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Metaphorical Perceptions of Prospective Teachers Regarding the Concept of Digital Literacy

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ABSTRACT

This study aims to reveal prospective teachers' perceptions of the concept of "digital literacy" through metaphors. The study was conducted using a phenomenological research design and carried out with 45 prospective teachers studying at Sivas Cumhuriyet University during the 2024–2025 academic year. The data were collected through an open-ended metaphor form, asking participants to complete the statement "Digital literacy is like… because…". The responses were analyzed using content analysis. A total of 45 metaphors were obtained, and the most frequently used metaphors were book, knowledge, and real literacy. The metaphors were grouped under five categories: Education, Technology, Abstract, Tool/Object, and Nature, with Education being the most concentrated category. The findings indicated that prospective teachers largely associate digital literacy with accessing information, learning, understanding, and using technology consciously. In conclusion, prospective teachers view digital literacy as an essential skill in modern life, a fundamental resource for accessing information, and a multidimensional domain that needs to be managed carefully. This study offers insights for enhancing prospective teachers' cognitive and pedagogical awareness regarding digital literacy.

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Introduction

Globalization has introduced a new social order in which borders have become increasingly invisible, and individuals can interact instantly with different parts of the world [1]. This process has influenced many fields, including economy, politics, culture, and education; digital technologies, in particular, have emerged both as the cause and consequence of globalization. Thanks to the internet, social media, and mobile communication networks, the circulation of information has accelerated, interaction between societies has intensified, and individuals have become part of a shared global digital culture. In this regard, digitalization is not only a technological advancement but also one of the most prominent indicators of global citizenship, intercultural communication, and the transition to the information society.

In this new social structure shaped by globalization through digital technologies, the essential skills individuals must possess have also transformed. Traditional literacy skills are no longer sufficient. Skills such as accessing information in digital environments, evaluating information accurately and reliably, producing new digital content, and managing digital communication processes effectively have gained prominence [2],[3]. In the literature, digital literacy is defined not only as a technical competence but also as a "survival skill" necessary for individuals to succeed in a rapidly changing digital world [4]. Thus, digital literacy is conceptualized as an umbrella term that encompasses computer, information, media, and communication technology literacies and is accepted as a multidimensional construct [5]. At the same time, digital literacy emerges as a fundamental concept that enables individuals to use the opportunities offered by the digital world consciously, critically, and ethically.

Paul Gilster was the first researcher to introduce the concept of digital literacy into the literature. Gilster [6] emphasized that digital literacy goes beyond technical skills; rather than merely pressing keys, it is associated with understanding and applying specific ways of thinking. He argued that digital literacy is based on three core principles: having access to and effectively using hardware and software tools; understanding and critically evaluating digital content and applications; and creating new products and content through digital technologies [7]. Building on Gilster's approach, the European Commission defines digital literacy competencies broadly, referring to a combination of knowledge, skills, attitudes, and values that encompass problem-solving, communication, information management, collaboration, content creation, and sharing in professional, educational, social participation, and consumer contexts, while using information and communication technologies ethically, critically, creatively, autonomously, and flexibly [8],[9]. However, continuously evolving technological, cultural, and social dynamics reshape the purposes and methods through which individuals use digital technologies, leading to varied definitions of digital literacy in the literature [10]. Teachers, as the core actors of the education system, must possess advanced digital literacy

skills in order to integrate digital technologies into pedagogy and guide students effectively. The perceptions of prospective teachers—future educators—toward this concept hold critical importance as they are expected to directly shape their future professional practices and the digital competencies of future generations [11],[12].

The rapid transformation of educational environments in the digital age makes it essential to thoroughly understand prospective teachers' perceptions of digital literacy. The quality of the teaching profession depends not only on the ability to use technological tools but also on how digital culture, information security, critical media literacy, and online ethical behaviors are reflected in pedagogical processes. In this regard, metaphors provide a powerful source of data, as they reveal individuals' mental representations of abstract concepts, making visible how prospective teachers make sense of digital literacy, which analogies they employ, and which dimensions they emphasize. Although there are numerous studies on digital literacy competencies in the literature, research focusing on prospective teachers' metaphorical perceptions of this concept remains limited, increasing the originality of the present study. By uncovering prospective teachers' mental images regarding digital literacy, this study aims to provide valuable insights for improving technological adaptation, digital pedagogical competencies, and future teacher profiles in teacher education programs. Therefore, it contributes to identifying the needs of teacher education within the process of digital transformation and fills an important gap in the literature.

