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Review Paper

Postgraduate Theses on Digital Literacy in Turkey: A Content Analysis Study

Mithat Elçiçek*[a], Mustafa Kahyaoğlu [b]

[a](ORCID ID: 0000-0003-1845-7271), Siirt University, Siirt, Turkey, mithat_elcicek@siirt .edu.tr
[b](ORCID ID: 0000-0003-2003-9730), Siirt University, Siirt, Turkey, mustafa.kahyaoglu56@gmail.com

*Corresponding author

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ABSTRACT
The purpose of this research is to reveal the research trends of postgraduate theses published in the field of digital literacy published in Turkey between 2015 and 2020. In this context, a total of 34 postgraduate theses on digital literacy published between 2015 and 2020 in the database of YÖK (Higher Education Institution) National Thesis Centre were examined. In the examination of the theses, the publication classification form including year, level, language, department, research method, research design, sample, the determination method of the sample, number of sample, data collection tool, data analysis techniques, research topic, and research results were used. According to the results of the research, it was determined that the number of studies published in the field of digital literacy increased until 2019 and decreased in 2020. It was also determined that these theses are generally carried out at the master's level and mostly regarding the department of Computer and Instructional Technology Education. Another finding was that common methods and designs used in these studies are the quantitative research method and descriptive and relational research design. Considering the sample in the theses, it was determined that pre-service teachers and university students constitute the sample and that the convenience sampling method is used. The topics were mainly about the examination of digital literacy level based on various variables and the highest digital literacy levels of secondary and high school students were found to be the highest in the results obtained.

INTRODUCTION

In today's globalized world, the individual's ability to compete with other individuals and survive depends on understanding the changing and transforming the world and gaining the basic required knowledge and skills as soon as possible. Particularly in the 21st century, rapid technological developments have made it a necessity for individuals to acquire new skills. One of these skills is digital literacy (List, 2019). The concept of digital literacy was coined by Gilster. According to Gilster (1997), digital literacy is the ability to use, analyse and evaluate digital resources, tools, and services appropriately and apply them to lifelong learning processes. Today, the concept of digital literacy has become related to many fields, from education to health sciences, law, banking, commerce, and media, depending on the developments in the internet and mobile applications (McDougall, Readman & Wilkinson, 2018). Digital literacy is a key concept in reaching the information society and constitutes one of the most important elements of digital citizenship, together with digital access, digital commerce, digital communication, digital ethics, digital law, digital rights and responsibilities, digital health, and digital security. Digital citizenship is defined as individuals who use digital tools correctly, respect ethical rules and personal rights on digital platforms, and use these tools safely and responsibly (Çubuk & Bayzan, 2013). Digital literacy, on the other hand, is to interpret and evaluate the information presented in digital environments with a critical perspective (Mossberger, Tolbert., & McNeal, 2007) or to reach the right information in digital environments, to be aware of producing the right information and sharing the right information, and to use technology in learning and teaching processes (Çubuk & Bayzan, 2013). Accordingly, digital literacy is sometimes defined as the technical use of information and communication technologies while also being defined as the ability to produce information. However, the widespread use of the internet and the proliferation of personal and mobile devices have further increased the effective use of digital resources and the importance of digital literacy. Digital literacy is to perform the action of literacy using digital tools for the individual (Maden, Maden & Banaz, 2018). It requires having functional and digital skills while accessing information (Polizzi, 2020). It also covers the basic knowledge and skills that will enable the individual to be safe in online environments (Yalçınkaya & Cibaroğlu, 2019). For this reason, digitally literate individuals should have higher-order thinking skills such as research, questioning, critical thinking, and problem-solving.

Eshet Alkalai (2004) defines digital literacy as the ability to survive in the digital age while Ng (2012) defines it as the ability to adapt to emerging new and modern technologies. Martin (2005), on the other hand, refers to digital literacy as the awareness, attitude, and ability of individuals to appropriately use digital tools and facilities to identify, access, manage, integrate, evaluate, analyse, and synthesize digital resources, construct new knowledge, create media expressions, and communicate with others, in the context of specific life situations, in order to enable constructive social action; and to reflect upon this process. However, it is stated in the literature that digital literacy is an umbrella literacy that includes information literacy, computer literacy, media literacy,

communication literacy, visual literacy, and technology literacy (Covello, 2010). Furthermore, skills considered to be essential for digital literacy are to be technology-focused, goal-directed, digital reading focused and reflecting critical use (List, Brante & Klee, 2020). Four components of digital literacy are technical skills, information usage, communication, and creation (Moon & Bai, 2020). Accordingly, technical skills to use digital tools, ability to access information while solving problems, ability to interpret, analyse and evaluate information, to connect with other individuals in online environments, communication and ability to produce information in digital environments constitute the components of creating digital literacy. Besides, there are 8 components of digital literacy including creativity, critical thinking and evaluation, cultural and social understanding, collaboration, the ability to find and select information, effective communication, e-safety, and functional skills (Payton & Hangue, 2010). Therefore, digital literacy is a fairly broad multi-dimensional concept that includes technical and cognitive behaviors on one side and social and affective behaviors on the other.

Although digital literacy is a relatively newly defined concept, it is one of the most researched topics due to its content, scope, related disciplines, and expectations in the individual and society. However, considering the studies conducted in Turkey on digital literacy, Dönmez (2019) examined the relationship between awareness of information security and digital literacy in high school students, concluding that there is a positive and significant relationship between students' awareness of information security and digital literacy. Kaya (2020) examined the relationship between digital literacy and digital citizenship in his study on secondary school students, reporting that there is a positive and significant relationship between them because of the research. Kul (2020) analysed the relationship between digital literacy levels of university students and internet addiction, reporting that there is a positive significant relationship between students' digital literacy and internet usage time. In their study on digital transformation and digital literacy in Turkey, Karabacak & Sezgin (2019) reported that there is a digital transformation in the field of education in Turkey and there is a need for projects to increase digital literacy competence for the relevant transformation to take place quickly. Kozan & Bulut Özek (2019), on the other hand, investigated pre-service computer and instructional technologies education teachers' sensitivities towards digital literacy and cyberbullying, concluding that the pre-service teachers' sensitivity towards digital literacy and cyberbullying was at a high level. In their study on the digital literacy level of pre-service science teachers, Üstündağ, Güneş & Bahçıvan (2017) found that the digital literacy of pre-service science teachers was at a good level. Finally, Yıldız (2020) analysed the views of academics on digital literacy, reporting that academics are familiar with the concept of digital literacy and ready to participate in training programs to be provided by relevant institutions and organizations. On the other hand, Onursoy (2018) conducted a study on the digital literacy levels of university students and reported that university students' use of digital tools and spending more time in digital environments does not mean that they use digital technologies wisely and that there is no relationship between critical perspective and digital skills. Bayrakçı (2020), Hamutoğlu, Canan, Kaya & Gür (2017), and Aydemir, Sakız & Doğan (2019) developed scales and rubrics to measure the digital literacy skills of university students, pre-service teachers, and primary school students.

