Knowledge in digital environments: A systematic review of literature

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There are several meanings of the term "knowledge" that match to the diverse study areas. A knowledge creation, sharing, dissemination, and presentation environment is required. Digital platforms and technology lead to the development of innovative methods of teaching and learning in a digital environment. It is of intellectual and academic interest to determine if knowledge processes change in digital contexts, which provide more options than conventional environments such as books and newspapers. The study is built on an exhaustive examination of prior studies on knowledge in digital contexts. The databases ERIC and Scopus served as the search grounds for the keyword-based inquiry. The collected documents were evaluated to determine whether or not they contributed to the investigation's objective. The cornerstone of our inquiry was a careful review of the remaining 14 studies. For quantitative investigations, the experimental design was the most desired approach, but the case study method was the most preferred method for qualitative research. The objectives of the research employ the terms "knowledge" and "digital environments" either directly or implicitly. Studies were designated as "creating" "creating with cooperation" "acquiring" "presenting" and "sharing" In the research, data was coded in accordance with the responsibilities assigned in digital worlds. In the study, 10 distinct theories and models were referenced. These models and hypotheses are categorized based such as creating, acquiring, designing, and using their interaction with data. In the investigations, the existence of traditional knowledge creation and application has been investigated. In addition, the process's distinction owing to the capabilities of digital environments has been investigated.

KEYWORDS

digital environments, knowledge, knowledge theories, review systematic, education

Introduction

There are many different interpretations of the term "knowledge" that correspond to the many foci of research. A network of cognitive elements that are tightly interconnected and serve to reflect the overarching ideas stored in memory constitutes knowledge (Juuti et al., 2012; Buitrago and Chiappe, 2019; Drozdikova-Zaripova and Sabirova, 2020; Sudakova et al., 2022). The idea that knowledge is "justified true belief" is one of the predominant and most disseminated definitions of the term (Oeberst et al., 2016). According to the findings of the study conducted by Oeberst et al. (2016), the majority of the conceptualizations of knowledge taken from a philosophical point of view share two primary elements in common. The first one has to do with looking for the truth, which is the same thing as being consistent with the facts. The second point is that different conceptualizations of knowledge are individualistic in nature.

When seen from a different angle, knowledge might be equated to power. Knowledge, also known as intellectual capital, is the most important ingredient in the production process and the major driver of wealth creation in an economy based on the accumulation of knowledge (Carlaw et al., 2006; Bedford et al., 2015). Although the definition of knowledge is different, an environment is needed for knowledge creation, sharing, dissemination and presentation. It is a matter of intellectual and academic curiosity whether knowledge processes differ in digital environments, which have more opportunities than in traditional environments such as books, and newspapers.

Digital environment

The digital environment has not had one definition. It is defined according to the research context. In Martin and Quan-Haase (2013) study, an e-book is accepted as a digital environment. It is essential for e-books to include interactive features, as stated by Yang et al. (2021), in order to successfully deliver digital learning outcomes. It is not believed to be adequate to transfer merely the written content to electronic media. Instead, it is required to integrate the possibilities of digital tools, such as connecting to another website, adding video or sound, and so on. In more updated research, augmented reality (Salinas and Pulido, 2017), e-learning platforms (Milenkova and Manov, 2019), digital stories Seckin Kapucu and Yurtseven Avci (2020), and electronic concept maps (Kimber and Wyatt-Smith, 2006; Buitrago and Chiappe, 2019) are seen as "digital environments."

The use of traditional teaching methods in conjunction with digital learning environments has resulted in the creation of new chances for learning that is centered on the student and has facilitated the production of knowledge by the learner (Ng and Ong, 2018). Digital platforms and technologies contribute to the creation of new ways for teaching and learning, for evaluation and self-assessment, and for autonomous learning activities (Terzieva et al., 2021).

Common types of learning that take place in digital environments include learning that is assisted by computers, learning that takes place on mobile devices, and learning that utilizes multimedia, including representations such as text, images, video, and animation, to improve student learning (Chang and Linn, 2013; Ng and Ong, 2018). It has a variety of applications in accordance with the many fields of study. When preparing content for academic use, a clinician, medical educator, or basic scientist, for instance, must conduct the essential process of annotating digital pictures with symbols and language. This is a task that is common in the field of medicine (Goede et al., 2004). Enhancements have been made so that students have more opportunities to acquire ideas and information, magnify ideas and information, change ideas and information, and share ideas and information with one another (Freestone and Mason, 2019).

The breadth and depth of learning may also be expanded through the utilization of content-based digital resources such as videos, podcasts, and webpages. In order for these tools to be considered interactive, there must be adequate time allotted for students to think up their own questions (Wachtler et al., 2016; Freestone and Mason, 2019). Not only do these digital platforms assist more traditional methods of instruction, but they also feature activities that are appropriate for kids who have specific educational needs. According to Forsling (2019), the utilization of digital tools in settings pertaining to special needs may be characterized as the provision of compensating assistance from either a compensatory or a categorical point of view.

