

A Historical Review of Educational Technology: Evolving Definitions and Milestones (1970–2024)

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ABSTRACT

This study provides a comprehensive historical analysis of educational technology from 1970 to 2024, highlighting significant transformations driven by technological advancements and evolving pedagogical paradigms. In the present study, the systematic literature review focuses on the evolution of definitions of educational technology and the identification of milestones. The study offers insights for educators, researchers, and policymakers in shaping future educational technology practices. It evolved over the years to encompass technology, media, communication, and learning systems, as well as systems approaches to instruction. Some of the major developments include the use of audio-visual aids in the 1970s, the use of personal computers in the 1980s, the use of internet and Learning Management Systems in the 1990s and the use of virtual reality, augmented reality and artificial intelligence in the 21st century. These developments show the advancement in educational technology and the impact it can have on the learning process.

Keywords: *Educational Technology, Definitions, Developments Evolution, Virtual Reality, Artificial Intelligence*



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INTRODUCTION

The area of educational technology has undergone major changes from 1970 to 2024 due to the development of technologies and changes in paradigms. The very term 'educational technology' has been defined many a time to accommodate the changes in educational practices, learning theories, and the use of new technologies. However, over the decades, this definition broadened to include more holistic approaches that incorporate technology, media, and other forms of learning environments and instructional systems that seek to improve the learning process (Garrison & Vaughan, 2008).

The advancement of educational technology has solved many issues and created opportunities in the educational environment. While in the 1970s the approach was to integrate media into the teaching process as an addition to the traditional methods, in the 1990s with the appearance of the internet and personal computers, the emphasis was made on the creation of an interactive and student-centered environment (Reiser & Dempsey, 2017). Modern educational technology includes such tools and approaches as learning management systems, virtual reality, and artificial intelligence to support individualized and effective learning processes (Selwyn, 2020). This historical analysis shows how definitions and advancements in

educational technology have evolved to meet the needs of educators and learners and how they have improved the educational experience over time (Abbas et al., 2021).

The history and evolution of educational technology are as follows: every advancement in technology has led to new definitions and uses of technology in education. The early educational technologies were mainly concerned with media and audiovisual teaching aids, but with the advent of digital tools and learning environments, the concept of educational technology expanded considerably. This is a continuous process that shows a cycle of evolution where the new technologies require new definitions and frameworks to capture the new roles of technology in education (An, & Oliver, 2021; Li, 2023). However, this continuous evolution presents several challenges. One major issue is the need for ongoing professional development for educators to stay abreast of new tools and methodologies. Teachers and administrators must continuously update their skills to effectively integrate these technologies into their teaching practices (Koehler & Mishra, 2009). Moreover, the rapid pace of technological change makes it difficult to ensure the sustainability and scalability of educational technology initiatives, necessitating careful planning and resource allocation to maximize their impact (Hartley et al., 2010). To provide fruitful results this study will follow these questions:

1. How have the definitions of educational technology changed over time?
2. What are the key milestones of educational technology during the development evolution?

The definitions of educational technology have evolved significantly from 1970 to 2024, reflecting advancements in technology and shifts in educational paradigms. In the 1970s, educational technology was often defined narrowly as the use of media produced by the communication revolution, including tools such as television, films, overhead projectors, and early computers. This era emphasized the integration of these media into traditional teaching environments alongside teachers and textbooks. For example, the 1970 definition by the Commission on Instructional Technology highlighted two main approaches: one focused on the media themselves and the other on the systematic design and evaluation of learning processes using these media (Commission on Instructional Technology, 1970).

By the 1990s and early 2000s, the definitions began to incorporate more sophisticated understandings of the role of technology in education. The 1994 definition by Seels and Richey expanded the scope to include the theory and practice of design, development, utilization, management, and evaluation of processes and resources for learning. This reflected a shift towards viewing educational technology not just as tools but as a field encompassing a broad range of activities aimed at improving learning outcomes. By 2004, the Association for Educational Communications and Technology (AECT) further refined the definition to include the ethical practice of facilitating learning and improving performance through the creation, use, and management of technological processes and resources. This definition underscored the importance of ethical considerations and the broader impact of technology on educational practices (AECT, 2004).