Significance of the Study

There has been a recent increase in academic studies published on the digital literacy subject. This is also the case for postgraduate theses. Postgraduate theses are among the most important information production and dissemination tools of Higher Education institutions (Universities). In addition, postgraduate theses are reports of a series of academic activities for scientific research and applications and contribute to the realization of various purposes such as producing information and spreading, raising qualified human resources, and offering solutions to social problems. Postgraduate theses are also the concrete outputs of educational activities at the highest level as an indicator of the scientific quality of the Master's and doctoral programs in higher education institutions. Therefore, it is important to examine the postgraduate theses published in Turkey in terms of the research subject, research method, sample, data collection tools, data analysis techniques and to reveal the impact value of the information, the publication of the produced information, the general view specific to the subject, and the current trend.

When the literature is examined, it is seen that there are many studies that focus on postgraduate theses in different disciplines in Turkey (Bıkmaz, Aksoy & Altınyüzük, 2013; Daşdemir, 2018; Gökmen et al.2017; Karadağ, 2010; Yavuz & Yavuz, 2017). On the other hand, it is striking that there are no content analysis studies examining the research processes specific to the digital literacy subject in Turkey. In this context, it is reported that such content analysis studies play an important role in the dissemination of information, guiding future research, and shaping new policies, new practices and public perception specific to the subject (Suri & Clarke, 2009; Çalık & Sözbilir, 2014). It is known that content analysis is the synthesis and interpretation of studies on a specific subject with a critical point of view or systematic studies that evaluate the results and tendencies of studies on a particular subject (Çalık & Sözbilir, 2014). Accordingly, the examination of the postgraduate theses published by the universities in Turkey in terms of the research subject, research method, and the results obtained will contribute to the dissemination of information about digital literacy and revealing the needs and deficiencies in the field. It will also guide researchers who are doing and will do research on digital literacy. Apart from this, it is thought to be important in terms of providing the opportunity to do a comparison of these theses with the theses published abroad on digital literacy.

Objective

The objective of this study is to reveal the research trends of postgraduate theses published in the field of digital literacy published in Turkey during the period of 2015-2020. In this context, answers were sought for a total of twelve research questions, three of which were related to the demographic characteristics of the postgraduate theses, eight of which were related to the research subject and method, and one of which was related to the research result. These are as follows:

1. How is the distribution of postgraduate theses by years?
2. How is the distribution of postgraduate theses according to research types?
3. How is the distribution of postgraduate theses according to the department?
4. How is the distribution of postgraduate theses according to the research subject?
5. Which methods were used (qualitative, quantitative, and mixed)?
6. Which research designs were used?
7. Who constitutes the sample?
8. Which methods were used to determine the sample?
9. What is the number of the sample?
10. Which data collection tools were used?
11. Which data analysis techniques were used?
12. What are the results?

METHOD

Research Model

This research was designed according to the content analysis method, which is one of the qualitative research methods in terms of the process it follows. Content analysis is a scientific method that collects similar data within the framework of certain concepts and themes and examines them objectively and systematically (Krippendorff, 2018; Yıldırım & Şimşek, 2013). From this point of view, the term content analysis was used as a research method rather than a data analysis technique. In addition, the content analysis method was applied in the study because it was aimed at presenting the current situation descriptively in terms of the research subject, method, and results of postgraduate theses on digital literacy in Turkey.

Population and Sample

The population of this research consists of postgraduate theses on the digital literacy subject in the database of the Higher Education Institution (YÖK) National Thesis Centre. The research sample was determined according to the purposeful sampling method depending on the subject area. Purposeful sampling is used to select and analyse events, situations, or facts based on certain characteristics (Büyüköztürk et al., 2012). There is no postgraduate thesis on the subject of digital literacy published before 2015 in the database of the Higher Education Council (YÖK) National Thesis Centre. In this framework, the sample consists of 34 postgraduate theses, 30 of which are master's theses and 4 doctoral theses published between 2015 and 2020 with open access.

Data Collection Tools

In the study, the "Publication classification form" developed by Sözbilir, Kutu & Yaşar (2012) was used to evaluate the theses related to digital literacy. However, depending on the purpose of the research, some changes were made in the publication classification form by the researchers to facilitate the classification of the information about the theses. Accordingly, the digital literacy publication classification form (DLPF) includes the publication year, type, department, research subject, method, research design, sample determination method, number of samples, data collection tool, data analysis, and results obtained in the research.

Data Collection Process

Within the scope of the research, the steps in Figure 1 were followed sequentially in the process of collecting data on postgraduate theses.

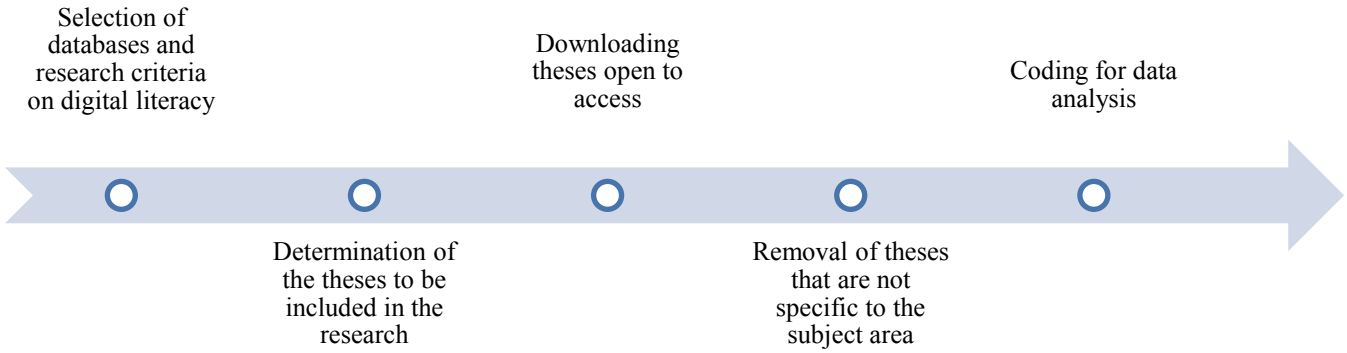

Figure 1. Data collection process

In the first step of the data collection process of the research, the keywords to be searched in the database of the YÖK National Thesis Centre were determined. For this, a literature review was made, and it was observed that the keywords "digital literacy" and "numerical literacy" are generally used in the same sense. In this context, these keywords were searched separately in the database of the YÖK National Thesis Centre and related theses that are open to access were obtained. Firstly, 72 results were obtained, including 53 Master's and 19 doctoral theses. With the subsequent preliminary examination, 23 Master's and 15 doctoral theses that

are not specific to the subject area of digital literacy (digital citizenship, financial literacy, digital applications, digital intelligence, digital data security, etc.) 34 theses were included in the scope of the research. Then, the data collection process was completed by transferring the data obtained according to the digital literacy publication classification form created by the researchers to the computer environment.