Material and Methods

A. Research Design

This study is a qualitative research that aims to reveal prospective teachers' perceptions of the concept of "digital literacy" through metaphors. The phenomenology design was used in the study. This design allows for an in-depth examination of individuals' subjective perceptions, meaning-making processes, and experiences related to a particular phenomenon [13].

B. Study Group

The study group consists of a total of 45 prospective teachers studying in the Faculty of Education at Sivas Cumhuriyet University during the spring semester of the 2024–2025 academic year. The criterion sampling technique, one of the purposive sampling methods, was used in the selection of participants. The criterion was that participants should be prospective teachers who actively use digital tools.

Table 1 shows that the highest number of participants comes from Social Studies Teaching (33.3%) and Turkish Language Teaching (26.7%). Together, these two departments constitute nearly two-thirds of the study group. Other departments are represented with lower percentages: English Language Teaching with 8.9%, Mathematics Teaching, Preschool Teaching, and PCG each with 4.4%, and Science Teaching with 2.2%. This distribution indicates

that although the study includes participants from different disciplines, it is predominantly represented by prospective teachers in verbal fields.

Table 1. Distribution of the study group by department

Education Department	n	*f (%)*
Social Studies Teaching Department	15	33.3
Turkish Language Teaching Department	12	26.7
English Language Teaching Department	4	8.9
Mathematics Teaching Department	2	4.4
Pre-school Teaching Department	2	4.4
Psychological Counseling and Guidance (PCG)	2	4.4
Science Teaching Department	1	2.2
Total	**45**	**100**

C. Data Collection Tools

Data were collected through an open-ended metaphor form in which participants were asked to complete the prompt: *"Digital literacy is like … because …"*. Participants were required to justify the metaphor they produced. This approach enables individuals to describe the phenomenon in their own words, making their subjective perceptions and thoughts about the concept visible [14],[15]. In this way, mental images, personalized meanings, and symbolic associations related to the concept of digital literacy were identified.

D. Data Analysis

The forms were analyzed using the content analysis method. First, invalid metaphor statements, left blank, or lacking semantic integrity were excluded. Afterwards, metaphors with similar meanings were grouped, and their frequencies were calculated. During the coding process, the steps of open coding, category development, and thematization were followed [16]. The identified metaphor codes were reviewed by three experts specializing in metaphor analysis for field relevance. To ensure coding reliability, two researchers independently coded the metaphors, and the findings were compared to establish intercoder agreement

Results

A. Metaphors created by participants regarding digital literacy

The metaphors obtained from 45 pre-service teachers were analyzed, and metaphors with similar meanings were combined to create Table 2.

Table 2. Metaphors created by participants regarding digital literacy

Metaphor	*n*	Metaphor	*n*
Book	5	Critical thinking	1
Knowledge	4	Effective communication	1
True literacy	4	Ship's rudder	1
Technology	4	Lens of glasses	1
Life	2	High-speed train	1
Problem solving	2	Medicine	1
Authentic literacy	2	Unexplored forest	1
Grammar	1	Informal education	1

Metaphor	*n*	Metaphor	*n*
Driving car	1	Cultural awareness	1
Gardening	1	Media literacy	1
Brain	1	Drawing	1
Flower	1	Digital game	1
Sea voyage	1	Cooking	1
Writing poetry	1	Student questionnaire	1
Pen	1	Basic arithmetic skills	1
Bread and water	1		

According to Table 2, the most frequently repeated metaphors were "book" (n = 5), "knowledge" (n = 4), and "true literacy" (n = 4). The high frequency of these metaphors indicates that participants predominantly associate digital literacy with learning, accessing information, and research processes. The metaphors "traditional literacy," "problem solving," and "life", each repeated twice, suggest that digital literacy is also conceptualized in relation to everyday life practices and cognitive skills. The fact that the remaining metaphors were expressed only once demonstrates that there are highly diverse and multidimensional mental representations of digital literacy among the participants. Furthermore, a word cloud visualization was created to illustrate these metaphors and highlight their conceptual intensity.