It is well-established that the potential of digital tools and resources can provide expression to learners' creativity and imagination (Anshari et al., 2017; Freestone and Mason, 2019). At the same time, as a result of the mediation provided by technology, the linguistic and social activities that we engage in on a daily basis are undergoing substantial transformations (Thorne et al., 2009; Wernholm and Vigmo, 2015). Literacy, in point of fact, has its definition extended and scope debated in a framework that takes into account the use of a variety of digital instruments, such as technological literacy. The incorporation of digital technology into educational settings inevitably results in altered circumstances for the use of reading as a learning resource (Salakhova et al., 2021). The implementation of digital technology in educational settings is frequently lauded as beneficial, despite the fact that other individuals have a more pessimistic outlook on the extent to which these tools may really alter instructional methods (Molin and Lantz-Andersson, 2016).

Digital media opportunities also have the potential to make the presentation of knowledge more effective (Buitrago and Chiappe, 2019). Thanks to the interaction that digital media offers, it is possible not only to present knowledge but also to create or re-create it (Wernholm and Vigmo, 2015; Hauck et al.,

2021). The progressive expansion of technical possibilities and the interplay of the z generation (Desai and Lele, 2017; Persada et al., 2019) and alpha generation (Apaydin and Kaya, 2020; Ziatdinov and Cilliers, 2021) with technology make it impossible to view them from a classical standpoint. This generation, classified as digital natives (Prensky, 2001), need a conceptual framework for how they produce and utilize information in the digital environment, which they view as an integral component of their existence (Kim and Yang, 2016; Šorgo et al., 2017; López-Meneses et al., 2020). This investigation has the potential to support and illuminate the proposed conceptual framework. Therefore, this study is based on the examination of studies containing "knowledge in digital environments." The study will contribute to the literature in terms of shedding light on the gaps in the field for future research.

Methodology

A systematic review was carried out with the purpose of demonstrating how various aspects that emerged from a variety of research have contributed to knowledge in digital environments.

Data collection process

Literature review

A first key process of a literature review has to do with establishing an approach that allows it to be effective and orderly addressed, mainly through the formulation of guiding questions:

1. What are the methods of knowledge in digital environments mostly used in studies?

2. What are the aims of the studies?

3. What activities of knowledge in digital environments are used in studies?

4. What theories or approaches are applied in order to explain knowledge in digital environments?

5. What are the perspectives of studies to describe knowledge in digital environments?

Searching database

A search was completed according to the keywords entered in the ERIC and Scopus databases. "Knowledge" and "Digital Environment" keywords were entered in the ERIC database. Added "Peer reviewed only" and "Full text available on ERIC" restrictions. In the Scopus database, the following search key was entered. The process of the study is shown in Figure 1.

TITLE-ABS-KEY (knowledge "digital environment*") AND LIMIT-TO (LANGUAGE, "english") AND EXCLUDE (PUBYEAR, 2022) AND EXCLUDE (LANGUAGE, "portuguese") OR EXCLUDE (LANGUAGE, "spanish")
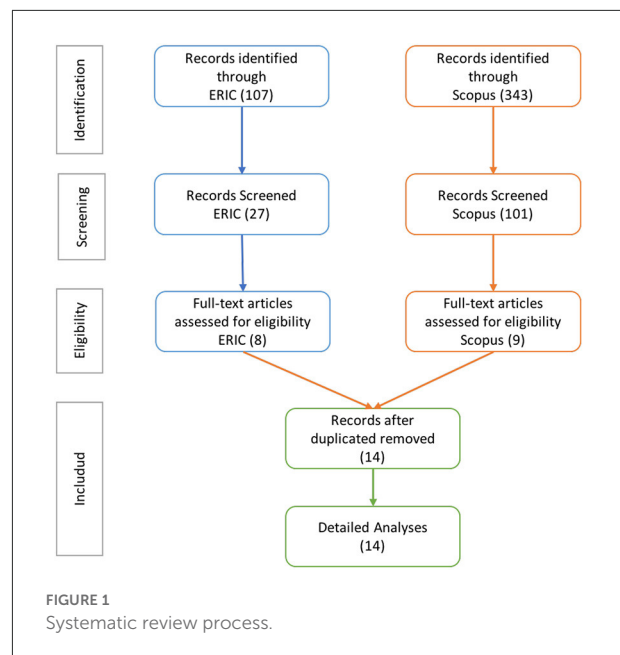

FIGURE 1
Systematic review process.

TABLE 1 Inclusion and exclusion criteria for knowledge in digital environment.

Inclusion criteria

Knowledge in digital environments must be the central topic.

The studies should be published in peer-review journals.

Searching must consider documents published after 2010.

