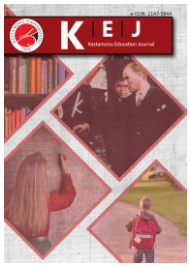
Kastamonu Education Journal, 2024, Vol. 32, No:2, 260-271
doi: 10.24106/kefdergi.1473578



|Research Article/ Araştırma Makalesi|

Investigation of Digital Competence Levels of Online Learners

Çevrimiçi Öğrenenlerin Dijital Yeterlik Düzeylerinin İncelenmesi

Yusuf YILDIRIM[1], **Gökhan ALPTEKİN**[2], **Hakan ALTINPULLUK**[3], **Deniz TÜRKMEN**[4]

Keywords

1. Distance Education
2. Digital Competencies
3. Distance Education Non-Thesis Master's Degree

Anahtar Kelimeler

1. Uzaktan Eğitim
2. Dijital Yeterlikler
3. Uzaktan Eğitim Tezsiz Yüksek Lisans

Received/Başvuru Tarihi
24.08.2023

Accepted /Kabul Tarihi
12.03.2024

Abstract

Purpose: This study aims to analyze the digital competence levels of online learners in terms of different variables.

Design/Methodology/Approach: A total of 303 students participated in the study conducted with the cross-sectional screening model of the quantitative research method. The data were collected online via the "University Students Digital Competencies Scale".

Findings: Students' digital competence levels show a significant difference according to the variables of gender, age, technology usage competence and duration of using technological devices. It was concluded that students with high technology use competence also have high problem-solving ability in virtual environments. It was determined that as the duration of students' use of technological devices increased, their level of content development in digital environments also increased.

Highlights: Considering the finding that as the average daily usage time of students' technological devices increases, students' digital competence levels also increase, it is recommended to prepare more activities to increase the average daily usage time of students' technological devices in distance education environments, to organize synchronous meetings and asynchronous forum activities, and to develop educational policies to take into account the time students spend in the distance education environment and their completion rates in measurement and evaluation processes.

Öz

Çalışmanın amacı: Bu çalışma, çevrimiçi öğrenenlerin dijital yeterlik düzeylerini farklı değişkenler açısından analiz etmeyi amaçlamaktadır.

Materyal ve Yöntem: Nicel araştırma yönteminin kesitsel tarama modeli ile yürütülen çalışmaya toplam 303 öğrenci katılmıştır. Çalışmanın verileri "Üniversite Öğrencileri Dijital Yeterlikler Ölçeği" aracılığıyla çevrimiçi olarak toplanmıştır.

Bulgular: Öğrencilerin dijital yeterlik düzeyleri cinsiyet, yaş, teknoloji kullanım yeterliği ve teknolojik cihazları kullanma süresi değişkenlerine göre anlamlı bir farklılık göstermektedir. Teknoloji kullanım yeterliği yüksek olan öğrencilerin sanal ortamlarda problem çözme becerilerinin de yüksek olduğu sonucuna ulaşılmıştır. Öğrencilerin teknolojik cihazları kullanma süreleri arttıkça dijital ortamlarda içerik geliştirme düzeylerinin de arttığı belirlenmiştir.

Önemli Vurgular: Öğrencilerin günlük ortalama teknolojik cihaz kullanımı süreleri arttıkça dijital yeterlik düzeylerinin de arttığı bulgusu dikkate alındığında, uzaktan eğitim ortamlarında öğrencilerin günlük ortalama teknolojik cihaz kullanımı sürelerini artırmaya yönelik daha fazla etkinlik hazırlanması, senkron toplantılar ve asenkron forum etkinlikleri düzenlenmesi, ölçme ve değerlendirme süreçlerinde öğrencilerin uzaktan eğitim ortamında geçirdikleri süreyi ve tamamlama oranlarını dikkate alacak eğitim politikaları geliştirilmesi önerilmektedir.

[1] Anadolu University, Department of Distance Education, Eskisehir, Türkiye; https://orcid.org/0000-0003-4475-4923
[2] Anadolu University, Department of Distance Education, Eskisehir, Türkiye; https://orcid.org/0000-0001-9374-5471
[3] **Corresponded Author,** Anadolu University, Department of Distance Education, Eskisehir, Türkiye; https://orcid.org/0000-0003-4701-1949
[4] Eskisehir Technical University, School of Foreign Languages, Eskisehir, Türkiye; https://orcid.org/0000-0002-1883-2003

Citation/Alıntı: Yıldırım, Y., Alptekin, G., Altınpulluk, H., & Türkmen, D. (2024). Investigation of Digital Competence Levels of Online Learners, *Kastamonu Education Journal, 32*(2), 260-271. doi: 10.24106/kefdergi.1473578

INTRODUCTION

Constant developments in information and communication technologies have enabled the realization of learning activities that require distance-learning students to have higher-level skills and competencies through the effective and efficient use of current technologies in learning management systems. The usage of advanced information and communication technologies which will ensure that students perform learning activities demanding higher level skills and competencies in distance learning environments requires students who need to use these technologies productively and actively to acquire digital competencies (Afacan-Adanır & Gülbahar-Güven, 2022).

Examining the definitions made within the scope of digital competencies in the literature, it is observed that digital competency, which is closely related to 21st-century skills and is a core competency in the acquisition of 21st-century skills (Ferrari, 2012; Juhász et al., 2022), is defined as the competencies necessary for students to use information and communication technologies effectively and efficiently (Kuzminska et al., 2019). In another study, digital competencies were considered as the skills needed to use information and communication technologies effectively and efficiently to achieve lifelong learning, entertainment, and socialization in education and working life by employing the skills of problem-solving, communication, collaboration, content creation, and sharing, which are among the 21st-century skills (Ferrari, 2012). In a further study, digital competencies (European Commission, 2018), which are determined by the European Commission as one of the competencies required for lifelong learning, are identified as competencies determined in five dimensions which are information and data literacy, communication, and collaboration, digital content development, security, problem-solving within the framework of Digital Competences 2.1 for individuals to use information and communication technologies consciously, safely, responsibly and to show commitment to digital technologies for their participation in learning, professional and social life (Carretero et al., 2017).

