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Research Paper

A Phenomenological Research on Examining Middle School Teachers' Digital Competency Self-Efficacy Perceptions and Beliefs about Self-Regulation

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ABSTRACT
The primary purpose of the research is to examine middle school teachers' self-efficacy perceptions of digital competence. The participants of this study, which was conducted using the phenomenology pattern of the qualitative research approach, consisted of 17 middle school teachers who were determined using the criterion sampling method, one of the purposive sampling methods. The data were collected using a semi-structured interview form developed by the researchers and analyzed by content analysis. As a result of the research, it was determined that teachers mostly tried to define the concept of digital competence as having technology and software knowledge. It has been observed that teachers' self-efficacy perceptions of digital competence are generally at a moderate level. Middle school teachers mainly stated the factors contributing to self-efficacy as being able to do daily and professional life in a digital environment and using digital devices, software, and the internet. In contrast, they stated that the factors that lead to poor self-efficacy perceptions are the inability to use digital devices and software comprehensively and to prepare content.

INTRODUCTION

The developing and growing world is accompanied by new information and technologies daily; thus, the accumulation of knowledge expands daily. Rapidly advancing technology has settled in human journeys and has taken place in all areas of life. Needs and demands have emerged due to quickly growing technological developments in many different areas, such as daily life, education, work, citizenship, and health. From this point of view, the knowledge, skills, and experiences people should have from technological and scientific developments also embark on a journey of change (Ekmen & Bakar, 2018). In particular, the COVID-19 pandemic has made the need for digital skills even more indispensable (Iansiti & Richards, 2020). In this context, many studies have been conducted highlighting the need to develop digitally competent, literate, talented, and skilled people in the ever-changing technological and online environment (Fulton and McGuinness, 2016; Martzoukou, Fulton, Kostagiolas, and Lavranos, 2020). However, many concepts have emerged regarding what characteristics individuals should have and what they should achieve to be sufficiently "digital", and the definitions formed within this framework have been discussed in this field (Martzoukou, et al., 2020). Many concepts have emerged to describe the innovations that emerge with digitalization and the skills to use them. Some of these concepts are internet skills, technology skills, information and communication technology literacy, digital citizenship, digital literacy, technology literacy, digital competence, etc. (Erişen, Gürültü, and Bildik, 2018). Digital competence, which is one of the newest concepts that has emerged recently, is a concept that has been included in many political documents, including many essential points, including the knowledge and skills that individuals should have in the information society and what and how to teach individuals (Ilomäki, Paavola, Lakkala, & Kantosalo, 2016).

Digital technologies open the door to a brand-new world for children, offering them a new world without any time or space limitation. Accordingly, it has become a necessity for children who have opened their eyes to the digitalizing world and must live with technology to understand, use, and manage technology correctly (Ekmen and Bakar, 2018). In this context, one of the main goals of education should be to raise individuals who can use technology effectively and efficiently in an ethical framework, manage, produce, and share information. For this reason, it becomes important how the information to be taught is conveyed to the student. In this context, it is the teachers who will guide the students.

With the rapid development of technology, many concepts have begun to be used to express competence in this field. In this regard, concepts such as digital skills, information technology skills, information literacy, digital literacy, media literacy were used (Erişen, Gürültü, and Bildik, 2018). One of the new concepts that is related to all these skills and has recently gained a place in the literature is the concept of digital competence (Ilomäki, Kantosalo, & Lakkala, 2011, p. 1). Digital competence was first defined by Paul Gilster in 1997 as "the ability to understand and use information presented in different formats from various sources via the

computer" (Larraz and Esteve, 2015, p. 99). The European Commission (2006), in its report "Key Competencies for Lifelong Learning," defined digital competence as the safe and critical use of information and communication technologies for work, entertainment, leisure, learning, and communication. The lack of a generally accepted definition of the concept is due to the continuous development of digital technologies and their increasing influence in all areas of life. Additionally, the concept of digital competence is multidimensional. For this reason, the necessity of creating a digital competence definition that can be used by everyone and can explain the technological competence of all people in the 21st century has emerged (Erişen, Gürültü, and Bildik, 2018). From this point of view, this study first aims to examine phenomenologically how middle school teachers interpret digital competence.