Fig. 1. The word cloud visualization

B. Metaphor Categories

As a result of the content analysis conducted by considering the semantic similarities of the metaphors, the metaphors related to digital literacy were grouped under specific themes. This thematic classification was carried out in order to systematically reveal the dimensions through which prospective teachers conceptualize digital literacy. Accordingly, the metaphors were evaluated not merely as individual expressions but as holistic themes reflecting shared cognitive structures and tendencies. The distribution of the metaphor categories identified within this framework is presented in Fig. 2.

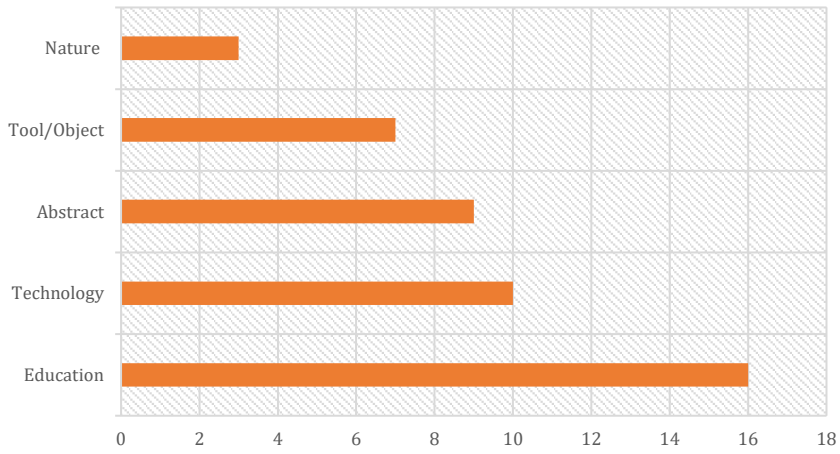


Fig. 2. Distribution of metaphors by conceptual categories (n=45)

An examination of the categorical distribution of the metaphors reveals that the Education category has the highest frequency (n = 16). This category indicates that participants predominantly associate digital literacy with processes of learning, understanding, interpreting, and accessing information. The Technology category (n = 10), which ranks second, demonstrates that digital literacy is conceptualized in terms of technological tools and digital media use skills. The Abstract category (n = 9) reveals that participants interpret digital literacy within the context of cognitive processes, life experiences, and personal development. The relatively lower frequencies observed in the Tool/Object (n = 7) and Nature (n = 3) categories suggest that digital literacy is perceived by this group primarily through its cognitive and educational dimensions. Fig. 3 to Fig. 7, some direct quotations from pre-service teachers' metaphors related to the conceptual categories are presented.

1. Education Category

The Education category highlights how pre-service teachers conceptualize digital literacy as an essential learning competence. Participant P5 compares digital literacy to reading a book, emphasizing its value in refreshing prior knowledge and acquiring new information in a rapidly evolving technological era. This metaphor positions digital literacy as the backbone of contemporary learning. Similarly, P32 associates digital literacy with traditional literacy, noting that both require the ability to understand, evaluate, and communicate information effectively, underscoring its foundational educational role.

> **P5:** Digital literacy is like reading a book because, if we use digital literacy healthily and effectively, it is highly beneficial for refreshing existing knowledge and learning new information. In the face of rapidly developing and expanding technology, digital literacy constitutes the backbone of learning.

> **P32:** Digital literacy is similar to traditional literacy skills because both involve an individual's ability to understand, evaluate, and communicate information effectively.