Digital competencies, which have an important role in shaping the economic and social levels of individuals (Gümüş, 2021), also play an important role in establishing interactions between students and instructors in distance learning environments in the field of education and enabling students to conduct technology-enriched collaborative activities with instructors and other students (Korucu, 2020). Since it is crucial for university students to have digital competencies addressed in the dimensions determined in the Digital Competencies 2.1 Framework to achieve success and satisfaction in their educational and professional lives (Kuzminska et al., 2018), higher education institutions need to provide digital competencies for all university students in a practice-oriented manner (Afacan-Adanır & Gülbahar-Güven, 2022). It is critical for higher education institutions, especially in crisis processes such as earthquakes and epidemics, to have digital competencies, for students who are studying in distance education institutions and postgraduate education in distance non-thesis programs should use information and communication technologies effectively and efficiently in distance learning environments.

RELATED RESEARCH

There are many studies in the literature on examining the digital competence levels of learners. For example, in a study conducted with university students in Chile, the digital competence levels of undergraduate students were examined and it was found that students had medium level digital competence (Silva-Quiroz & Morales-Morgado, 2022). In another study, the digital competence levels of pre-service teachers studying at universities in Spain were analysed. As a result of the study, it was found that pre-service teachers had moderate digital competence and some difficulties in creating content (Galindo-Domínguez & Bezanilla, 2021). In another study by Nyikes (2018), the digital competence levels of university students in Hungary were examined. As a result, it was determined that the digital competence levels of university students in Hungary were not at the expected level. In another study examining the digital competence levels of teachers and students in Ukraine, it was concluded that the digital competence levels of university students in Ukraine were at a high level (Kuzminska et al., 2018). Vodă et al. (2022) examined the digital competence levels of students studying at three large universities in Belgium and Romania in line with seven basic skill components. As a result of the analysis, it was revealed that students in Belgium had higher digital skills such as communication and cooperation, knowledge and problem solving compared to other skills, while students in Romania had higher creativity and technological skills compared to other digital skills.

When the studies conducted with graduate students in higher education institutions are examined in the literature, two main studies emerge. In the first of these studies, Prabhu et al. (2022) investigated whether the digital competence levels of 315 undergraduate and 44 graduate students at a private university in India differed according to gender. As a result of the research, gender differences were found in problem solving competence parameters, which include the ability to solve technical problems, use technology creatively, and identify needs and technological responses. Another study conducted by Kassymova et al. (2023) analyzed the perceptions of digital competence in online learning and teaching of 49 graduate students who attended distance evening courses at a private university in Kazakhstan and worked as English teachers in various educational institutions during the working hours. As a result of the study, it was found that Kazakhstani postgraduate students were well-equipped for online and distance learning and teaching, they received a good ICT education for online teaching at the university through the use of different digital tools in their learning processes, their digital competence levels for online learning were higher than their digital competence levels for online teaching, and they needed special training in using ICT for pedagogical purposes.

When the studies on digital competence in Turkey are examined, it is seen that there are activity studies aimed at improving the digital competence of pre-service teachers (Çebi & Reisoğlu, 2020). In the study conducted by Kaya (2020), the relationship

between the self-efficacy perceptions of education faculty students towards technology integration and their digital competence levels was investigated. As a result of the research, it was determined that there was a relationship between self-efficacy perception towards technology integration and digital competence levels and that digital competence levels differed significantly according to gender, age and department of study. In another study on digital competence, it was found that pre-service teachers had high levels of digital awareness, digital competence and digital fluency (Karakuş, 2022). As a result of the literature review, it has been seen that there are limited number of studies examining the digital competence levels of graduate students and that new scientific research is needed. In this context, it is considered that it is important to investigate the digital competence levels of graduate students studying through distance education. For this reason, it is thought that this study, which addresses the digital competence levels of graduate students studying through distance education from different perspectives, is thought to be important and contribute to the related literature. In this study, it was aimed to examine the digital competence levels of non-thesis master's degree students studying through distance education in terms of different variables. In the framework of this main purpose, answers to the following research questions were sought:

1. Do the digital competence levels of students studying in Distance Education Non-Thesis Master's programs differ according to the gender?
2. Do the digital competence levels of students studying in Distance Education Non-Thesis Master's programs vary according to the age?
3. Do the digital competence levels of students studying in Distance Education Non-Thesis Master's programmes differ according to technology usage competence?
4. Do the digital competence levels of students studying in Distance Education Non-Thesis Master's programs differ according to the average daily time spent using technological devices?

As a result of the research, pioneering findings were provided to the literature with the results obtained by evaluating the digital competence levels of graduate students in distance education environments in terms of different variables.

METHOD

In this study, the descriptive research method, which is one of the quantitative research methods, was used. Descriptive research is a type of research that aims to directly investigate an ongoing situation and detect the current situation (Karakaya, 2014). In the descriptive research method, it is fundamental to clarify a situation and to make various evaluations to establish the relationship between events (Büyüköztürk et al., 2014). This method tries to define the individuals, events, or objects that are the subject of research as they are by assessing them within the conditions they are in (Karasar, 2012).

Research Model

This study was conducted to investigate the digital competence levels of students studying in Anadolu University Institute of Social Sciences Distance Education Non-Thesis Master's Degree programs in terms of various variables. The cross-sectional screening model, one of the general survey models, was used in the study. Survey models within the descriptive research method are the arrangements made on the whole population or a sample to be taken from the population to have a general opinion about it in a population with a high number of elements (Karasar, 2012). Cross-sectional screening models are research models that include communities of individuals with different qualities from one another and generally have a large sample size. The variables to be depicted in this survey model are measured at one time (Büyüköztürk et al., 2014; Fraenkel et al.,2012). In this study, the cross-sectional screening model was used since it was intended to determine the digital competence levels of non-thesis master's degree students studying through distance education by measuring them at one time according to different variables.

Population and Sample

The population of the study consists of students enrolled in Anadolu University Institute of Social Sciences Distance Education Non-Thesis Master's Degree programs in the spring semester of the 2022-2023 academic year. The sample of the study consists of a total of 303 students enrolled in distance education non-thesis master's programs and responding to the data collection tools presented to them. While forming the sample group of the study, the convenience sampling method, which is one of the non-random sampling methods, was used. This sampling method, which is based on the principles of being both accessible and convenient, is a method that enables researchers to collect the most accurate information quickly (Büyüköztürk et al., 2014). Researchers using this sampling method mostly work with individuals who are easy to access and volunteer to participate (Erkuş, 2005).

Information on the demographic characteristics of the students constituting the sample of the study was collected via a personal information form. Information on the demographic characteristics of the students is given in Table 1.