Digital competence is described as an indicator of quality education in the 21st century (Maderick, Zhang, Hartley, & Marchand, 2016). 21st-century learning skills; digital literacy, which includes visual, multicultural, and information literacy; creative thinking, which includes adaptation, self-management, curiosity, creativity, reasoning, and risk-taking skills; collaboration, team building, social responsibility, etc., effective communication skills; It consists of skills such as productivity, which includes the skills of planning, managing, using information technologies efficiently, and producing high-value products (Önür and Kozikoğlu, 2019). While teachers used to be instructors who created and presented the learning content in accordance with the student's level and ensured that the content was acquired, they are now teaching students in the 21st century. They have turned into teachers who are 21st-century learning companions, guiding them in their learning processes (Kurt et al., 2022). The leading 21st-century learner skills are digital competencies based on learning with digital technologies. Teachers also need to organize learning activities based on increasing digital competencies. When the research are examined, it is revealed that although teachers are proficient in the use of technology, they are not sufficiently equipped in terms of its educational use (Cuban, 2001; Lei, 2009). According to Cuban (2001), teachers have problems with how to reflect technology into classroom practices. For this reason, it is important for teachers to be aware of their own digital competencies for them to be digitally satisfied, to see the positive effects of technology on teaching-learning, and to eliminate their deficiencies. 21st-century teachers are expected to design teaching activities using developing technologies and reflect this in their course practices. To realize these expectations, first of all, teachers' self-efficacy within the scope of digital competence should be determined, and studies should be carried out on this subject. Starting from this point, this study aims to secondly examine the digital competence self-efficacy of middle school teachers phenomenologically.

It can be said that teachers with a high level of digital competence will contribute in terms of perspective on innovations and directing education. For this reason, how teachers perceive their self-efficacy perceptions of digital competence will affect their individual development and the education-teaching process. Self-efficacy is included in the social cognitive theory and can be explained as an individual's self-awareness, comparing his/her performance with his/her capacity, and acting in this context (Deniz & Algan, 2007). On the other hand, the self-efficacy level can be explained as the degree of difficulty that a person thinks she/he will face when performing a job (Arseven, 2016). It is thought that determining the knowledge and self-efficacy of teachers within the scope of digital competence and adjusting accordingly within the scope of education will offer a new perspective to education that is changing in the digital age. In addition, it has been observed that the studies conducted based on digital competence are insufficient. Within the scope of these limited studies, the opinions of the books and curricula (Ekmen & Bakar, 2018; Hazar, 2018; Yener, 2022), the informatics teachers about digital competence (Erişen, Parlak & Bildik, 2018), and the teacher candidates (Çebi & Reisoğlu, 2020) digital competence levels (Akdemir, 2022) were examined. There are no studies on how middle school teachers define the concept of digital competence and their self-efficacy. For these reasons, it is thought that the research to be done will fill the literature gap and is considered essential.

Teachers are obliged to teach the course curriculum published by the Ministry of National Education to the students. For this reason, the teacher must be a digitally competent individual to realize the goals related to digital competence in the curriculum. Therefore, how teachers make sense of this concept and their self-efficacy constitute the main problem of this research. The main purpose of the research is to examine the digital competence self-efficacy perceptions of middle school teachers. In line with this main purpose, answers to the following questions were sought:

1. What are the middle school teachers' views on the meaning of digital competence?
2. What are their digital competence self-efficacy levels?
3. What are the factors contributing to the digital competence self-efficacy level?
4. What are the factors that lead to poor digital competence self-efficacy perception?

