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Towards a new definition of e-learning and m-learning

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Abstract In the last decade, research on e-learning and m-learning has grown significantly, reflecting the increasing importance of these approaches in the field of education. However, a careful review of the literature reveals a lack of consensus on the precise definitions of these two approaches. Terms like 'Digital learning,' 'Distance learning,' and 'Online learning' are often used interchangeably to refer to e-learning, which can create some confusion and a lack of clarity in academic and practical discourse. This ambiguity not only complicates research efforts but also creates challenges for policymakers and educators who seek to apply these approaches effectively. Our study adopts an exploratory documentary methodology to develop a comprehensive and contemporary definition of e-learning and e-learning through a detailed analysis of existing literature. In this article, we clarify the key distinctions among the terms 'Digital learning,' 'Distance learning,' and 'Online learning'. Additionally, we propose an updated definition of e-learning that that goes beyond the simple transmission of knowledge through digital tools, the use of the internet for learning, or the integration of information and communication technologies (ICT) in education. Instead, our definition highlights an integrative approach that considers these three dimensions while prioritizing pedagogical interactions between teachers and students within a virtual environment. In parallel, we position m-learning as a more advanced concept than e-learning, characterized by its capacity to facilitate learning in diverse contexts, including offline scenarios. This article proposes contemporary definitions for e-learning and m-learning, offering a more nuanced and consistent view of these two concepts. These new definitions will contribute to better alignment in research, educational policies, and teaching practices, allowing for the full benefits of learning technologies to be realized.

Keywords: e-learning, m-learning, distance learning, online learning, digital learning

1. Introduction

The development of information and communication technologies (often referred to as ICT) has helped to enrich and support distance education, enabling faster and more efficient learning with minimal organizational challenges and time loss (Soualah-Alila, 2015). With this technological revolution, it has become necessary to change traditional learning methods to adapt to internet generation and to promote rapid, efficient learning while saving time and effort (Kouninef et al., 2014; Tayebinik & Puteh, 2012). This new mode of learning is known as e-learning.

The term e-learning was first introduced by Jay Cross in 1999 (Elisabeta and Alexandru, 2018), and its evolution has gone through four essential phases, according to UNESCO (2003):

- Phase 1: Correspondence systems

Distance education began in the 19th century at the University of London to meet the needs of British citizens living far away, who were unable to attend university in person (Moore et al., 2011; Amad et al., 2023). This type of education, known as correspondence education, flourished owing to the invention and popularization of postal services (Orivel & Orivel, 2006; Caruth & Caruth, 2013). The postal service allowed for regular interaction between students and teachers through the exchange of letters and printed materials. Students received their lessons, assignments, and reading materials by mail and returned their completed work in the same way, thereby creating an educational exchange despite the distance.

- Phase 2: Television and radio educational systems

The emergence of new technologies, such as television and radio, in the early 20th century opened the possibility of broadcasting live or recorded courses. These advancements allowed for a broader range and improved the quality of distance education offered by teachers at that time (Molenda, 2008; Anderson, 2021). However, a major drawback of these radio and television lectures was their inability to facilitate two-way communication (Wenger, 2023). Learners could receive information

passively, but they did not have the opportunity to interact directly with the teacher to ask questions or receive clarifications in real time.

- Phase 3: Multimedia systems

In the 1980s and 1990s, courses gradually integrated various multimedia resources, such as printed documents, audio recordings, videos, and computer tools. This computer-assisted teaching model was implemented to provide training both individually and in groups (UNESCO, 2003). Education is no longer simply the work of a single educator; it has become a collective effort involving teams of specialists. These teams include media experts for the creation and management of multimedia content, information professionals for the processing and organization of data, instructional specialists for the development of teaching methods, and pedagogy specialists for adapting learning approaches to meet students' needs.

- Phase 4: internet-based systems

In the 21st century, the integration of the internet into distance education profoundly transformed the field of education (Odunaike et al., 2012). It has enabled the dissemination of multimedia resources (texts, audio, videos) via computers, thereby revolutionizing distance learning methods. These systems have greatly facilitated interactions not only between individuals but also between a person and a group, as well as among different groups (Hafeez et al., 2014). These exchanges can occur synchronously, in real time, or asynchronously, offering increased flexibility and diversity in communication and learning.