Data Analysis

The categorical analysis technique was used in the analysis of the collected data. Four steps were followed in the categorical analysis technique. In the first step, the theses were saved in the computer in two folders as master's and doctoral theses. Starting from the master's theses, each one was given a code according to the thesis number order given by the National Thesis Centre. These codes were used in the analysis and presentation of the findings. In the second step, an Excel worksheet was created to enter the data to be obtained for each heading in the data collection tool. The serial numbers of the analysed theses were written in the rows in the Excel worksheet, and the headings for the research problems were written in the columns. In the third step, the theses were examined in detail according to the headings for each research problem and the tables were filled. In the fourth step, the data were arranged in a meaningful way and reported after frequency and percentage calculations were made. The findings were presented to the reader with percentages and frequencies using graphics. In addition, the procedures to ensure the validity and reliability of the study were (i) to explain the data collection and analysis processes in detail, (ii) to create the encoding key named publication classification form, and (iii) to get assistance from an independent encoder.

FINDINGS

This section includes the findings related to postgraduate theses on digital literacy in Turkey published between 2015 and 2020.

Findings Related to the Demographic Characteristics of Digital Literacy Theses

Type of theses

It was observed that most of the postgraduate theses published in the field of digital literacy are master's degree theses. Accordingly, 30 (88%) of the theses published between 2015 and 2020 are master's theses, while 4 (12%) are doctoral theses.

Distribution by Years

The distribution of postgraduate theses on digital literacy by years is presented in Figure 2.

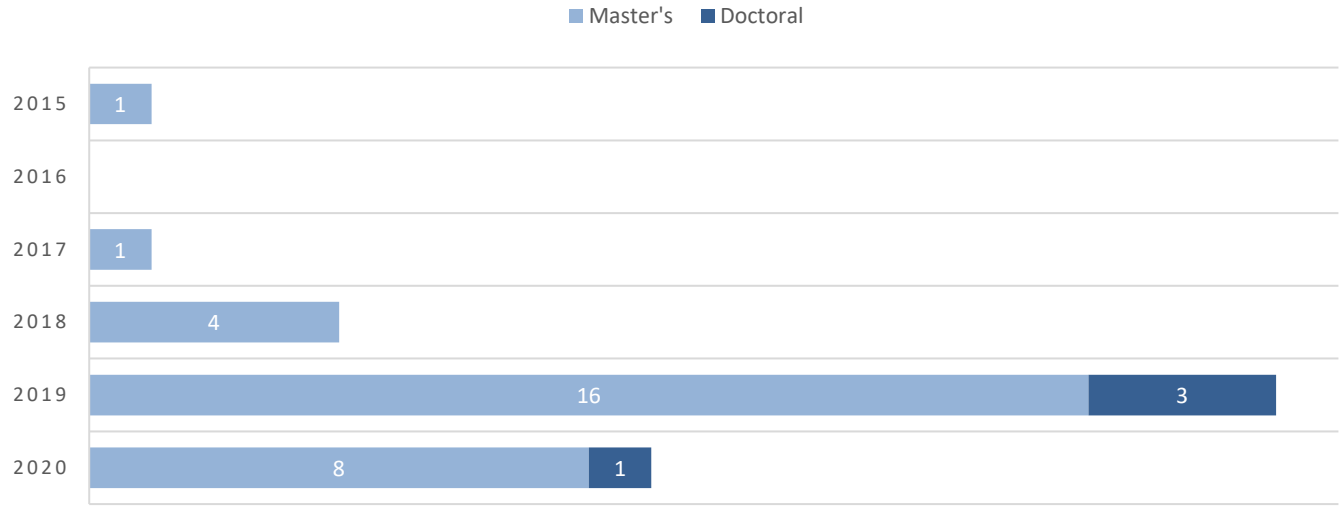

Figure 2. Distribution of postgraduate theses on digital literacy by years

Figure 2 reveals that postgraduate theses on digital literacy were mostly published in 2019 between 2015 and 2020. Accordingly, 19 theses, 16 of which are master's and 3 of which are doctoral, were published in 2019. Within the scope of the research, it was determined that the years with the least number of studies were 2015 and 2017; however, no graduate thesis was published in 2016 on digital literacy. It was also observed that the number of theses on digital literacy, which has been increasing since 2015, decreased after 2019.

Distribution According to Original Language

The distribution of the postgraduate theses on digital literacy according to the original languages in which they were written is presented in Figure 3.

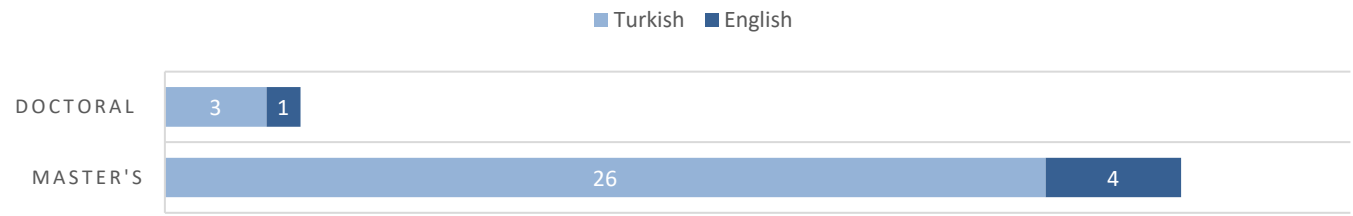

Figure 3. Distribution of the postgraduate theses on digital literacy according to the original languages in which they were written**.**

According to Figure 3, a total of 29 (85%) publications were published in Turkish, 26 at the Master's level and 3 at the doctoral level, on the subject of digital literacy, while a total of 5 (15%) publications, 4 at the Master's level and 1 at the doctoral level, were published in English.