The studies should be indexed in ERIC or the Scopus database.

Exclusion criteria

Notes, editorials, books, and book chapters are excluded.

Knowledge management in digital systems is excluded.

Non-English studies are excluded.

OR EXCLUDE (LANGUAGE, "russian") AND [LIMIT-TO (DOCTYPE, "ar")].

Inclusion/Exclusion criteria

The inclusion and exclusion criteria are presented in Table 1.

Data analysis

Each research team did an extensive reading of some of the studies that were chosen. It was decided what the primary emphasis and goal of each piece would be. The methods and approaches were decided upon at that point. It was possible to determine the theoretical framework and methodological technique utilized in each research. The next step is to investigate the connection that exists between the theory and the topic at

issue. Developed using a knowledge-based coding system. There are four distinct ways in which the processes relating to the idea of "knowledge" are codified. The word "acquiring" is used throughout the research to refer to the process of gathering knowledge and different points of view. When it came to the generation of new knowledge over the course of the studies, he applied the "creating" code. In the study, the "presenting" code was utilized whenever there was an issue regarding the presentation of knowledge. In the study, the "sharing" code was utilized whenever there was an emphasis placed on the exchange of knowledge. The codes were discussed to verify that all of the researchers were on the same page, and consensus was reached over the whole coding process.

Findings

Aims

When looking at the objectives of the articles, it is important to remember that in the digital environment, "knowledge" can be communicated both explicitly and implicitly in the purpose statements. However, in most cases, it is not brought to the forefront in line with the topic of the research. In 9 of the investigations, the term "knowledge" was described as being open, whereas in the other 5 studies, it was described as being concealed (Table 2).

For example, the concept of "knowledge" is clearly included in the aim of the study conducted by Gharib et al. (2020). In addition, "knowledge" was not used directly in the aim of the study conducted by Paek et al. (2016), but the phrase "understanding of new material" was referred to knowledge formation.

When the "digital environment" emphasis is examined, the purpose statements of the study differ according to the subject of the study. For example, in the study conducted by Andresen et al. (2019), the perceptions of people with dyslexia were prioritized in the study, as can be understood from the statement of purpose. "Digital environment" is seen only as an environment. In some studies, the expression of digital environment was implicitly emphasized. For example, from the phrase "interactive blind map" in the aim statement of the study by Balla et al. (2015), it is understood that it is a digital environment.

Methods

When the approaches used in the studies were examined, the qualitative approach was used in seven studies, while the quantitative approach was preferred in seven studies (as shown Figure 2). While experimental design was preferred in four of the studies, the "partial ethnography" design was preferred in one study.

Knowledge

The processes for the concept of "knowledge" are coded in 4 different ways. In the study, the emphasis on obtaining information and perspectives is expressed as "acquiring." He used the "creating" code when it came to the creation of knowledge in the studies. In the study, when presenting knowledge is in question, the "presenting" code was used. In the study, if sharing knowledge was the foreground, the "sharing" code was used.

There are studies that examine the process of creating knowledge in the digital environment. In the study conducted by de Andrés Martínez (2012), students created a blog in a digital environment. In the study, students' blog writing was evaluated as "creating." The students used multimedia materials besides text in accordance with the digital environment. In Seckin Kapucu and Yurtseven Avci (2020) study, the participants were asked to prepare digital stories. During the study process, pre-service teachers created specific knowledge in the digital stories they developed. In this process, they used multimedia tools thanks to digital media opportunities. In another study (Kjällander, 2018), teachers prepared a digital presentation to attract students' attention. Teachers used multimedia tools to create knowledge in these presentations.

In some studies, the process of knowledge creation was handled as a group activity and the process of collaborative knowledge was examined. In the study performed by Hauck et al. (2021), the participants prepared a concept map with group work. While creating an electronic concept map, they created "knowledge" by taking advantage of the possibilities of the digital environment. Since there is an interaction between the participants, the knowledge was created together. In the study conducted by Wernholm and Vigmo (2015), the language used by the users in the Minecraft digital game environment was examined and the process of creating common knowledge was examined.

In Andresen et al. (2019) research, the learning process of participants with and without dyslexia was examined with digital resources. In this process, how much knowledge they acquired was measured by applying the "Word recognition test." In this study, knowledge acquisition in digital resources is at the forefront. The study by Feola (2016) also focused on how knowledge is obtained in the digital environment. Therefore, the study was coded as "acquiring." As shown in Figure 3, the participants interact with digital media tools in the processes coded as "acquiring," "creating," and "creating with cooperation." They play a more active role in this process.

In some of the studies examined, the digital environment was seen and used as a knowledge-presenting environment. In the study of Forsling (2019), digital media was used to meet the demands of individuals in need of special education. In

TABLE 2   The aims of studies.