The adoption of e-learning by teachers and institutions occurred in 2020, marked by a radical shift in educational systems worldwide due to the spread of the COVID-19 pandemic (Kabir, 2020; Hamdani, 2021). Given this situation, schools around the world have decided to suspend in-person classes and transition to distance education. In the same vein, research on e-learning significantly increased during this period, with over 13,950 articles published in 2022, as illustrated in Figure 1.

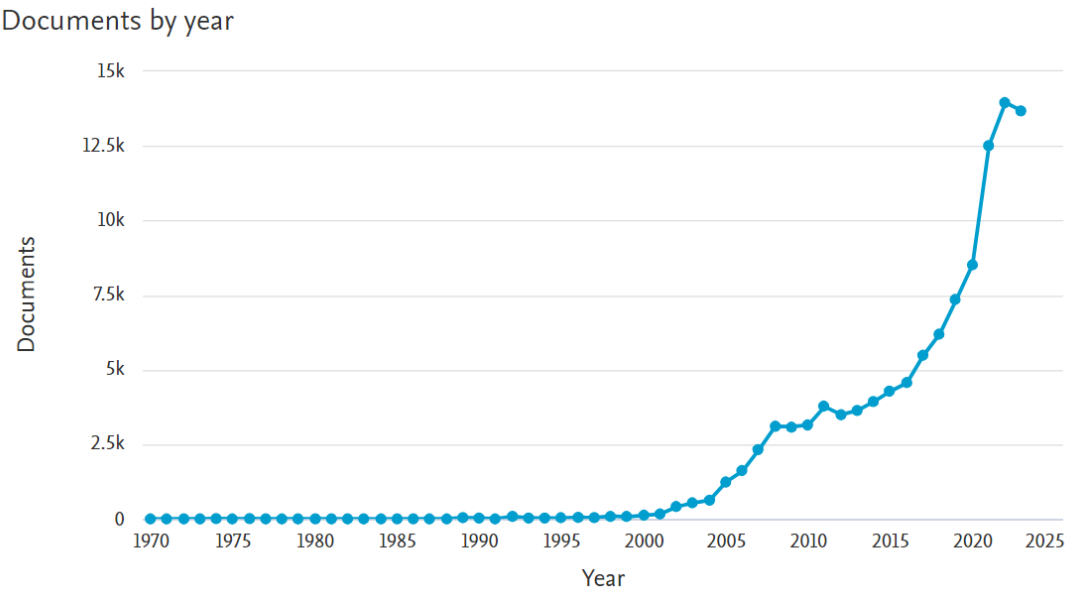

Figure 1 Articles Published on E-Learning from 1970-2023. *Source:* Scopus.

Since the beginning of the 21st century, research on e-learning and m-learning has experienced significant growth, increasing the popularity of these two teaching methods. However, the rapid evolution of technologies has profoundly altered their definitions (Sajeva, 2006). Thus, the way e-learning is understood today differs considerably from how it was perceived twenty years ago.

A thorough analysis of the literature reveals that there is no clear consensus on the precise definitions of the terms e-learning and m-learning, in such a way that each definition is based on the personal experience of the researcher and their own conceptions of the educational process.

In fact, the terms 'digital learning', 'distance learning', and 'online learning' are frequently used interchangeably to refer to e-learning, which can lead to confusion and a lack of clarity (Sangrà et al., 2012). This interchangeability makes it difficult to identify the specific characteristics of each concept and can complicate the adoption of pedagogical strategies tailored to each teaching context.

The objective of this article is to clarify these terms and propose a definition of e-learning and m-learning that is suitable for modern education. This leads us to formulate the following research objectives:

- Research objective 1: To demonstrate the difference between the terms 'digital learning', 'distance learning', and 'online learning'.
- Research objective 2: To propose a new definition of e-learning

- Research objective 3: To propose a new definition of m-learning

2. Materials and Methods

2.1. Research design

Our work is an exploratory documentary study that seeks to develop a new definition of e-learning and m-learning on the basis of a thorough analysis of the literature. We conducted a bibliographic search of the most recognized databases, such as Scopus and Web of Science, focusing on the most cited articles published since 2000 regarding e-learning and m-learning.

