Journal of Teacher Education and Lifelong Learning (TELL)

Volume: 5 Issue: 1 Year: 2023 ResearchArticle ISSN: 2687-5713

Examination of Digital Competences of Teachers According to Different Variables

Muhammed Murat Gümüş[1] Volkan Kukul[2]

[1] Amasya University, Vocational School of Design, Department of Computer Education and Instructional Technologies, Amasya, Türkiye
muhammedmuratg@gmail.com

[2] Amasya University, Faculty of Education, Department of Computer Education and Instructional Technologies, Amasya, Türkiye
volkan.kukul@amasya.edu.tr

Article Info

Article History
Received: 08/11/2022
Accepted: 01/05/2023
Published: 30/06/2023

Keywords:
Data Literacy,
Problem Solving,
Digital Content Production,
Communication and Cooperation,
Ethical.

ABSTRACT

This study examines the digital competence of teachers according to different variables. It was thought that the variables (gender, age groups, service school, foreign language) discussed would give an idea about the status of teachers' digital competencies. In this direction, a total of 695 teachers, 352 female teachers, and 343 male teachers, working in primary, secondary, and high schools participated in the research.In order to explain the general views and characteristics of the participants on the subject, the cross-sectional survey model, one of the survey types, was used.On the other hand, the Teacher Digital Competence Scale developed by Gümüş and Kukul (2022) was used to determine the digital competencies of teachers.The digital efficacy scale used in the research was filled out online by the teachers.T-test and ANOVA tests were used for the analysis of the collected data. When the results obtained in the research were examined, the digital competencies of teachers differed according to gender and age range. However, no difference was observed in the digital competencies of teachers according to school type and foreign language level. On the general evaluation of the analyses, it is thought that although the teachers have medium-level digital competences, considering the difficulties experienced during the pandemic period, the digital competences of the teachers observed at the medium level are eventually insufficient and the teachers should develop themselves in this regard.

Citation: Gümüş, M. M. & Kukul, V. (2023). Examination of digital competences of teachers according to different variables. *Journal of Teacher Education and Lifelong Learning*, 5(1),111-129.

INTRODUCTION

Recently, there has been a significant surge in the number of individuals using digital media and tools, leading to a pervasive influence on people's way of life. Therefore, it has become an absolute necessity to acquire the essential digital competences to navigate and effectively utilize digital environments and tools. National and international studies are being conducted to cultivate such competences in individuals. In line with this, the Eleventh Development Plan (2019) published in Turkey aims to address the society's digital competence challenges and promotes digital transformation across all fields. As the number of digital users worldwide continues to grow (Statista, 2020; Turkish Statistical Institute [TUIK], 2019; We are Social [WAS], 2020), it is critical to emphasize the importance of digital transformation initiatives that enable individuals to attain a sufficient level of digital use and maximize the efficiency of digital tools.

In today's society, an individual's ability to develop their knowledge and skills in the digital space is crucial to maintaining competitiveness both domestically and globally. It is essential that individuals have digital competencies that enable them to use technology effectively and efficiently for their own benefit. Lack of these skills can lead to a disadvantage in economic competition, both at the national and international level (Castro-Granados & Artavia-Diaz, 2020; Matli & Ngoepe, 2020). Digital competences may be said to affect and direct living standards to a significant extent and consequently be an effective factor for the quality of life. Therefore, the education and social levels of countries may differ according to their digital competence (Drossel, Eickelmann & Vennemann, 2020).

For many reasons, countries in the world are working to develop digital competence programs and it is emphasized that worldwide collaborative work should be developed (Bejakovic & Mrnjavac, 2020; Matli & Ngoepe, 2020; Radovanovic et al., 2020). The Covid-19 pandemic brought numerous challenges to the education sector worldwide (Cosofreț & Avram, 2020; Joshi, Vinay & Bhaskar, 2020; Kavuk & Demirtas, 2021), highlighting the poor digital competence of both teachers and students (Kavuk & Demirtas, 2021; Turker & Dundar, 2020). Consequently, the lack of digital infrastructure and the insufficient digital competence of teachers posed significant difficulties in implementing distance education during the pandemic (Bakioglu & Cevik, 2020; Joshi, Vinay & Bhaskar, 2020; Kavuk & Demirtas, 2021; Turke r& Dundar, 2020). During this period, it was noted that the challenges faced by teachers were not only affecting them but also their students and parents, highlighting issues in communication between these parties (Bakioglu & Cevik, 2020; Kavuk & Demirtas, 2021). Additionally, various studies have shown that the exposure of teachers to technology during this period has had a positive impact on their professional growth (Bakioglu & Cevik, 2020). As such, it is evident that the digital skills of teachers will play a crucial role in the future of education. In addition, it will be very important for teachers to be technology leaders and to emphasise the studies on this subject in the literature in terms of reflecting the digital competences of teachers (Korkmaz, Kutlu& Yavuz, 2022). Bozkurt (2020) reports that in order for teachers to have digital competencies, their current skills should be evaluated and opportunities should be provided for them to develop their skills. In this context, the International Association for Technology in Education [ISTE] (2017) standards and Digital Competencies [Dig. Comp] (2016) frameworks prepared by Vuorikari, Punie, Carretero Gomez, and Van den Brande, digital competence frameworks for teachers were developed, and a nationwide digital competence guide was prepared (Kelentric, Helland & Arstorp, 2017). These frameworks highlight the importance of teachers integrating Information and Communication Technologies (ICT) into their lessons to develop classroom management skills (McGarr, Mifsud, &Colomer Rubio, 2021). Morever, a new national education policy has been established within the framework of the international ICT competence framework developed by the United Nations Educational, Scientific and Cultural Organization [UNESCO] (2018) to improve the digital competence of teachers (McGarr et al., 2021). In this way, it is aimed to improve digital competence by providing a stronger technology integration in education. Developing digital infrastructure and implementing supportive policies, along with

establishing national frameworks to enhance the digital competencies of educators, are crucial steps towards achieving higher quality and efficiency in education. In this sense, considering that the ways of raising qualified individuals with 21st-century skills are directly related to education, it can be said that teachers and even students should develop and evaluate digital competences at certain periods in education.

In this direction, on the examination of Statista (2020), We are Social (2020), and TUIK (2019) data, different statistical information is observed in terms of gender, age, social media tools, and digital tool use. On the other hand, there are differences in the literature in the digital competences of teachers according to gender, age, institutions, technologies used, and foreign language knowledge (Cebi & Reisoglu, 2020; Celebi & Sevinc, 2019; Durak & Tekin, 2020; Dias-Trindade & Moreira, 2020; Esteve-Mon et. al., 2020; Instefjord&Munthe, 2017). When the studies conducted on digital competence were examined, it was revealed that gender had an effect on digital competences (Eyo, 2016; Fidan&Yeleğen, 2022; Gökbulut, Keserci, & Akyüz, 2021; Lucas, Bem-Haja, Siddiq, Moreira, &Redecker, 2021). On the other hand, it has been observed that age or seniority has an effect on digital competences (Eyo, 2016; Fidan & Yeleğen, 2022; Gökbulut et al, 2021; Lucas, et al, 2021; Pihlainen, Korjonen-Kuusipuro & Kärnä, 2021). At the same time, studies conducted with teachers have revealed that branch has an effect on digital competences (Fidan & Yeleğen, 2022; Yılmaz & Toker, 2022). In another study conducted in terms of branch variable, Bişirici and Gülbahar (2023) recommended that the digital competences of teachers should be formed according to the branches of teachers. In other studies, it is seen that research has been conducted according to the variables of school type (Karakuş & Gürbüz, 2019) and foreign language (Aktaş, 2022; Konokman & Yelken 2014). Therefore, variables have an effect on teachers' digital competences. In this context, addressing the digital competences of teachers on these variables in an up-to-date way will give an idea to understand the current situation of teachers' digital competences. Based on statistical information and differences in the literature, these variables (gender, age, school of service and foreign language) are considered important in terms of determining teachers' digital competences to be able to evaluate and develop the same in an up-to-date manner. Therefore, the effect of the variables determined in this study on teacher digital competence is observed.