Article	Aims
Andresen et al. (2019)	This study compared students with and without dyslexia working with multiple information sources on a socio-scientific issue in a digital environment.
Balla et al. (2015)	This study introduces the self-developed interactive blind map teaching-examining e-learning system of the University of Debrecen
de Andrés Martínez (2012)	This report aims to address this concern by discussing design and management of an online learning space for a face-to-face undergraduate Spanish course using proprietary technology.
Feola (2016)	This paper aims to reflect on the implications and challenges that experts in the field have to deal with when you want to evaluate the performance in the use of digital technologies in teaching.
Forsling (2019)	The aim of this article is to contribute knowledge about challenges to literacy development in a digitalized learning environment, with focus on pupils in need of special support.
Gharib et al. (2020)	The purpose of this paper is to extend knowledge about WOM in this new context by proposing a conceptual framework that enables a better understanding of how trust and reciprocity influence eWOM participation in ORCs.
Hauck et al. (2021)	In this paper, we present a digital-collaborative intervention as well as selected results from a first implementation cycle. Here, we will investigate the potential of digital devices to optimize group processes and effective collaboration, a subject where recent meta studies indicate research gaps
Kjällander (2018)	Students' and teachers' assessment interaction with each other, and with digital learning resources—when teachers and students are designing the subject area together, is a focal point in this article.
Koh (2013)	This study explores the ways adolescents create information collaboratively in the digital environment.
Molin and Lantz-Andersson (2016)	This study aims to contribute to the knowledge of educational reading practices by scrutinizing how literacy events evolve in a digital classroom where each student has a personal digital device (1:1), iPads in this study
Noskova et al. (2021)	To identify a diversity of students' information behavior in the digital learning environment, a survey was conducted for the first-year bachelor students of the Herzen State Pedagogical University of Russia
Paek et al. (2016)	The purpose of this study was to examine if student understanding of new material could be promoted by manipulating the perceptual factors experienced at the time of learning.
Seckin Kapucu and Yurtseven Avci (2020)	The purpose of the study is examination of the quality of digital stories developed by pre-service science teachers and deeply investigating pre-service teachers' experiences related to scientific concepts, the characteristics of scientific knowledge and the ways of reaching scientific knowledge in the stages of exploration, storytelling and digitalization.
Wernholm and Vigmo (2015)	The aim of this article is to address how online tools and digital technologies can influence data collection opportunities.