2.2. Sampling, analysis, and data collection

We conducted a bibliographic search that lasted 4 months (July 2024–October 2024) to collect a set of articles by applying specific inclusion and exclusion criteria.

2.2.1. Inclusion criteria

In our study, we selected all the articles written in English or French that focused on e-learning and m-learning, on the basis of the following criteria:

- Articles published after 2000.
- Articles from recognized and reliable scientific databases such as Scopus and Web of Science.
- Articles containing definitions of e-learning.
- Articles containing definitions of m-learning.
- Articles explaining the distinctions between the terms distance learning, online learning, and digital learning.

2.2.2. Exclusion criteria

The exclusion criteria include studies that are not relevant to our topic and articles that are not indexed.

3. Results and Discussion

3.1. The difference between the terms 'digital learning', 'distance learning', and 'online learning'

In the literature, terms such as distance learning, online learning, and digital learning are sometimes used interchangeably to describe e-learning. However, these terms can be clearly distinguished, although they sometimes present similarities (Gubbins et al., 2023; Culduz, 2024). Figure 2 presents a conceptual map illustrating the relationships among these terms. The key differences between these concepts are presented in the following sections.

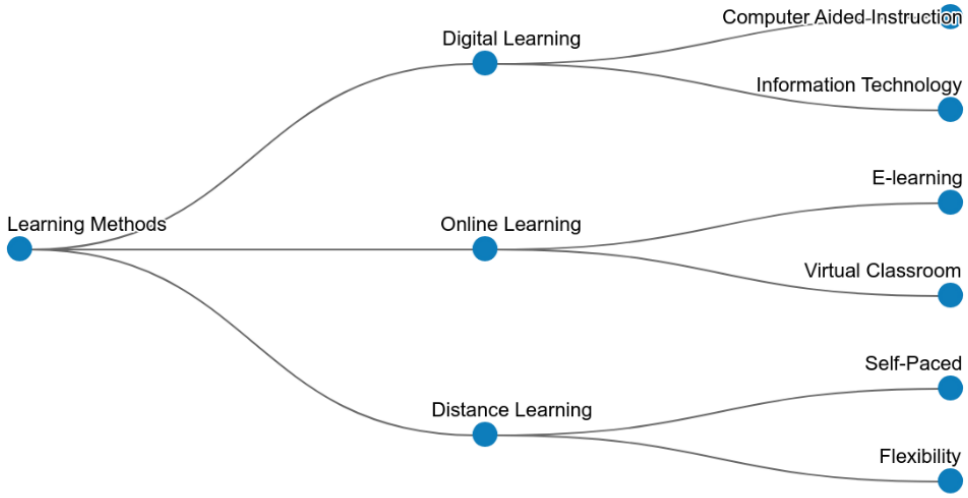

Figure 2 Conceptual map generated by Scopus AI. *Source:* Scopus AI.

3.1.1. Digital learning

Digital learning refers primarily to any form of learning that is facilitated by technology (Kumar Basak et al., 2018; Sousa & Racha, 2017; Manoharan et al., 2024). It represents only a part of e-learning (Culduz, 2024). This approach can be conducted

in person in the classroom or remotely, so it is not necessarily online (Faridah et al., 2020). According to Figure 2, the term digital learning is clearly more closely associated with information and communication technologies, as is computer-assisted teaching. In the literature, the term digital learning is also associated with other terms, such as computer-based learning, technology-based training, and computer-based training (Mashhadi & Kargozari, 2011; Wolfson et al., 2014; Lum et al., 2016).

The integration of information and communication technologies (ICTs) into the teaching process to facilitate knowledge acquisition for students thus forms the foundation of digital learning (Sayaf et al., 2022; Camilleri & Camilleri, 2016; Akyuz & Yavuz, 2015; Amad et al., 2023). This integration can occur both online and offline, which explains why online learning is just a specific form of digital learning made possible through the use of the internet. Although the terms 'digital learning' and 'online learning' are often used interchangeably, distinguishing between these two concepts is essential (Gubbins et al., 2023), with the former encompassing a broader range of educational practices supported by technology and the latter being limited to learning via an online connection.

