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THE EFFECT OF PRE-SERVICE TEACHERS' DIGITAL LITERACY LEVELS ON THEIR ATTITUDE FOR DIGITAL WRITING: STRUCTURAL EQUATION MODEL STUDY

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Abstract:
In this study, it was aimed to determine the effect of pre-service teachers' digital literacy levels on their attitudes towards writing in the digital environment. In addition, the mean scores of teacher candidates from both scales were examined in terms of different variables. Probability-based random sampling method, which is included in the general survey model, was preferred in the study. The sample of the research consists of 467 teacher candidates who attend Sivas Cumhuriyet University Faculty of Education in the spring semester of the 2021-2022 academic year. The data of the study were obtained by applying the *"Digital Literacy Scale"* developed by Ng (2012) and adapted into Turkish by Üstündağ, Güneş and Bahçivan (2017) and the *"Attitude Scale for Digital Writing"* developed by Kırmızı, Kapıkıran and Akkaya (2021). Research data were analyzed using normality tests, independent groups t-test, ANOVA, Scheffe, SEM and CFA statistical methods. In the findings obtained in the research, digital literacy of fathers education status, graduated high school type, time spent on the internet, computer, tablet, smart watch; on the other hand, it has been determined that the attitudes towards writing in the digital environment differ significantly according to the variables of gender, class level, place of residence, mother and father education level, branch, type of high school graduated, time spent on the internet, computer, smart phone, tablet, smart watch. In addition, it was concluded that digital literacy had a positive effect on their attitudes towards writing in the digital environment.

Keywords: digital literacy, digital writing, attitude, pre-service teacher, SEM

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1. Introduction

When it comes to literacy, it seems like a simple and clear definition at first glance. When we look at literacy from the classical framework, it is seen that the individual perceives, understands and interprets the signs or symbols created in any language and creates a meaning frame. Looking at the definitions of literacy in the literature, Akkoyunlu and Soylu (2010) define it as the ability of an individual to read and write symbols related to the language created and spoken by the society in which he was born or lived. Hobbs (2010) defines literacy as language, music, moving or still images, graphics, symbols, signs, etc. He says that it is interacting using many different means of expression and communication. Kress (2003) states that literacy is a skill that helps the individual to make his life meaningful thanks to the interactions established with all these tools. The literacy level of the individual supports the control of his life by determining the reasoning, problem-solving and evaluation processes (O'Brien & Rugen, 2001). In this context, it is seen that literacy is a skill that has important effects on an individual's life.

In the process that has evolved from the past to the present, the definition of literacy has not been limited to just reading a text or deciphering the signs. In the changing and developing process, the definition of literacy has also expanded and started to include different concepts (Bawden, 2008). With the spread of developing technology and new digital tools in all areas of life, the concept of digital literacy has emerged. Digital literacy varies according to the scope of literacy skills in the past (Green & Beavis, 2013). digital literacy; computer, mobile phone etc. It is expressed as the ability to find, read and use information in sources that offer multiple access to the internet by using tools with a critical perspective (Gilster, 1999; Kim, 2019). Morrison and Garcia (2011) defined digital literacy as the ability to access information using digital too to read and use information, create new information, and different digital software on the internet. Aviram and Alkalai (2006) stated that digital literacy includes skills related to solving different problems brought by rapidly developing, changing and transforming digital technology. If collected, it is seen that digital literacy covers the skills of accessing and using different sources and information in technological environments and creating new information. It is stated here that the competence of individuals to access and use technology in the technical dimension is also important. Gilster (1999) underlined that expressing digital literacy only as competence and skill is an inadequate definition today and stated that it should be accepted as an individual's ability to adapt and survive. In this context, it is seen that digital literacy is far beyond the classical definition of literacy. Concerning the comparison of the definitions of classical literacy and digital literacy, Churchill, Ping, Oakley, and Churchill (2008) state that digital literacy is not an alternative to or can be used instead of classical literacy. They states that it is a skill that is effective in meeting the need. He states that he contributes to classical literacy with these features. Bawden (2008) stated that digital literacy includes the knowledge of digital tools as well as performing the cognitive activities in traditional literacy in digital environments. An

individual who defines himself as a digital literate needs to have many different skills at the same time and use these skills in a coordinated manner.

Being digitally literate in the reality of today's world offers many advantages to the individual compared to classical literacy (Süss, 2001). As a result of the increasing use and importance of technology especially in the field of education, it has become important for both teachers and students to have digital literacy skills in order for societies to keep up with the times. Education processes show a constant change and development in itself with the updates made. With the updates made in education in connection with technology, it is expected that the individual will have different skills in order to adapt to the renewed educational environments and to perform the different applications that have emerged correctly. Among these skills, digital literacy is very important and therefore, due care should be taken to develop this skill in educational settings. Children born after the 2000s were almost born into technology (Arslan, 2020; Prensky, 2001). The skills of this generation, which is considered to be digital natives, are at a much higher level and skillful than previous generations, but it is not enough for them to be considered digital literate. Because the generation, which is accepted as digital native, has problems in accessing, managing and using information. It also has difficulties in evaluating the reliability of information, creating personal information and ensuring its confidentiality (González, 2012). Therefore, although they are good at using digital technology, it is not possible to say that they are competent in digital literacy (Moreno, 2008). Giving digital literacy in educational environments fully coincides with these reasons. However, just giving information is not enough to gain digital literacy skills. In this regard, especially, they must have a positive attitude and be willing.