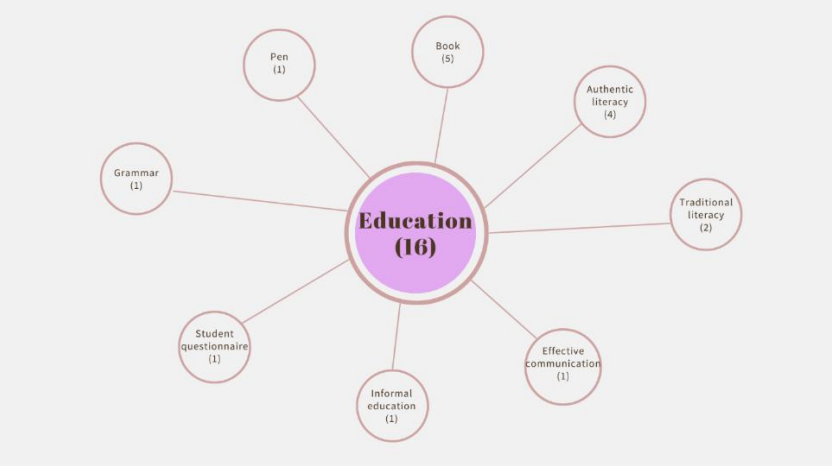


Fig. 3. Quotations from Pre-Service Teachers' Metaphors Related to Education

2. Technology Category

The Technology category illustrates how pre-service teachers perceive digital literacy as closely intertwined with technological tools and systems. Participant P23 compares it to a pair of eyeglasses, emphasizing its function as a lens for filtering, analyzing, and evaluating information accurately. P24 highlights its dynamic nature, noting that digital literacy evolves alongside technological advancements. P35 likens it to a high-speed train, stressing speed and efficiency in accessing information. Meanwhile, P38 underscores its connection to networked devices and content production, and P42 compares it to driving a car, emphasizing responsible and skillful use to avoid negative consequences.

> **P23:** Digital literacy is similar to a pair of eyeglasses. Because the digital world is filtered through a lens that allows information to be scanned, synthesized, and evaluated as correct or incorrect, thereby fulfilling the need for literacy in a manner as eyeglasses.
>
> **P24:** Digital literacy is similar to technology itself because it is in a constant state of development and interaction with humans. As technology evolves, digital literacy develops in parallel.
>
> **P35:** Digital literacy is like a high-speed train because it enables us to reach information that would otherwise take a long time to access in a faster and more reliable way.
>
> **P38:** Digital literacy is comparable to concepts such as finding and understanding information through networked devices like smartphones and tablets, as it fundamentally refers to a form of literacy that encompasses not only the effective use of new media environments and the ability to read their content, but also the capacity to produce content specific to media platforms.
>
> **P42:** Digital literacy is like driving a car because if you know when and where to use the brake or clutch, you avoid accidents; however, if these actions are performed incorrectly, serious consequences may occur. Similarly, when digital literacy is used improperly or in the wrong context, individuals may lose access to accurate and reliable information.