THEORETICAL FRAMEWORK

Digital Competence

There are many definitions of digital competence in the literature. Some of the definitions within this scope are as follows: Krumsvik (2014) defines it as the use of information and communication technologies in helping teachers create students' learning strategies and making sense of them; From (2017) defines it as the ability to use information and communication technologies; Vieru (2015) defines it as the ability to use information and communication technologies effectively, efficiently, and critically in order to ensure individual development and participation in society within the scope of lifelong learning. Ilomäki et al. (2016) examined 76 studies including the concept of digital competence and found that this concept includes being technically proficient, being able to use information and communication technologies in work and daily life, being able to effectively evaluate information and communication technologies, participating in the information society, using technology ethically, etc. Similarly, Ferrari, Punie & Redecker (2012) tried to explain how digital competence is defined by examining different studies. In this context, digital competence of researchers is defined as "the ability to use information and communication technologies ethically, responsibly, and

collaboratively to solve problems, communicate and manage information; Being able to create and share information and content at work, in free time, in learning and socializing environments, etc. They defined it as "the set of knowledge, skills, attitudes, abilities, strategies and awareness required to perform operations" (Ferrari, Punie & Redecker, 2012). The reason why there is no valid and accepted definition of the concepts is since information and communication technologies are constantly renewing themselves, developing and increasing their impact in all areas of life. In addition, the concept of digital competence is a multidimensional concept that includes many skills and abilities. For these reasons, it has become necessary to create a definition of digital competence valid for everyone that can express the technological competence of all people in the 21st century (Erişen, Gürültü, and Bildik, 2018). In this context, the European Commission report (European Commission, 2006) showed digital competence as one of the eight key competencies that individuals must have to be compatible with the changing and developing world conditions, and they tried to put forward a comprehensive definition in this context. From this point of view, digital competence is defined as the safe and critical use of information society technologies for business, daily life, and communication, to access information, use computers to evaluate, store, produce, present, and exchange information, and to participate in public networks and communicate via the Internet (European Commission, 2006). This definition has taken its place in international political documents.

Digital Competence Framework

To determine the basic components within the scope of digital competence, the European Digital Competences Framework, also known as DigComp, was developed in 2013 to provide guidelines and a conceptual framework valid at the European level. DigComp was first published in 2013 (Ferrari, 2013), then revised as DigComp 2.0 in June 2016 (Vuorikari, Punie, Carretero Gomez, and Van Den Brande, 2016), and further updated in 2017 as DigComp 2.1 (Carretero Gomez, Vuorikari, and Van Den Brande, 2016; Punie, 2017). Finally, DigComp 2.2, the latest version of DigComp, was published in 2022 (Vuorikari, Kluzer, and Punie, 2022). Within this framework, which is generally accepted in European countries and integrated into the education policies of many nations, there are five fundamental dimensions. These dimensions are stated as “information and data literacy”, “communication and collaboration”, “digital content creation”, “security”, and “problem-solving” (Ferrari, 2013). The competencies deemed essential for every individual today are elaborated under these dimensions. The qualifications of teachers within the scope of the digital competence framework, which is internationally accepted and assessed as part of professional competence, will enhance the efficiency of the education-teaching process.

Creating a national qualification framework that will increase the quality of education and training and strengthen the relationship between employment and education is among the priority needs of Turkey, as in many other countries. From this point of view, a Turkish Qualifications Framework has been established in line with the European Qualifications Framework, which will support the education and training needs of all individuals in society through lifelong learning and ensure the development of qualifications required for the labor market (Vocational Qualifications Authority [VOA], 2016). In addition, it has been decided that the critical competencies in this framework will be included under the title of Turkish Competences Framework in the curriculum updated in 2018 (Ministry of National Education [MoNE], 2018). Digital competence is one of the eight key competencies within the scope of lifelong learning. These reports define digital competence as the critical and safe use of information and communication technologies for business, entertainment, education, and communication purposes (VOA, 2016).

Self-Efficacy

Self-efficacy is a motivation theory developed by Albert Bandura, who also created the social learning theory. According to this theory, the psychological processes within a person contribute to the development and re-establishment of their competence expectation (Akar, 2008). The perception of self-efficacy is defined as the individual's belief in what they can do with their own skills (Senemoğlu, 2007). If individuals believe that they have the necessary ability and control power to perform a task or skill, they will be more willing to engage in it (Yenilmez & Kakmacı, 2008). A high level of self-efficacy enables individuals to set higher goals for themselves, be consistent in their decisions, and increase their cognitive processes and motivation (Azar, 2012). Bandura stated that self-efficacy in a particular field affects individuals' thought processes, motivation levels, and emotional states regarding tasks in the same field, and therefore influences their performance (Hatlevik & Hatlevik, 2018). Therefore, individuals with high levels of self-efficacy are expected to be more willing to participate in activities related to the same subject, be more enthusiastic about learning the subject, and have higher expectations in this regard. Having a high self-efficacy belief is thought to be as important as acquiring the skill itself (Mannila, Nordén, & Pears, 2018).