When the content of the concept of digital literacy is examined, it is seen that it includes the ability to write as well as read the information available in digital environments. The writing skill, which is included in the concept of literacy, is basically conveying the feelings, ideas and thoughts of individuals through a text created through symbols, symbols and signs (Köksal, 2001). While creating a text in writing skill, it is necessary to have knowledge about letters, syllables, words, sentences, grammar and rhetoric and to use them together in a certain order and harmony in accordance with the integrity of meaning (Yaman, 2008). In this context, it has a feature that directs the individual to interpret in a planned and regular thnking process. Although it is difficult for the individual to make an effort in the writing process, he develops intellectually as a result. Developments in the digital field have also affected the writing skill and revealed the concept of digital writing apart from classical writing (Kırmızı et al., 2021). With the spread of digitalization, there has been a great increase in digital writing. While individuals spend time in digital environments, they perform digital writing at different levels and for different purposes. It is important in which medium, how and with what tools digital writing is written (Grabill, 2012). At the same time, it is necessary to have different writing skills required by digital writing. Fortunati and Vincent (2014) say that for this, first of all, the digital environment skills of the individual should be developed. Looking at the definitions in the literature on digital writing; Lieberman and Wood (2002)

digital writing, creating texts that can be read and viewed with a digital medium; it is seen that Kırmızı et al. (2021) expressed the symbols used in the article as creating using digital tools and presenting these articles to other people on the internet. Taipale (2014) states that the productivity of the individual increases as it is possible to correct the mistakes made in digital writing very quickly and efficiently. Digital writing consists of preliminary preparation, writing, reviewing, making necessary corrections and publishing. Special writing programs offer support to the individual at these stages. In addition, in the digital writing environment, it is possible to explain the texts with visuals, to support them with different pictures and drawings, and to sound and effects (Kırmızı, et al., 2021). It is also important that at the end of the writing process, it is possible to deliver all the articles to a limited audience determined on the internet or to a wide audience with open access, in terms of making life easier. In this context, it is seen that many printed books have been transferred to digital media and made accessible (McGrail & Davis, 2011). Different competencies related to digitalization, which take their place in all areas of life today, have begun to be accepted as competencies required in educational processes (Shackelford, 2007). The increasing use of technology-based teaching types in educational environments; access to information, production and sharing of information through digital tools are important reasons in this sense. It is necessary to carry out studies on the development of digital competencies in educational institutions (Dahlström, 2019). Providing students with the opportunity to learn with digital tools will support the development of their digital writing skills. Since the competencies required by the writing skill are quite comprehensive, the full development of this skill requires a long process. Adding skills related to digital competencies in digital writing skills can negatively affect students in this regard. Digital-based trainings in schools will offer students the opportunity to improve their digital writing competencies. This will positively support them to acquire a positive attitude towards digital writing (Kırmızı et al., 2021). Therefore, this will make it easier for individuals to learn and keep up with the changing digital process.

It is also important that at the end of the writing process, it is possible to deliver all the articles to a limited audience determined on the internet or to a wide audience with open access, in terms of making life easier. In this context, it is seen that many printed books have been transferred to digital media and made accessible (McGrail & Davis, 2011). Attitude is an individual's approach, tendency and feelings about an event, person or phenomenon. An individual's attitude can develop in two opposite directions, either positive or negative (Eagly & Chaiken, 1993). Attitude consists of sensory, behavioral and cognitive components. There are many different factors such as family, environment, religion, language, education, age, gender, and intelligence in the formation of an individual's attitude towards any subject (Poteat, 2007; Shapiro & Chock, 2003). The interaction processes that the individual establishes with environmental factors since birth are effective in the formation of attitudes (De Houwer, Thomas, & Baeyens, 2001; Malik, 2018). However, some researchers state that some attitudes may occur in individuals through genetic transfers (Olson, Vernon, Harris, & Jang, 2001).

Today, with the spread of digitalization, the realities perceived in the virtual environment also affect the mental processes, behaviors, beliefs and attitudes of the individual (Arslan, 2022). It is seen that the individual begins to exhibit an attitude towards many actions such as reading, writing, speaking and communication performed in the digital environment. While they perceive some of these actions as positive and are willing, they perceive some of them negatively and have no desire to perform them. The individual also exhibits a positive or negative attitude towards writing in the digital environment. Sometimes, a person who almost does not take a pen and paper in his daily life is willing to write in virtual environments. Sometimes, the opposite of this may occur (Kırmızı, et al., 2021). It is important to determine what the factors affecting the individual's attitude about digital writing are in this sense. Considering that many concepts such as digital literacy, reading, writing, and speaking have just begun to be studied in the literature, it is seen that studies in these areas will contribute to both the literature and researchers.