3.1.2. Distance learning

Distance learning is a mode of learning that takes place remotely. According to Ruiz et al. (2006), it is a method that uses information technologies to deliver courses to learners located far from a central site. However, it is not necessarily online, and it does not always rely on technology. It is, in fact, a situation in which students receive lessons while being physically and temporally separated from the teacher (Ogrinc et al., 2003; Zhang & Bao, 2010; Culduz, 2024). It can be synchronous (real-time interaction) or asynchronous (using prerecorded materials of various types).

Distance education has a history that dates back two centuries (Moore et al., 2011; Amad et al., 2023), notably with the invention of postal services. Its earliest forms emerged at the University of London in the 19th century in response to the needs of British citizens living far from the empire who were unable to attend university (Soualah-Alila, 2015; Orivel & Orivel, 2006). Thus, distance education can encompass various media, such as books, CD-ROMs, audio or video recordings, and even correspondence via postal mail.

3.1.2. Online learning

Online learning is a subset of learning in general (Anderson, 2004) that specifically focuses on learning that takes place online via the internet (Oblinger & Oblinger, 2005). In the literature, the term 'online learning' is the term that most closely aligns with the concept of e-learning, as both rely on the use of the internet to access educational content. Furthermore, online learning always involves technology. Thus, online learning is a form of digital learning that occurs through the internet.

Several authors argue that it represents a recent version of distance learning that improves access to educational opportunities (Moore et al., 2011; Conrad, 2002). It also serves as an earlier version of e-learning, as the term 'online learning' appeared in the literature before the term 'E-learning.' Importantly, however, raw information and educational content available online are double-edged swords (Muller et al., 2008). They are not always trustworthy and reliable for educational purposes, especially those available on social media in very large quantities recently, most of which have a profit-driven agenda, a phenomenon known as content creation. This content cannot be considered part of the e-learning strategy. On the one hand, the intended goal is not learning; on the other hand, the available content is not always structured and does not follow a suitable approach to facilitate effective learning. Therefore, just as traditional learning requires the presence of a teacher or specialist, e-learning also necessitates the involvement of an instructor.

3.2. Definition of e-learning in the literature

In the literature review, we find several definitions of e-learning that have been proposed by researchers. Each definition is based on the researcher's personal experience and conceptions of the education process. We have identified three general categories of definitions: definitions based on the use of technology, definitions based on the use of the internet, and definitions based on the transmission of knowledge.

3.2.1. Definitions based on the use of technology

- "E-learning refers to the use of digital resources to deliver education" (Grabusts & Teilans, 2021).
- "E-learning is the practice of using information and communication technologies to create learning experiences" (Bezhovski & Poorani, 2016).
- "E-learning involves the use of electronic technologies to create learning experiences" (Horton, 2006).
- "E-learning is an approach that facilitates and enhances learning through computers and communication technologies" (Su, 2007).
- "E-learning is learning supported by digital electronic tools and resources" (Kumar Basak et al., 2018).

This category includes definitions of e-learning that focus only on the use of technology to facilitate teaching and learning. However, the approach of e-learning cannot be limited to the use of technology alone. For instance, the use of a

microphone during a class should be excluded from a correct definition of e-learning" (Tavangarian, 2004). This is why other dimensions of the definition of e-learning should be considered.

3.2.2. Definitions based on the use of the internet

- “E-learning is defined as an educational intervention delivered electronically via the internet in an asynchronous manner" (Sinclair et al., 2016).
- "E-learning is the use of internet technology to enhance knowledge and performance" (Ruiz et al., 2006).
- "E-learning involves the use of modern internet technology to enhance the learning experience and quality" (Djeki et al., 2022).
- "E-learning refers to the use of computer network technology, primarily via the internet, to deliver information to individuals" (Wang et al., 2010).

These definitions limit the principle of the e-learning approach. In reality, e-learning is not restricted to the use of the internet for delivering information. It also includes interactions with the teacher, allowing for the assessment of students' achievements and the adaptation of teaching according to their needs. E-learning concerns not only the distribution of learning, online learning, virtual learning, or web-based learning but also the evaluation and interaction between the teacher and the learner through an online learning platform (Alowayr & Badii, 2014).