a sense, digital media has been seen as a tool that facilitates the presentation of information. The fact that the multimedia opportunities of digital tools have the opportunity to meet the needs of individuals in need of special education may have been effective in this process. Again, in the study of Koh (2013), there is also the presentation of knowledge along with knowledge creation. Digital media opportunities are also used in sharing the information created in the digital environment. Gharib et al. (2020) examined the eWOM process in the study. Participants can share their thoughts on the product through the digital environment. In the sharing and presenting processes, people are less active in the context of information in the digital environment compared to other processes.
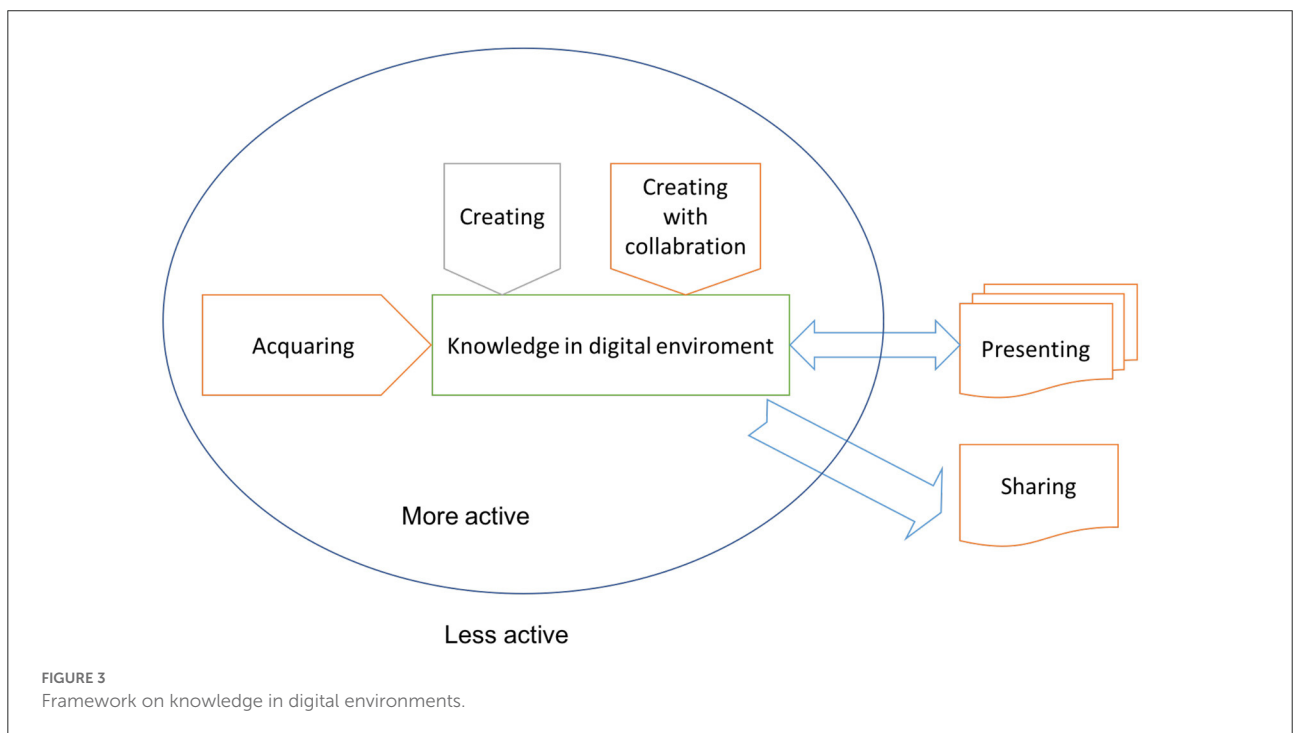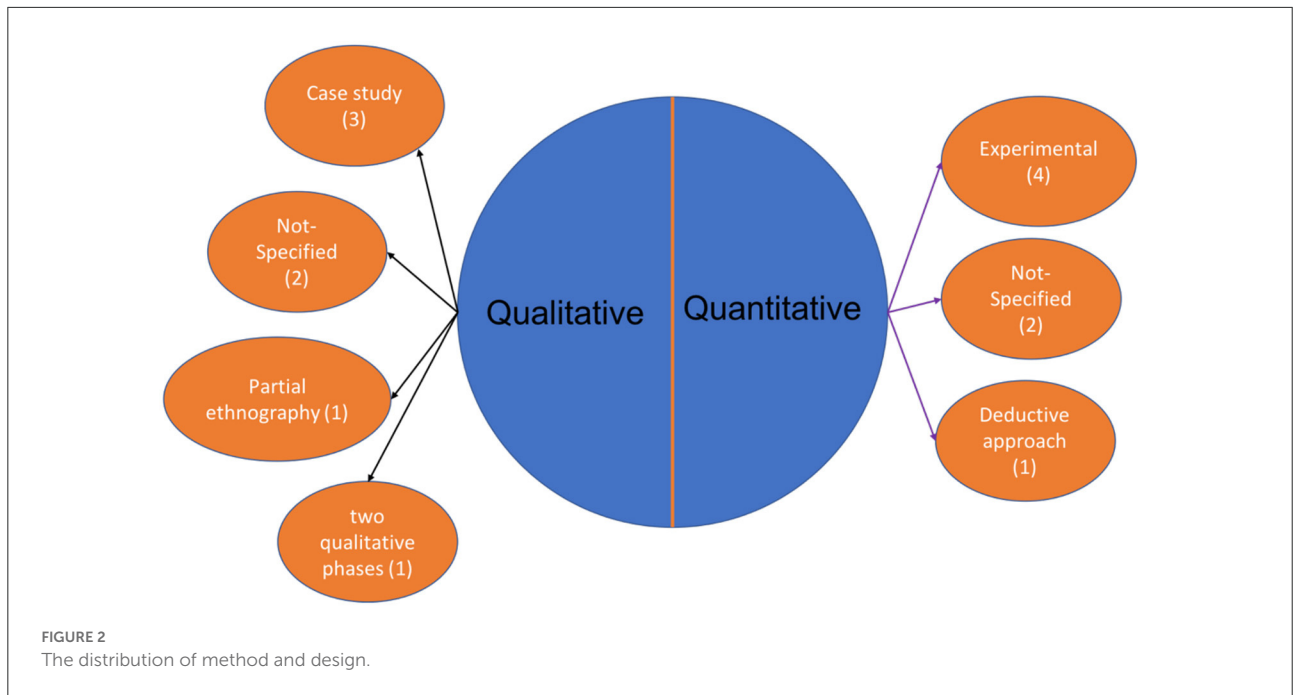
Each study is tagged with multiple codes. Acquiring has five studies. Creating with cooperation is labeled in two studies while "creating" are observed in six research. While there were 10 studies "presenting," "sharing" was found in only one study.

Theories, model and approach

In the papers that were reviewed, a variety of theoretical frameworks were applied in order to explain the results and to design the research. These conceptual frameworks are connected to the body of knowledge that exists inside the digital environment. When this relationship is examined in greater depth, it is possible to categorize the theoretical frameworks associated with it as follows: theoretical frameworks related to the production of knowledge; theoretical frameworks related to the acquisition of knowledge; theoretical frameworks related to the design of knowledge; and theoretical frameworks relating to the use of knowledge (Figure 4).