Study Problems

1. Do teachers' digital competencies differ according to their gender?
2. Do teachers' digital competencies differ according to their age groups?
3. Do teachers' digital competencies differ according to their school of service?
4. Do teachers' digital competencies differ according to their level of any foreign language?
5. What is the level of teachers' digital competencies?

METHOD

Research Model

In this study, cross-sectional survey model was used as one of the study survey types. According to Buyukozturk et al. (2018), this model aims to capture the participants' general perspectives and characteristics on a particular issue or event, together with variables covering various skills, behaviours and attitudes. A cross-sectional survey model was used to collect information on different variables at a given time. In this study, it was desired to determine how teachers' digital competencies are in the current situation in terms of different variables. This method was chosen because the data is collected and analyzed in a single time and it is cost-effective.

Participants

The convenience sampling method was used in this study. The study group consists of teachers working in the city center, district center, and village schools of Amasya in the academic year 2020-2021. A total of 695 teachers participated in the study, with 352 being female and 343 being male. When analyzed according to school type and subject area, there were 181 primary school teachers, 280 high school teachers, 192 secondary school teachers, and 42 teachers from other educational institutions. The classroom teaching branch had the highest participation, with 160 individuals. Among other subject areas, 73 teachers from information technologies, 59 from religious studies, 63 from science, 31 from music and painting, 53 from mathematics, 37 from vocational high schools, 49 from social studies, 62 from Turkish, and 63 from foreign languages participated. In addition, 45 individuals participated from other unclassified fields. The information illustrating the distribution of teachers in the study according to gender and age groups is given in Table 1.

Table 1. *Distribution of Participants according to Their Gender and Age Groups*

	Gender		
Age Group	**Female**	**Male**	**Total**
21-40 years old (Generation Y)	244	137	381
41-55 years old (Generation X)	104	176	280
56-74 years old (Generation Baby Boomers)	4	30	34
Total	352	343	695

Data Collection Tool

Teacher Digital Competence Scale: It is a scale oriented toward detecting the digital competences of teachers. The scale consisted of 6 factors and 46 items as follows: "Safety", "Data Literacy", "Problem Solving", "Digital Content Production", "Communication and Cooperation", and "Ethical." Additionally, the options of the five-point Likert-type scale are "1-Strongly Disagree", "2-Disagree", "3-Neutral", "4-Agree" and "5-Strongly Agree". In the study in which the total variance value was declared as 71.967%, the reliability coefficients of the factors were "Security" α=.95, "Data Literacy" α=.91, "Problem Solving" α=.94, "Digital Content Production" α=.93, "Communication and Cooperation" α =.95, and "Ethical" as α=.90 (Gümüş & Kukul, 2022). The information regarding the internal consistency coefficients of the Teacher Digital Competence Scale is given in Table 2.

Table 2. *Internal Consistency of the Teacher Digital Competence Scale*

Factors	**Number of Items**	**α**
Safety	10	.95
Data Literacy	9	.91
Problem Solving	9	.94
Digital Content Production	6	.93
Communication and Cooperation	7	.95
Ethical	5	.90
Total	46	.97

Data Collection Process

In this study, the digital competence scale prepared for teachers was created and filled by teachers online. Necessary permits were received from the Directorate of National Education to start the data collection process from teachers working in primary, secondary, and high school institutions in Amasya in affiliation with the Ministry of National Education in 2019-2020, and the study was applied to the teachers between the planned dates. The data obtained after the application were organized and analyzed to examine the digital competences of teachers according to different variables.

Data Analysis

The data obtained from the Teacher Digital Competence Scale were analyzed using the SPSS program. Descriptive interpretations were made on the scores of the teachers from the digital competence scale. With the provision of parametric conditions, an independent sample t-test was used to examine whether there is any difference within one dependent variable or between two variables (Taspinar, 2017). Again, one-way ANOVA was used to compare the means obtained from independent groups or at least three independent variables of the dependent variable (Taspinar, 2017). On the other hand, the normality test was applied before the analysis to perform the t-test and ANOVA tests. In the normality tests, Shapiro-Wilks test results are taken if the sample size is lower than 50, and Kolmogorov-Smirnow test results if the sample size is greater than 50 (Taspinar, 2017). In this study, the Kolmogorov-Smirnow test was used as the sample size was greater than 50. In the analyses, since 45 data, which were determined as outliers, violated the normality distribution, the data obtained from these participants were excluded from the data set and 695 data were finally analysed. In addition, when the values of the Teacher Digital Competence Scale were examined, it was seen that it showed a normal distribution, but it did not show a normal distribution when examined in terms of factors. Therefore, skewness and kurtosis values were examined for the factors that did not exhibit a normal distribution. Since the skewness and kurtosis coefficients in the examined values were between +1 and -1, it was observed that there was no significant deviation, and it was concluded that the normal distribution can be assumed (Buyukozturk et. al., 2019). In addition, Levene test was applied in ANOVA tests and Tukey test was used when variances were homogeneous (p>.05). Dunnett T3 test was used in cases where the variances were not homogeneous (p<.05). Statistical data required for the normality test analysis results are given in Table 3.

Table 3. *Descriptive statistics of Normality Test Analysis Results*

			Kolmogorov-Smirnov	
Scale	**N**	**P**	**Skewness**	**Kurtosis**
Teacher Digital Competence Scale	695	0.169	-0.018	-0.386
Safety	695	0.000	-0.423	0.076
Data Literacy	695	0.000	-0.719	1.031
Communication and Cooperation	695	0.000	-0.405	0.300
Ethical	695	0.000	-1.148	2.680
Digital Content Production	695	0.000	0.128	-0.438
Problem Solving	695	0.000	-0.277	0.054

FINDINGS

Analyses were made using the data collected from the teachers and the independent sample t-test and ANOVA test for study problems. The results of these analyses are explained below.

Examination of Teacher Digital Competence Scale Scores According to Gender

The relationship between the data obtained from the Teacher Digital Competence Scale and the gender of the teacher group participating in the study was analyzed using the independent sample t-test. The analyzed data are given in Table 4.