3.2.3. Definitions based on knowledge transmission through technology

- “E-learning is an educational concept that uses technology to deliver learning materials and facilitate distance learning” (Alyoussef, 2023).
- "E-learning involves the use of technology to deliver information for education and training" (Sun et al., 2008).
- "E-education is the delivery of instruction through electronic means" (Zhang et al., 2004).
- "E-learning refers to the transmission of knowledge through teaching and learning scenarios supported by online digital means" (Back et al., 2016).

Similarly, these definitions focus solely on the transmission of knowledge through technology and the internet, even though they are more applicable to online learning. However, e-learning goes beyond mere dissemination of digital content; it also aims to promote interaction, pedagogical support, and continuous assessment of learning outcomes.

3.3. Building a new definition of e-learning

All the definitions mentioned earlier seem contradictory. However, they are actually complementary in that each definition explores only a part of the definition of e-learning. Sangrà et al. (2012) noted that it is difficult to find a single definition of e-learning that would be accepted by the majority of the scientific community. Nevertheless, they attempted to formulate a general definition of e-learning: "E-learning is a teaching-learning approach that relies on the use of electronic devices as tools to enhance access to training, communication, and interaction, and which facilitates the adoption of new ways of understanding and developing learning" (Sangrà et al., 2012).

Nevertheless, this definition seems to be more aligned with digital learning. In fact, it does not emphasize the use of information and communication technologies and the internet for learning, nor does it include the notion of distance education.

On the basis of the previous definitions, e-learning can be viewed as the intersection of the concepts of distance learning, online learning, and digital learning. Indeed, e-learning incorporates elements from each approach: the distance learning aspect of distance learning, the internet component of online learning, and the digital technologies from digital learning. By combining these characteristics, we can propose a comprehensive definition of e-learning that encompasses these three dimensions. E-learning is thus defined as

> "An educational approach that uses digital technologies and the internet to provide students with access to digital learning resources provided by an instructor, fostering learning through interaction and collaboration”.

Figure 3 below is an explanatory diagram we have developed, illustrating the relationships between these different concepts.

3.4. Definition of m-learning in the literature

The term "M-learning" literally refers to mobile learning, which refers to learning via mobile tools. However, this can lead to some confusion regarding the understanding of this approach, as even books are considered mobile tools that enable this type of learning. Therefore, m-learning represents a mode of learning that leverages mobile technologies alone or in combination with ICT to facilitate learning anytime and anywhere (UNESCO, 2013).

In the literature, there is a consensus regarding the definition of m-learning. According to various authors, m-learning represents e-learning that occurs via wireless mobile devices such as smartphones, tablets, and laptops, which are characterized by the ability to access educational resources anytime and anywhere (Quinn, 2001; Almaiah & Jalil, 2014; Lebzar & Jahidi, 2017; Amad et al., 2023; Jaworska, 2024).

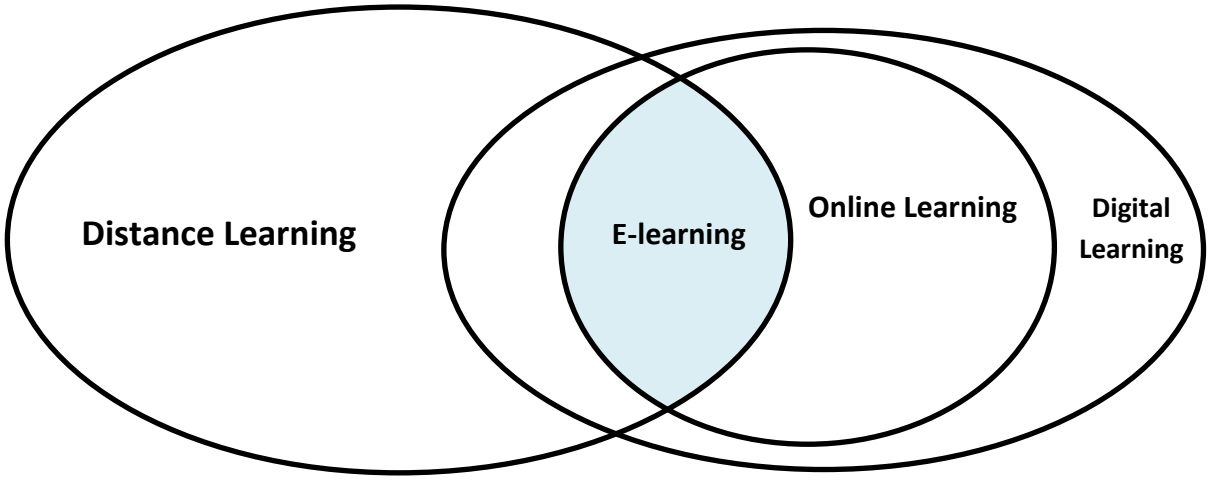

Figure 3 Relationships among e-learning, distance learning, online learning, and digital learning.