Three theories have been identified regarding the creation of knowledge; "sociocultural theories of learning," "Social exchange theory," and "zone of proximal development." In Molin and Lantz-Andersson (2016) research, sociocultural perspectives were used, as it is accepted that learning takes place within the

FIGURE 2
The distribution of method and design.

FIGURE 3
Framework on knowledge in digital environments.

activity, context and culture through the interaction between the participants and the tools used in "sociocultural theories of learning." "Social exchange theory" was used in the studies of Gharib et al. (2020). Since the participants share information about the product in the digital environment, this theory was used to make sense of the data. According to the results of the research, the findings are compatible with the assumptions of the social exchange theory, interactions between individuals are reinforced by mutual exchanges. Zone of proximal development theory was used in the study by Wernholm and Vigmo (2015). The language structures used by the participants in the Minecraft online environment were examined. While examining the study

FIGURE 4
Theories used in study to explain knowledge in digital environments.
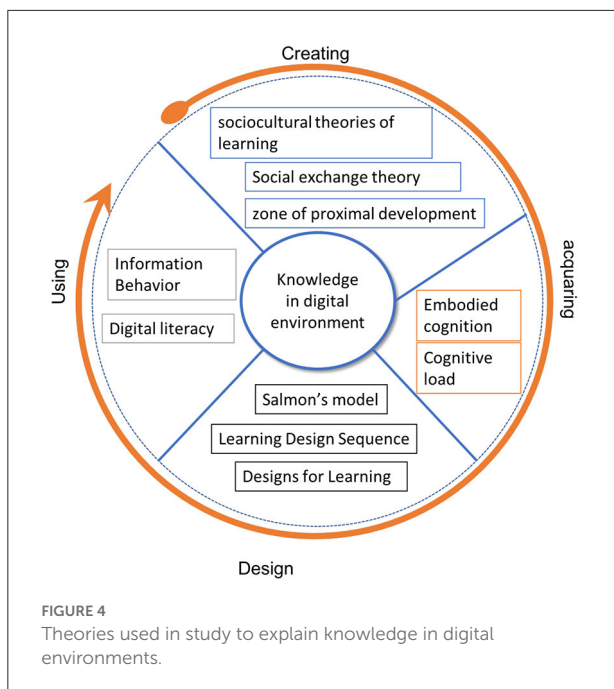
data, peer influence was examined in the knowledge formed in the participants based on the theory.

In the context of acquiring knowledge, two theories were referred. In the study conducted by Paek et al. (2016), it was tried to determine the perceived factors in the learning process in digital environments. In the study, the "embodied cognition" theory was used because the connections between sensory and motor systems and cognition were the focus. In the study of Hauck et al. (2021), measurements were made regarding the cognitive load of students on the electronic concept map creation process.

Another approach is design theories about how knowledge should be designed for the processes of creation, presentation and sharing. In de Andrés Martínez (2012) study, Salmon's five-stage e-regulation model was followed to facilitate the educational intervention. Kjällander (2018) used the Learning Design Sequence model in the study design. The model is based on a perspective of learning as a multimodal sign-making procedure. Forsling (2019) used the "design for learning" model in his study. Designs for learning is a relatively new and broad field of research based on socio-semiotic and multimodal theories. Design theory is based on communicative possibilities in an increasingly digital environment and how these possibilities affect knowledge and learning conditions.

In two studies, a relationship was established with the "information behavior" institution. In the study of Koh (2013), the information created by the adolescents in the digital environment was explained with the information institution. Noskova et al. (2021) is also associated with the theory

of information behavior. The theory is mentioned in the theoretical background. The theory was used while creating the survey. Feola (2016) based her work on the theory of "digital literacy."

Perspective

Andresen et al. (2019) conducted research that analyzed and compared the impact that utilizing digital resources has on the amount of knowledge that students are able to acquire. The cognitive dimension is responsible for its management. The ability to recognize words, working memory, an assessment of topic knowledge, and eye movements were all measured. The participants were anticipating that the digital tool would make it simpler for them to acquire the necessary information.

The research conducted by Balla et al. (2015) relied heavily on the usage of digital maps to depict various pieces of spatial data. It is possible to take use of the benefits that come with being a digital product, but there is no possibility that any new knowledge will be presented using the digital environment.

In the study of de Andrés Martínez (2012), the blog was used to develop the reflective thoughts of the students. Although the students were not examined in the context of the digital environment, the achievements obtained as a result were examined. A cognitive perspective is considered.

The acquisition of the skills necessary to make effective use of digital technology is the primary emphasis of the research carried out by Feola (2016). The method of education through the utilization of the digital tool has, in a sense, been completed. The realization process of learning in the digital environment is not the focus of the study.