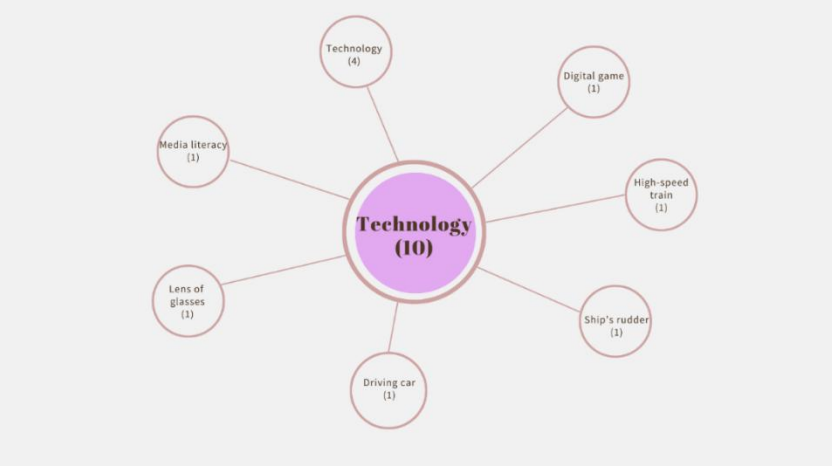


Fig. 4. Quotations from Pre-Service Teachers' Metaphors Related to Technology

3. Abstract Category

The Abstract category reflects pre-service teachers' perceptions of digital literacy as a conceptual and cognitive capacity extending beyond technical skills. Participant P8 associates digital literacy with cultural understanding, emphasizing the ability to interpret and respect diverse perspectives encountered on digital platforms. P12 compares it to knowledge, highlighting competencies such as accessing, evaluating, and communicating information effectively. Similarly, P26 links digital literacy to critical thinking, stressing the importance of questioning sources and drawing accurate conclusions. Meanwhile, P27 likens it to life itself, suggesting that meaningful experience and personal growth are essential for navigating the digital world successfully.

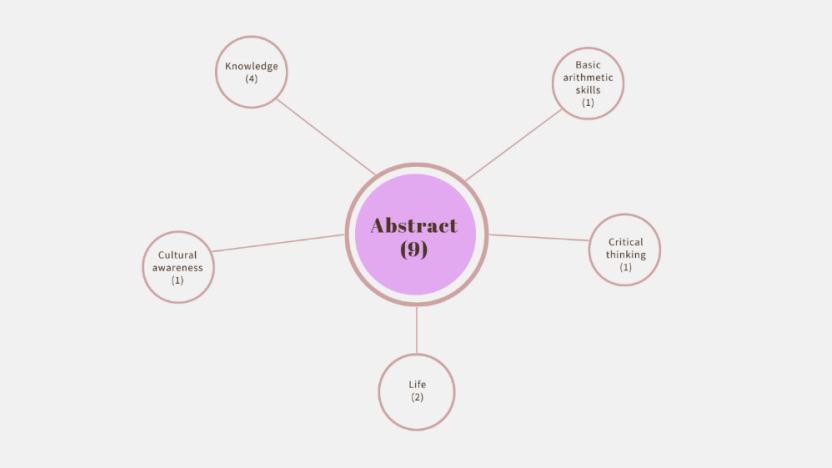


Fig. 5. Quotations from Pre-Service Teachers' Metaphors Related to Abstract

P8: Digital literacy is similar to cultural understanding because both involve the ability to understand and respect different cultural contexts encountered through interaction on various digital platforms.

P12: Digital literacy is comparable to knowledge because it commonly develops skills such as accessing information, evaluating information, and communicating effectively.

P26: Digital literacy is similar to critical thinking skills because both involve questioning information, evaluating data from multiple sources, and reaching accurate conclusions.

P27: Digital literacy is like life itself because, if individuals lack experience or if it does not contribute to personal development, it can become challenging in many respects.

4. Nature Category

The Nature category illustrates how pre-service teachers conceptualize digital literacy as an organic and evolving phenomenon. Participant P16 compares digital literacy to a flower, emphasizing that it requires continuous care, guidance, and cultivation to grow and flourish. This metaphor highlights the importance of sustained learning and support. Meanwhile, P39 likens digital literacy to unexplored forests, suggesting a dynamic landscape filled with new paths and discoveries. This perspective underscores the idea that digital literacy involves exploration, adaptation, and the development of innovative approaches as technology and information environments continue to expand.

P16: Digital literacy is likened to a flower because, like a flower, it needs to be nurtured and cultivated to grow.

P39: Digital literacy is similar to unexplored forests because digital literacy can be described as the discovery of new paths, as long as existing methods fail to adequately address it, and as new approaches continue to emerge.