Despite the advancements, significant challenges have persisted. The need for continuous professional development for educators to keep pace with rapid technological changes is a major issue. Educators require ongoing training to effectively integrate new technologies into their teaching. Furthermore, the digital divide remains a critical challenge, as unequal access to technology exacerbates existing educational inequalities. Ensuring the sustainability and scalability of educational technology initiatives also requires careful planning and resource allocation. Addressing these challenges is essential for maximizing the potential benefits of educational technology in enhancing learning outcomes (Reiser & Dempsey, 2017; Koehler & Mishra, 2009; Selwyn, 2020; Hartley et al., 2010).

The evolution of educational technology is marked by several key milestones that have significantly transformed the landscape of teaching and learning. One of the earliest milestones was the introduction of audiovisual aids such as films, slides, and overhead projectors in the mid-20th century. These tools were revolutionary at the time, providing new ways to present information and engage students visually. The subsequent advent of personal computers in the late 20th century represented a major leap forward (Jaakkola, 2024). Computers facilitated the development of educational software and interactive learning programs, enabling more personalized and self-paced learning experiences. The proliferation of the internet in the 1990s further revolutionized educational technology by providing unprecedented access to information and resources, paving the way for the emergence of online learning platforms and distance education programs (Akhmetshin, 2019; Molenda, 2022).

In the 21st century, the evolution of educational technology continued with the introduction of Learning Management Systems (LMS), which facilitated the organization, delivery, and tracking of educational content. Technologies such as interactive whiteboards, tablets, and mobile devices have become commonplace in classrooms, further enhancing interactive and engaging learning experiences. More recently, advancements in virtual reality (VR), augmented reality (AR), and artificial intelligence (AI) have opened up new possibilities for immersive and adaptive learning environments. These technologies enable students to experience simulations and scenarios that were previously impossible, thus enhancing understanding and retention. Online learning platforms, such as MOOCs (Massive Open Online Courses), have democratized education by providing access to high-quality courses from top institutions to learners worldwide, making education more accessible and flexible than ever before (Calinger & Howard, 2008; Kloos et al., 2019).

METHODS

The method employed in this scientific article research is a literature review. A literature review is a well-defined, transparent, and replicable process of identifying, assessing, and integrating research articles and ideas generated by scholars and practitioners. The use of a literature review is to review the existing literature on the topic of interest and to determine the research gaps that need to be filled. This method entails a sequence of activities, which include the library data collection, reading, writing, and management of writing materials. The research stages are as follows: First, search for articles on the historical definitions and developments of educational technology from databases like Google Scholar and Scopus.

The collected literature is then read, analysed, and synthesized to get detailed information concerning the research questions. This approach guarantees the understanding of the historical development of educational technology and emphasizes the major events in the process, with the focus on the definitions of educational technology from 1970 to 2024 (Booth et al., 2016).

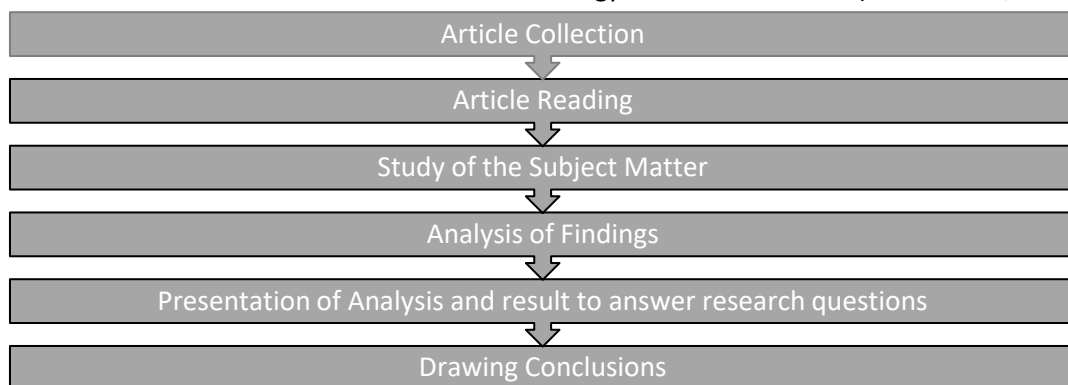


Figure 1. Research stages

Table 1. The Themes Determined for the Educational Technology Definitions and Milestone Development during the Evolution