Table 4. *t-test Results of Teacher Digital Competence Scale Scores According to Gender*

Scale	**Gender**	**N**	$\bar{X}$	**Sd**	**t**	**p**
Teacher Digital Competence Scale	Female	352	3.7047	.60855	.678	.498
	Male	343	3.7374	.66511		

Safety Factor	Female	352	3.6091	.79870	.008	.993
	Male	343	3.6096	.87161		
Data Literacy Factor	Female	352	4.0461	.65333	.493	.622
	Male	343	4.0706	.65782		
Communication and Cooperation Factor	Female	352	3.8941	.69181	.080	.936
	Male	343	3.8984	.71830		
Ethical Factor	Female	352	4.3585	.59436	1.442	.150
	Male	343	4.2904	.65095		
Digital Content Production Factor	Female	352	2.9238	.92601	2.999	.003
	Male	343	3.1429	.99959		
Problem Solving Factor	Female	352	3.4795	.78697	.494	.621
	Male	343	3.5102	.85111		

When the digital competences of the teachers are examined in terms of gender, the mean of male teachers ($\bar{X}$=3.7374) is higher, although not greatly, compared with female pre-service teachers ($\bar{X}$=3.7047). An independent sample t-test was performed to determine whether this difference was significant or not. Accordingly, while no significant difference was observed between male and female teachers in the scores of the whole scale, a significant difference was observed between the genders in the digital content production factor, except for other factors, when evaluated in terms of sub-factors (Teacher Digital Competence Scale: t(693) = 0.678; p>.05, Safety Factor: t(693) = 0.008; p>.05, Data Literacy Factor: t(693) = 0.493; p>.05, Communication and Cooperation Factor: t(693) = 0.080; p>.05, Ethical Factor: t(693) = 1.442; p>.05, Digital Content Production Factor: t(693) =2.999;p<.05, Problem Solving Factor: t(693) =0.494;p>.05).

Examination of Teacher Digital Competence Scale Scores According to Age Groups

The data collected for age in the Teacher Digital Competence Scale are grouped as follows: Generation Y for the age group 21-40; Generation X for the age group 41-55, and Baby Boomers Generation for the age group 56-74. The relationship between the age groups of the teacher group participating in the study was analyzed using the One-Way ANOVA test with such arrangements. The analyzed data are given in Table 5.

Table 5. *Descriptive Statistics of Teacher Digital Competence Scale Scores According to Age Groups*

Scale	**Age Group**	**N**	$\bar{X}$	**Sd**
	A. 21-40 years old	381	3.8369	.61078
Teacher Digital Competence Scale	B. 41-55 years old	280	3.6096	.63208
	C. 56-74 years old	34	3.3363	.66544
	Total	695	3.7208	.63684
	A. 21-40 years old	381	3.7496	.80350
Safety Factor	B. 41-55 years old	280	3.4757	.83601
	C. 56-74 years old	34	3.1382	.84136
	Total	695	3.6094	.83487
	A. 21-40 years old	381	4.1939	.56138
Data LiteracyFactor	B. 41-55 years old	280	3.9183	.70438
	C. 56-74 years old	34	3.6895	.82777
	Total	695	4.0582	.65519
	A. 21-40 years old	381	4.0015	.65972
Communication and Cooperation Factor	B. 41-55 years old	280	3.8031	.72207

	C. 56-74 years old	34	3.4832	.80044
	Total	695	3.8962	.70450
	A. 21-40 years old	381	3.1181	.98448
Ethical Factor	B. 41-55 years old	280	2.9393	.95105
	C. 56-74 years old	34	2.8284	.84833
	Total	695	3.0319	.96856
	A. 21-40 years old	381	3.6360	.79741
Digital Content Production Factor	B. 41-55 years old	280	3.3536	.82275
	C. 56-74 years old	34	3.0719	.68596
	Total	695	3.4946	.81880
	A. 21-40 years old	381	4.3622	.56777
Problem Solving Factor	B. 41-55 years old	280	4.3164	.63946
	C. 56-74 years old	34	3.9765	.92869
	Total	695	4.3249	.62341

According to the results of the analysis, when the digital competences of teachers are individually examined according to the safety factor, data literacy factor, communication and cooperation factor, ethical factor, digital content production factor, and problem-solving factor, it is seen that the age range 21-40, which is classified as the Generation Y, has the highest mean scores (Digital Competence Scale for Teacher: $\bar{X}$=3.8369, Safety Factor: $\bar{X}$=3.7496, Data Literacy Factor: $\bar{X}$=4.1939, Communication and Cooperation Factor: $\bar{X}$=4.0015, Ethical Factor: $\bar{X}$=3.1181, Digital Content Production Factor: $\bar{X}$=3.6360, Problem Solving Factor: $\bar{X}$=4.3622). On examination in Table 6, teachers' digital competence scores differ according to their age groups. A one-way ANOVA test was applied to examine the significance of these differences. The test results are given in Table 6.

Table 6. *ANOVA Results of Teacher Digital Competence Scale Scores According to Age Groups*

Scale	Source of Variance	Sum of Squares	sd	Mean of Squares	F	p	Significant Difference
	Intergroup	13.620	2	6.810	17.594	.000	A-B,
Teacher Digital Competence Scale							A-C
	Intragroup	267.843	692	.387			
	Total	281.462	694				
	Intergroup	20.042	2	10.021	14.955	.000	A-B,
Safety Factor							A-C
	Intragroup	463.688	692	.670			
	Total	483.729	694				
	Intergroup	17.124	2	8.562	21.101	.000	A-B,
Data Literacy Factor							A-C
	Intragroup	280.794	692	.406			
	Total	297.918	694				
	Intergroup	12.453	2	6.227	12.978	.000	A-B,
Communication and Cooperation Factor							A-C
	Intragroup	331.997	692	.480			
	Total	344.450	694				
	Intergroup	6.641	2	3.320	3.566	.029	A-B,
Digital Content Production							A-C

Factor	Intragroup	644.402	692	.931			
	Total	651.043	694				
	Intergroup	19.267	2	9.633	14.946	.000	A-B,
Problem Solving Factor							A-C
	Intragroup	446.019	692	.645			
	Total	465.286	694				
	Intergroup	4.678	2	2.339	6.107	.002	None
Ethical Factor	Intragroup	265.041	692	.383			
	Total	269.719	694				

On examination in Table 6, it was observed that the teachers' digital competence scale and factors differed according to age groups. In other words, the teacher digital competence scale and its factors exhibited a significant difference in terms of age groups (Teacher Digital Competence Scale: F (2.692) = 17.594; p<.05, Reliability Factor: F (2.692) = 14.955; p<.05, Data Literacy Factor: F (2.692) = 21.101; p<.05, Communication and Cooperation Factor: F (2.692) = 12.978; p<.05, Digital Content Production Factor: F (2.692) = 3.566; p<.05, Problem Solving Factor: F (2.692) = 14.946; p<.05, Ethical Factor: F (2.692) = 6.107; p<.05). As the teacher digital competence scale and factors exhibited a significant difference in terms of age groups, the Post Hoc Analysis was applied. Dunnett T3 test was used because the variances of data literacy and ethical factors were not homogeneous (p<.05) according to the analysis results. According to the Dunnett T3 test results, there was a significant difference in favor of the age group 21-40 in the data literacy factor between the ages of 21-40 and 41-55, and between the ages of 21-40 and 56-74, but no significant difference was observed in the ethical factor. On the other hand, the Tukey test analysis was conducted since the variances of the scales and factors were homogeneous except for these two factors (p>.05). According to the results of the Tukey test, a significant difference is observed between the ages of 21-40 and 41-55, and between the ages of 21-40 and 56-74, in favor of the ages 21-40, in factors other than data literacy and ethical factors in the teacher digital competence scale.