When self-efficacy beliefs are evaluated in terms of the teaching profession, teacher self-efficacy is related to "teachers' beliefs that they can provide good teaching in the classroom" (Christophersen, Elstad, Turmo & Solhaug, 2016). Teachers' self-efficacy levels are an important predictor of students' motivation and success (Caprara, Barbaranelli, Steca & Malone, 2006; Guo, Connor, Yang, Roehrig & Morrison, 2012). Social cognitive theory points out the positive impact of individuals' perceptions of their own competence and abilities in the same field and similar interests (Hatlevik & Hatlevik, 2018). In teacher self-efficacy research, it has been determined that there is a positive significant relationship between teacher self-efficacy and the development of students' motivation, success, and competence (Ross, Hogaboam-Gray & Hannay, 2001; Thoonen, Sleegers, Peetsma & Oort, 2011; Turel, 2014; Zee & Koomen, 2016).

Teachers' self-efficacy levels regarding their own digital competencies are considered essential for utilizing digital tools effectively in teaching and are seen as significant. However, only a limited number of studies have been conducted in the literature to examine digital competence and self-efficacy in this context (Mannila, Nordén, & Pears, 2018). It is believed that this research will contribute

to filling the gap in the literature. Research reveals that research primarily focuses on analyzing the use of information technologies in education and teachers' self-efficacy in this regard. Consequently, it has been found that being an effective teacher of information technologies can lead to a higher level of confidence (Fanni, Rega & Cantoni, 2013). Additionally, there is evidence indicating a positive relationship between teachers' self-efficacy in the use of digital tools and the integration of information technologies for instructional purposes (Hatlevik, 2017; Teo, 2014). Moreover, a positive relationship between teacher candidates' computer uses and computer self-efficacy has been identified (So, Choi, Lim & Xiong, 2012). Therefore, it is assumed that teachers with high self-efficacy in the use of technology will be better able to integrate technology into their teaching practices effectively to create more conducive educational environments (Ogodo, Simon, Morris & Akubo, 2021). In this research, we aim to qualitatively explore how teachers perceive their own digital competence self-efficacy and which competencies influence this perception.

METHOD

Research Model

This research employs a phenomenological pattern within a qualitative research approach. In the phenomenology model, the focus is primarily on phenomena that are recognized but not fully understood (Şimşek, 2015). Phenomenological studies may not yield definitive and generalizable results due to the nature of qualitative research. However, they can unveil examples, explanations, and experiences that contribute to a better understanding of a phenomenon (Yıldırım & Şimşek, 2016). The phenomenology model was chosen for this research because it is well-suited for examining how teachers comprehend the concept of digital competence and their self-efficacy perceptions in this regard.

Study Group

The research participants comprise 17 teachers employed in public middle schools in Turkey. The criterion sampling method, a form of purposive sampling, was employed to select participants. Criterion sampling involves examining all instances that meet a predetermined set of criteria (Yıldırım & Şimşek, 2016). In determining the participants, criteria including being a middle school subject teacher, possessing a minimum of five years of teaching experience, and volunteering to partake in the research were considered. Demographic information regarding the participants is presented in Table 1.

Table 1. Distribution of teachers participating in the interview according to demographic variables

Variables	Sub-Dimensions	f	%
Gender	Female	10	58.8
	Male	7	42.2
Seniority	5-10	12	70.6
	11-15	5	29.4
Branch	English	4	23.5
	Maths	4	23.5
	Science	3	17.6
	Turkish	3	17.6
	Social Studies	3	17.6

As seen in Table 1, 10 participants were female, and seven were male. There are 12 teachers with 5-10 years of seniority and five teachers with 11-15 years of seniority. Within the scope of the research, mathematics (f: 4), social studies (f: 4), English (f: 3), Turkish (f: 3), and science (f: 3) teachers were interviewed.