Year	Contributor(s)	Definitions	Scope	Milestone Development
1970	Commission on Instructional Technology	Instructional technology refers to media produced as a result of the communication revolution that can be utilized in classrooms alongside teachers, textbooks, and blackboards. It is also a systematic way of designing, carrying out, and evaluating the total process of learning and teaching.	Media and instructional aids	Introduction of audiovisual aids such as films, slides, and overhead projectors. The focus was on integrating these media into traditional teaching environments.
1983	Ely, D.P.	Educational technology is defined as the development, application, and evaluation of systems, techniques, and aids to improve the process of human learning.	Systems, techniques, and aids for learning	Expansion of systematic planning, design, and evaluation of instructional processes. Increased use of computers for educational purposes.
1994	Seels, B., & Richey, R. C.	Instructional technology is the theory and practice of design, development, utilization, management, and evaluation of processes and resources for learning.	Theory and practice of instructional design	Rise of digital tools and online resources. Introduction of Learning Management Systems (LMS) and the use of the internet for educational purposes.
2004	AECT	Educational technology is defined as the development, application, and evaluation of systems, techniques, and aids to improve the process of human learning.	Ethical practice, technological processes and resources	Widespread use of interactive whiteboards, educational software, and the growth of e-learning platforms. Emphasis on ethical considerations and broad impacts on educational practices.
2017	Reiser, R. A., & Dempsey, J. V.	Educational technology is the study and ethical practice of facilitating learning and improving performance by creating, using, and managing appropriate technological processes and resources.	Digital tools, interactive learning, systemic instructional design	Incorporation of mobile learning, virtual and augmented reality, and artificial intelligence in education. Development of personalized and adaptive learning environments.
2019	Huang, R., Spector, J., & Yang, J.	Educational technology refers to the use of tools, technologies, processes, procedures, resources, and strategies to improve learning experiences in a variety of settings, such as formal learning, informal learning, non-formal learning, lifelong learning, learning on	Human-centered approaches, immersive and adaptive learning, diverse learning settings	Enhanced use of VR, AR, and AI to facilitate personalized and interactive learning experiences. Increased focus on immersive learning environments and AI-driven personalized learning.

Year	Contributor(s)	Definitions	Scope	Milestone Development
		demand, workplace learning, and just-in-time learning.		
2024	Huang, R., Spector, J. M., & Yang, J.	Educational technology (EdTech) encompasses tools, technologies, and resources aimed at improving learning experiences. This includes hardware (computers, tablets, webcams) and software (simulations, LMS, AR, VR).	Enables teachers to digitalize planning and enrich lessons, while allowing students to access content anytime and collaborate with peers.	Digitalizing curriculum planning, enriching lessons, encouraging engagement, facilitating teacher-student interaction, analyzing performance data and emergence of AR and VR for immersive learning, AI for personalized education, and analytics for data-driven insights.

RESULTS AND DISCUSSION

Results

The definitions of educational technology have changed over the years from 1970 to 2024 due to changes in technology and learning. First, in 1970, educational technology was characterized by the use of media and audiovisual means, and the systematic approach to the learning process design and evaluation. By 1983, the definition had broadened to encompass the design, implementation, and assessment of systems, methods, and tools for enhancing human learning. The definition was expanded again in 1994 to include the theory and practice of instructional design, which saw the emergence of technology and the use of online resources.

In 2004, the focus was on the ethical practice of supporting learning through technological procedures, due to the increased use of interactive whiteboards and e-learning. By 2017, the definition incorporated digital media, learning environments, and systemic instructional designs, which emphasized the use of mobile learning, virtual and augmented reality, and artificial intelligence. The definition provided by Huang, Spector, and Yang in 2019 defined educational technology as the use of technology in learning environments, including tools and techniques, with a focus on virtual reality and AI-based adaptive learning. The 2024 definition built upon the previous ones and added the aspects of digitalization, artificial intelligence, data analysis, and learning environments that are collaborative, interactive, and lifelong. There are several stages in the development of educational technology that can be considered as major steps in the use of technology in education. In the 1970s, the use of films and overhead projectors as teaching aids was a significant advancement in the use of new media technologies in classrooms. The systematic instructional processes were further developed in the 1980s with the incorporation of computers as the learning systems became more structured and evaluated.