Examination of Teacher Digital Competence Scale Scores According to School Type

The relationship between the school types of the teacher group participating in the study for the Teacher Digital Competence Scale was analyzed using the one-way ANOVA test. The analyzed data are given in Table 7.

Table 7. *Descriptive Statistics of Teacher Digital Competence Scale Scores According to School Types*

Scale	School Type	N	$\bar{X}$	Sd
	A. Other Educational Institutions	42	3.8157	.55893
Teacher Digital	B. Primary School	181	3.6875	.56534
Competence Scale	C. High School	280	3.6401	.68197
	D. Secondary School	192	3.8493	.62994
	Total	695	3.7208	.63684
	A. Other Educational Institutions	42	3.6952	.77898
	B. Primary School	181	3.6044	.71646
Safety Factor	C. High School	280	3.4779	.91797
	D. Secondary School	192	3.7870	.79309
	Total	695	3.6094	.83487
	A. Other Educational Institutions	42	4.1852	.55673
Data LiteracyFactor	B. Primary School	181	4.0068	.69024
	C. High School	280	4.0095	.67524

	D. Secondary School	192	4.1499	.60022
	Total	695	4.0582	.65519
	A. Other Educational Institutions	42	3.9592	.63676
Communication and	B. Primary School	181	3.9013	.64512
Cooperation Factor	C. High School	280	3.8311	.74234
	D. Secondary School	192	3.9725	.71150
	Total	695	3.8962	.70450
	A. Other Educational Institutions	42	3.0159	.79190
Digital Content	B. Primary School	181	2.9346	.89780
Production Factor	C. High School	280	2.9899	1.02905
	D. Secondary School	192	3.1884	.96505
	Total	695	3.0319	.96856
	A. Other Educational Institutions	42	3.6587	.81220
Problem Solving Factor	B. Primary School	181	3.4647	.71879
	C. High School	280	3.3889	.86798
	D. Secondary School	192	3.6412	.81380
	Total	695	3.4946	.81880
	A. Other Educational Institutions	42	4.4333	.47558
Ethical Factor	B. Primary School	181	4.2840	.61103
	C. High School	280	4.2643	.69293
	D. Secondary School	192	4.4281	.53860
	Total	695	4.3249	.62341

According to the analysis results, on the examination of the digital competences of teachers according to school types, the Secondary School type is seen to have the highest mean score (Teacher Digital Competence Scale: $\bar{X}$=3.8493). On examination in Table 7, the digital competence scores of teachers differ according to school types. A one-way ANOVA test was applied to examine the significance of these differences. The test results are given in Table 8.

Table 8. *ANOVA Results of Teacher Digital Competence Scale Scores According to School Types*

Scale	Source of Variance	Sum of Squares	sd	Mean of Squares	F	p	Significant Difference
Teacher Digital Competence Scale	Intergroup	5.575	3	1.858	4.654	.003	D-C
	Intragroup	275.888	691	.399			
	Total	281.462	694				
Safety Factor	Intergroup	11.214	3	3.738	5.466	.001	D-C
	Intragroup	472.516	691	.684			
	Total	483.729	694				
Data Literacy Factor	Intergroup	3.434	3	1.145	2.686	.046	None
	Intragroup	294.484	691	.426			
	Total	297.918	694				
Communication	Intergroup	2.474	3	.825	1.666	.173	None
	Intragroup	341.976	691	.495			

and Cooperation Factor	Total	344.450	694				
	Intergroup	6.919	3	2.306	2.474	.061	D-C
Digital Content Production Factor	Intragroup	644.124	691	.932			
	Total	651.043	694				
	Intergroup	8.549	3	2.850	4.311	.005	D-C
Problem SolvingFactor	Intragroup	456.737	691	.661			
	Total	465.286	694				
	Intergroup	3.872	3	1.291	3.354	.019	D-C
Ethical Factor	Intragroup	265.848	691	.385			
	Total	269.719	694				

On examination of Table 8 it was observed that the Teacher Digital Competence Scale differed according to school types. In other words, the teacher digital competence scale exhibited a significant difference in terms of school types (Teacher Digital Competence Scale: F (3.694) = 4.654; p<.05). As the Teacher Digital Competence Scale exhibited a significant difference in terms of school types, the Post Hoc Analysis was applied. Since the variance value was homogeneous according to the analysis results (p>.05), a Tukey test analysis was performed. According to the results of the Tukey test, a significant difference in favor of Secondary School was observed between the Secondary School type and the High School type for the Teacher Digital Competence Scale.

On the other hand, on examination in terms of factors, it was observed that there was no significant difference between the Digital Content Production and Communication and Cooperation factors, whereas the safety factor differed according to the school type. In other words, the safety factor did not exhibit any significant difference in terms of school types (Safety Factor: F (3.694) = 5.466; p<.05).

It was observed that the ethical factors differed in terms of school types. In other words, the ethical factor also exhibited a significant difference in terms of school types (Ethical Factor: F (3.694) = 3.354; p<.05). As the Safety Factor and Ethical Factor exhibited a significant difference in terms of school types, the Post Hoc Analysis was applied. Since the variance values were homogeneous in both factors according to the analysis results (p>.05), a Tukey test analysis was performed. According to the results of the Tukey test, a significant difference in favor of Secondary School was observed between the Secondary School type and the High School type for the Safety Factor and Ethical Factor.

It was observed that the Data Literacy factor differed in terms of school types. In other words, the data literacy factor exhibited a significant difference in terms of school type (Data Literacy Factor: F (3.694) = 2.686; p<.05). It was also observed that the Problem-Solving factor differed in terms of school types. In other words, the problem-solving factor also exhibited a significant difference in terms of school type (Problem Solving Factor: F (3.694) = 4.311; p<.05). As the Data Literacy and Problem-Solving factors exhibited a significant difference in terms of school types, the Post Hoc Analysis was applied. Since the variance values were not homogeneous in both factors according to the analysis results (p<.05), a Dunnett T3 test analysis was performed. According to the results of the Dunnett T3 test, a significant difference in favor of Secondary School was observed between the Secondary School type and the High School type for the Data Literacy Factor and Problem-Solving Factor.

Examination of Teacher Digital Competence Scale Scores According to Foreign Language Levels

The relationship between the foreign language levels of the teacher group participating in the study for the Teacher Digital Competence Scale was analyzed using the One-Way ANOVA test. The analyzed data are given in Table 9.