Distribution According to the Department

The distribution of postgraduate theses on digital literacy according to departments is presented in Figure 4.

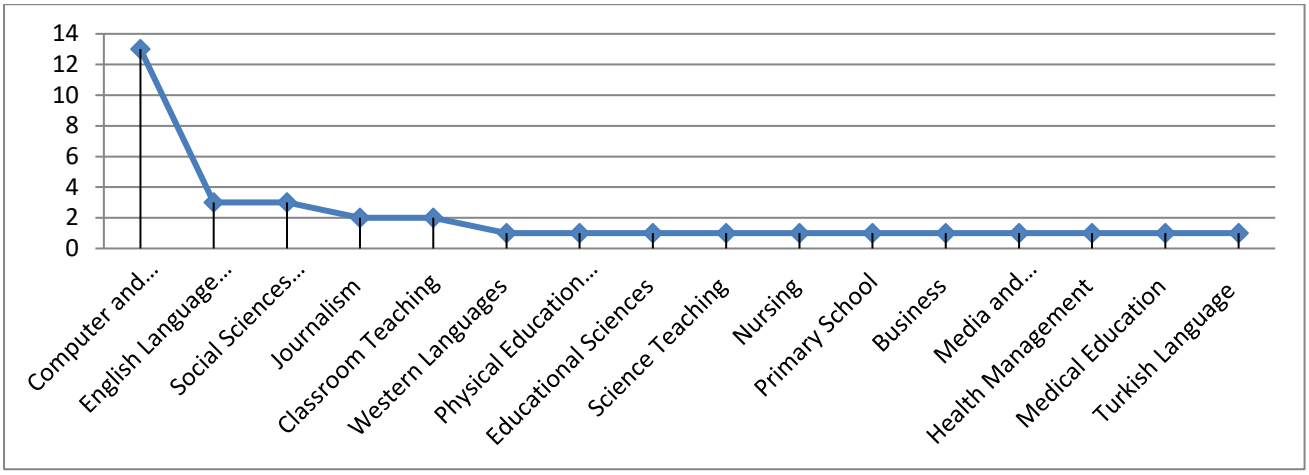

Figure 4. Distribution of postgraduate theses on digital literacy according to departments

Figure 4 reveals that postgraduate these on digital literacy were published mainly in the Department of Computer and Instructional Technologies (f=13) followed by the departments of English Language Teaching (f=3), Social Sciences Teaching (f=3), Classroom Teaching (f=2), and Journalism (f=2). Besides, at least one postgraduate thesis was published in 11 different departments (Western Languages, Physical Education, Educational Sciences, Science Teaching, Nursing, Primary School, Business, Media and Communication, Health Management, Medical Education, and Turkish Language).

Distribution According to Research Subjects

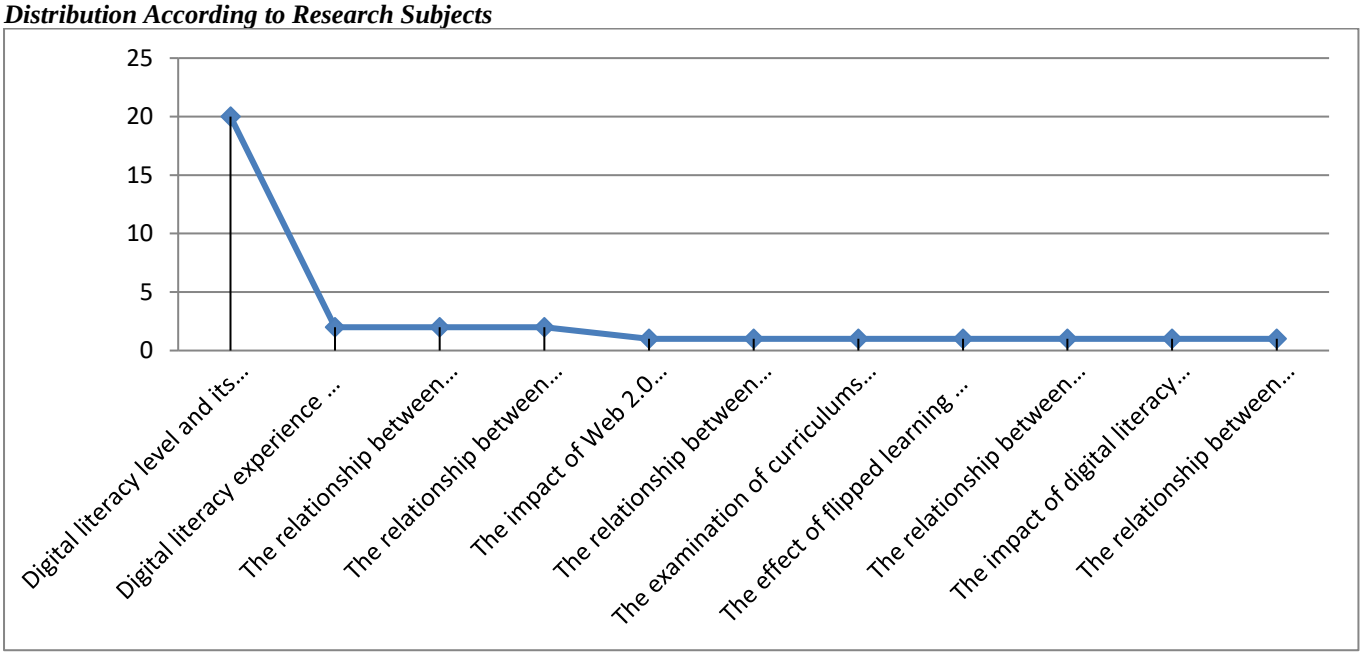

Figure 5. Research subjects of postgraduate theses on digital literacy

As can be seen in Figure 2, the common research subject on digital literacy is digital literacy level and its examination in the context of various variables (f = 20) followed by the digital literacy experience and its reflection on daily life (f = 2), the relationship between digital literacy and health literacy (f = 2), and the relationship between digital literacy and lifelong learning dispositions (f = 2). Besides, there are also some publications on information security (1), digital citizenship (f = 1), financial literacy (f = 1), awareness of online privacy (f = 1), and the impact of flipped learning (f = 1) and web 2.0 applications (f = 1) on digital literacy.

Findings Regarding the Method of Theses on Digital Literacy

Distribution According to the Research Method

Findings regarding the research method of graduate theses on digital literacy are presented in Figure 6.