Data Collection Tools

The study's data were collected using the "Interview Form on Teachers' Digital Competence Self-Efficacy Perceptions," which was developed by the researchers specifically for this study. The interview form begins with inquiries about personal information such as gender, years of service, and teaching branch of the participating teachers. Subsequently, four open-ended questions were included in alignment with the sub-objectives of the research. During the preparation of the interview form, preliminary questions were drafted. These draft questions were then reviewed by two experts with experience in qualitative research, and the interview form was finalized based on their feedback. The interviews, which lasted approximately 10-15 minutes each, were recorded using a voice recorder. The questions in the interview form are outlined as follows:

1. What is your understanding of the concept of digital competence? If asked to define this concept, how would you articulate it?
2. How would you assess your level of self-efficacy regarding digital competence?
3. What are the factors that positively influence your level of digital competence? Could you elaborate on them?
4. Conversely, what are the factors that negatively impact your level of digital competence? Could you provide explanations for these factors?

Data Analysis

Content analysis was employed to analyze the data gathered from the interviews. Content analysis involves collecting similar data related to specific concepts, categories, and themes and organizing and interpreting them in a manner that is comprehensible to the reader (Yıldırım & Şimşek, 2016). All collected data were transferred to a computer environment, and raw data texts were obtained to initiate the analysis process. Subsequently, coding was conducted on these texts. The coding process entails grouping textual or visual data into small categories of information, seeking evidence for codes from various data sources used in the study, and assigning labels to the codes (Creswell, 2020). At the conclusion of this process, themes and codes were identified and analyzed. To maintain anonymity, teachers were anonymized and referred to as "T1" or "T2" instead of using their names.

Validity and Reliability

Lincoln and Guba (1985, as cited in Yıldırım & Şimşek, 2016, p. 276) propose strategies that enhance the quality of qualitative research. These strategies, termed as “credibility (internal validity),” “transferability (external validity),” “consistency (internal reliability),” and “confirmability (external reliability),” are particularly suited to the nature of qualitative research. To enhance the credibility of the study, the identified codes and developed themes were presented to experts experienced in qualitative research, and adjustments were made based on their feedback. Regarding transferability, the data were meticulously described without interpretation, direct quotations from teachers' perspectives were included, and the report was written in clear and understandable language. To ensure consistency, two authors coded the data, ensuring researcher diversity, and the consistency of the codes was assessed using the formula proposed by Miles and Huberman (1994): agreement/consensus + disagreement x 100. The encoder reliability coefficient obtained was .89. According to coding control standards for consistency, a consensus among coders of at least 80% is expected (Miles & Huberman, 1994). Inconsistencies were addressed through coder meetings, where codes were reviewed, and necessary adjustments were made. To bolster the confirmability of the research, both interviews and analyses were recorded in the computer environment.

FINDINGS

In this section, the findings obtained through interviews based on the study's aims are described. In line with the sub-objectives of the research, the findings were analyzed and presented in this order.

Findings Related to The Meaning of The Concept of Digital Competence

In order to examine the teachers' views on the meaning of the concept of digital competence, the teachers question "What do you think the concept of digital competence means? What would you share if you were asked to define this concept?” The answers they gave to the question were analyzed, and the themes and codes were presented in Table 2.

Table 2. Teachers' views on the meaning of the concept of digital competence

Theme	Code	Frequency
Technology and Software Knowledge (f: 30)	Effective use of digital devices and computer	16
	Effective use of the internet	6
	Understand/interpret/criticize digital technologies	6
	Ability to use software	2
Every day/ Responsible Use (f: 7)	Using/benefiting from digital technologies in daily life	5
	Responsible and safe use of digital technologies/media	2
Information Literacy (f: 6)	Ability to access/use information	3
	Communication skill	2
	Ability to analyze the accuracy of information	1
Literacy Scope (f: 5)	Digital literacy	2
	Media literacy	2
	Technology literacy	1

As seen in Table 2, teachers' views on the meaning of digital competence are grouped under four themes: technology and software knowledge, daily/responsible use, information literacy, and the scope of literacy. While teachers expressed the concept of digital competence as knowledge about technology and software the most, they explained the literacy areas they covered the least. The expressions of the teachers in which these views emerged are exemplified below.