It has been determined that studies on this subject have increased in the literature as digitalization gradually enters the field of education. Considering the studies on digital literacy; it is seen that Arslan (2022) researched the digital literacy levels of associate degree students, Yontar (2019) prospective teachers, Onursoy (2018) university youth, and Pala and Başıbüyük (2020) fifth grade students. In addition, it has been determined that there are studies in the literature investigating the relationship between digital literacy and different factors. Kul (2020) examined the relationship between digital literacy and internet addiction, Kozan and Özbek (2019) cyberbullying awareness, Kaya (2020) digital citizenship. When we look at the studies on digital writing; it is seen that Tüzel and Tok (2012) researched pre-service teachers' digital writing experiences, Dayan and Girmen (2018) researched digital storytelling, and Maden, Banaz and Maden (2018) researched their writing habits in a digital environment. In the studies conducted in the literature, no study was found in which the relationship between digital literacy and attitude towards digital writing was investigated. Lynch (2018) states that digital literacy is related to digital writing and that the individual benefits from digital literacy skills at every stage of writing from the moment they start writing in digital media. In this context, it is planned to investigate the effect of digital literacy on the attitude towards writing in digital environments. The aim of this study is to determine the effect of digital literacy levels of teacher candidates on writing in the digital environment and to examine them in terms of various variables. In line with the purpose of the study, answers to the following questions were sought:

- Pre-service teachers' digital literacy and attitudes towards writing in the digital environment, gender, class level, place of residence, mother and father education status, branch, type of high school graduated, time spent on the Internet and whether they have a computer, smartphone, tablet, smartwatch variables are significantly different. does it differ?
- Does the digital literacy of teacher candidates have an effect on their attitudes towards writing in the digital environment?

2. Methodology

In this part of the research, information about the model, universe/sample, data collection tools, data collection and analysis processes used in the research is given.

2.1. Research Design

The simple random sampling method, which is included in the general survey model, was preferred in the study. Each element in the universe defined in this method has an equal and independent chance of being selected for the research (Altuınışık, Coşkun, Bayraktaroğlu, & Yıldırım, 2017). It is based on the principle of determining the sample group completely randomly from the units that are included in the relevant research universe and can represent it (Yıldırım & Şimşek, 2018). In the simple random sampling method, it is advantageous that each member in the universe has a chance to be selected and that each selected unit does not have any effect on the chance of being selected by other units. It can be used in situations where the number of units is relatively high, there are time and cost constraints, and there is no possibility to reach each unit. For this reason, it is frequently preferred in studies (Sharma, 2017).

2.2. Universe/Sample

In accordance with the purpose of the research, the group consisting of all units that can be included in the research is called the universe (Christensen, Johnson, & Turner, 2015). The smaller number of units selected within the framework of certain rules from within this universe is called the sample. The sample should have the characteristics of the universe in terms of the relevant subject (Nachimas & Nachimas, 1996). The sample of the study consists of 467 (361 female-106 male) teacher candidates, whose data were collected considering d= ±0.03 sampling error according to .05 significance level from 2443 pre-service teachers studying at Sivas Cumhuriyet University Faculty of Education in the 2021-2022 academic year (Yazıcıoğlu & Erdoğan, 2014). Demographic information of the sample group is presented in Table 1.

Table 1: Demographic information of the sampling

Variables		*f*	%	**Variables**		*f*	%
Gender	Female	361	77.3	Branch	Social Studies	68	14.6
	Male	106	22.7		Pre-School	94	20.1
Grade level	1st grade	101	21.6		Music	30	6.4
	2nd grade	117	25.1		Picture	35	7.5
	3th grade	129	27.6		Pdr	98	21.0
	4th grade	120	25.7		Class	80	17.1
Place of residence	Village	32	6.9		Science	62	13.3
	Town	99	21.0	Computer	No	129	27.6
	City	236	50.5		Yes	338	72.4
	Metropolitan	100	21.4	Smartphone	No	72	15.4
Mother education	Primary School	245	52.5		Yes	395	84.6
	Middle School	102	21.8	Tablet	No	345	73.9

	High School	74	15.8		Yes	122	26.1
	University	46	9.9	Smartwatch	No	401	85.9
Father education	Primary School	142	30.4		Yes	66	14.1
	Middle School	102	21.8	Time spent on the internet	0-2 hours	40	8.6
	High School	147	31.5		3-4 hours	140	30.0
	University	76	16.3		5-6 hours	211	45.2
High school graduation	Anatolia	307	65.7		7-8 hours	52	11.1
	Science	20	4.3		9 hours +	24	5.1
	Vocation	92	19.7				
	Other	48	10.3				