Table 1. Demographic information of the students

Attribute	Variable	Frequency (N)	Percentage Value (%)
Gender	Female	141	46.5
	Male	162	53.5

Attribute	Variable	Frequency (N)	Percentage Value (%)
Age	18-25 years	56	18.5
	26-33 years	101	33.3
	34-41 years	86	28.4
	42-49 years	48	15.8
	50 years and over	12	4.0
Technology Use Competency	Basic Level	46	15.2
	Intermediate Level	155	51.2
	Advanced Level	102	33.7
Average Daily Usage Time of Technological Devices*	Between 0-3 hours	26	8.6
	Between 3-5 hours	69	22.8
	Between 5-7 hours	93	30.7
	7 and more hours	115	38.0

*Participants with an average daily technological device use of 3 hours were included in the 3–5 hour group, and those with 5 hours were included in the 5-7 hour group. Analyses were carried out accordingly.

Data Collection Tools

In the study, a personal information form and the "University Students Digital Competencies Scale" adapted into Turkish by Afacan-Adanır and Gülbahar-Güven (2022) were adopted to collect data. The data of the study were collected online through Google Forms. The electronic questionnaire form created in the online environment was applied to students studying in Anadolu University Institute of Social Sciences Distance Education Non-Thesis Master's Degree programs between December 15, 2022 and March 26, 2023. The data collection process with the help of Google Forms was conducted based on the principle of volunteerism. Only the data of the participants who declared that they participated voluntarily were used in the study. In the online questionnaire form, participants were given a single answer and care was taken not to create a biased sample group. The students who constituted the sample of the study were given the necessary information to answer the questions in the questionnaire form in a credible way and were given the right to examine the collected data if desired.

Personal Information Form

The personal information form is a form prepared to determine the demographic characteristics of the participants such as gender, age, technology usage competence and average daily usage time of technological devices.

University Students Digital Competencies Scale

The scale used in the study was adapted into Turkish by Afacan-Adanır and Gülbahar-Güven (2022). This scale, which consists of 29 items and 5 sub-dimensions in total, is a 4-point Likert scale. Items 1, 2, 3, 4, 5, 6, 7, 8, 9 of the scale measure students' digital content development levels; items 10, 11, 12, 13, 14, 15, 16, 17, 18, 19 measure students' information and data literacy levels; items 20, 21, 22 measure students' contact skills; items 23, 24, 25, 26 measure students' skills in the use of virtual tools and social communication levels; and items 27, 28, 29 measure students' problem-solving skills in virtual environment. On the other hand, Cronbach's Alpha internal reliability value was also examined to test the reliability of the scale and it was found that this value was $\alpha = 0.907$. The reliability coefficients of the sub-dimensions of the scale were calculated as $\alpha > 0.70$ (Afacan-Adanır & Gülbahar-Güven, 2022).

Confirmatory Factor Analysis (CFA) was applied to ascertain the validity and reliability of the scale used in the study. As a result of CFA using IBM AMOS 21.0 (Analyses of Moment Structures) program, the adjusted chi-square value is $\chi 2/sd = 1.831$, which is one of the values indicating compliance. According to Kline (2011), this value is in the range of $0 \leq \chi 2/sd \leq 2$ means that there is an impeccable fit. Therefore, it was found that this value obtained as a result of CFA had an excellent fit. In the study, another fit value, the Root Mean Square Error of Approximation (RMSEA) value was investigated, and it was found that this value was RMSEA=0.052. In the literature, this value is in the range of $.05 \leq RMSEA \leq .08$ indicating that there is acceptable compliance. In this regard, the obtained value was found to have an acceptable match (Browne & Cudeck, 1993). When the CFI value, which is another fit index, was examined, it was seen that this value was CFI= 0.95. According to Kline (2011), a value greater than 0.95 indicates a good fit. TLI value, which is another goodness of fit, was calculated as 0.95. Hu and Bentler (1999) considered this value to be in the range of $0.95 \leq TLI \leq 1.00$ as a good fit criterion. In this context, it was determined that the calculated TLI value had a good fit. Another goodness of fit index examined as a result of CFA is the IFI value. In this study, IFI=0.96 was calculated. The fact that this value is in the range of $0.90 \leq IFI \leq 1.00$ is an indication of having a good fit index (Bollen, 1989). SRMR value, another goodness of fit value, was calculated and it was found that this value was 0.48. SRMR value less than 0.80 indicates a good fit according to Hu and Bentler (1999). In this respect, it was determined that the SRMR value obtained has a good fit value. The Adjusted Goodness of Fit Value (AGFI) was calculated as AGFI= 0.92. According to Schermelleh-Engel and Moosbrugger (2003), this value being in the range of $0.90 \leq AGFI \leq 1.00$ is considered as a good fit criterion. Therefore, it can be said that this result obtained is a good fit criterion. To assess the reliability of the scale, Cronbach's

Alpha (α) value was calculated. As a result of the calculation, it was found that Cronbach's Alpha value for the whole scale was α= 0.93. The Cronbach's Alpha values of the sub-dimensions of the scale were found to be higher than α= 0.70.

Data Analysis

Before starting the analysis process, it was checked whether there was any incorrect data entry and a normality test was performed to determine the analyses to be used in the resolution of the data. To determine whether the research data displayed a normal distribution, kurtosis and skewness values and histogram graphs were examined respectively. According to the results of the normality analysis, it was found that the kurtosis and skewness values of the data set were in the range of -1/+1 and the histogram graphs showed a normal distribution (Huck, 2012). As a result of the normal distribution of the data set, it was decided to use measurement techniques such as frequency analysis, independent samples t-test, and one-way analysis of variance (One-Way ANOVA) respectively. While the calculation of kurtosis and skewness values, frequency analysis showing percentage value distributions, independent samples t-test, One-Way ANOVA, and other parametric test techniques were carried out in the IBM SPSS 26.0 package program, the CFA, which was conducted due to the study on a different research population, was prepared in the AMOS 21.0 package program. Cohen's d values and eta squared (η2) values were computed to determine the effect sizes of significant differences (Cohen, 1988a; Cohen, 1988b).

FINDINGS

In this section of the study, statistical analyses were carried out to investigate the significance of students' digital competence levels in terms of different variables. Following the analyses, the findings were presented and interpreted in tables.

Independent samples t-test was used to determine whether the students' digital competence levels varied considerably based on the gender variable. The results of the analysis demonstrating the level of correlation between the variables are given in Table 2.