> *“I think digital competence means media literacy. In my opinion, digital competence can interpret digital technologies in one's way, to use the internet, the information on the internet and the computer effectively and purposefully...”* (T8)

> *"I perceive it as technological competence. It means how much we can use technology. For example, how much we can use it professionally or daily. I think it means how much we can benefit."* (T9)

> *"In my opinion, digital competence is the ability to communicate with the internet and other technological tools. It can also be defined as the ability to use information in different forms on the internet. Of course, the concept of digital competence also includes using this information ethically and securely. Again, instead of accepting the information as it is, looking at the information obtained critically and confirming it from different sources also falls into digital competence."* (T16)

As can be seen from their statements, teachers interpreted the concept of digital competence in different ways.

Findings related to teachers' views on the digital competence self-efficacy levels

In order to examine the teachers' views on digital competence self-efficacy, the question "What level do you see your competence in terms of digital competence?" was asked of the teachers. The answers given by the teachers were analyzed, and the categories, themes, and codes were presented in Table 3.

Table 3. Teachers' views on the level of digital competence self-efficacy

Theme	Code	Frequency
Perception of Self-Efficacy	Low	2
	Low to Medium	2
	Middle	9
	Medium to High	2
	High	2

As seen in Table 3, most teachers expressed their perception of digital competence as a medium. In addition, four teachers stated that they perceived their digital competency level as above the middle, and four teachers perceived it as below the level.

Findings on Factors Contributing to Digital Competency Self-Efficacy Perceptions

In the interviews, the teachers were asked about the factors that affect their self-efficacy perceptions positively, and the findings obtained because of the analysis of the answers given are shown in Table 4.

Table 4. Teachers' views on the factors that contribute to the level of digital competence self-efficacy.

Theme	Code	Frequency
Daily use (f: 15)	Ability to do daily work in a digital environment	9
	Ability to work in professional life	6
Technology and Software Competencies (f: 12)	Ability to use software (Office, video editing software, etc.)	5
	Ability to use digital devices	3
	Effective use of the Internet	3
	Ability to solve problems encountered in the digital environment	1
Information Literacy (f:10)	Access to information	5
	Ability to do research	4
	Ability to create/edit information	1
Individual/ Developmental Competencies (f: 2)	Saving time with the help of digital technologies	1
	Self-development by leveraging the digital world	1
Content preparation (f: 2)	Ability to create digital content (Presentation, video, etc.)	2

Table 4 shows teachers' views on the factors contributing to their digital competence self-efficacy perceptions, which are grouped under five themes: daily use, technology and software competencies, information literacy, individual/developmental competencies, and content preparation. Teachers stated that they attribute the self-efficacy levels of digital competence to daily usage purposes the most and to content preparation least. The expressions of the teachers in which these views emerged are exemplified below.

> *"I can say it is intermediate level. I can do many things, but there are many things I do not know. I can use it as much as necessary in my profession. For Banking and Health applications, I can use it to find any information..."* (T4)

> *"I am a person who can think analytically. I see myself as a digitally competent individual. I am also aware that I must constantly change and improve myself because technology is constantly changing. I know that I am highly digitally competent. I know how to access information. Because I know how to use technological tools*

effectively. I can save time by using these technologies. I can use it in my profession when preparing my course schedule and presentations. In daily life, I use it constantly when communicating and taking photos." (T10)

"It is not one hundred percent. I would say slightly above average. Of course, I am open to innovations, but I cannot keep up. I think it is a little above average. I can use the computer and the internet at a sufficient level for my needs. I can prepare for exams. I can use Word. I can search the internet. I can prepare a PowerPoint presentation." (T12)

As can be seen from the statements, teachers expressed their views on the elements that contribute to the perception of digital self-efficacy. In this context, it has been observed that the emphasis is generally on the skill-based use of digital competencies, and no views are expressed on the responsible use of technology such as ethics and security.