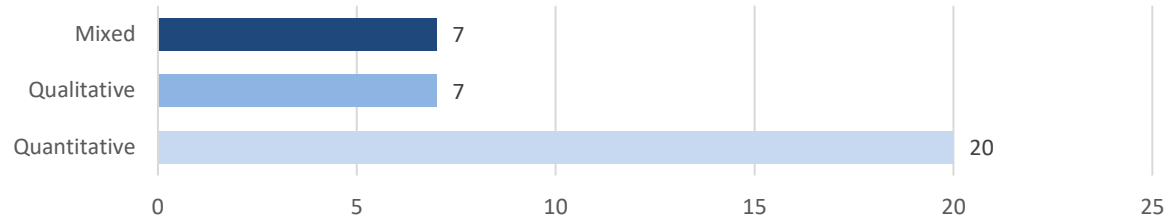

Figure 6. Distribution of graduate theses on digital literacy according to research methods

Figure 6 reveals that quantitative research methods (f = 20) were mainly used in theses on digital literacy, followed by qualitative (f = 7) and mixed research methods (f = 7), respectively. In the study, it was also determined that quantitative research methods were used more than the sum of qualitative and mixed research methods.

Research Design

The findings regarding the research designs used in the postgraduate theses on digital literacy are presented in Figure 7.

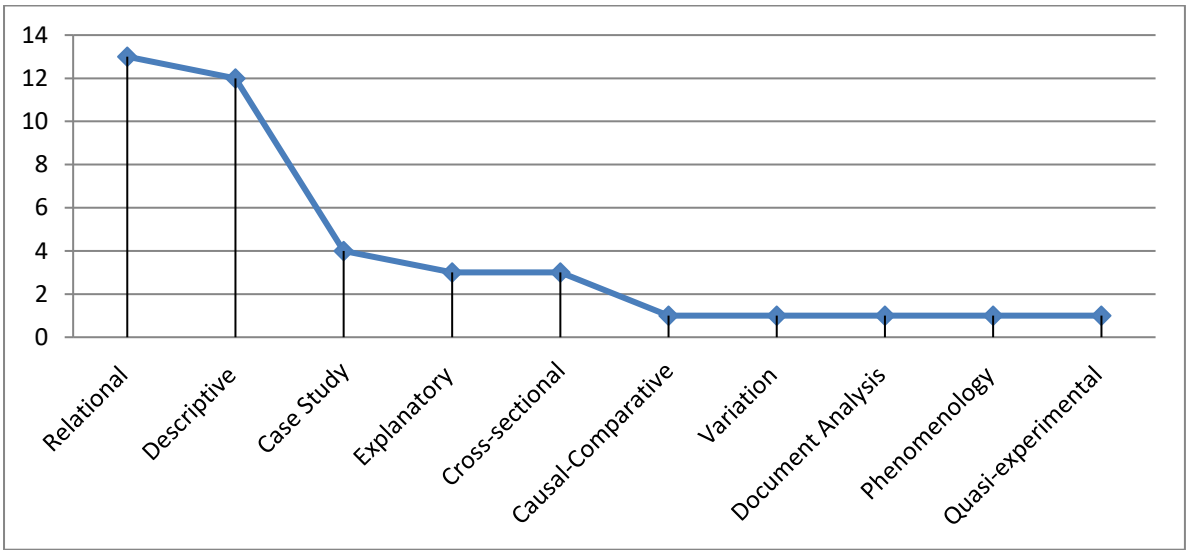

Figure 7. Research designs used in the postgraduate theses on digital literacy

Figure 7 reveals that most common research designs were relational (f=13) and descriptive (f=12) research designs followed by case study (f=12), explanatory (f=3) and cross-sectional (f=3) research designs. The least common ones were causal-comparative (f=1), variation (f=1), document analysis (f=1), phenomenology (f=1) and quasi-experimental (f=1) research designs.

Research Sample

Findings regarding the sample distribution of postgraduate theses on digital literacy are presented in Figure 8.

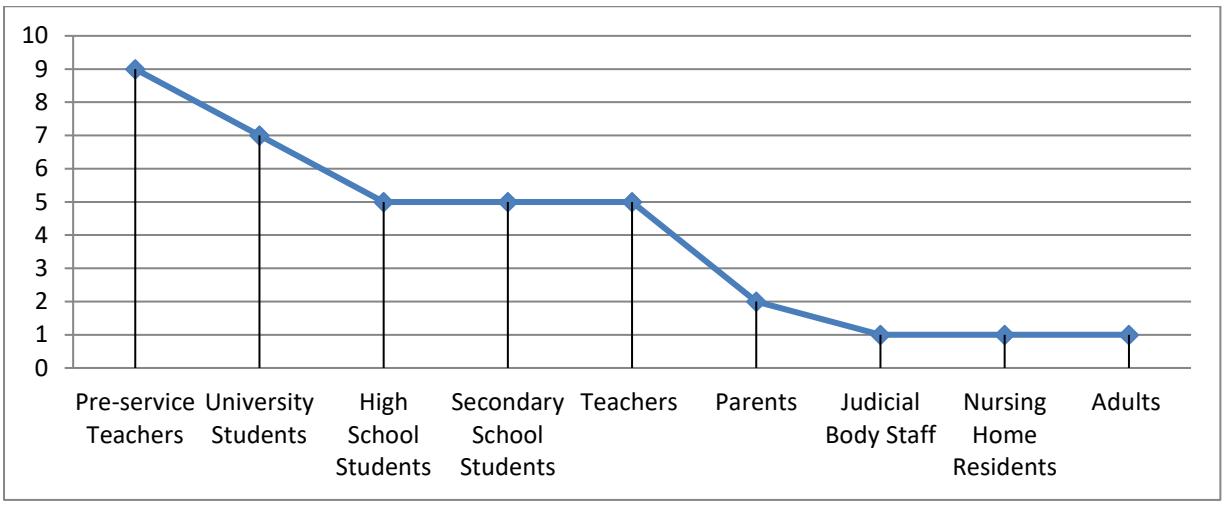

Figure 8. Sample groups used in postgraduate theses on digital literacy

Figure 8 reveals that sample groups in postgraduate theses on digital literacy are comprised of mainly pre-service teachers (f=9) and university students (f=7) followed by high school students (f=5), secondary school students (f=5), teachers (f=5), parents (f=2), judicial body staff (f=1), nursing home residents (f=1) and adults (f=1). Besides, some theses consist of more than one sample group.