Table 2. Differentiation of students' digital competence levels according to gender variable

Subscale/ Scale	Gender	N	X̄	S	t	df	*p*
Digital Content Development	Female	141	2.156	.5963	-3.202	301	.002*
	Male	162	2.380	.6128			
Information and Data Literacy	Female	141	2.888	.6442	-2.776	301	.006
	Male	162	3.089	.6138			
Contact	Female	141	3.141	.7062	-.081	301	.935
	Male	162	3.148	.6413			
Using Virtual Tools and Social Communication	Female	141	2.586	.6331	1.471	301	.142
	Male	162	2.479	.6298			
Problem Solving in a Virtual Environment	Female	141	2.983	.7739	-1.334	301	.183
	Male	162	3.096	.7036			
Total	Female	141	2.655	.5280	-2.335	301	.020*
	Male	162	2.792	.4862			

In Table 2, whether the digital competence levels of the students differed significantly according to the gender variable was examined. According to Table 2, it was found that students' digital competence levels ($t(301)= -2.335$, $p<0.05$) differ considerably according to gender variable. In this regard, the digital competence levels of male students were seen to be at a higher level than female students. This indicates that the gender variable is an influential variable on students' digital competence levels. To determine the degree of this significant difference, Cohen's d value was examined and it was seen that this value was 0.026. With this value, we can see that the significant difference has a small effect magnitude. When the sub-dimensions were analyzed, students' digital content development levels ($t(301)= -3.202$, $p<0.05$) also showed a significant difference based on the gender variable. Thus, the level of digital content development of male students was observed to be at a relatively higher level than that of female students. This significant difference was detected to have a small effect (d= 0.036). On the other hand, students' levels of information and data literacy ($t(301)= -2.776$, $p>0.05$), communication ($t(301)= -.081$, $p>0.05$), using virtual tools and social communication ($t(301)= 1.471$, $p>0.05$) and problem-solving in a virtual environment ($t(301)= -1.334$, $p>0.05$) did not show a significant difference in terms of gender variable.

A One-Way ANOVA test was applied to find out whether the digital competence levels of the students differed depending on the age variable. Information about the test results is given in Table 3.

Table 3. Differentiation of students' digital competence levels according to age variable

Subscale/ Scale	Variables	N	X̄	sd	df	F	*p*	Difference
Digital Content Development	18-25 years	56	2.434	.5028	302	3.140	.015*	18-25 years> 42-49 years
	26-33 years	101	2.292	.6725				
	34-41 years	86	2.311	.6189				
	42-49 years	48	2.046	.5481				
	50 years and over	12	2.064	.5694				

Information and Data Literacy	18-25 years	56	3.160	.6271	302	2.015	.092	-
	26-33 years	101	3.034	.6844				
	34-41 years	86	2.945	.5620				
	42-49 years	48	2.862	.6363				
	50 years and over	12	2.800	.6208				
Contact	18-25 years	56	3.178	.7546	302	0.333	.856	-
	26-33 years	101	3.168	.7065				
	34-41 years	86	3.155	.6107				
	42-49 years	48	3.076	.6422				
	50 years and over	12	3.000	.5318				
Using Virtual Tools and Social Communication	18-25 years	56	2.687	.5625	302	3.390	.010*	18-25 years> 42-49 years
	26-33 years	101	2.549	.6736				
	34-41 years	86	2.558	.6285				
	42-49 years	48	2.250	.5880				
	50 years and over	12	2.541	.5204				
Problem Solving in a Virtual Environment	18-25 years	56	3.166	.7275	302	0.839	.501	-
	26-33 years	101	3.056	.7558				
	34-41 years	86	3.038	.7166				
	42-49 years	48	2.916	.7421				
	50 years and over	12	2.916	.7929				
Total	18-25 years	56	2.872	.4625	302	2.979	.020*	18-25 years> 42-49 years
	26-33 years	101	2.753	.5578				
	34-41 years	86	2.726	.4684				
	42-49 years	48	2.552	.4948				
	50 years and over	12	2.569	.4708				

When the test results presented in Table 3 are reviewed, it is seen that students' digital competence levels showed a significant difference ($F(2,302)= [2.979]$, $p<0.05$) concerning the age variable. Similarly, this significant difference was observed in the sub-dimensions of developing digital content, using virtual tools and social communication. To determine the source of these significant differences in the total and sub-dimensions of the digital competencies scale, the Bonferroni test, which is used when the variances are equal, was used (Field, 2005). As a result of the test, students between the ages of 18-25 ($\bar{X}$=2.872, sd=.4625) had a higher level of digital competence than students between the ages of 42-49 ($\bar{X}$=2.552, sd=.4708). It was observed that this statistically meaningful difference had a small effect magnitude ($\eta 2$=0.038). Furthermore, students between the ages of 18-25 ($\bar{X}$=2.434, sd=.5028) showed higher levels of digital content development than students between the ages of 42-49 ($\bar{X}$=2.046, sd=.5481). However, this significant differentiation ($\eta 2$=0.040) has a small effect magnitude. Another significant variation was found in the sub-dimension of using virtual tools and social communication. Therefore, it was determined that the level of using virtual tools and social communication of the students between the ages of 18-25 ($\bar{X}$=2.687, sd=.5625) was higher than that of the students between the ages of 42-49 ($\bar{X}$=2.250, sd=.5880). When the effect size of this difference was evaluated, a small effect size ($\eta 2$=0.043) was observed.

A one-way ANOVA test was carried out to see whether the digital competence levels of the students varied considerably regarding the technology usage competence variable. The results of the one-way ANOVA test are shown in Table 4.

Table 4. Differentiation of students' digital competence levels according to technology use competence variable

Subscale/ Scale	Variables	N	$\bar{X}$	sd	df	F	*p*	Difference
Digital Content Development	Basic Level	46	2.009	.4474	302	33.505	.000*	Advanced Level > Intermediate Level, Advanced Level > Basic Level
	Intermediate Level	155	2.115	.5357				
	Advanced Level	102	2.640	.6291				
Information and Data Literacy	Basic Level	46	2.650	.5608	302	38.618	.000*	Advanced Level > Intermediate Level, Advanced Level > Basic Level
	Intermediate Level	155	2.840	.5738				
	Advanced Level	102	3.388	.5629				
Contact	Basic Level	46	2.891	.6168	302	8.257	.000*	Advanced Level > Intermediate Level, Advanced Level > Basic Level
	Intermediate Level	155	3.094	.6598				
	Advanced Level	102	3.336	.6658				
Using Virtual Tools and Social	Basic Level	46	2.331	.5987	302	4.254	.015*	Advanced Level > Intermediate Level, Advanced Level > Basic Level
	Intermediate Level	155	2.509	.5837				