Forsling (2019), in his study, investigated how students who require a special education program make use of digital resources to supplement their education. The utilization of digital resources is determined by the requirements of the audience being served. It is believed that the digital environment will speed up the learning process and will make people more productive.

Examined in the research carried out by Gharib et al. (2020) was the manner in which the viewpoint of electronic word-of-mouth, the diffusion of knowledge in the traditional environment, the development in the electronic environment, and the factors impacting this process were investigated. The manner in which knowledge was disseminated, in particular, has been a primary focus of concern.

In the research carried out by Hauck et al. (2021), the production of a product takes place within an electronic setting. During the process of making the product, it was a top priority to create it collaboratively while also including individual contributions. The results from the study were analyzed with both the generation of new knowledge and the sharing of existing knowledge in mind.

In the study of Kjällander (2018), electronic materials were taken in all their dimensions. The processes of obtaining information of the students were examined in detail.

In the research carried out by Koh (2013), the procedure for the generation of new knowledge in a digital setting was investigated. The findings of the study are significant in terms of the level of detail they provide on the information process in the digital environment.

The research carried out by Molin and Lantz-Andersson (2016) was analyzed from the point of view of reading comprehension. It is interested in the processes of re-creating knowledge and making meaning of what has been learned. The conventional method of reading comprehension has been scrutinized with regard to its development in the context of the digital environment.

The utilization of digital resources by students was investigated in the study that Paek et al. (2016) conducted. The question of whether or not individuals make use of the learning process is emphasized more than the process itself.

According to the findings of a research that was carried out by Seckin Kapucu and Yurtseven Avci (2020), conventional channels include digital media as well. A conventional approach was taken to analyzing the results of the study.

Classical theories were utilized in the investigation that Wernholm and Vigmo (2015) carried out in order to analyze the language that players employ in online games; nevertheless, the influence of digital media was not discounted in any way.

Discussion

In the studies examined, "knowledge in digital environments" is included in the content. However, in five studies, the word "knowledge" is not explicitly mentioned in the purpose statements of the study. The expression "Digital environment" is also used with reference to different tools such as "interactive blind map." In this case, it is more preferable to use the name of the digital tool used in the scope of the study directly. For example, in the study of Martin and Quan-Haase (2013), "e-books" represent the digital environment. It is intended to contain digital media options such as connecting to another website and adding video or audio. Again, in the study by Troussas et al. (2021), "social network" represents the digital environment.

The experimental design was the most favored method for quantitative investigations, but the case study method was the most preferred method for qualitative studies. The authors of the study employed a methodology and a design that was suitable for the type of research being conducted. In this way, it is appropriate for both approaches and can accommodate a variety of design configurations because to its adaptability. The fact that he carried out studies by different disciplines may have been effective in this regard. The research conducted by Wernholm and Vigmo (2015) is classified as belonging to the field of education. The research conducted by Balla et al. (2015) is classified as belonging to the field of geography, and the research conducted by Gharib et al. (2020) is classified as belonging to the field of knowledge management.

There has been research done that investigate the process of creating new knowledge in digital environments. There were six studies (de Andrés Martínez, 2012; Koh, 2013; Balla et al., 2015; Kjällander, 2018; Seckin Kapucu and Yurtseven Avci, 2020; Noskova et al., 2021) that looked at the process of how new knowledge is formed. Two investigations contributed to the development of collaborative knowledge. The fact that digital technologies make it possible to create content has accelerated the process of gathering information and increased the number of people who have access to it. According to the findings of Milenkova and Manov (2019) research, young people believe that they are capable of readily generating material and making comments on various forms of digital media, including social media. Kimber and Wyatt-Smith (2006) conducted a research in which they investigated the ways in which students' knowledge was created *via* the use of digital technology. The influence of social networks on the generation of new knowledge was the subject of an investigation carried out by Troussas et al. (2021).

The acquisition of new knowledge was the focus of five of the research in this review. The ability to communicate with more people and acquire more knowledge is made possible by technologies like the internet. A rise in data quantities, quality, and experimental precision has been attributed to the capture of digital information, as stated by Bond et al. (2007) in the field of digital media. When readers acquire new information from the web, they need to identify relevant information from credible sources and integrate this information into a coherent mental representation across a variety of web pages, types of media, and frequently conflicting perspectives before integrating this mental representation with their existing knowledge of knowledge (Andresen et al., 2019).

Eleven research pointed to the importance of presenting and sharing knowledge. There are several benefits associated with the use of multimedia into the information representation process that may be found in digital settings. For instance, video, audio, and even the possibility of augmented reality— all of which are not available in standard print books— offer significant benefits when it comes to the dissemination and presentation of knowledge. The Augmented Reality (AR) technology, with its potential to enable users to see educational information from three-dimensional viewpoints and to help the inspection of three-dimensional objects, among other things (Salinas and Pulido, 2017). In their study, the students were able to learn more about conics thanks to the use of augmented reality (AR) technology into the curriculum for teaching conics. As a direct consequence of this, digital surroundings have a significant impact on the display of information in a variety of different ways.

