunities regarding the ways knowledge is transmitted and acquired. In modern education, the schoolbook no longer serves as the sole learning tool but is integrated into a broader and multidimensional context, coexisting with digital resources, interactive applications, and AI systems that are gaining increasing significance in educational practices (Selwyn, 2021).

Confronting this new reality requires European countries to reconsider the role and form of schoolbooks to ensure they remain useful and functional in today's educational environment. Modern textbook authorship is influenced by the need to adapt to personalized learning while maintaining the capacity to foster critical thinking and deep understanding. A new educational framework has emerged, where the integration of Artificial Intelligence (AI) and digital technologies is not perceived as a threat to traditional learning, but rather as an opportunity to enhance the learning process through interactivity, personalization, and engagement (Bates, 2019).

The challenge for modern educational practices lies in achieving a balance between the stability offered by the printed format of schoolbooks and the flexibility provided by digital media. Writing teams are called upon to develop books that combine the advantages of both formats, creating tools that harness the potential of the digital age without sacrificing fundamental pedagogical values. This new approach is becoming increasingly imperative as technological advancements continue to reshape learning conditions and the relationship between students and knowledge (Siemens, 2005).

3.0 THE IMPACT OF ARTIFICIAL INTELLIGENCE AND AUGMENTED REALITY ON THE ROLE OF THE SCHOOLBOOK

The analysis of the evolution of the schoolbook as a central teaching tool highlights its enduring significance within the contemporary European educational framework. Since the invention of printing and the emergence of mass book production, the schoolbook has played a decisive role in the dissemination of knowledge, the development of educational practices, and the reinforcement of national identity, serving as a foundational pillar of educational and cultural cohesion in Europe. Its cultural and social value has been invaluable, as the book contributed to the spread of ideas and the preservation of culture and history (Chartier, 1993).

However, the integration of artificial intelligence (AI) and augmented reality (AR) technologies into the educational process marks a new era for the schoolbook. These

technological developments constitute a turning point, reshaping the nature of learning and students' perceptual capacities. The digital transformation of education influences the role of the book, which is no longer the exclusive medium of knowledge transmission but is now part of a multidimensional learning environment that includes interactive and digital platforms. Adapting educational books to this new digital reality has become imperative, as this transition carries significant implications for reading behavior and learning processes (Leu et al., 2013).

This evolving educational landscape underscores the role of scientific writing teams, who are tasked with adapting traditional pedagogical principles to the demands of the digital age. Writing modern schoolbooks requires the ability to combine linear, coherent narrative with the flexibility and interactivity offered by contemporary digital technologies. The new form of the book must incorporate features such as personalization, interactivity, and real-time feedback for students, to foster active engagement and the development of critical thinking. It is essential to acknowledge the limitations of these technologies, such as the need to strengthen pedagogical guidance and avoid excessive dependency on technology, to ensure their effective integration into the learning process (Collins & Halverson, 2009).

Writing educational books in the new digital era requires a deep understanding of the possibilities and limitations that the transition to technological educational practice entails. Scientific writing teams, in the midst of this transitional period, assume the pivotal role of designing books that incorporate new technologies without weakening core educational values and the ability to develop a sustainable learning environment.

Entering the digital era offers significant opportunities for education, such as the personalization of learning, enhanced student engagement, and the development of a multisensory approach to the learning process. However, this transition also presents challenges that may undermine educational goals. Fragmented attention, superficial understanding of concepts, and technological dependency may weaken students' ability to develop critical thinking and autonomy (Carr, 2011). Additionally, the constant use of digital media may diminish learning engagement and depth of processing, making the educational experience more superficial.

A dynamic environment is emerging, in which digital transformation necessitates continuous and targeted redefinition of educational practice, aiming to harness technological capabilities without jeopardizing the pedagogical value of traditional tools like the schoolbook. Educational design must integrate modern technologies with the core principles of pedagogical science. The key challenge for authorial teams is to incorporate new technologies while preserving learning quality and maintaining the role of the book as a tool that enhances the learning process, not merely as a supplementary source of information (Sirkemaa & Varpelaide, 2018).