Table 9. *Descriptive Statistics of Teacher Digital Competence Scale Scores According to Foreign Language Levels*

Scale	Foreign Language Levels	N	$\bar{X}$	Sd
Teacher Digital Competence Scale	A. Beginner	188	3.6851	.63432
	B. I do not know	183	3.6201	.61168
	C. Intermediate	223	3.7670	.66501
	D. Advanced	101	3.8678	.59324
	Total	695	3.7208	.63684
Safety Factor	A. Beginner	188	3.5665	.85674
	B. I do not know	183	3.5448	.84760
	C. Intermediate	223	3.6422	.84252
	D. Advanced	101	3.7337	.74314
	Total	695	3.6094	.83487
Data LiteracyFactor	A. Beginner	188	4.0343	.67082
	B. I do not know	183	3.9872	.63180
	C. Intermediate	223	4.0369	.68613
	D. Advanced	101	4.2783	.55302
	Total	695	4.0582	.65519
Communication and Cooperation Factor	A. Beginner	188	3.8442	.71218
	B. I do not know	183	3.7744	.70961
	C. Intermediate	223	3.9814	.71372
	D. Advanced	101	4.0255	.61921
	Total	695	3.8962	.70450
Digital Content Production Factor	A. Beginner	188	3.0053	.94515
	B. I do not know	183	2.8443	.94743
	C. Intermediate	223	3.1196	.98266
	D. Advanced	101	3.2277	.97003
	Total	695	3.0319	.96856
Problem Solving Factor	A. Beginner	188	3.4462	.80677
	B. I do not know	183	3.3254	.79674
	C. Intermediate	223	3.5934	.84449
	D. Advanced	101	3.6733	.76575
	Total	695	3.4946	.81880
Ethical Factor	A. Beginner	188	4.3170	.63745
	B. I do not know	183	4.3552	.56253
	C. Intermediate	223	4.3202	.64758
	D. Advanced	101	4.2950	.65397
	Total	695	4.3249	.62341

According to the analysis results, on the examination of the digital competences of teachers according to foreign language levels, the Advanced group is seen to have the highest mean score (Teacher Digital Competence Scale: $\bar{X}$=3.8678). On examination in Table 9, the digital competence scores of teachers differ according to foreign language levels. A one-way ANOVA test was applied to examine the significance of these differences. The test results are given in Table 10.

Table 10. *ANOVA Results of Teacher Digital Competence Scale Scores According to Foreign Language Levels*

Scale	Source of Variance	Sum of Squares	sd	Mean of Squares	F	p	Significant Difference
Teacher Digital Competence Scale	Intergroup	4.755	3	1.585	3.958	.008	D-B
	Intragroup	276.708	691	.400			
	Total	281.462	694				
Safety Factor	Intergroup	2.908	3	.969	1.393	.244	None
	Intragroup	480.821	691	.696			
	Total	483.729	694				
Data LiteracyFactor	Intergroup	6.024	3	2.008	4.754	.003	D-A, D-B, D-C
	Intragroup	291.894	691	.422			
	Total	297.918	694				
Communication and Cooperation Factor	Intergroup	6.530	3	2.177	4.451	.004	C-B, D-B
	Intragroup	337.920	691	.489			
	Total	344.450	694				
Digital Content Production Factor	Intergroup	12.163	3	4.054	4.385	.005	C-B, D-B
	Intragroup	638.880	691	.925			
	Total	651.043	694				
Problem Solving Factor	Intergroup	11.079	3	3.693	5.618	.001	C-B, D-B
	Intragroup	454.207	691	.657			
	Total	465.286	694				
Ethical Factor	Intergroup	.275	3	.092	.235	.872	None
	Intragroup	269.445	691	.390			
	Total	269.719	694				

On examination of Table 10, it was observed that the Teacher Digital Competence Scale differed according to the foreign language levels. In other words, the teacher digital competence scale exhibited a significant difference in terms of foreign language levels (Teacher Digital Competence Scale: F (3.694) = 3.958; p<.05). As the Teacher Digital Competence Scale exhibited a significant difference in terms of foreign language levels, the Post Hoc Analysis was applied. Since the variance value was homogeneous according to the analysis results (p>.05), Tukey analysis was performed. According to the results of the Tukey test, a significant difference in favor of the Advanced level was observed between those with an Advanced level and those not speaking any foreign languages for the Teacher

Digital Competence Scale.

On examination in terms of factors, it was observed that there was a difference in terms of foreign language levels in the factors other than the safety and ethical factors. In other words, all factors except the safety and ethical factors exhibited a significant difference in terms of foreign language levels (Safety Factor: F (3.694) = 1.393; p>.05; Data Literacy Factor: F (3.694) = 4.754; p<.05; Communication and Cooperation Factor: F (3.694) = 4.451; p<.05; Digital Content Production Factor: F (3.694) = 4.385; p<.05; Problem Solving Factor: F (3.694) = 5.618; p>.05; Ethical Factor: F (3.694) = 0.235; p>.05). As the factors exhibited a significant difference in terms of foreign language levels, the Post Hoc Analysis was applied. Since the variance value was homogeneous according to the analysis results (p>.05), Factors Tukey analysis was performed for all factors. According to the results of the Tukey test, a significant difference in favor of Advanced level was observed between Advanced, Beginner, I do not know, and Intermediate for the Data Literacy Factor. For Problem Solving, Communication and Cooperation, and Digital Content Production factors, a significant difference was observed between Intermediate and I do not know, and Advanced and I do not know, in favor of Advanced and Intermediate. No significant difference was observed in the Safety and ethical factors.

Examination of the Digital Competences of Teachers

A descriptive analysis was performed regarding the digital competences of the teacher group participating in the study with the data obtained from the Teacher Digital Competence Scale. The analyzed data are given in Table 11.

Table 11. *Descriptive Results of the Teacher Digital Competence Scale Scores*

Scale	N	Min.	Max.	$\bar{X}$	Sd
Teacher Digital Competence Scale Scores	695	2.00	5.00	3.7208	.63684
Safety Factor	695	1.00	5.00	3.6094	.83487
Data Literacy Factor	695	1.67	5.00	4.0582	.65519
Communication and Cooperation Factor	695	1.00	5.00	3.8962	.70450
Ethical Factor	695	1.00	5.00	4.3249	.62341
Digital Content Production Factor	695	1.00	5.00	3.0319	.96856
Problem Solving Factor	695	1.00	5.00	3.4946	.81880

On examination of Table 11, the Teacher Digital Competence Scale score consists of the lowest 2 points and the highest 5 points. Looking at the general average ($\bar{X}$=3.7208), it is seen that the digital competence levels of the teachers are at an intermediate level. On the other hand, when the digital competence levels of teachers are examined in terms of factors, it is seen that the security factor consists of the lowest 1 point and the highest 5 points, and the security factor mean score is close to, but lower than, the general mean score ($\bar{X}$=3.6094). It is seen that while the data literacy factor mean score consists of the lowest 1 point and the highest 5 points, the data literacy factor mean score is higher than the general mean score ($\bar{X}$=4.0582). It is seen that the communication and cooperation factor consists of the lowest 1 and the highest 5 points, and the communication and cooperation factor mean score is close to, but higher than, the general mean score ($\bar{X}$=3.6094). It is seen that while the ethical factor mean score consists of the lowest 1 point and the highest 5 points, the ethical factor mean score is higher than the general mean score ($\bar{X}$=4.3249). It is seen that the digital content production factor consists of the lowest 1 and the highest 5 points, and the digital content production factor mean score is close to, but lower than, the general mean score ($\bar{X}$=3.0319). It is seen that the problem-solving factor consists of the lowest 1 and the highest 5 points, and the problem-solving factor mean score is close to,

but lower than, the general mean score ($\bar{X}$=3.4946).

DISCUSSION

In this study, it was aimed to reveal teacher digital competence profiles by examining teachers' digital competences in terms of different variables. In this direction, 695 teachers participated in the study, and analyses were made using the Teacher Digital Competence Scale (2021) developed by Gumus. In the study, digital competences were examined with a total of 4 different variables, including gender, age ranges, school type, and foreign language levels, and the results were reported.