m-learning represents an innovative method that makes learning mobile through the use of ubiquitous devices. It is considered the most suitable approach for the ATAWAD era: "Any Time, Anywhere, Any Device" (Mrabbi, 2022).

However, it is crucial to focus not only on the mobility of devices but also on the mobility of access to educational content. Kouninef et al. (2014) emphasized the importance of prioritizing the notion of mobility over that of functionality in defining m-learning. However, in our view, what is the point of a device's mobility if it does not allow its user to access content under any conditions?

Therefore, access to educational content should be possible under all conditions, even offline; otherwise, we can never speak of learning anytime and anywhere. In fact, we cannot consider a mobile device that is incapable of accessing online training, for example, as an integral part of the m-learning strategy. This is unacceptable, especially when the primary advantage of e-learning, in general, lies in the accessibility it offers.

This is why m-learning is considered a more developed and enriched form of e-learning (Brown, 2005; Kumar Basak et al., 2018; Amad et al., 2023). It is a form of learning that shares similarities and differences with e-learning (Almaiah & Jalil, 2014). While both utilize mobile devices, e-learning also uses nonmobile devices, whereas m-learning allows for learning even in the absence of an internet connection. This is illustrated in figure 4 below, which was developed by Kumar Basak et al. (2018):

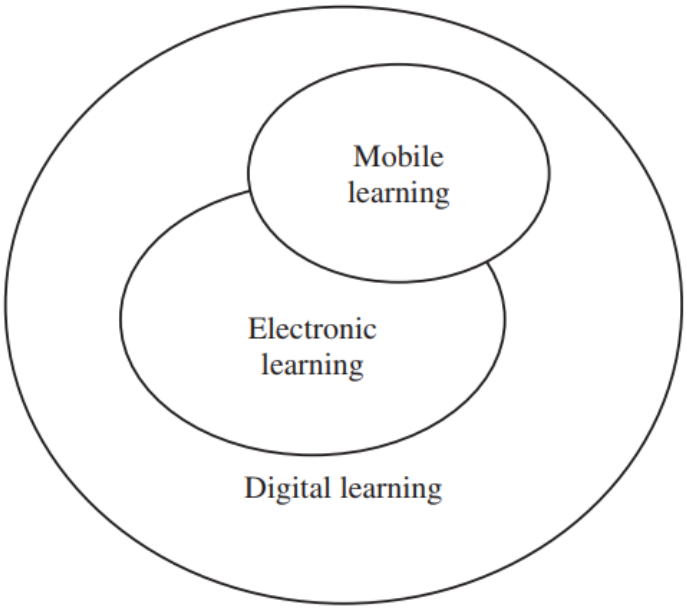

Figure 4 Relationships among e-learning, m-learning and digital learning. *Source:* Kumar Basak et al. (2018).

3.5. Building a new definition of m-learning

On the basis of the above, we can define m-learning as:

"An advanced form of e-learning that allows access to educational resources through mobile digital technologies, anytime, anywhere, and under any conditions."

Therefore, we can further develop our previous figure to illustrate the relationships among e-learning, m-learning, online learning, distance learning, and digital learning. Figure 5 illustrates the developed model.