Sampling

Findings regarding sampling methods used in postgraduate theses on digital literacy are presented in Figure 9.

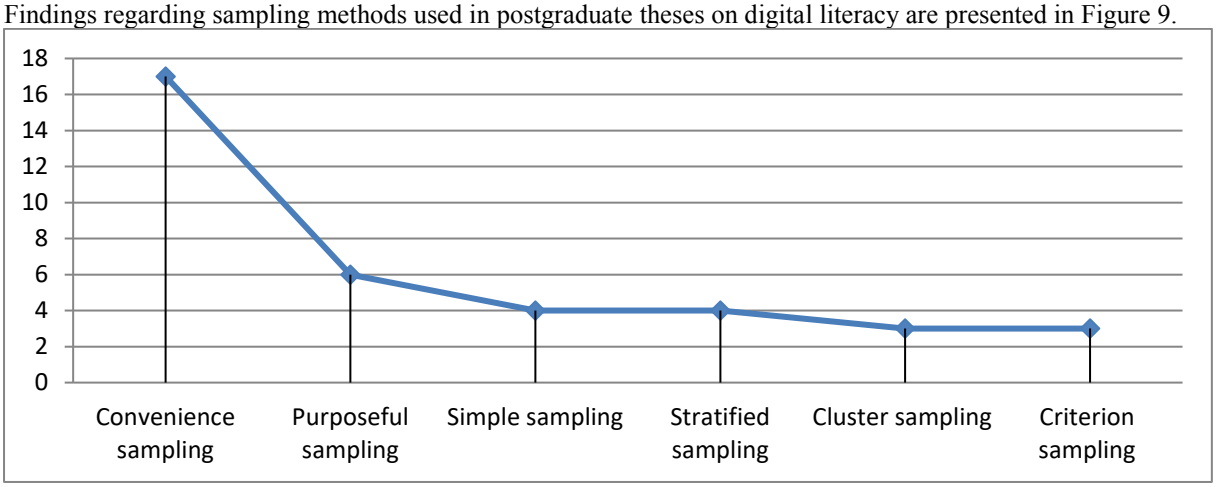

Figure 9. Sampling methods used in postgraduate theses on digital literacy

Figure 9 reveals that the most common sampling methods used in postgraduate theses on digital literacy are convenience sampling (f=17) followed by purposeful sampling (f=6), simple sampling (f=4), and stratified sampling (f=4). The least preferred ones are cluster sampling (f=3) and criterion sampling (f=3).

The Number of Samples

Findings regarding the number of samples used in graduate theses on digital literacy are presented in Figure 10.

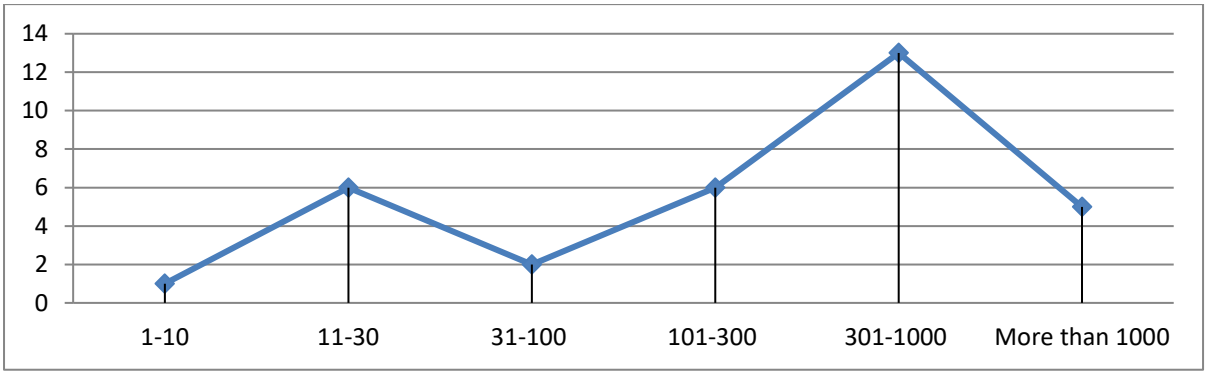

Figure 10. The number of samples used in graduate theses on digital literacy

Figure 10 reveals that the number of samples ranges mostly between 301 and 1000 (f=13) followed by the range of 11-30 (f=6) and 101-300 (f=6). The least preferred number of samples is 1-10 (f=1).

Data Collection Tools

Findings regarding the data collection tools used in graduate theses on digital literacy are presented in Figure11.

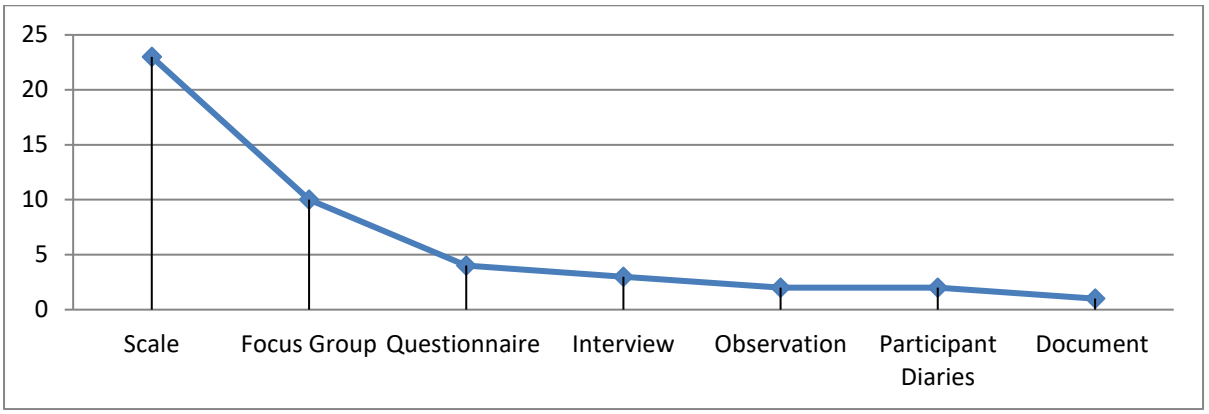

Figure 11. Distribution according to the data collection tools used in graduate theses on digital literacy

Figure 11 reveals that the most commonly used tools are scale (f = 23) and focus group (f = 10) followed by questionnaire (f = 4), interview (f = 3), observation (f = 2), participant diaries (f = 2), and document review (f = 1), respectively.

Data Analysis Techniques

Findings regarding data analysis techniques used in postgraduate theses on digital literacy are presented in Figure 12.