To meet the needs of the present era, writing teams must combine the use of digital and traditional media, while promoting deep understanding and students' critical thinking. Addressing contemporary educational needs entails the development of strategies that integrate digital technologies while retaining the schoolbook as a tool for fostering thought, critical reasoning, and commitment to learning (Bowers, 2014).

Managing the digital transition in education requires critical thinking and strategic planning to ensure that new technologies function complementarily and supportively, rather than

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undermining traditional pedagogical values. Only in this way can European education effectively respond to the challenges of the 21st century, maintaining the value of the schoolbook as a core component of the educational process.

4.0 AUTHORING AND COMPILING SCHOOL TEXTBOOKS IN THE AGE OF TECHNOLOGICAL REVOLUTION

The process of writing modern textbooks is undergoing a complete overhaul, as artificial intelligence (AI) and augmented reality (AR) technologies are causing decisive changes in educational practice. Historically, the schoolbook served as the primary medium for transmitting knowledge, shaping educational practices and solidifying the cultural cohesion and national identity of European societies (McLuhan, 1962). The introduction of digital technologies, however, marks a radical shift, introducing new dynamics into educational processes and reshaping the effectiveness of the book as a learning tool (Brynjolfsson & McAfee, 2014).

The digital transformation of education has led to a substantial rethinking of how educational books are written. The contemporary need for personalized learning, combined with the possibilities offered by technologies such as interactive environments and AI, demands a new kind of textbook, one that integrates and highlights technological capabilities without undermining its pedagogical value. Nevertheless, AI and digital technologies raise concerns, such as the potential weakening of students' critical thinking and autonomy (Luckin, Holmes, Griffiths, & Forcier, 2016).

At the same time, recognizing new technologies as dynamic partners in the learning process can foster the development of interactive learning experiences that, when used appropriately, enhance student engagement. However, strong instructional design remains imperative to ensure that technology is integrated in ways that do not diminish the value of traditional tools, such as the schoolbook. Science writing teams are called upon to combine traditional pedagogical approaches with the potential of modern technologies (Holmes, Bialik, & Fadel, 2019).

The evolving nature of education and the increased presence of technology do not negate the importance of the schoolbook as a core learning tool. Rather, they highlight the need for continuous revisions and adjustments to pedagogical models. The digital transition must result in a balanced combination of traditional methods and innovative technological tools that ensure the effective transmission of knowledge without abandoning foundational pedagogical principles (UNESCO, 2019).

Our present era is defined by an urgent need to restructure the process of textbook authorship, as technological advancements and emerging learning needs present new challenges for writing teams. The traditional approach of unidirectional knowledge transmission, which dominated for centuries, is giving way to a multidimensional and interactive learning model. Under these evolving conditions, authors must reevaluate the pedagogical principles that guide textbook creation, incorporating new technologies in ways that preserve learning value without neglecting educational foundations (Seldon & Adiboye, 2018).

The challenge extends beyond merely integrating new technologies; it also encompasses redesigning the structure of textbooks to include interactivity and adaptability. In fact, the transition from traditional to digital learning practices requires not only technological competence but also a new conceptualization of education, one that emphasizes dynamic interactions among students, materials, and technology. Scientific teams must not only adapt content but also redefine the relationships between the components of the educational process, ensuring that technologies do not erode students' critical thinking or autonomy (Luckin et al., 2016).

Successfully addressing these challenges requires a deep understanding of both the potential and the limitations of digital technology. Designing schoolbooks for the digital age must leverage the benefits of personalized learning and interactivity, while maintaining pedagogical coherence and educational effectiveness. The objective is not simply technological integration, but the creation of a learning environment that meets the needs of 21st-century learners, without diminishing the value of traditional educational tools such as schoolbooks (Holmes, Bialik, & Fadel, 2019).

This process also introduces new challenges, particularly in maintaining critical thinking and autonomous learning within digital environments. The integration of technologies offering personalized learning environments may lead to overdependence on technological solutions if not properly balanced with traditional pedagogical principles. Effective use of these tools requires strong instructional design that ensures technology supports the development of critical thinking and autonomous learning (UNESCO, 2019).