Communication	Advanced Level	102	2.649	.6958				
Problem Solving in a Virtual Environment	Basic Level	46	2.637	.7091				
	Intermediate Level	155	2.907	.6769	302	28.214	.000*	Advanced Level > Intermediate Level, Advanced Level > Basic Level
	Advanced Level	102	3.434	.6696				
Total	Basic Level	46	2.431	.4504				
	Intermediate Level	155	2.603	.4315	302	42.394	.000*	Advanced Level > Intermediate Level, Advanced Level > Basic Level, Intermediate Level > Basic Level
	Advanced Level	102	3.053	.4813				

The results of the analysis given in Table 4 demonstrate that there is a significant difference (F(2,302)= [42.394], p<0.05) between the digital competence levels of the students and the technology usage competence variable. The findings indicate that the digital competence levels of students with advanced level of technology use competence ($\bar{X}$=3.053, sd=.4813) are higher than the other students. It has been observed that this significant difference has a large effect (η2=0.220). In this context, as students' technology use competence increases, their digital competence levels also rise. Likewise, significant differences were also reported in other sub-dimensions of the scale. Bonferroni test was run to analyze these differences. Based on the results of the test, advanced ($\bar{X}$=2.640, sd=.6291) students with advanced technology use competence had higher levels of digital content development than intermediate ($\bar{X}$=2.115, sd=.5357) and basic ($\bar{X}$=2.009, sd=.4474) students. This significant difference was characterized by a strong effect size (η2=0.182). Furthermore, it was concluded that students who could use technology at advanced level ($\bar{X}$=3.388, sd=.5629) had higher levels of information and data literacy than students who used technology at intermediate level ($\bar{X}$=2.840, sd=.5738) and basic level ($\bar{X}$=2.650, sd=.5608), which indicates a significant effect magnitude of η2=0.182. Another important difference was found in the communication sub-dimension. In this respect, it was found that students with advanced technology use competence ($\bar{X}$=3.336, sd=.6658) had higher communication levels than students who used technology at intermediate level ($\bar{X}$=3.094, sd=.6598) and basic level ($\bar{X}$=2.891, sd=.6168). This emerging difference was reported to have a small effect (η2=0.052). In this regard, it can be said that as technology use competence increases, the level of communication also increases. Another significant differentiation is observed in the sub-dimension of using virtual tools and social communication. Based on this, it was concluded that as the students' technology use competence increased, their ability to use virtual tools and social communication level also increased, which indicated a small effect (η2=0.027). One more significant difference obtained with the result of the test is in the sub-dimension of problem-solving in a virtual environment. Based on this, it was determined that students who could use technology at an advanced level ($\bar{X}$=3.434, sd=.6696) had higher levels of problem-solving in a virtual environment compared to other students. From this point of view, it was observed that as the ability to use technology rose, the level of problem-solving in a virtual environment also rose. Considering the effect magnitude of this significant difference, it is seen that this value is η2=0.158 and therefore has a large influence.

It was desired to see whether there was a significant difference between the students' digital competence levels and the average daily usage time of technological devices, and a one-way ANOVA test was carried out in this sense. Information about the test results is provided in Table 5.

Table 5. Differentiation of students' digital competence levels according to the average daily duration of use of technological devices

Subscale/ Scale	Variables	N	$\bar{X}$	sd	df	F	*p*	Difference
Digital Content Development	Between 0-3 hours	26	2.085	.6720	302	6.565	.000*	7 and more hours> Between 0-3 hours, 7 and more hours> Between 3-5 hours, 7 and more hours> Between 0-3 hours
	Between 3-5 hours	69	2.157	.6042				
	Between 5-7 hours	93	2.179	.5290				
	7 and more hours	115	2.468	.6288				
Information and Data Analysis	Between 0-3 hours	26	2.930	.5760	302	2.648	.049*	7 and more hours> Between 5-7 hours
	Between 3-5 hours	69	2.972	.6599				
	Between 5-7 hours	93	2.879	.6252				
	7 and more hours	115	3.119	.6267				
Contact	Between 0-3 hours	26	3.153	.6270	302	2.091	.101	-
	Between 3-5 hours	69	3.202	.6082				
	Between 5-7 hours	93	3.003	.7605				
	7 and more hours	115	3.223	.6286				
Using Virtual Tools and Social Communication	Between 0-3 hours	26	2.480	.6477	302	.182	.909	-
	Between 3-5 hours	69	2.539	.6042				
	Between 5-7 hours	93	2.502	.6680				
	7 and more hours	115	2.556	.6230				
Problem Solving in a	Between 0-3 hours	26	2.961	.6688	302	1.524	.208	-

Virtual Environment	Between 3-5 hours	69	3.009	.7604				
	Between 5-7 hours	93	2.953	.7495				
	7 and more hours	115	3.156	.7245				
Total	Between 0-3 hours	26	2:632	.4628	302	4.046	.008*	7 and more hours > Between 5-7 hours
	Between 3-5 hours	69	2.687	.5017				
	Between 5-7 hours	93	2.630	.4912				
	7 and more hours	115	2.854	.5194				

According to the results of the analysis presented in Table 5, there is a statistically significant differentiation (F(2,302)= [4.046], p<0.05) between students' digital competence levels and the average daily usage time of technological devices. When the sub-dimensions of the scale were studied, it was noticed that there was a similar differentiation in the sub-dimensions of digital content development and information and data literacy. Bonferroni multiple comparison test was done to find out the source of the significant differences found in the total and sub-dimensions of the digital competence scale. The results of the test revealed that students who use technological devices for an average of 7 or more hours a day ($\bar{X}$=2.854, sd=.5194) had higher levels of digital competence than students who use them for 5-7 hours ($\bar{X}$=2.630, sd=.4912), which corresponds to a small effect magnitude (η2=0.039) for this significant difference. Furthermore, these results show that there is no meaningful differentiation before the 5th hour. A further differentiation was noted in the sub-dimension of digital content development. Thus, as the average daily usage time of technological devices gradually increased, it was observed that students' digital content development levels also increased. However, the effect size of this significant difference was found to be moderate (η2=0.061). Moreover, another significant difference was found in the information and data literacy sub-dimension. According to this, students who use technological devices more than 7 hours a day on average had higher levels of information and data literacy than students who use these devices between 5 and 7 hours a day, which indicates a small effect size (η2=0.066). This finding shows that there is no significant difference in the information and data literacy levels of students who use technological devices less than 5 hours a day on average.