On the examination of the results of the study, it was determined that 49.4% of the teachers participating in the study were male and 50.6% were female. When the digital competences of the teachers were examined in terms of gender, no statistical difference was observed between female and male teachers, although the average scores of male teachers were higher. However, when evaluated in terms of sub-dimensions, it was observed that male teachers had higher scores on the digital content production than female teachers. When the literature on this subject is examined, it is seen that the results obtained in the study exhibit similarities and differences between the results obtained in the study and other studies. Kayhan (2022) found that the level of educational technology use of male teachers was higher than that of female teachers. Cebi and Reisoglu (2020) determined in their study that there were significant differences in favor of male pre-service teachers in the sub-dimensions of information and data literacy, digital content production, security, and problem-solving. In a different study, Keskin and Yazar (2015) observed that male teachers had higher competences in the sub-dimensions of computer use, digital media use, and data acquisition of teachers. On the other hand, in a different study by Esteve-Mon, Angeles Liopis, and Adell-Segura (2020), it was seen that male teachers had higher levels of competence in issues such as solving technical problems and programming. Furthermore, in two studies conducted by Martin, Gonzales, and Penalvo (2020) as well as Gamez, Fernandez, Agapito, and Ortiz (2020), the digital competences of male pre-service teachers were observed at a higher level than female pre-service teachers. However, unlike other studies, Durak and Tekin (2020) observed that the skills of female teachers were higher than male teachers in their study, which examined the lifelong learning competences of teachers, including digital competences, personally and professionally. Generally, the higher digital competences of male teachers may be because male teachers spent more time in digital environments, are more interested than women, or have a higher computer and internet usage rate than women (TUİK, 2019).

When the digital competences of the teachers were examined in terms of age groups, it was observed that the average scores of the teachers in the age range 21-40, who are defined as Generation Y in the study, were higher than the other age groups, and significant differences were observed between the ages of 21-40 and 41-55, and between the ages of 21-40 and 56-74, in favor of the ages 21-40, in all dimensions other than ethical factor and the overall scale. On the other hand, it was observed that the competence scores of the teachers decreased as the age of the teachers increased. When the literature on this subject is examined, it is seen that the results obtained in the study exhibit similarities between the results obtained in the study and other studies. In the study by Durak and Tekin (2020), in which they examined the lifelong learning competences of teachers, no difference was observed between the ages and competence scores of the teachers, whereas the level of competence was observed to decrease as the age of the teachers increased. This may be due to the characteristics of the generations. Considering that the new generation grows in the age of technology, the fact that they interact more with technology may account for the higher digital competences of young teachers. Additionally, the computer courses that teachers took during their education may also affect the digital competences of teachers based on the basis of age.

A significant difference was found between secondary schools and high schools in favor of secondary school, except for scale-wide and digital content production and communication and

cooperation factor according to the type of school the teachers work in. The fact that the digital competences of the teachers working in high schools are lower than those of secondary school teachers may be because teachers in high schools have a lower level of lifelong learning tendencies and therefore show less curiosity and interest in learning new digital skills than secondary school teachers (Ayaz, 2016).

When the digital competences of the teachers were examined according to the foreign language levels of the teachers, although the mean scores of the teachers who speak foreign languages were observed higher, no difference was observed in terms of the status of knowing a foreign language. This may be due to the availability of translation opportunities in digital media. Additionally, it may be because the videos, which serve as user guides prepared for the use of a tool or the use of any digital environment, do not require a different skill to learn in the digital sense. On the other hand, when the digital competences of the teachers were examined in terms of their level of foreign language competence, the digital competence scores of the teachers with advanced language knowledge were observed to be higher, and the digital competence scores of the teachers with advanced foreign language knowledge were higher than the teachers who did not know a foreign language. Additionally, it was observed that teachers with an intermediate level of foreign language had a higher level of digital competence than teachers who did not know a foreign language. This may be because as the level of foreign language knowledge increases, the information about the content in the digital environment or in the tools can be better understood. When the literature on this subject is examined, it is seen that the results obtained in the study exhibit similarities between the results obtained in the study and other studies. Instefjord and Munthe (2017) stated that teachers' knowledge of a foreign language provides an advantage in many areas for the skills such as problem-solving, communication and cooperation, and critical thinking of both themselves and their students. This may also be because the English language is universal and knowledge of a foreign language helps get to know different tools or environments more easily.

Generally, when the digital competence status of the teachers was examined, it was seen that the digital competence levels of the teachers were at an intermediate level. It was observed that the highest values were the competences in the ethical factor, while the lowest values were the competences in the digital content production factor. When the literature on this subject is examined, it is seen that the results obtained in the study exhibit similarities and differences between the results obtained in the study and other studies. Dias-Trindade and Moreira (2020) determined in their study that the digital competence levels of the teachers were at an intermediate level. In this study, it was observed that teachers' pedagogical competences and students' competence factors had low values, whereas the professional competences of educators factor had the highest value. Napal Fraile et al. (2018) observed that the digital competence levels of pre-service teachers were low. In this direction, it was observed that the competences of the pre-service teachers were at the lowest level in content production and problem-solving factors. Cebi and Reisoglu (2020) determined in their study that the digital competences of the pre-service teachers were at an intermediate level, while their skills in content development, digital media use, and technical problem-solving skills were at a lower level, and their skills in information and data literacy, communication and cooperation, and security was at a higher level. Esteve Mon et al. (2020), on the other hand, determined that pre-service teachers perceived their digital competences in multimedia and communication and collaboration at a high level. On the other hand, Rokenes and Krumsik (2016), Instefjord and Munthe (2017), and Napal Fraile et al. (2018) observed that the content development skills of pre-service teachers were at very low levels in terms of digital competences and identified deficiencies in their digital competences. This may be due primarily to the low and medium levels of observation of teachers' digital skills in many studies and the inadequacy of the content of teachers' in-service courses (Cebi & Reisoglu, 2020; Ceylan & Gundogdu 2017; Dias-Trindade & Moreira, 2020; Gokmen, Akgul, & Kartal, 2014). On the other hand, it may be because teachers do not make an effort to improve their digital competence. Additionally, the low level

of content production and problem-solving competences may be due to the lack of training received by teachers in these fields.

CONCLUSION

According to the data obtained with the Teacher Digital Competence Scale, the digital profiles of the teachers working in primary, secondary, and high schools in the 2020-2021 period desired was observed. The differences in the digital competences of the teachers according to the variables are summarized in Figure 1.