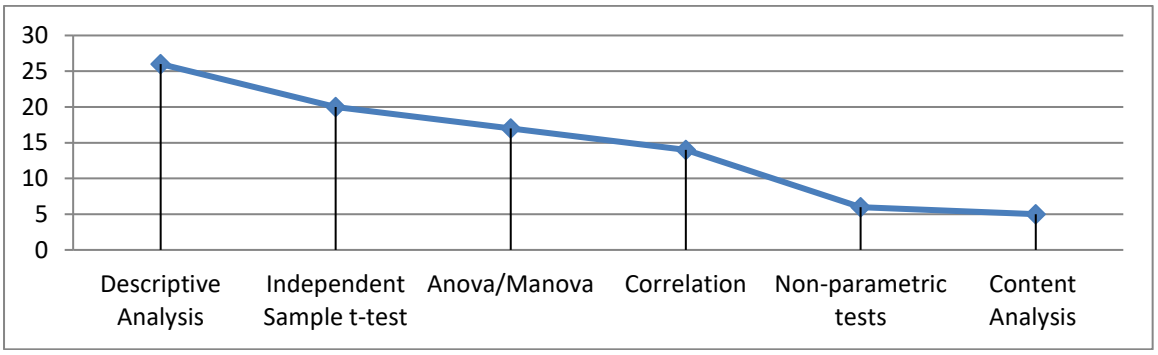

Figure 12. Data analysis techniques used in postgraduate theses on digital literacy

Figure 12 reveals that the most commonly used technique is the descriptive analysis (f=26) followed by independent sample t-test (f=20), Anova/Manova (f=17), correlation (f=14), non-parametric tests (f=6), and content analysis (f=5).

Research Results of Postgraduate Theses

Findings regarding the research results of postgraduate theses on digital literacy are presented in Table 1.

Table 1. Research results of postgraduate theses on digital literacy

Research Results	Frequency (f)
It was concluded that the digital literacy levels of pre-service teachers were high.	5
It was concluded that the digital literacy levels of male students were higher than female students.	5
It was concluded that secondary and high school students had high digital literacy levels.	4
It was concluded that the digital literacy levels of parents and teachers were higher than students.	3
It was concluded that teachers' digital literacy levels were high.	3
It was concluded that there was a positive correlation between health literacy and digital literacy levels.	2
It was concluded that there was a positive relationship between lifelong learning disposition and digital literacy.	2
It was concluded that the digital storytelling workshop increased the digital literacy levels of the elderly.	1
It was concluded that the flipped learning method positively affected the digital literacy level.	1
It was concluded that Web 2.0 applications had no effect on digital literacy.	1
It was concluded that the use of target-based scenarios positively affected the digital literacy level.	1
It was concluded that there was a positive significant relationship between awareness of information security and digital literacy levels.	1
It was concluded that the digital literacy levels of the staff working in the judicial bodies were high.	1

It was concluded that there was a significant positive relationship between digital citizenship and digital literacy level.	1
It was concluded that the digital literacy level did not have a significant effect on financial literacy.	1
It was concluded that there was a positive significant relationship between online privacy awareness and digital literacy level.	1
It was concluded that the reflection of the digital literacy lesson experiences of the pre-service teachers on daily life was not at a sufficient level.	1
Total	**33**

Table 1 reveals that as a result of the research in postgraduate theses, digital literacy levels of pre-service teachers are high and digital literacy of male students is higher than female students; the digital literacy levels of secondary and high school students are high and the digital literacy levels of parents and teachers are higher than students; there is a positive significant relationship between digital literacy and information security, financial literacy, digital citizenship, lifelong learning, and online privacy, and; the reflection of the digital literacy lesson experiences of the pre-service teachers on daily life is not at a sufficient level.

DISCUSSION and CONCLUSION

Given the demographic characteristics of the postgraduate theses on digital literacy published in Turkey, it was determined that the majority of the theses (82%) were at the Master's level and the number of theses made at the doctoral level was relatively low (12%). This is probably because there are more programs that provide education at a Master's level than programs that provide education at a doctoral level in Higher Education Institutions in Turkey. However, it can be implied that reasons such as the length of the doctoral programs, the harsh conditions for admission to the doctoral programs, and the limited number of admitted students can also explain the scarcity of postgraduate these at the doctoral level. Şimsek et al. (2009) and Gökmen et al. (2017) reported that the number of theses at the Master's level is much higher than the theses at the doctoral level, which confirms our research results.
It was determined that there was an increase in the number of theses published in the digital literacy subject area from 2015 to 2019, whereas there was a decrease in 2020. A potential reason for this result is the increased interest of researchers in the field of digital literacy in Turkey, as in the whole world. The decrease in 2020 may arise from the difficulty of research opportunities due to the Covid-19 pandemic process that has been affecting the whole world. Most of the theses published on digital literacy were published in Turkish (85%), whereas the number of theses published in English was very limited (15%). Postgraduate programs run under Higher Education Institutions in Turkey generally are in Turkish. This may increase the international recognition of postgraduate theses published in Turkey along with more citations or higher numbers of publications to be published in journals scanned in international indexes (such as SCI, SSCI, ESCI, ERIC, AHCI). It was also determined that one-third (38%) of the theses published on digital literacy in Turkey were conducted in the Department of Computer and Instructional Technologies. This is not surprising though as topics of digital literacy (*such as accessing information in digital environments, producing and sharing information, using technology in learning and teaching processes, exhibiting ethical behaviors on digital platforms*) are included in Computer and Instructional Technology Education curricula and researched further at the graduate level. Given the subject contents of the postgraduate theses on digital literacy published in Turkey, it was determined that the focal point was the digital literacy level and the examination of digital literacy in terms of various variables. This is due to the increase in access to digital media (*applications such as e-commerce, e-government, e-health, and e-school*) and the development of regulations on the development of digital literacy in social life in Turkey in recent years, depending on the level of digital literacy in different samples and their various variables. Karabacak & Sezgin (2020) also reported that depending on the developments in the world, studies on the level of digital literacy and the areas of use of new technologies, especially educational sciences, have increased in Turkey.