CONCLUSION AND DISCUSSION

Within the scope of this study, the digital competence levels of students studying in distance education non-thesis master's degree programs were investigated in terms of a range of variables. Numerous findings were identified with the research and these findings are reported below respectively.

As gender and age variables are the most frequently examined variables in studies conducted to measure digital competencies (Lucas et al., 2021), this study primarily examined whether students' digital competency levels differ according to gender and age variables. Examining the findings obtained for the gender variable, it has been concluded that the digital competence levels of the students differ substantially depending on the gender variable. Hence, the digital competence levels of male students were reported to be higher than those of female students. However, this significant difference was observed to possess a small effect magnitude. The finding that male students have higher proficiency levels than female students is similar to the findings of Prabhu et al. (2022), Çebi and Reisoğlu (2020), Kaya (2020), Cabezas-Gonzalez et al. (2017), Yazar and Keskin (2016), and Yaman et al. (2013). Prabhu et al. (2022) conducted a research to investigate whether the digital competency levels of 315 undergraduate and 44 graduate students studying at a private university in India differ by gender. According to the results of their research, it was concluded that there was no distinction between female and male students in terms of information literacy, communication, and content creation competency levels, and male students had higher levels of competencies than female students in terms of solving technical problems, determining needs and technological responses, and innovating by using technology creatively. Cabezas-Gonzalez et al. (2017) conducted a study to find out the digital competence levels of university students studying at the Faculty of Psychology and Educational Sciences of the University of Porto and concluded that male students had higher digital competence than female students. The findings that male students have higher proficiency levels than female students are in contrast with the findings of Karakuş (2022), Galindo-Domínguez and Bezanilla (2021), and Kuzminska et al. (2018). Galindo-Domínguez and Bezanilla (2021), as a result of their research conducted to determine the digital competencies of 79 pre-service teachers studying at the public university in the Basque Country of Spain and 121 pre-service teachers studying at the private Deusto University, showed that there was no statistically notable difference in the digital competencies of pre-service teachers concerning gender variable. Kuzminska et al. (2018), conducted a study to identify the level of digital competencies of 193 university students studying at the National University of Life and Environmental Sciences of Ukraine, National Aviation University of Ukraine, and Boris Grinchenko Kyiv University, and concluded that there was no meaningful disparity between the level of digital competencies of male and female students. Although the digital competence levels of male students are significantly higher than the digital competence levels of female students, the fact that this significant difference has a small effect size does not mean that male students use digital technologies more effectively than female students. Taking into consideration that the students participating in the study received their postgraduate education in distance education environments where digital technologies are used intensively, since all students are expected to have high levels of digital competence, it is necessary to develop educational policies to overcome gender inequality among students by increasing the awareness of female students towards the use of digital technologies and enhancing their digital competencies.

Looking at the findings obtained according to the age variable of the students, it has been concluded that the specified variable shows a meaningful change in the digital competence levels of the students participating in the study. Based on this, students between the ages of 18-25 had a higher level of digital competence than students between the ages of 42-49. It was determined that this noteworthy difference between the students had a low-level effect magnitude. Results of the study showed that students' digital competence levels increased with decrease in age, which contradicts the findings of Galindo-Domínguez and Bezanilla (2021), Guillén-Gámez et al. (2020), Kaya (2020), Kuzminska et al. (2018) and Cabezas-Gonzalez et al. (2017). Guillén-Gámez et al. (2020), as a result of their research conducted to determine the digital competencies of 108 pre-service teachers studying at the Pontifical University of Salamanca, stated that there was no statistically meaningful change in students' digital competencies based on the age variable. Galindo-Domínguez and Bezanilla (2021), Kuzminska et al. (2018), and Cabezas-Gonzalez et al. (2017) reported that there was no statistically considerable discrepancy between students' digital competence levels based on age. Despite having a small effect on the age levels of the students participating in the study, a considerable variance is a finding that needs to be taken into account. Given that in other studies conducted in the literature, while the age range among university students is close to each other in this study, the age difference of the students who received postgraduate education is higher, and as a result of the research, students in the higher age group have lower digital competencies. It is necessary to develop educational policies to eliminate the age inequality among students by increasing the awareness of students in the higher age group who have previously received their undergraduate education face-to-face for the use of digital technologies and improving their digital competencies.

It has been stated that there is a statistically meaningful differentiation between the digital competence levels of the students and the variable of technology usage competence. In this regard, it has been noted that as the students' competence in using technology rises, their level of digital competence also rises. To determine the effect degree of this significant difference, eta square (η2) values were calculated and it was determined that there was a large effect size (η2=0.220) between these two variables. These results also indicate that there is a positive correlation between the two variables. A similar differentiation was encountered in the sub-dimensions of the scale. To ascertain the source of this difference, a multiple comparison test was applied. Based on the results of the test, students who use technology at an advanced level produce more digital content than students who use technology at an intermediate and basic level, which refers to a significant difference with a high level of effect magnitude (η2=0.182). Furthermore, another significant difference was found in the information and data literacy sub-dimension. Hence, students who can use technological devices at an advanced level have higher levels of information and data literacy than students who can use technological devices at an intermediate or basic level. This significant difference was identified to have a significant effect (η2=0.204). Another significant difference was detected in the communication sub-dimension. Accordingly, students with high technology use competence were also characterized as having high levels of communication, which indicates a difference with a low-level effect (η2=0.052). A similar difference was observed in the sub-dimension of using virtual tools and social communication. This means that as proficiency in using technology improves, the students' ability to use virtual tools and social communication levels also increase. This meaningful variance was found to have a value of η2=0.027 and thus a small effect size. Moreover, another significant difference captured by the analysis was found in the sub-dimension of problem-solving in the virtual environment. This indicates that students with high technology use competence also have high problem-solving ability in virtual environments. This emerging difference was found to have a substantial effect (η2=0.158). Research findings that there is a notable positive correlation between students' digital competence levels and technology use competence levels are similar to the findings of Kaya (2020). Kaya (2020), as a result of his research, which aimed to investigate the association between technology integration self-efficacy perceptions and digital competence levels of 681 students studying at Balıkesir University, shared the results that there was a positive and significant relationship between students' technology integration self-efficacy perceptions and digital competence levels, there was a positive and significant relationship between students' self-efficacy levels in using computer technologies and digital competence levels, and students' self-efficacy perceptions towards technology integration significantly predict their digital competence levels.