Findings Regarding Factors Leading to Weak Digital Competency Self-Efficacy Perceptions

Within the scope of the study, with the question "What are the factors that negatively affect the level of digital competence you have, please explain?" it is tried to be determined whether there are points among the teachers that they see themselves as inadequate within the framework of digital competence and what are the factors that cause these points. The findings obtained as a result of the analysis of the answers given by the participants to this question can be seen in Table 5.

Table 5. Teachers' views on the factors that lead to poor digital competence self-efficacy perception

Theme	Code	Frequency
Software information (f: 13)	Inability to use software (Word, Excel, PowerPoint, etc.)	11
	Inability to install software	2
Digital device information (f: 10)	Lack of competence in using digital tools	5
	Inability to solve problems in digital devices/environment	5
Content preparation (f: 8)	Inability to prepare content (Video, presentation, material, etc.)	6
	Inability to create software	2
Privacy and Security (f: 3)	Inability to remain secure in the digital environment	2
	Inability to be protected from malware	1
Use of Educational platform (f: 2)	Inability to use Web 2.0 tools	1
	Inability to use EBA	1

As seen in Table 5, teachers' views on the points they consider inadequate within the digital competence framework are grouped under five themes: software knowledge, digital device knowledge, content preparation, privacy and security, and education platform use. The expressions of the teachers in which these views emerged are exemplified below.

"I would like to use the computer better. I wish I could use computer programs better. I can search for information on the Internet, but I do not know anything beyond that. I have a limited space. I want to expand this field." (T4)

"I feel incapable of using apps. I want to do better in preparing slides in PowerPoint. I want to make a video. For example, adding videos end-to-end. In short, I would like to produce content." (T5)

"I don't know how to use the computer properly. For example, I don't know what I can do if a virus gets into the computer. I just go to Google. I don't know what to do when I encounter a problem. I'm stunned." (T7)

"Since I am interested in shooting videos, I may have difficulty in editing the video I shoot. On matters such as adding sound, cutting video. So I'm having difficulty editing the content. It would be better if I had more information about this." (T10)

As can be seen from their statements, the teachers stated the points that they consider themselves inadequate within the scope of their digital competencies. It is seen that teachers explain the reasons why they feel weak in their digital competencies through the situations in which they feel deficient.

DISCUSSION

Based on the research findings, it is evident that teachers generally define digital competence as the effective use of technological devices and software. Ferrari, Punie, and Redecker (2012) attempted to define digital competence by synthesizing 15 perspectives from political documents, educational frameworks, and certifications. They portrayed digital competence as the ability to utilize information and communication technologies ethically, responsibly, and collaboratively within the digital environment to solve problems, manage information, communicate, create content, and share information and content—an amalgamation of knowledge, skills, abilities, attitudes, strategies, and awareness that individuals should possess. Gallardo-Echenique, Oliveira, Marques Molias,

and Esteve-Mon (2015) analyzed 73 articles on digital competency-related concepts spanning from 1990 to 2014, suggesting that digital competence is a multidimensional concept derived from various fields and disciplines, highlighting its significance in utilizing information and communication technologies and applying 21st-century skills. Ilomaki et al. (2016) reviewed 76 studies incorporating the concept of digital competence and identified its facets, including technical proficiency, the effective use of information and communication technologies in work and daily life, proficient evaluation of these technologies, active participation in the information society, and responsible technology use. Alptekin (2023) characterized digital competence as streamlining work and daily life using technological tools and applications and adapting to the demands of the digital age. Geçgel et al. (2020) elucidated Turkish teachers' perspectives on digital competence, emphasizing the use of tools such as smart boards, computers, phones, and cameras, crafting student-level presentations, positively integrating technology into life, and engaging with social media. Consequently, it appears that teachers' viewpoints align with other conceptualizations of digital competence in the literature, although some variations exist.