The transition to digital reality undoubtedly offers significant benefits for education, including the personalization of learning, the enhancement of active student participation, and the facilitation of multisensory learning. New technologies provide a variety of tools that enable students to actively engage, interact with content, and develop personal learning strategies. However, unregulated use can result in reduced concentration and superficial engagement with knowledge (Carr, 2011). Fragmented attention and information overload are among the most significant challenges of digital learning, negatively affecting students' ability to deepen their knowledge and develop critical thinking (Gazzaley & Rosen, 2016).

There is an urgent need for critical evaluation and careful management of the digital transition. Instructional design should not be limited to the integration of technologies to improve teaching but must ensure that new learning methods are grounded in the core principles of educational science. This requires collaboration among scientific writing teams that must balance the technological and pedagogical dimensions of education, preserving the educational value of the traditional schoolbook (Siemens, 2005). The digitization of education does not necessarily entail replacing the book but opens the possibility of combining traditional tools with new technologies to strengthen the educational process without compromising fundamental pedagogical values (Mishra & Koehler, 2006).

In the modern European educational landscape, the implementation of such approaches is particularly crucial. The emphasis on critical thinking, the cultivation of autonomous learning, and the continuous renewal of the schoolbook's educational value are highlighted as key priorities of current educational policy (OECD, 2018). Only through a comprehensive and critical approach can the European education system effectively respond to the challenges of

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the digital era, ensuring that the schoolbook is not sidelined by an unrestrained digital reality, but instead is reinforced by it (Bowers, 2014).

5.0 THE IMPACT OF AI AND AR TECHNOLOGIES ON STUDENTS' PERCEPTUAL AND LEARNING CAPABILITIES

The study of the schoolbook's evolution as an educational tool reveals its enduring and significant value within the modern European educational system. The book has long served as the primary medium of knowledge, substantially shaping educational processes while reinforcing the cultural and national cohesion of European societies (McLuhan, 1962). Through the dissemination of ideas, the book played a key role in shaping education, which adapted to the social and cultural needs of each era. Even with the advent of new technologies in education, the book maintained its role as a central learning tool, demonstrating its capacity to adapt to new conditions (Pacey, 1985).

The arrival of artificial intelligence and digital technologies such as augmented reality (AR) brings a revolution to education, offering new opportunities for personalized learning and enhanced interactivity (Selwyn, 2021). However, the transition into this new digital realm entails a fundamental redefinition of the role of the schoolbook. While digital transformation opens pathways for new forms of learning, it simultaneously raises concerns regarding its impact on pedagogical approaches and learning processes. The constant technological evolution requires scientific writing teams to revisit and restructure traditional textbook formats, aligning them with the demands of the digital age without departing from core pedagogical values (Laurillard, 2012).

The composition of new schoolbooks must strike a balance between the coherence and progression of traditional narratives and the flexibility and interactivity made possible by digital technologies. There is now a pressing need for authoring strategies that incorporate user interaction and allow for content updates aimed at promoting critical thinking and collaborative learning (Garrison & Kanuka, 2004). Writing teams must re-examine how information is structured and presented to ensure learning effectiveness and prevent the erosion of educational objectives due to technological pressures. The capacity of a new generation of schoolbooks to integrate digital features without sacrificing structural integrity and content coherence is essential to their educational value (Siemens, 2005).

Digital tools provide new avenues for personalized learning, supporting active student engagement and the integration of multisensory learning methods (Mayer, 2005). However, excessive dependence on technology may lead to superficial knowledge processing and limited capacity for deep comprehension. The challenge lies in finding a balance between technological advancement and the need for deeper, more critical thinking. Avoiding the pitfalls of fragmented attention and surface learning requires continuous reflection on pedagogical methods and the careful integration of technology (Kukulska-Hulme & Shield, 2008).

Maintaining the schoolbook as a cornerstone of education remains essential, as it continues to offer a stable learning framework that upholds quality and preserves core educational values. Writing teams, working collaboratively with educators and advanced technology experts, can develop textbooks that serve the needs of the digital age by combining traditional content with

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the interactive learning opportunities that technology fosters (Mishra & Koehler, 2006). Successful management of this balance is key to sustaining the quality and reliability of education in the digital era.