Another question that the research seeks to answer is whether students' digital competence levels differ significantly in terms of the average daily usage time of technological devices. The results showed that students who used technological devices for 7 hours or more on average per day had higher levels of digital competence than students who used technological devices for 5-7 hours per day on average. According to these findings, there is no homogeneous differentiation before the 5th hour. This implies that there will not be any change in the digital competence levels of students who use technological devices less than 5 hours a day. This meaningful difference was observed to have a low effect size (η2=0.039). When the sub-dimensions are analyzed, it is seen that significant differences occur in digital content development and information and data literacy sub-dimensions. In this respect, as the average daily use of technological devices rises, students' level of content development in digital environments also increases. Calculating the effect size of this significant difference, it is seen that there is a moderate effect (η2=0.061). Another sub-dimension in which a significant difference was recorded was the information and data literacy sub-dimension. Thus, there was no homogeneous differentiation in the information and data literacy levels of students who use technological devices less than 5 hours a day. These results inform us that information and data literacy levels start to increase after the 5th hour. This is one of the results of the study that creates a difference, and this significant difference is considered to have a small effect (η2=0.025). According to the results of the study, the finding that students' digital competence levels increase as the average daily usage time of technological devices increases is consistent with the findings of Martinez-Lopez et

al. (2020), Hernández-Martín et al. (2021), and Korucu et al. (2016). Martinez-Lopez et al. (2020), as a result of their research with 205 students studying at various state universities in Russia, found that there was a strong positive correlation between students' internet usage time and their digital competence levels. Hernández-Martín et al. (2021) concluded that students who used social networks daily had better digital competence levels than those who used social networks only three or four times a week. Korucu et al. (2016) detected that as students' mobile device ownership and weekly internet usage time increased, their digital competence also increased. In distance education environments, it is essential to prepare more activities to increase the average daily usage time of students' technological devices, to organize synchronous meetings and asynchronous forum activities, and to develop educational policies to ensure that the time spent by students in the distance education environment and their completion rates are taken into account in measurement and evaluation processes.

LIMITATIONS AND RECOMMENDATIONS

This research has some limitations. This research, which was conducted to measure the digital competence levels of learners studying in distance education non-thesis master's programmes in terms of different variables, is limited to non-thesis master's students studying at Anadolu University Institute of Social Sciences and the scale used in the research.

As a result of this research conducted within the limitations mentioned above, some suggestions were made for future scientific research. These suggestions are as follows:

1. The fact that the digital competence levels of male students participating in the study are higher than female students is a finding that should be taken into consideration by policy makers. Therefore, it is recommended to develop new educational policies that will increase the digital competence levels of female students.

2. The significant difference between the age levels of the students participating in the study is a finding that should be taken into consideration. Therefore, it is suggested that various seminars should be organized to increase the awareness levels of students in the older age group regarding the use of digital technologies.

3. Considering the finding that there is a significant relationship between students' digital competency levels and technology usage competency levels, in order to increase students' technology usage competencies, they can be provided free access to some programs by collaborating with international organizations such as Apple, Cisco, Google, Microsoft.

Declaration of Conflicting Interests

On behalf of all authors, the corresponding author declares that there is no conflict of interest in this research.

Funding

This research is not funded by any institution or organisation.

Statements of publication ethics

This research was conducted following the approval of the Scientific Research and Publication Ethics Board of Social Sciences and Humanities of T.R. Anadolu University dated 22.11.2022 and numbered 442539. The consent to use the scale, which was required for the start of the data collection process, was obtained from the relevant researchers via e-mail.

Researchers' contribution rate

The study was conducted and reported with equal collaboration of the researchers.

REFERENCES

Afacan Adanır, G., & Gülbahar Güven, Y. (2022). Üniversite öğrencileri dijital yeterlikler ölçeğinin Türkçeye uyarlama çalışması. *Yükseköğretim ve Bilim Dergisi, 12*(1) 122-132. https://doi.org/10.5961/highereducsi.990452

Bollen, K. A. (1989). A new incremental fit index for general structural equation models. *Sociological Methods & Research*, *17*(3), 303-316. https://doi.org/10.1177/0049124189017003004

Browne, M. W., & Cudeck, R. (1993). Alternative ways of assessing model fit. In: Bollen, K.A., & Long, J.S. (Eds.), *Testing structural equation models* (pp. 136-162). Beverly Hills, CA: Sage.

Büyüköztürk, Ş., Çakmak, E. K., Akgün, Ö. E., Karadeniz, Ş., & Demirel, F. (2016). *Bilimsel araştırma yöntemleri*. Ankara: Pegem Akademi.

Cabezas-Gonzalez, M., Casillas-Martín, S., Sanches-Ferreira, M., & Teixeira Diogo, F. L. (2017). Do gender and age affect the level of digital competence? A study with university students. *Fonseca Journal of Communication, 15*, 109-125. https://doi.org/10.14201/fjc201715109125

Carretero, S., Vuorikari, R. & Punie, Y. (2017). *DigComp 2.1: The digital competence framework for citizens with eight proficiency levels and examples of use*. Luxembourg: Publications Office of the European Union. https://doi.org/10.2760/38842

Cohen, J. (1988a). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum Associates, Publishers.

Cohen, J. (1988b). *Statistical power analysis for the social sciences*. Hillsdale, NJ: Erlbaum.

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, 9*(2), 294-308. Retrieved from https://www.learntechlib.org/p/217619/

Desjardins, F. J., Lacasse, R., & Belair, L. M. (2001). Toward a definition of four orders of competency for the use of information and communication technology (ICT) in education. In *Proceedings of the IASTED International Conference. Computers and Advanced Technology in Education*, 213-217. Banff: ACTA Press. Retrieved from http://eilab.ca/wp-content/uplaods/2013/04/2001CATE.pdf

Erkuş, A. (2005). *Bilimsel araştırma sarmalı.* Ankara: Seçkin Yayınları.

European Commision. (2018). *Council recommendation of 22 May 2018 on key competences for lifelong learning*. Retrieved from https://eur-lex.europa.eu/legal content/EN/TXT/?uri=uriserv:OJ.C_.2018.189.01.0001.01.ENG

Ferrari, A. (2012). *Digital competence in practice: An analysis of frameworks*. Luxembourg: Publications Office of the European Union.

Field, A. (2005). *Discovering statistics using spss: And sex and drugs and rock 'n' roll* (2th Edition). London: Sage Publications.