When reviewing studies on teachers' self-efficacy in Turkey, it becomes apparent that there are relatively few investigations specifically focused on digital competence. Typically, these examinations emphasize teachers' perceptions of self-efficacy in information technology, primarily conducted through quantitative methodologies. For instance, Gökbulut (2021), Gürbüztürk, Demir, Karadağ, and Demir (2015), Kartal, Temelli, and Şahin (2018), and Öztutucu (2022) all found that teachers generally exhibit a high perception of self-efficacy in information technology. Conversely, Dikmen, Akyıl, and Akçay (2021) identified teachers' perceptions of information technology self-efficacy as slightly above average, which resonates with the findings of the present study. research outcomes argue that teachers tend to view themselves as competent in the realm of information and communication technologies. However, leveraging the advantages of qualitative research, this study examines both the factors contributing to teachers' self-efficacy perceptions and those hindering them. Consequently, it has uncovered various areas where teachers perceive themselves as inadequate. Furthermore, while teachers demonstrate a relatively comprehensive understanding of the concept of digital competence, this study also reveals certain deficiencies in their comprehension.

CONCLUSION

It becomes evident that teachers primarily conceptualize digital competence as proficiency in technology and software. However, they also associate it with the daily use of technology, responsible usage, and information literacy. The predominant sentiments among teachers revolve around the effective utilization of digital devices and computers, adeptness in internet usage, as well as the ability to understand, interpret, and critique digital technologies, along with leveraging digital tools in daily life.

Furthermore, the research indicates that teachers generally perceive their self-efficacy in digital competence at a moderate level. They commonly attribute factors contributing to their self-efficacy to their ability to execute daily and professional tasks in digital environments, proficiency in utilizing digital devices, software, and the internet, content creation, information access, and research. Conversely, they identify factors leading to poor self-efficacy perceptions as the inability to extensively use digital devices and software, challenges in content preparation, difficulties in utilizing educational platforms, and struggles in ensuring digital security.

LIMITATIONS AND RECOMMENDATIONS

The study acknowledges several limitations that warrant consideration for future research endeavours. Primarily, the research is confined to qualitative data pertaining to teachers' digital competence self-efficacy, thereby restricting the depth of analysis. To address this, future studies could employ diverse methodologies and data collection techniques for a more comprehensive examination. Moreover, the generalizability of the findings is constrained due to the research methodology and characteristics of the participant group. Future investigations could employ survey research methodologies to ascertain teachers' digital competencies on a broader scale, potentially encompassing educators from various educational levels. Additionally, while the study exclusively focuses on middle school teachers, expanding the participant pool to include educators from different educational levels could offer a more holistic understanding of digital competence across the educational spectrum. Furthermore, the study solely relies on teachers' opinions, and no interventions were implemented to enhance their digital competencies and self-efficacy. Future research endeavours could explore action-oriented approaches aimed at addressing the identified deficiencies and enhancing teachers' digital competencies. Lastly, future studies could explore different facets of the conceptual framework of digital competence and diversify research questions to encompass a broader range of topics. Additionally, the development of a scale to measure teachers' digital competence self-efficacy based on the research data could be a valuable avenue for future research endeavours.

The research underscores the need for targeted interventions to address teachers' limited understanding of digital competence and their identified deficiencies in this domain. Given that digital competence encompasses various interdisciplinary sub-competencies, providing training to teachers on the concept of digital competence and its associated competencies is crucial. This training should also emphasize strategies for integrating these competencies into classroom instruction effectively. Moreover, efforts should be made to identify the specific areas where teachers feel deficient in digital competence. Tailored in-service training programs can then be developed to address these areas of need, thereby enhancing teachers' digital competency levels. Additionally, integrating digital competence-focused content into the teacher training process can help ensure that future educators are adequately prepared to navigate the digital landscape. By addressing teachers' deficiencies in digital competence and providing targeted training opportunities, educational stakeholders can work towards aligning teachers' skills with internationally accepted digital competence framework standards. This, in turn, can contribute to the creation of more digitally proficient educators who are better equipped to leverage technology in support of student learning and development.

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