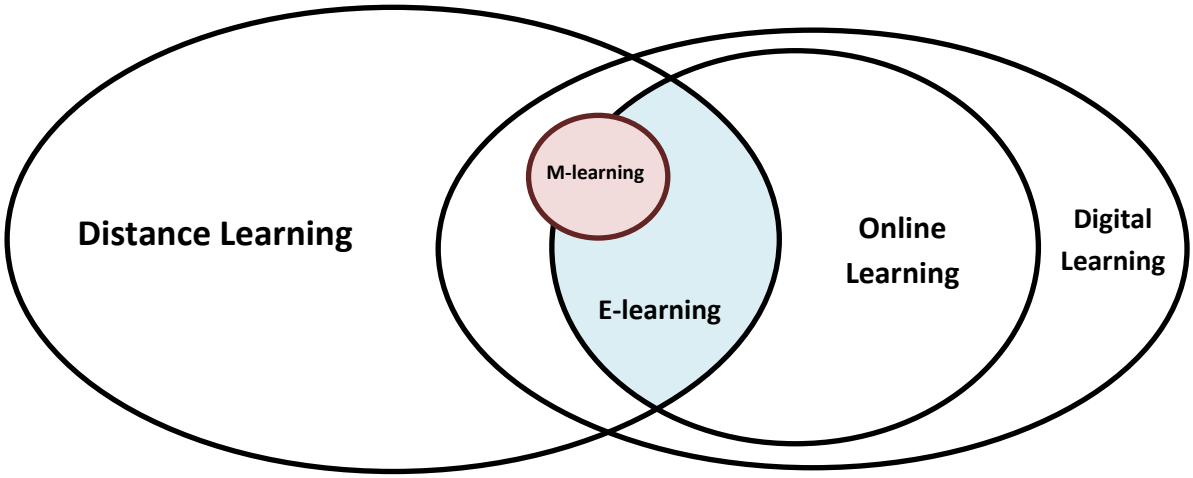

Figure 5 Relationships among e-learning, m-learning, distance learning, online learning and digital learning.

4. Final Considerations

An in-depth analysis of the literature reveals diverse definitions for e-learning and m-learning, each covering only one facet of these approaches. Moreover, the terms distance learning, digital learning, and online learning are often used interchangeably, without precise distinction, and sometimes even mistakenly refer to e-learning and m-learning. This article aims to clarify these distinctions and propose a more comprehensive definition for e-learning and m-learning on the basis of an exhaustive analysis of the research.

The new definition of e-learning goes beyond the simple transmission of knowledge via digital tools, the use of the internet for learning, or the integration of information and communication technologies in teaching. This definition highlights an integrative approach that considers these three dimensions, as well as the pedagogical interactions between the teacher and the student in this virtual environment.

This article also proposes a new vision of m-learning, considering it a more advanced approach than e-learning, as it allows for learning in all circumstances, including offline. Although m-learning shares similarities with e-learning, particularly the use of technology and the internet remotely, it is distinguished by its increased flexibility, allowing learners to access educational resources even without an internet connection.

E-learning can represent the best possible learning method or the least effective method. This depends exclusively on our decisions and how we implement those decisions (Horton, 2006). Similarly, the ubiquity of mobile phones represents an undeniable advantage that encourages learners to install educational applications on their mobile devices to ensure flexibility, allowing them to study at their own pace. This is the concept of "In My Own Time" and "Just for Me" (Choules, 2007).

Furthermore, while online learning offers new tools and more flexible teaching possibilities, it cannot, regardless of the method used, improve a teacher's skills or change their way of teaching and pedagogical approach. This is because teachers often develop their teaching methods over the years on the basis of their beliefs, experiences, and personal understanding of education. These elements are deeply rooted and may resist change, even when transitioning to an online environment. Therefore, we can deduce that a teacher using the same methodology and approach will achieve similar results, regardless of the teaching mode, because "what truly matters is not the teaching tool, but the teacher's approach."

Thus, we must first begin with the development of our own vision of education. This requires a deep reflection on the expected outcomes of the educational system. Next, we need to construct a coherent training curriculum that aligns pedagogical objectives with previously defined goals. Moreover, it is imperative to clearly specify the teacher's role, which should be that of a facilitator and guide rather than merely a passive transmitter of knowledge. Similarly, the status of the student should be defined as an active participant in the construction of their knowledge. Concurrently, knowledge should not be perceived as static but rather as an evolving and ever-changing entity.

The educational vision discussed in the previous paragraph is necessary for the success of future e-learning projects. On the one hand, the teacher will have access to innovative resources to explore new pedagogical approaches. On the other hand, the student will develop greater autonomy and become the actual driver of their learning.

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Ethical Considerations

Not applicable.

Conflict of Interest

The authors declare that they have no conflicts of interest.

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