2.3. Data Collection Tools

The data of this study were obtained by applying the *"Digital Literacy Scale"* and the *" Attitude Scale for Digital Writing "* to teacher candidates. Explanatory information about the scales used is given below.

a. Digital Literacy Scale (DLS)

The scale, which was developed by Ng (2012) and adapted into Turkish by Üstündağ et al., (2017), has a single factor structure and consists of 10 items. The Cronbach's Alpha value of the scale was determined as .86 in the scale development study and .87 in this study. Scale items prepared as a 5-point Likert type have degrees between "Strongly Disagree … Strongly Agree=5". The maximum score that teacher candidates can get from the scale total is 50, and the minimum score is 5.

b. Attitude Scale for Digital Writing (DWS)

Kırmızı et al. (2021), the 25-item scale developed by; it has a three-factor structure called Convenience (13 items), Motivation (6 items), and Impact (6 items). 20 of the scale items have positive statements and 5 of them have negative statements. Negative items were reversed and analyzed. The Cronbach's Alpha value of the scale was determined as .83 in the scale development study and .91 in this study. Scale items prepared as a 5-point Likert type have degrees between "Strongly Disagree … Strongly Agree=5". The maximum score that teacher candidates can get from the scale total is 125, and the minimum score is 25.

Information on the mean scores of the pre-service teachers from the scales, the standard deviation values of the mean scores, the maximum and minimum scores obtained, and the Cronbach Alpha values of the scales are given in Table 2 below.

Table 2: Descriptive statistics on scales

Scales	n	$\overline{X}$	Item average	Sd	Min.	Max.	Cronbach Alpha	Skewness	Kurtosis
DLS (total)	467	35.25	3.53	6.83	11.00	50.00	.87	-.272	.994
Convenience	467	49.37	3.80	13.93	13.00	65.00	.95	-.641	-.896
Motivation	467	17.56	2.93	4.98	6.00	30.00	.79	.003	.002
Impact	467	20.74	3.46	4.67	6.00	30.00	.75	-.319	-.606
DWS (total)	467	87.67	3.51	17.97	36.00	125.00	.91	-.434	-.480

Looking at the data in Table 2, it is seen that the Cronbach Alpha values of the scales are high, and the skewness and kurtosis values are in the acceptable range (Altunışık et al., 2017).

In the path analysis applied within the scope of the aims of the research, confirmatory factor analyzes (CFA) of the sub-factors of the DLS scale and DWS scale were performed separately and the obtained values of fit are given in Table 3 below.

Table 3: CFA fit index values of factor structures

Model Fit Indices	Acceptable Compliance Values	DLS Values	Convenience Values	Motivation Values	Impact Values
X^2/sd	$0< X^2/sd< 5$	4.586	4.443	4.896	2.826
GFI	0.85≤GFI≤1.0	0.959	0.964	0.975	0.986
NFI	0.90≤NFI≤1.0	0.921	0.947	0.962	0.982
IFI	0.90≤ IFI ≤1.0	0.937	0.959	0.969	0.989
CFI	CFI≥ 0.97≥ 0.95	0.937	0.959	0.969	0.989
RMSEA	0.00≤RMSEA≤0.08	0.078	0.076	0.081	0.063

It is seen that the model fit values in Table 3 are in the acceptable range. The factor structures of the DLS and DWS scales to be used in the path analysis were confirmed by the CFA analysis.

2.4. Data Collection and Analysis

The data of the study were obtained by the face-to-face application of the scales on a voluntary basis by the researcher to the prospective teachers who continue their education at Sivas Cumhuriyet University, Faculty of Education. The obtained data were transferred to the computer environment and analyzed using SPSS and AMOS statistical programs. Since n>30 for the normality analyzes of the scales, Kolmogorov-Smirnov analysis was performed and it was determined that the data did not meet the normality values (n<.05). Accordingly, skewness and kurtosis values were checked and it was determined that these values were within the acceptable range (±1.96) (Kalaycı, 2014). In the examination of participants' attitudes towards digital literacy and digital writing in terms of various variables; the t-test was used to compare paired groups and the ANOVA test was used to compare multiple groups. Scheffe test was applied in cases where a significant difference was detected in multiple group comparisons. It reveals a confidence interval in multiple comparison tests between groups (Sincich, 2003). The Scheffe test is among the tests developed in this direction and is applied in order to keep the margin of error under control in the most flexible multi-comparison of all possible linear combinations (Scheffe, 1959). DFA analyzes of the scales used in the AMOS program were conducted to determine the effect of the participants' digital literacy on their attitudes towards writing in the digital environment. In the results of the CFA analysis, it was seen that the scales met the acceptable values. In this direction, a Structural Equation Model (SEM) was created using the Standardized Estimates and Maximum Likelihood calculation method (Gürbüz, 2019). The effect of DLS on DWS in SEM was