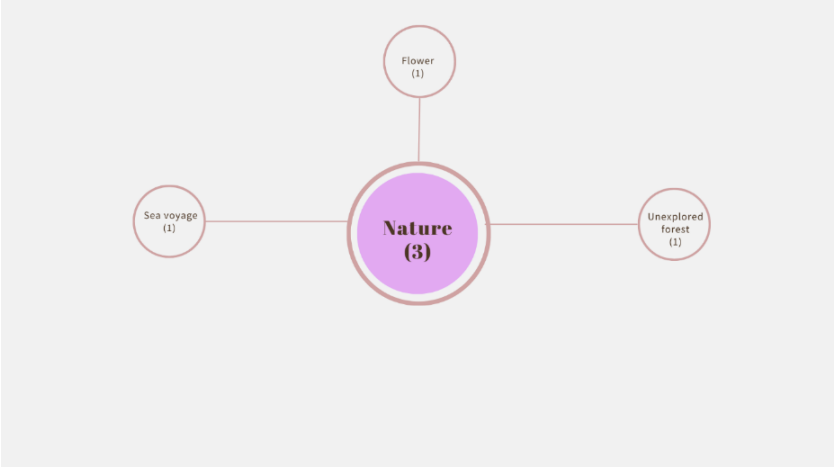


Fig. 6. Quotations from Pre-Service Teachers' Metaphors Related to Nature

5. Tool/Object Category

The Tool/Object category portrays digital literacy as a practical and essential instrument in everyday life. Participant P2 compares it to cooking, emphasizing the integration of diverse "ingredients" such as information, skills, and media to produce meaningful outcomes. P10 likens digital literacy to bread and water, underscoring its role as a fundamental necessity in contemporary society. Similarly, P21 draws an analogy with gardening, describing digital environments as soil and content as seeds that require careful cultivation, organization, and evaluation. Meanwhile, P43 compares digital literacy to

medicine, highlighting its function as a solution to various informational and societal challenges.

P2: Digital literacy is similar to cooking because, while cooking, various ingredients are brought together to create a meaningful outcome.

P10: Digital literacy is like bread and water, which hold an essential place in daily life today, because it is a basic necessity.

P21: Digital literacy is similar to gardening because the digital environment can be likened to soil, which forms the foundation of a garden, just as digital environments form the foundation of digital literacy. The seeds planted in the soil can be compared to content, as they may transform into texts, images, or sounds, just as seeds grow into plants. In this sense, digital literacy can be likened to gardening skills: a gardener plants seeds, nurtures growth, and organizes the garden, while digital literacy involves understanding, evaluating, interpreting, and effectively using digital content.

P43: Digital literacy is similar to medicine because, like medicine, it often serves as a remedy for various problems.

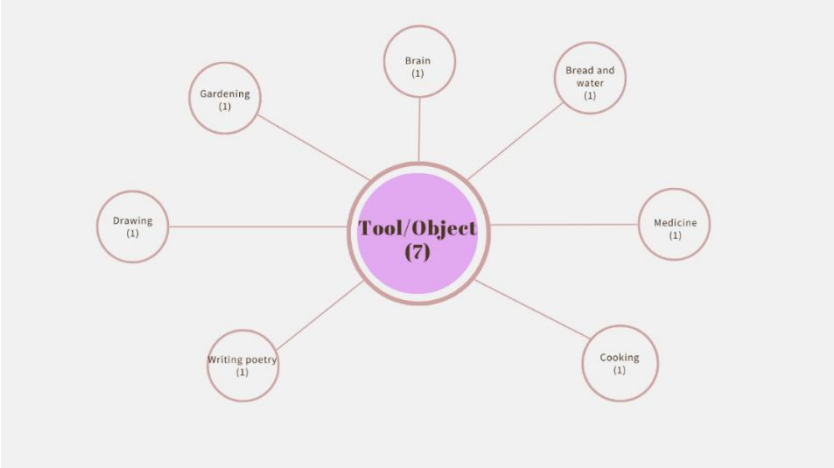


Fig. 7. Quotations from Pre-Service Teachers' Metaphors Related to Tools/ Objects

Discussions

In this study, prospective teachers' metaphorical perceptions of the concept of digital literacy were examined, and the ways in which they conceptualized this notion through metaphors were explored in depth. Overall, the findings indicate that prospective teachers predominantly define digital literacy in relation to education, knowledge acquisition, learning processes, critical awareness, and the appropriate and responsible use of technology. The frequent use of metaphors such as *book*, *knowledge*, and *true literacy* suggests that digital literacy is perceived primarily as a tool for learning, understanding, and meaning-making rather than merely as a technical competence. In this sense, participants' perceptions align with Gilster's foundational definition of digital literacy, which emphasizes that it extends beyond operational computer skills and involves the ability to structure, analyze, and reconstruct information meaningfully [6]. Similarly, Ferrari and Punie [8] argue that digital literacy encompasses higher-order cognitive and social skills, including information

management, communication, collaboration, problem-solving, and content creation, rather than being limited to the use of digital tools.