6.0 CONCLUSIONS

The trajectory of the book as a fundamental educational tool spans the history of the European education system. Since the invention of the printing press, the schoolbook has served as the primary medium for disseminating knowledge, profoundly shaping the educational process and contributing to the formation of national and cultural identities. The book has functioned not only as a vehicle for transmitting scientific knowledge but also as a tool for shaping and regulating ideological thought, laying the groundwork for the social and cultural cohesion of European peoples (Eisenstein, 1983). However, the introduction of new technologies in education, especially artificial intelligence and augmented reality, marks a pivotal transitional period. The digital transformation introduces new challenges and calls for a reconsideration of the structure and content of schoolbooks, highlighting the need to redefine the book's role in light of digital developments (Cuban, 2001). Scientific writing teams are now tasked with balancing traditional pedagogical values and the possibilities offered by new technologies to ensure the quality of learning (Selwyn, 2021).

The digital transformation occurring in education, driven by AI and AR, represents a significant turning point in how knowledge is transmitted and understood, generating deep reflection. In the era of the digital revolution, the printed book is losing its uncontested status as an authoritative educational medium, ceding part of its pedagogical power to digital platforms and AI-driven learning tools (Selwyn, 2021). Nevertheless, this transitional process should not proceed under the logic of complete replacement. Instead, the convergence of the printed book and digital technologies calls for strategic planning to harness the strengths of the digital world without compromising the educational value of the book. The printed book enables deeper, linear reading that fosters analytical thinking and sustained attention, two essential factors for developing critical thought and conceptual understanding (Carr, 2011).

Focused attention, critical thinking, and deep conceptual understanding are cognitive benefits that the printed book demonstrably provides, supported by extensive research. The organized and coherent structure of written language, as expressed through linear narrative, offers unique opportunities for grasping and internalizing complex ideas, thereby reinforcing cognitive coherence. In contrast, digital multimedia, although rich in information, often leads to fragmentation of both content and thought, negatively impacting concentration and the capacity for analytical processing (Mangen, Walgermo & Brønnick, 2013).

A crucial factor in the ongoing digital transition is the role of authorship and pedagogical committees in Europe, which, as essential institutions for ensuring educational quality, are now confronted with new tasks and responsibilities. While traditionally responsible for safeguarding the scientific accuracy and pedagogical soundness of textbooks, these committees must now reflect on and adapt their roles. In the digital age, their responsibilities extend beyond preserving the stability and reliability of traditional educational materials. They must also act as designers and architects of modern, dynamic learning environments in which traditional and digital learning sources are interactively fused and tailored to students' needs, creating a rich and functional learning ecosystem.

However, the emerging digital landscape poses significant risks, primarily due to the unregulated and excessive use of technology, which may lead to information overload and superficial comprehension. Constant exposure to unfiltered content without opportunities for deep engagement can destabilize the learning process and limit the development of critical thinking. As a result, there is a pressing need to establish strict criteria and frameworks for evaluating digital knowledge to ensure that learning remains coherent and of high quality, safeguarding the pedagogical and cognitive values cultivated by print-based education over centuries.

The transition to the digital age should not be viewed as a threat to the book, but rather as an opportunity to redefine the educational process, where the book continues to hold a central role, blending traditional values with new possibilities. The real challenge, therefore, lies not in choosing between printed and digital books, but in recognizing the collaborative and synergistic potential that arises from combining these two media.

This combination is not a mere compromise, but a deliberate strategic synthesis that highlights the unique strengths and advantages of each format. The printed book, with its capacity for depth, focus, and linear thinking, remains a foundational tool for cultivating critical reasoning and deep understanding. On the other hand, digital technology, with its ability to support interactive and adaptive learning environments, offers unprecedented flexibility for personalized learning and immediate access to a wide array of resources.

A meaningful learning experience does not emerge from simply comparing or alternating between media, but from the way in which they complement and reinforce the learning process. This integrated approach enhances the learner's ability to critically engage with content and process information in a meaningful and sustainable way.

A conscious evaluation of the risks and benefits of each medium requires a pedagogical approach that not only integrates the capabilities of digital and printed books but also leverages them in pursuit of sustainable and high-quality learning outcomes.

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