Fraenkel, J. R., Wallen, N. E., & Hyun, H. H. (2012). *How to design and evaluate research in education* (8th Ed.). New York: Mac GrawHill, Inc.

Galindo-Domínguez, H., & Bezanilla, M. J. (2021). Digital competence in the training of pre-service teachers: Perceptions of students in the degrees of early childhood education and primary education. *Journal of Digital Learning in Teacher Education, 37*(4), 262-278. https://doi.org/10.1080/21532974.2021.1934757

Guillén-Gámez, F. D., Mayorga-Fernández, M., & Álvarez-García, F. J. (2020). A study on the actual use of digital competence in the practicum of education degree. *Technology, Knowledge and Learning, 25(*3), 667-684. https://doi.org/10.1007/s10758-018-9390-z

Gümüş, M. M. (2021). *Teachers' digital competencie.* Unpublished Master Thesis, Amasya University, Institute of Natural and Applied Sciences, Amasya, Türkiye.

Hernández-Martín, A., Martín-del-Pozo, M., & Iglesias-Rodríguez, A. (2021). Pre-adolescents' digital competences in the area of safety. Does frequency of social media use mean safer and more knowledgeable digital usage? *Education and Information Technologies, 26*(1), 1043–1067. https://doi.org/10.1007/s10639-020-10302-4

Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, *6*(1), 1-55. https://doi.org/10.1080/10705519909540118

Huck, S. W. (2012). *Reading statistics and research* (6th ed.). Boston, MA. Pearson Education.

Juhász, T., Kálmán, B., Tóth, A., & Horváth, A. (2022). Digital competence development in a few countries of the european union. *Management & Marketing.Challenges for the Knowledge Society, 17*(2), 178-192. https://doi.org/10.2478/mmcks-2022-0010

Karakaya, İ. (2014). Bilimsel araştırma yöntemleri. A. Tanrıöğren (Ed.), *Bilimsel Araştırma Yöntemleri* (s. 57-83). Ankara: Anı Yayıncılık.

Karakuş, İ. (2022). *A digital look at pre-service teachers' profiles: Digital awareness, competence and fluency.* Doctoral Thesis, Mersin University, Institute of Educational Sciences, Mersin, Türkiye.

Karasar, N. (2012). *Bilimsel araştırma yöntemi*. Ankara: Nobel Yayıncılık.

Kassymova, G. M., Tulepova, S. B., & Bekturova, M. B. (2023). Perceptions of digital competence in learning and teaching English in the context of online education. *Contemporary Educational Technology, 15*(1), 1-14. https://doi.org/10.30935/cedtech/12598

Kaya, R. (2020). *Examining the relationship between technology integration self-efficacy perceptions and digital competence levels of education faculty students.* Master Thesis, Balıkesir University, Institute of Social Science, Balıkesir, Türkiye.

Kline, R. B. (2011). *Principles and practice of structural equation modeling* (3rd ed.). New York: The Guilford Press.

Korucu, A. T. (2020). The effect of digital stories used in science education on academic achievement, digital empowerment and inquiry skills of teacher candidates. *Kastamonu Education Journal, 28*(1), 352-370. https://doi.org/10.24106/kefdergi.3617

Korucu, A., Yücel, A., Gündoğdu, M., & Gençtürk, T. (2016). Investigation the technology usage level of teacher candidates. *Participatory Educational Research, 3*(1), 14-21. https://doi.org/10.17275/per.15.49.3.1

Kuzminska, O., Mazorchuk, M., Morze, N., Pavlenko, V., & Prokhorov, A. (2019). *Study of digital competence of the students and teachers in Ukraine*. Ermolayev, V., Suárez-Figueroa, M., Yakovyna, V., Mayr, H., Nikitchenko, M., Spivakovsky, A. (Eds) In *Information and Communication Technologies in Education, Research, and Industrial Applications*. *ICTERI 2018. Communications in Computer and Information Science*, 148-169. Cham: Springer. https://doi.org/10.1007/978-3-030-13929-2_8

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. https://doi.org/10.1016/j.compedu.2020.104052

Martinez-Lopez, R., Yot-Domínguez, C., & Trigo, M. E. (2020). Analysis of the internet use and students' Web 2.0 digital competence in a russian university. *International Journal of Technology Enhanced Learning, 12*(3), 316–342. https://doi.org/10.1504/IJTEL.2020.107986

Nyikes, Z. (2018). Contemporary digital competency review. *Interdisciplinary Description of Complex Systems, 16*(1), 124-131. https://doi.org/10.7906/indecs.16.1.9

Prabhu, D., Mallya, J., Patwardhan, V., & Nayak, A. (2022). Digital competence and the gender gap: A case study of hospitality students. *International Journal of Media and Information Literacy, 7*(1), 190-196. https://doi.org/10.13187/ijmil.2022.1.190

Samuelsson, L., & Lindström, N. (2022). Online surveillance and education for digital competence. *Athens Journal of Education, 9*(4), 545-558. https://doi.org/10.30958/aje.9-4-1

Schermelleh-Engel, K., Moosbrugger, H., & Müller, H. (2003). Evaluatingthe fit of structural equation models: Tests of significance and descriptive goodness-of-fit measures. *Methods of Psychologicalresearch Online*, *8*(2), 23-74. Retrieved from https://www.psycharchives.org/en/item/1a8dea48-0285-4dac-a612-9dc0ff2532f6

Silva-Quiroz, J., & Morales-Morgado, E. M. (2022). Assessing digital competence and its relationship with the socioeconomic level of Chilean university students. *International Journal of Educational Technology in Higher Education, 19*(46), 1-18. https://doi.org/10.1186/s41239-022-00346-6

Vodă, A. I., Gradinaru, C., Cautisanu, C., & Poleac G. (2022). Student's digital competences in Belgium and Romania: A comparative analysis. *Frontiers in Education, 7*, 1-17. https://doi.org/10.3389/feduc.2022.1034252

Yaman, H., Demirtaş, T., & Aydemir, Z. İ. (2013). The digital pedagogic competencies of pre-service turkish-language teachers. *Electronic Turkish Studies, 8*(8), 1407-1419. http://doi.org/10.7827/TurkishStudies.4665

Yazar, T., & Keskin, İ. (2016). Examination of prospective teachers' digital competence in the context of lifelong learning. *International Journal of Curriculum and Instruction Studies, 6*(12), 133-149. Retrieved from https://www.ijocis.com/index.php/ijocis/article/view/161