An examination of the categorical findings reveals that the metaphors were largely concentrated in the Education category. This concentration indicates that prospective teachers situate digital literacy within pedagogical and instructional contexts. The literature consistently highlights digital literacy as a fundamental competence that enhances critical thinking, information processing, creativity, and problem-solving skills in educational settings [17]. The prominence of educational metaphors suggests that participants conceptualize digital literacy as an integral component of teaching and learning processes. Rather than framing it as an external or supplementary skill, they appear to regard it as embedded within classroom practices and lifelong learning. This perspective resonates with the "new literacies" framework proposed by Lankshear and Knobel [18], which conceptualizes digital literacy as a socially situated practice shaped by participation, collaboration, and meaning construction in digital environments.

Importantly, the participants' use of metaphors such as *book* indicates that digital tools are perceived primarily as means for accessing, organizing, and interpreting information, rather than as ends in themselves. This distinction reflects a sophisticated understanding of the cognitive dimension of digital literacy. Instead of focusing on hardware or software proficiency, prospective teachers emphasized interpretation, evaluation, and purposeful engagement with content. This finding directly corresponds to the cognitive dimension—particularly critical thinking and information evaluation—outlined in Ng's digital literacy model [19]. Ng [19] emphasizes that effective digital literacy involves the integration of technical, cognitive, and socio-emotional dimensions. The metaphors identified in this study strongly highlight the cognitive aspect, suggesting that participants prioritize analytical engagement over mechanical usage.

Another notable finding is the emergence of metaphors such as *problem solving*, *life*, and *medicine*, particularly within the Abstract category. These metaphors extend the conceptualization of digital literacy beyond formal education and into broader life contexts. Associating digital literacy with *life* suggests that participants perceive it as an indispensable, ongoing, and experiential process that shapes daily decision-making and personal development. Eshet-Alkalai conceptualizes digital literacy as a "survival skill" in the digital era, enabling individuals to intuitively manage complex digital tasks and environments beyond mere technical manipulation. The life metaphor identified in this study can be interpreted as reflecting this theoretical perspective within the cognitive schemas of prospective teachers. It implies that digital literacy is internalized as a foundational competence necessary for navigating contemporary society.

Furthermore, metaphors such as *driving a car* introduce a critical dimension related to responsibility, risk, and safety. Participants' references to "having an accident" when digital literacy is misused indicate awareness of potential dangers in digital environments, such as misinformation, privacy violations, or unethical behavior. This perception aligns closely with the Digital Safety and Digital Responsibility dimensions of Ribble's Digital Citizenship framework [20]. Ribble [20] underscores that effective participation in digital spaces requires not only access and skills but also ethical awareness, safety consciousness, and responsible conduct. The presence of such metaphors suggests that prospective teachers are developing an understanding of digital literacy that includes moral and civic considerations.

Taken together, these findings demonstrate that prospective teachers conceptualize digital literacy as a multidimensional construct encompassing cognitive, educational, social, and ethical components. Their metaphors reflect alignment with established theoretical frameworks [6], [8], [17]–[20], indicating that digital literacy is perceived not merely as technical proficiency but as an essential competence for critical engagement, lifelong learning, and responsible digital citizenship in contemporary society.

Conclusion

In conclusion, the findings reveal that prospective teachers' perceptions of digital literacy have developed in a way that reflects the multidimensional nature of the concept. Participants view digital literacy as a resource that facilitates access to information, a skill necessary for survival in modern life, and a process that must be managed carefully. These results highlight the importance of strengthening digital literacy education within teacher education programs and suggest that pedagogical practices should emphasize not only technical competencies but also cognitive, ethical, and critical dimensions of digital literacy.

Conflict of Interest

The authors declare no conflict of interest.

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