When the postgraduate theses published on digital literacy in the study were examined in terms of methods, it was determined that the quantitative research method was used the most (59%) and the qualitative and mixed research methods were used less frequently (21%). In this case, it can be said that research on digital literacy is done with these methods for reasons such as reaching different and multiple samples, time, cost, and easier generalization of the results obtained. Similarly, it was reported that quantitative research methods are used more in other studies on postgraduate theses published in Turkey (Gökmen et al.2017; Erdem, 2018). The less frequent use of qualitative and mixed research methods by researchers may be due to reasons such as the participant role of the researchers, the need for a holistic approach, difficulties in revealing their perceptions in the sample, flexibility in research designs, and an inductive perspective. This situation makes it difficult to reveal the reasons that cannot be measured by quantitative research in-depth, as stated by Sandelowski (1986) in postgraduate theses on digital literacy in Turkey. Therefore, researchers should be encouraged to use more qualitative and mixed research methods to publish more detailed postgraduate theses on digital literacy. Furthermore, Şimşek & et al. (2008) reported that students should be provided with more information on how to conduct and report mixed research in graduate programs. Gökmen et al., (2017) put forward that giving courses for mixed-method research at the graduate level would be beneficial for the quality of graduate theses.

In the study, it was determined that descriptive and relational survey designs, which are among non-experimental quantitative research designs, were mostly used in postgraduate theses on digital literacy published in Turkey, whereas causal-comparative designs, variation, document analysis, phenomenology, and experimental research were used less frequently. The research design is a very important step in presenting the theses and gives the researchers an idea about how to answer the research problem, how to collect the data, and how to evaluate and analyse the data. Accordingly, descriptive, and relational survey designs in theses on digital literacy are used as validity and reliability studies of such studies are easier and a situation should be explained as is or the

relationship levels between variables should be revealed. On the other hand, the less commonly used research designs such as causal-comparative designs, variation, document analysis, phenomenology, and experimental research may stem from the difficulty of validity and reliability studies of such studies. This overlaps with the results of studies conducted by Varışoğlu, Şahin & Göktaş (2013). It was also observed that there are not enough studies via experimental, quasi-experimental or weak designs to test the factors that may be effective in the development of digital literacy skills.

Considering the sample of postgraduate theses on digital literacy, it was found that researchers mostly focused on university students and pre-service teachers while they also focused on high school and secondary school students and teachers, respectively. Convenience sampling and appropriate sampling methods were mainly used in theses with a sample ranging between 301 and 1000. Accordingly, such a result may stem from the fact that students studying at higher education institutions are given technology-based courses and spend more time in digital environments. Studies were conducted on different sample groups (*such as judicial body staff, parents, elderly people, and adults*). This is also probably because the subject of digital literacy is a multidimensional concept and contains a subject of research in many different disciplines from health sciences, media and communication, educational sciences to journalism. The use of convenience and appropriate sampling methods in theses on digital literacy is believed to stem from the requests and needs for fast, easy, and comfortable data collection. Similar results were obtained in the study by Selçuk et al (2014) who focused on the articles published in the field of educational sciences. This result overlaps with the result of our research.

The analysis of the data collection tools of postgraduate theses on digital literacy revealed that scales were mostly used. It can be implied that as scales are more easily responded to and scored in measuring different variables or as the variables to be measured are easier to analyse mathematically, scales are preferred. This result overlaps with the result of the study conducted by Gökmen et al. (2017) on distance education. It was concluded in the relevant study that documents were the least frequently used tools in postgraduate theses. This may be due to the inadequacy of studies such as concept analysis, meta-analysis, systematic review, or collective evaluation in digital literacy theses. Another result of the study is that the descriptive analysis method (frequency, percentage tables, arithmetic mean, standard deviation) is mostly used in the analysis of digital literacy data. This is followed by independent sample t-test, Anova/Manova and correlation analysis method, respectively. It is believed to be an expected result due to the use of research designs such as descriptive and relational surveys in theses on digital literacy, which are conducted via description, estimation, or comparison. Şimşek et al. (2009) support the result in their study on educational technologies. The least frequently used data analysis method in the research was determined to be content analysis. This may be due to the less commonly used qualitative and mixed-method research in theses. Data analysis techniques such as regression analysis, structural equation model, and multi-factor Anova are not preferred as a result of this study. Gökmen et al. (2017) reported that researchers do not sufficiently draw upon advanced data analysis techniques (*such as Regression, Structural Equation Model, Manova*).
Finally, it was revealed that secondary and high school students, pre-service teachers, teachers, and parents have a high level of digital literacy. There was a positive and significant relationship between health literacy, financial literacy, digital citizenship, lifelong learning, awareness of information security, and online privacy awareness and digital literacy level. Also, lipped learning, Web 2.0 applications, digital storytelling and target-based scenario applications positively affect digital literacy.

RECOMMENDATIONS

As a result of the research, it was determined that the postgraduate theses about digital literacy published in Turkey between 2015 and 2020 were mainly published at the Master's degree level, in Turkish, and mostly in the department of Computer and Instructional Technology. In addition, it was determined that the theses focused on the digital literacy level, quantitative research methods were preferred, and studies were carried out on pre-service teachers and university students. In this respect,

1. It is recommended that higher education institutions may focus on doctoral theses that will provide the competence to conduct independent research about digital literacy, contribute to scientific developments, examine, interpret, and analyse the problems with a deep perspective, and to produce information.
2. It may be beneficial to increase the number of postgraduate theses in English other than Turkish in order to increase the scientific quality of graduate theses, the possibility of publication in journals scanned in international indexes, recognition, and the number of citations.
3. Digital literacy is a multidimensional research field related to different disciplines and universities may be encouraged to carry out theses specific to this subject area in different departments (for example, by providing project support to digital literacy theses).
4. In addition to non-experimental relational and descriptive survey methods, emphasis can be placed on concept analysis, meta-analysis, theory building, case study, explanatory or exploratory mixed research methods for more detailed, explanatory, and in-depth graduate theses related to digital literacy.
5. Alternative data collection tools such as open-ended survey questions, focus group interviews, participant or non-participant observations, diagnostic tests, and portfolios can be used as a data collection tool in graduate theses on digital literacy.
6. Beyond revealing the digital literacy levels of the sample of the digital literacy theses, there should be more focus on the studies aimed at determining the teaching approaches that will increase its competence in daily life.

As a result, this research will contribute to the quality of researchers' work by offering them some suggestions in their studies on digital literacy in terms of method and research results. Also, revealing the general trend in the theses related to the digital literacy

subject area will guide researchers who will conduct research on this subject. In this context, the research is limited to the theses available in the national thesis database of YÖK published as open access between 2015 and 2020 in Turkey on digital literacy.

Ethics and Consent: Ethics committee approval is not required as it does not involve clinical research on humans and does not contain retrospective studies in accordance with the Law on Protection of Personal Data.

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