The 1990s saw the rise of digital tools and the introduction of Learning Management Systems (LMS), which revolutionized the delivery and management of educational content online. The early 2000s were characterized by the widespread adoption of interactive whiteboards, educational software, and e-learning platforms, emphasizing ethical considerations in using technology for education. In 2019, the enhanced use of VR, AR, and AI facilitated more personalized and interactive learning, with a focus on creating diverse learning settings. The most recent developments in 2024 reflect a comprehensive integration of digital innovations, with AI and data analytics playing crucial roles in personalizing education and providing actionable insights for improving learning outcomes.

Discussion

The evolution of educational technology from the 1970s to 2024 demonstrates a dynamic and expansive growth in both definitions and applications. In the 1970s, educational technology was primarily defined by its use of media and audiovisual aids to enhance traditional classroom teaching (Commission on Instructional Technology, 1970). The scope at this time was relatively narrow, focusing on integrating basic media technologies into educational environments. By the 1980s, the definition had evolved to include systems and techniques designed to improve human learning, reflecting the increasing importance of systematic instructional design and the growing use of computers in education (Ely, 1983). This trend continued in the 1990s, where the emphasis shifted towards the theory and practice of instructional design, with the rise of digital tools and online resources such as Learning Management Systems (LMS) (Seels & Richey, 1994).

The early 2000s brought a broader understanding that included ethical practices and the management of technological processes, highlighting the widespread adoption of interactive whiteboards and e-learning platforms (AECT, 2004). By the late 2010s, definitions of educational technology had expanded to incorporate mobile learning, virtual and augmented reality, and artificial intelligence, emphasizing personalized and adaptive learning environments (Reiser & Dempsey, 2017). The most recent definitions, such as in 2024, reflect a comprehensive integration of digital innovations, AI, data analytics, and collaborative, interactive, and lifelong learning environments (GowherHassan, 2023).

The evolution of educational technology has been marked by several key milestones. In the 1970s, the introduction of audiovisual aids like films and overhead projectors marked the beginning of integrating new media technologies into classrooms (Li, 2023). This period focused on enhancing traditional teaching methods with new media technologies to improve instructional delivery. In the 1980s, the emphasis shifted towards the development and application of systems, techniques, and aids to improve the process of human learning, reflecting a more systematic approach to instructional design and the growing use of computers in education (Ely, 1983).

The 1990s marked a significant shift with the rise of digital tools and the introduction of Learning Management Systems (LMS), which revolutionized the delivery and management of educational content online (Alshammari, 2015). This period also saw the increased use of the internet for educational purposes, enabling a more interactive and accessible learning environment (Barranca, 2022). The early 2000s witnessed the widespread adoption of interactive whiteboards, educational software, and e-learning platforms, emphasizing the importance of ethical considerations in the use of technology for education (Reiser & Ely, 1997). By the late 2010s, mobile learning, virtual and augmented reality, and artificial intelligence were incorporated into educational settings, leading to the development of personalized and adaptive learning environments. These technologies allowed for more immersive and engaging learning experiences, tailored to the needs of individual learners (Lowyck, 2014)

CONCLUSION

The analysis of the educational technology from 1970 to 2024 shows that the various of definitions of technology and the development evolution of educational technology are intertwined. Originally, the field was concerned with the incorporation of audiovisual materials as an addition to traditional teaching methods, and has gradually evolved to include digital tools, interactive learning environments, and systematic instructional designs. Every decade had its achievements, from the personal computers and the internet in the 1990s to the present day use of virtual reality, artificial intelligence, and learning management systems. These developments have not only broadened the definitions and uses of educational technology but also revealed the persistent issues, including the professional learning and technology equity. In conclusion, the historical perspective shows that educational technology has always been in a

process of development, trying to respond to the needs of educators and learners, and to improve the quality and availability of education for people all over the world.

CONFLICT OF INTEREST

There is no conflict of interest regarding the publication of this article.

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