analyzed. A model analyzed with SEM can also be made using traditional regression analysis methods, expressed as the first generation. However, while the margin of error is set separately for each relationship established in traditional methods, while all relationships are analyzed together in SEM, it is reduced to a single margin of error. This makes it one of the second-generation analysis techniques (Bagozzi & Fornell, 1982). In addition, SEM is more advantageous than traditional methods in terms of examining many different dependent and independent variables together, modeling their relationships, and determining the relationships between them in a comprehensive and systematic way. (Anderson & Gerbing, 1988) It has been determined that the fit values of the variables in the model created by SEM analysis are suitable for path analysis. The findings obtained in all analyzes are presented in the findings section with the tables and figures created.

3. Findings

The findings obtained from the analyzes applied in line with the aims of the research are presented in this section in tables and figures. The mean scores of the teacher candidates on the DLS and DWS scales were examined in terms of the gender variable and the findings are presented in Table 4.

Table 4: Independent groups t-test results by gender variable

	Gender	**n**	$\bar{x}$	**Sd**	**df**	**Levene Test**		**t**	***p***
						F	***p***		
DLS	Female	361	34.95	6.31	465	14.227	.000	-1.717	.087
	Male	106	36.25	8.30					
Convenience	Female	361	49.36	13.47	465	2.646	.104	-0.034	.975
	Male	106	49.42	15.47					
Motivation	Female	361	17.16	4.92	465	.003	.956	-3.188	.002*
	Male	106	18.91	4.95					
Impact	Female	361	20.83	5.10	465	.013	.908	0.710	.479
	Male	106	20.42	5.36					

*p<.05

When Table 4 is examined, there was no significant difference between the scores of the teacher candidates in terms of the gender variable in terms of the DLS scale and the convenience and impact factors of the DWS scale (p>.05); in the motivation factor of the DWS scale, it was found to be in favor of male students (p<.05).

The findings of the ANOVA analysis applied to the scores of the teacher candidates from the factors of the DLS and DWS scale in terms of class level and place of residence variable are presented in Table 5.

Table 5: Class level and place of residence variables ANOVA test results

Scales	Grade Level	n	$\bar{x}$	sd	Source of Variance	df	F	*p*	Significant Differences
DLS	1st grade	101	35.10	6.54	Between groups	3	2.201	.087	-
	2nd grade	117	34.01	6.56					
	3th grade	129	36.17	6.43	Within groups	463			
	4th grade	120	35.58	7.59	Total	466			
Convenience	1st grade	101	50.65	13.27	Between groups	3	15.334	.000*	*1-2, *3-2, *4-2
	2nd grade	117	42.38	15.09					
	3th grade	129	53.34	11.12	Within groups	463			
	4th grade	120	50.85	13.73	Total	466			
Motivation	1st grade	101	17.50	4.84	Between groups	3	1.795	.147	-
	2nd grade	117	18.21	5.01					
	3th grade	129	16.79	4.37	Within groups	463			
	4th grade	120	17.81	5.60	Total	466			
Impact	1st grade	101	21.14	4.72	Between groups	3	7.675	.000*	*1-2, *3-2, *4-2
	2nd grade	117	18.81	5.73					
	3th grade	129	21.42	4.41	Within groups	463			
	4th grade	120	21.54	5.25	Total	466			
Scales	**Place of Residence**	**n**	$\bar{x}$	**sd**	**Source of Variance**	**df**	**F**	*p*	**Significant Differences**
DLS	1. Village	32	34.69	6.61	Between groups	3	2.335	.073	-
	2. Town	99	35.17	5.29					
	3. City	236	34.69	6.65	Within groups	463			
	4. Metropolitan	100	36.80	8.34	Total	466			
Convenience	1. Village	32	52.13	13.34	Between groups	3	1.183	.316	-
	2. Town	99	47.35	14.10					
	3. City	236	49.64	13.68	Within groups	463			
	4. Metropolitan	100	49.88	14.48	Total	466			
Motivation	1. Village	32	17.63	6.49	Between groups	3	0.094	.963	-
	2. Town	99	17.41	4.58					
	3. City	236	17.67	4.59	Within groups	463			
	4. Metropolitan	100	17.42	5.72	Total	466			
Impact	1. Village	32	20.38	4.65	Between groups	3	3.632	.013*	*4-2
	2. Town	99	19.49	5.27					
	3. City	236	20.83	5.14	Within groups	463			
	4. Metropolitan	100	21.86	5.04	Total	466			

*p<.05

When Table 5 is examined, the scores of the pre-service teachers according to the grade level variable did not differ significantly in the motivation factor of the DLS scale and DWS scale (p>.05); it was found that the DWS scale showed significant differences in convenience and impact factors (p>.05). According to the results of the Scheffe test, which was applied to determine between which groups the significant difference was, a difference was found between the second grades and all other grades, to the detriment of the second grades. In terms of the place of residence variable, there was a significant difference in the impact factor of the DWS scale (p<.05); however, it was determined that there was no significant difference in other factors of the scale and DLS factor (p>.05). It is seen that the significant difference in the impact factor is in favor of the metropolitan city and district groups.