In the evaluated studies, a range of theoretical frameworks were utilized to explain the results and construct the research. These conceptual frameworks are associated with the digital environment's corpus of knowledge. When this link is investigated in further detail, the corresponding theoretical frameworks can be classified as follows: Theoretical frameworks associated with the creation of knowledge, the acquisition of knowledge, the design of knowledge, and the use of knowledge. The focus of the discussion is not the discussion of the contents of the aforementioned theories and models. The use of these theories in the context of knowledge in digital environments is also determined in other studies.

Three theories have been identified regarding the creation of knowledge; "sociocultural theories of learning," "Social exchange theory," and "zone of proximal development." The majority of researchers who work in the learning sciences, educational psychology, and instructional systems technology are familiar with situative theories, and many of these researchers now embrace situative theories and/or related sociocultural theories as a primary orientation in their research (Hickey and Andrews, 2018). In addition to these researches, a significant number of other studies (Barnard et al., 2019; Peters et al., 2021; Ebenezer et al., 2022) dealing with online education and digital settings have been linked to sociocultural theories of learning. Social exchange theory has been used in studies (Gündüz and Akşit, 2018; Chia-An Tsai and Kang, 2019; Shehab et al., 2019) to figure out how people who share knowledge and people who are looking for knowledge act. The notion of the Zone of Proximal Development is relevant to a generalized issue scenario, which is the successful use of information and communication technology (ICT) in students' and own teaching processes (Quaicoe and Pata, 2018). The concept of Vygotsky's Zone of Proximal Development, which was introduced in Vygotsky (1978), has been utilized to provide an explanation for the findings of numerous researches (Impedovo et al., 2018; Baker et al., 2020; Dentith and Winfrey, 2020) conducted in the context of the digital world. In the context of acquiring knowledge, two theories (embodied cognition and cognitive load) were referred. Both embodied cognition (Gandolfi and Clements, 2018; Musetti and Corsano, 2018; Georgiou et al., 2021) and cognitive load (Zhampeissova et al., 2020; Skulmowski and Xu, 2022; Wang et al., 2022) theory have been used effectively in research on digital media. Another approach is design theories about how knowledge should be designed for the processes of creation, presentation, and sharing. Salmon's five-stage e-regulation model (da Gama Silva et al., 2019; Motaung and Makombe, 2021), Learning Design Sequence model (Hrastinski, 2020; Reyna, 2020), and design for learning model (Dickinson and Gronseth, 2020; Rabinowitz and Tondreau, 2022) are preferred in digital environments. In using knowledge in digital environments dimensions, information behavior (Kurniasih, 2019; Lee et al., 2022; Yavetz and Aharony, 2022) and digital

literacy (Baterna et al., 2020; Barnes and Potter, 2021; Çetin, 2021) theorical framework are applied.

Conclusion

The study is predicated on a literature review of previous research on knowledge in digital environments. The ERIC and Scopus databases served as the search grounds for the keyword-based investigation. The retrieved papers were scrutinized to see whether or not they contributed to the goal of the investigation into the topic. A detailed analysis of the remaining 14 papers served as the foundation for this investigation. The experimental design was the most favored method for quantitative investigations, but the case study method was the most preferred method for qualitative studies. The terms "knowledge" and "digital environments" are used explicitly or implicitly in the aims of the studies. Studies were labeled as "creating," "creating with cooperation," "acquiring," "presenting," and "sharing." In the studies, the information was coded according to which roles are given in digital environments. Ten different theories and models were referred to in the studies. These models and theories are classified according to their interaction with information as expressed in Figure 4. In the studies, it has been examined whether there is traditionally the formation and use of knowledge. In addition, the differentiation of the process due to the possibilities of digital environments has also been examined.

According to the results of the study, creating, using, presenting, and sharing knowledge in digital environments should be examined in more detail. It is also suggested for future research how information processes will change according to the possibilities of digital tools. Studies using different theories and models can also be conducted. Unlike research in psychology, which is driven by concepts, research in educational technology is driven by empirical evidence (Means, 2022). The production of new knowledge cannot be immediately observed. On the other hand, research on instructional technology tends to include a greater amount of visible data. Taking all of this into consideration, research may be carried out to compile the findings of educational technology research *via* the lens of educational psychology. This study includes studies indexed in ERIC and Scopus databases and published between 2010 and 2022. In both databases, there may be articles that will contribute to the non-indexed field. The inaccessibility of these studies is a limitation of the study.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Author contributions

RP and MR: analysis, editing, and writing. AK and NR: writing, analysis, design, and supervision. AP: writing, analysis, and design. AC: analysis and editing. All authors contributed to the article and approved the submitted version.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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