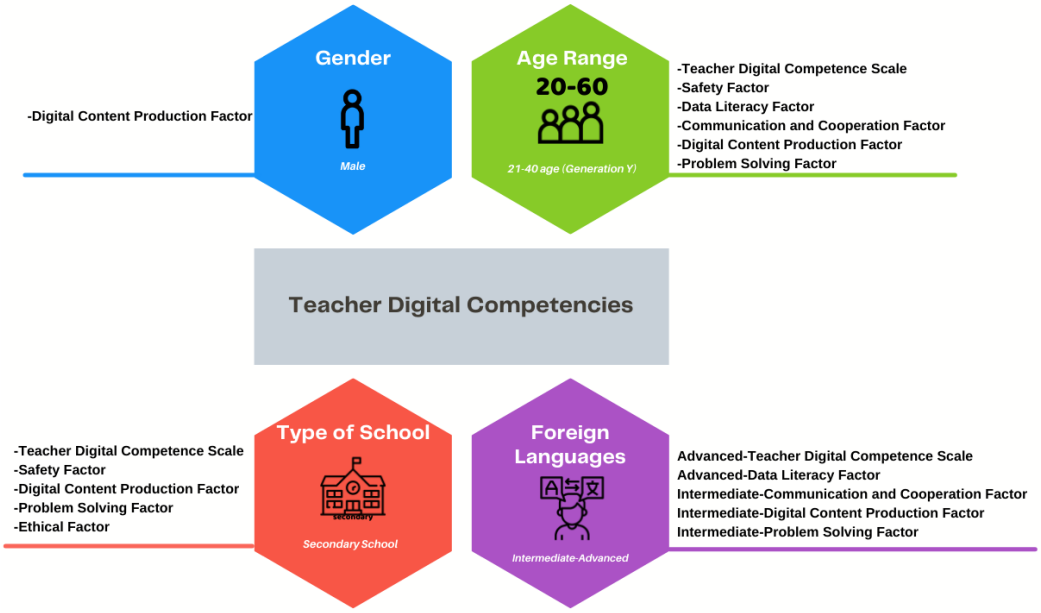

Figure 1. *The Effect of Variables on Digital Competence and Its Sub-Dimensions*

Accordingly, when examining the digital competences of the teachers based on gender, it was found that the digital competence scores of male teachers exceeded those of their female counterparts. With regards to the age range of the teachers, it was evident that the teachers belonging to Generation Y (aged 21-40) demonstrated higher digital competence compared to the more experienced teachers. Analyzing the types of schools where teachers were employed, it became apparent that the digital competence levels were higher in secondary schools compared to high schools. Additionally, an increase in foreign language proficiency corresponded to higher digital competence scores among teachers, particularly those with intermediate to advanced foreign language skills. Overall, the evaluation of the results indicated that the teachers' digital competences were at an intermediate level. This finding suggests that despite possessing moderate digital competences, the observed medium level is ultimately insufficient, considering the challenges faced during the pandemic period. Hence, teachers should strive to enhance their digital skills in this regard.

RECOMMENDATIONS

A country-wide digital competence profile can be created with study results covering different provinces. Therefore, in future studies, teacher digital competencies can be examined in different samples and in different locations, and a comparison can be made between the new data to be collected and the old data. Since the study is limited to only quantitative characteristics, it may be more effective to conduct mixed studies to evaluate the results of the digital competence of teachers in more detail. Making in-service courses more equipped so that teachers can develop their digital competences can bring the digital competences of teachers to a sufficient level. In this regard, the Ministry of National Education may get support from the departments of Information Technologies in universities and academicians working in these departments to improve the digital competences of teachers. It was observed that the digital competences of teachers decreased with an increase in their ages. Therefore,

supportive activities can be organized for experienced teachers to increase their digital competences. The digital competences of female teachers can be supported by focusing on courses/in-service training on digital content production for female teachers. Foreign language education can be provided by building on problem-solving, communication and cooperation, and digital content production skills.

REFERENCES

Aktaş, Ş. (2022). Examination Of Teachers'digital Competencies in Context of Some Variables.*Educational & Social Science Journal*. (4), 268-277. http://dx.doi.org/10.17121/ressjournal.3190

Ayaz, C. (2016). *Examination of teachers' lifelong learning tendencies in terms of some variables.* Master's thesis. Bartın University, Institute of Educational Sciences, Bartın.

Bakioğlu, B. & Çevik, M. (2020). Views of Science Teachers on Distance Education during the COVID-19 Pandemic Process. *Electronic Turkish Studies,15*(4),109-129. https://dx.doi.org/10.7827/TurkishStudies.43502

Bejakovic, P. & Mrnjavac, Ž. (2020). The importance of digital literacy on the labour market. *Employee Relations: The International Journal, 42*(4), 921–932. https://doi.org/10.1108/er-07-2019-0274

Bişirici, A., & Gülbahar, B. (2023). Investigating the Relationship Between Secondary School Teachers' Digital Competences and Their Attitudes Towards Information and Communication Technologies. *Pearson Journal, 8*(23), 102-122.

Bozkurt, A. (2020). The coronavirus (Covid-19) pandemic process and evaluations on education in the post-pandemic world: New normal and new education paradigm. *Journal of Open Education Applications and Research, 6*(3), 112-142.

Büyüköztürk, Ş., KılıçÇakmak, E., Akgün, Ö.E., Karadeniz, Ş. & Demirel, F. (2019). *Data Analysis Handbook for Social Sciences* (25th Edition). Ankara: Pegem Academy Publishing.

Büyüköztürk, Ş., Kılıç-Çakmak, E., Akgün, Ö.E., Karadeniz, Ş. & Demirel, F. (2018). *Scientific Research Methods* (24th Edition). Ankara: Pegem Publishing.

Casillas Martin, S., Cabezas Gonzalez, M. & Garcia Penalvo, F. J. (2020). Digital competence of early childhood education teachers: attitude, knowledge and use of ICT. *European Journal of Teacher Education, 43*(2), 210-223.

Castro-Granados, A. & Artavia-Diaz, K. Y. (2020). Teaching digital skills: an initial approach. *RevistaElectrónica Calidad en la Educación Superior, 11*(1), 47-80. https://doi.org/10.22458/caes.v11i1.2932

Çebi, A. & Reisoğlu, İ. (2020). Digital Competence: A Study from the Perspective of Pre-service Teachers in Turkey. *Journal of New Approaches in Educational Research (NAER Journal), 9(*2), 294-308.

Celebi, M. & Sevinç, S. (2019) Determination of teachers' perceptions of efficacy regarding 21st century skills and their level of use of these skills. *6th International Congress of Multidisciplinary Studies Educational Sciences* (p.157-172). Gaziantep: Hasan Kalyoncu University.

Ceylan, V. & Gündoğdu, K. (2017). E-Content Development Skills of Teachers: An In-Service Training Experience. *Journal of Education and Humanities:Theory and Practice,8*(15), 48-74.

Cosofret D. & Avram, E. R. (2020). Evaluation of the Maritime Higher Education didactic support during the coronavirus pandemic. Case Study. *In The 15th International Conference on Virtual Learning ICVL* (pp. 493-499).

Dias-Trindade, S. & Moreira, J. A. (2020). Assessment of high school teachers on their digital competences. *MAGIS, RevistaInternacional de InvestigaciónenEducación,13*, 1-21.

Drossel, K., Eickelmann, B. & Vennemann, M. (2020). Schools overcoming the digital divide: in depth analyses towards organizational resilience in the computer and information literacy domain. *Large-scale Assessments in Education, 8*(1), 1-19.

Durak, H. Y. & Tekin, S. (2020). Examination of teachers' lifelong learning competencies according to personal and professional variables. *AbantİzzetBaysal University Journal of the Faculty of Education, 20*(1), 221-235.

Eleventh Development Plan, (2019). *Eleventh Development Plan (2019-2023).* Presidency of the Republic of Turkey Strategy & Budget Department. http://www.sbb.gov.tr//wp-content/uploads/2019/07/On-Birinci-Kalkinma-Plani.pdf. It was obtained from the address on 25.05.2021.