The results of the ANOVA analyzes applied to the DLS and DWS scores of the teacher candidates in terms of the mother and father educational status variables are given in Table 6 below.

Table 6: Mother and father educational status variables ANOVA test results

Scales	Mother Education	n	$\bar{x}$	sd	Source of variance	df	F	*p*	Significant differences
DLS	1. Primary School	245	35.31	6.90	Between groups	3	1.583	.193	-
	2. Middle School	102	34.18	5.94					
	3. High School	74	35.65	6.13	Within groups	463			
	4. University	46	36.65	8.90	Total	466			
Convenience	1. Primary School	245	51.00	12.94	Between groups	3	5.562	.001*	*1-2, *3-2
	2. Middle School	102	44.69	14.95					
	3. High School	74	51.05	13.14	Within groups	463			
	4. University	46	48.39	15.83	Total	466			
Motivation	1. Primary School	245	17.25	5.53	Between groups	3	5.752	.001*	*3-1, *3-2, *4-2
	2. Middle School	102	16.51	3.86					
	3. High School	74	19.14	4.12	Within groups	463			
	4. University	46	19.00	4.55	Total	466			
Impact	1. Primary School	245	21.67	5.06	Between groups	3	6.707	.000*	*1-2, *1-4
	2. Middle School	102	19.35	5.42					
	3. High School	74	20.51	3.91	Within groups	463			
	4. University	46	19.22	5.87	Total	466			
Scales	**Father Education**	**n**	$\bar{x}$	**sd**	**Source of Variance**	**df**	**F**	***p***	**Significant Differences**
DLS	1. Primary School	142	35.85	6.42	Between groups	3	4.578	.004*	*4-2
	2. Middle School	102	33.82	7.11					
	3. High School	147	34.61	6.66	Within groups	463			
	4. University	76	37.26	7.01	Total	466			
Convenience	1. Primary School	142	50.17	13.98	Between groups	3	2.449	.063	-
	2. Middle School	102	47.25	14.60					
	3. High School	147	48.46	13.22	Within groups	463			
	4. University	76	52.50	13.86	Total	466			
Motivation	1. Primary School	142	18.10	5.42	Between groups	3	4.697	.003*	*4-3
	2. Middle School	102	17.08	4.79					
	3. High School	147	16.64	4.65	Within groups	463			
	4. University	76	18.97	4.60	Total	466			
Impact	1. Primary School	142	21.62	5.39	Between groups	3	2.305	.076	-
	2. Middle School	102	20.31	5.18					
	3. High School	147	20.14	5.03	Within groups	463			
	4. University	76	20.82	4.78	Total	466			

*p<.05

Considering the findings in Table 6; while the scores of the pre-service teachers in terms of the mother education level variable did not differ significantly according to the DLS scale (p>.05); it was seen that it showed in all factors of the DWS scale (p<.05). In the convenience factor of the significant difference, between the secondary school and primary school and high school groups, against the secondary school group; in the motivation factor, it was determined in favor of the high school group between high school and primary and secondary school groups, and in favor of the university group

between university and secondary school groups. In the impact factor, it was found to be in favor of the primary school group between primary school, secondary school and university groups. In terms of the father's educational status variable, the scores obtained from the DLS scale were in favor of the university group between the university and secondary school groups; it is seen that there is a significant difference between the university and high school groups in the motivation factor of the DWS scale in favor of the university group (p<.05). No significant difference was found in terms of the other two factors of the DWS scale (p>.05).

The results of the ANOVA analyzes applied to the scores of the pre-service teachers on the DLS scale and DWS scale factors in terms of the branch variable are given in Table 7 below.

Table 7: Branch variable ANOVA test results

Scales	Branch	n	$\bar{x}$	sd	Source of Variance	df	F	p	Significant Differences
DLS	1. Social Studies	68	34.82	6.54	Between groups	3	1.541	.163	-
	2. Pre-School	94	35.96	7.03					
	3. Music	30	33.20	6.28					
	4. Picture	35	35.09	5.23	Within groups	463			
	5. PGC	98	35.06	7.67					
	6. Class	80	34.48	7.12	Total	466			
	7. Science	62	37.00	5.76					
Convenience	1. Social Studies	68	50.44	12.89	Between groups	3	9.914	.000*	*1-3, *2-3, *2-4, *2-6, *5-3, *7-3, *5-4, *7-4, *5-6
	2. Pre-School	94	52.47	12.50					
	3. Music	30	38.13	15.33					
	4. Picture	35	41.77	12.94	Within groups	463			
	5. PGC	98	53.53	11.75					
	6. Class	80	45.18	16.32	Total	466			
	7. Science	62	52.10	11.06					
Motivation	1. Social Studies	68	17.15	4.34	Between groups	3	1.327	.243	-
	2. Pre-School	94	17.72	5.99					
	3. Music	30	17.60	4.55					
	4. Picture	35	18.11	5.44	Within groups	463			
	5. PGC	98	16.65	4.13					
	6. Class	80	18.63	5.47	Total	466			
	7. Science	62	17.48	4.32					
Impact	1. Social Studies	68	20.85	4.36	Between groups	3	5.324	.000*	*2-3, *2-6, *7-3, *7-6
	2. Pre-School	94	21.96	5.20					
	3. Music	30	17.60	4.74					
	4. Picture	35	20.86	6.44	Within groups	463			
	5. PGC	98	21.04	4.08					
	6. Class	80	18.95	6.05	Total	466			
	7. Science	62	22.03	4.50					

*p<.05

Considering the findings in Table 7; the scores of the pre-service teachers did not differ significantly in the motivation sub-factor of the DLS scale and DWS scale according to the branch variable they studied (p>.05); it was seen that the DWS scale showed ease and impact factors (p<.05). When the groups with significant differences were examined, it

was determined that the students studying in science, pre-school, PGC and social studies teaching had higher average scores. It was determined that the lowest average score belonged to music teaching students in general.

The results of the ANOVA analyzes applied to the scores of the pre-service teachers' scores on the DLS scale and DWS scale in terms of the type of high school they graduated from and the time spent on the internet variables are given in Table 8 below.

Table 8: Type of high school graduated and time spent on the internet variables Anova test results

Scales	Type of High	n	$\bar{x}$	sd	Source of Variance	df	F	*p*	Significant Differences
DLS	1. Anatolia	307	35.65	6.59	Between groups	3	4.047	.007*	*1-4
	2. Science	20	32.30	9.46					
	3. Vocation	92	35.83	5.98	Within groups	463			
	4. Other	48	32.75	7.89	Total	466			
Convenience	1. Anatolia	307	49.44	13.46	Between groups	3	5.537	.001*	*1-4, *3-4
	2. Science	20	44.80	14.96					
	3. Vocation	92	53.04	13.53	Within groups	463			
	4. Other	48	43.83	15.24	Total	466			
Motivation	1. Anatolia	307	18.01	5.08	Between groups	3	3.389	.018*	*1-2
	2. Science	20	15.00	4.90					
	3. Vocation	92	17.04	4.90	Within groups	463			
	4. Other	48	16.75	4.06	Total	466			
Impact	1. Anatolia	307	21.37	5.28	Between groups	3	6.843	.000*	*1-4
	2. Science	20	19.40	4.13					
	3. Vocation	92	20.30	5.15	Within groups	463			
	4. Other	48	18.04	5.55	Total	466			
Scales	**Internet Time**	**n**	$\bar{x}$	**sd**	**Source of Variance**	**df**	**F**	*p*	**Significant Differences**
DLS	1. 0-2 hours	40	33.35	6.10	Between groups	3	2.554	.038*	*4-1
	2. 3-4 hours	140	34.33	7.07					
	4. 5-6 hours	211	35.70	6.75	Within groups	463			
	5. 7-8 hours	52	36,46	5.94					
	6. 9 hours +	24	37.17	8.04	Total	466			
Convenience	1. 0-2 hours	40	43.05	15.27	Between groups	3	3.985	.003*	*3-1, *5-1,
	2. 3-4 hours	140	50.84	13.47					
	4. 5-6 hours	211	48.67	13.81	Within groups	463			
	5. 7-8 hours	52	50.19	14.27					
	6. 9 hours +	24	55.75	10.75	Total	466			
Motivation	1. 0-2 hours	40	18.90	4.82	Between groups	3	4.316	.002*	*1-4, *2-4, *3-4, *5-4
	2. 3-4 hours	140	17.61	4.77					
	4. 5-6 hours	211	17.55	5.19	Within groups	463			
	5. 7-8 hours	52	15.42	3.96					
	6. 9 hours +	24	19.67	5.16	Total	466			
Impact	1. 0-2 hours	40	18.95	5.92	Between groups	3	1.481	.207	-
	2. 3-4 hours	140	20.67	5.31					
	4. 5-6 hours	211	20.94	5.09	Within groups	463			
	5. 7-8 hours	52	21.15	4.41					
	6. 9 hours +	24	21.42	4.80	Total	466			

*p<.05

When looking at Table 8, it is seen that the scores of the participants in terms of the type of high school they graduated from show a significant difference in all factors of the DLS scale and DWS scale (p<.05). According to the results of the Scheffe test applied, it was determined that there was a significant difference in the impact factor of the DLS scale and DWS scale between the Anatolian high school and the group expressed as other, in favor of the students who graduated from Anatolian high schools. In the convenience factor of the DWS scale, it was determined that there was a significant difference between the group defined as Other and Anatolian and Vocational high schools, to the detriment of the other. Considering the average scores obtained from the scales in terms of time spent on the Internet; it is seen that there is a significant difference in the convenience and motivation factors of the DLS scale and DWS scale (p<.05). It was found that the significant difference was in favor of those who spent more time on the Internet in the convenience factor of the DLS scale and DWS scale, but in favor of those who spent more time in the motivation factor.