Esteve-Mon, F., Llopis, M. & Adell-Segura, J. (2020). Digital Competence and Computational Thinking of Student Teachers. *International Journal of Emerging Technologies in Learning (IJET),15*(2), 29-41.

Eyo, M. (2016). Counselling implications of teachers' digital competencies in the use of Social Networking Sites (SNSs) in the teaching-learning process in Calabar, Nigeria. *Cogent Education, 3*(1), 1128134.

Fidan, M., & Yeleğen, H. C. (2022). Investigation of Teachers' Digital Competences in Terms of Various Variables and Digital Competence Needs. *Journal of Aegean Education, 23*(2), 150-170.

Gökbulut, B. (2021). Investigation of teachers' digital literacy levels and lifelong learning tendencies. *Journal of Higher Education and Science, 11*(3), 469-479.

Gökbulut, B., Keserci, G., & Akyüz, A. (2021). Digital material design competences of academicians and teachers working in the faculty of education. *Journal of Social Sciences and Education, 4*(1), 11-24.

Gokmen, O., Akgun, O. & Kartal, F. (2014). Teachers' Views on Interactive Boards and In-Service Training Used in the Fatih Project. *Journal of National Education, 44*(204), 42-62.

Guillen-Gamez, F. D., Mayorga-Fernandez, M. J., Bravo-Agapito, J. & Escribano-Ortiz, D. (2020). Analysis of teachers' pedagogical digital competence: Identification of factors predicting their acquisition. *Technology, Knowledge and Learning*, 1-18.

Gümüş, M. M., & Kukul, V. (2022). Developing a digital competence scale for teachers: validity and reliability study. *Education and Information Technologies*, 2747-2765. https://doi.org/ 10.1007/s10639-022-11213-2

Instefjord, E. J. & Munthe, E. (2017). Educating digitally competent teachers: A study of integration of professional digital competence in teacher education. *Teaching and teacher education, 67*, 37-45.

International Society for Technology Education (ISTE) (2017). *ISTE Standards for Educators*. Obtained from https://www.iste.org/standards/for-educators on 23.08.2020.

Joshi, A., Vinay, M. & Bhaskar, P. (2020). Impact of coronavirus pandemic on the Indian education sector: perspectives of teachers on online teaching and assessments. *Interactive Technology and Smart Education*, 205-226. https://doi.org/ 10.1108/itse-06-2020-0087

Karakus, G., & Gurbuz, O. (2019). Examination of pre-service teachers' digital literacy self-efficacy skills in terms of different variables. *Afyon Kocatepe University Journal of Social Sciences*, 21(1), 129-147.

Kavuk, E. & Demirtaş, H. (2021). The Challenges Teachers Experience in Distance Education During the COVID-19 Pandemic Process. *E-International Journal of Pedandragogy, 1*(1), 55-73.

Kayhan, O. (2022). Understanding Teachers' Classroom Management Anxiety: The Role of Educational Technology Usage in Classrooms. *Journal of Teacher Education and Lifelong Learning, 4*(2), 51-64. https://doi.org/ 10.51535/tell.1148725

Kelentric M., Marijana, Helland K., & Arstorp A. T. 2017. *Professional Digital Competence Framework for Teachers. Tromso: The Norwegian Center for ICT in Education*. Retrieved 30.05.2021 from https://www.researchgate.net/publication/321796285_Professional_Digital_Competence_Framework_for_Teachers_in_Norway.

Keskin, İ. & Yazar, T. (2015). Examining the digital competencies of teachers in the light of twenty-first century skills and in the context of lifelong learning. *International Journal of Human Sciences*, 12(2), 1691-1711.

Korkmaz, Ö. ,Kutlu, A. Ö. & Yavuz, Ş. (2022). Trends in 'Technology Leadership' Research in Education: Scoping Review .*Journal of Teacher Education and Lifelong Learning, 4*(1) , 12-33 . https://doi.org/10.51535/tell.1088511

Lucas, M., Bem-Haja, P., Siddiq, F., Moreira, A., & Redecker, C. (2021). The relation between in-service teachers' digital competence and personal and contextual factors: What matters most?.*Computers & Education, 160*, 104052.

Matli, W. & Ngoepe, M. (2020). Capitalizing on digital literacy skills for capacity development of people who are not in education, employment or training in South Africa. *African Journal of Science, Technology, Innovation and Development, 12*(2), 129-139.

McGarr, O., Mifsud, L. & Colomer Rubio, J. C. (2021). Digital competence in teacher education: comparing national policies in Norway, Ireland and Spain. *Learning, Media and Technology*, 1-15. https://doi.org/ 10.1080/17439884.2021.1913182

Napal Fraile, M., Penalva-Velez, A. & MendiorozLacambra, A. M. (2018). Development of digital competence in secondary education teachers' training. *Education Sciences,8*(3), 104.

Pihlainen, K., Korjonen-Kuusipuro, K., & Kärnä, E. (2021). Perceived benefits from non-formal digital training sessions in later life: views of older adult learners, peer tutors, and teachers. *International journal of lifelong education, 40*(2), 155-169.

Radovanovic, D., Holst, C., Belur, S. B., Srivastava, R., Houngbonon, G. V., Le Quentrec, E., Miliza J., Winkler A.S, & Noll, J. (2020). Digital literacy key performance indicators for sustainable development. *Social Inclusion, 8*(2), 151-167. https://doi.org/ 10.17645/si.v8i2.2587

Rokenes, F. M. & Krumsvik, R. J. (2016). Prepared to teach ESL with ICT? A study of digital competence in Norwegian teacher education. *Computers & Education, 97,* 1-20.

Statista (2020). *Global Digital Population*. Obtained from https://www.statista.com/statistics on 19.08.2020.

Taspinar, M. (2017). *SPSS applied quantitative data analysis in social sciences*. Ankara: Pegem Academy.

Turker, A. & Dundar, E. (2020). Opinions of High School Teachers on Distance Education Conducted over the Education Information Network (EBA) during the Covid-19 Pandemic Process. *Journal of National Education, 49*(1), 323-342.

Turkish Statistical Institute (TUIK) (2019). *Information Society Statistics*. Obtained from http://www.tuik.gov.tr/ on 19.08.2020.

United Nations Educational, Scientific & Cultural Organization (UNESCO) (2018). *UNESCO ICT Competency Framework for Teachers*, retrieved from https://unesdoc.unesco.org/ark:/48223/pf0000265721 on 23.08.2020.

Vuorikari, R., Punie, Y., Carretero Gomez S. & Van den Brande, G. (2016*). Dig.Comp. 2.0: The Digital Competence Framework for Citizens. Update Phase 1: The Conceptual Reference Model.* Luxembourg Publication Office of the European Union. EUR 27948 EN.

We Are Social (WAS) (2020). *Digital Around the World In 2020*. Retrieved from https://wearesocial.com/digital-2020 on 19.08.2020.

Yavuz Konokman, G., & Yanpar Yelken, T. (2014). Perceptions of faculty of education faculty members about lifelong learning competencies. *Hacettepe University Journal of Education. 29*(2), 267-281.

Yılmaz, E. O. & Toker, T. (2022). Covıd-19 How Has the Pandemic Impacted Teachers' Digital Competencies? *Journal of National Education, 51* (235), 2713-2730. https://doi.org/ 10.37669/milliegitim.896996