Table 9 shows the results of the t test applied to determine whether the pre-service teachers' computers, smartphones, tablets and smartwatches have a significant effect on the factors of the DLS scale and DWS scale.

Table 9: Independent groups t-test results according to computer, smartphone, tablet and smartwatch variables

	Computer	**n**	$\bar{x}$	**sd**	**df**	**Levene Test**		**t**	***p***
						F	***p***		
DLS	No	129	33.40	7.11	465	1.115	.292	-3.544	.000*
	Yes	338	35.95	6.59					
Convenience	No	129	47.24	14.01	465	.357	.550	-2.041	.042*
	Yes	338	50.19	13.83					
Motivation	No	129	16.84	5.65	465	4.730	.030	-1.941	.076
	Yes	338	17.83	4.68					
Impact	No	129	20.09	5.62	465	9.668	.002	-1.669	.116
	Yes	338	20.98	4.96					
	Smart Phone	**n**	$\bar{x}$	**sd**	**df**	**Levene Test**		**t**	***p***
						F	***p***		
DLS	No	72	34.47	8.14	465	3.488	.062	-.902	.370
	Yes	395	35.39	6.56					
Convenience	No	72	47.53	14.91	465	3.462	.063	-1.156	.251
	Yes	395	49.71	13.74					
Motivation	No	72	17.44	5.92	465	3.844	.051	1.063	.291
	Yes	395	18.22	4.79					
Impact	No	72	20.67	5.23	465	.889	.346	-.124	.902
	Yes	395	20.75	5.15					
	Tablet	**n**	$\bar{x}$	**sd**	**df**	**Levene Test**		**t**	***p***
						F	***p***		
DLS	No	345	34.66	6.92	465	.547	.460	-3.294	.001*
	Yes	122	36.90	6.28					
Convenience	No	345	49.10	13.87	465	.220	.639	-.722	.471
	Yes	122	50.16	14.12					

Motivation	No	345	17.20	5.18	465	7.732	.006	-2.636	.009*
	Yes	122	18.57	4.21					
Impact	No	345	20.59	5.19	465	.356	.551	-1.076	.283
	Yes	122	21.16	5.08					
	Smart Watch	**n**	$\bar{x}$	**sd**	**df**	**Levene Test**		**t**	***p***
						F	***p***		
DLS	No	401	34.73	6.67	465	.929	.336	-3.937	.000*
	Yes	66	38.36	6.98					
Convenience	No	401	49.00	14.09	465	2.672	.103	-1.528	.130
	Yes	66	51.64	12.79					
Motivation	No	401	17.60	5.04	465	.371	.543	.478	.634
	Yes	66	17.30	4.63					
Impact	No	401	20.68	5.18	465	.000	.997	-.613	.542
	Yes	66	21.09	5.05					

*p<.05

Considering the findings in Table 9; it is seen that the mean scores of the pre-service teachers from the DLS scale differ significantly according to the computer, tablet and smartwatch variables (p<.05), but not in terms of the smartphone variable (p>.05). It has been determined that the significant differences are in favor of the students who have these digital tools. In the convenience factor of the scale in terms of the computer variable of the mean scores of the participants from the DWS scale; in terms of smartphone and tablet variables, it was found that there was a significant difference in favor of students who had these digital devices (p<.05).

4.1. Testing the Research Model

AMOS program was used for the path analysis made in line with the research purpose. First of all, CFA analysis was performed on the scales used and it was determined that the scale indices were in the appropriate range. Due to the appropriate scale values, the Covariance Matrix was created by using the Standardized Estimates and Maximum Likelihood calculation methods. In line with the research objectives and the model created, SEM was applied to analyze the independent and dependent variables together and analyze the effects between them (Gürbüz, 2019). In this context; a model was tested in which the effect level of pre-service teachers' digital literacy on their attitudes towards writing in a digital environment was examined. Considering the X2/sd<5 and other fit indices of the variables in the model; the obtained values were found to be at an acceptable level. It has been determined that the goodness-of-fit index values found in the direction of the path analysis are in the range of acceptable threshold values in the relevant literature (Karagöz, 2018). According to these results; it can be stated that the model is compatible with the data and is acceptable. Figure 1 shows the path analysis model conducted to determine whether the digital literacy of teacher candidates has a statistically significant effect on their attitudes towards writing in the digital environment.

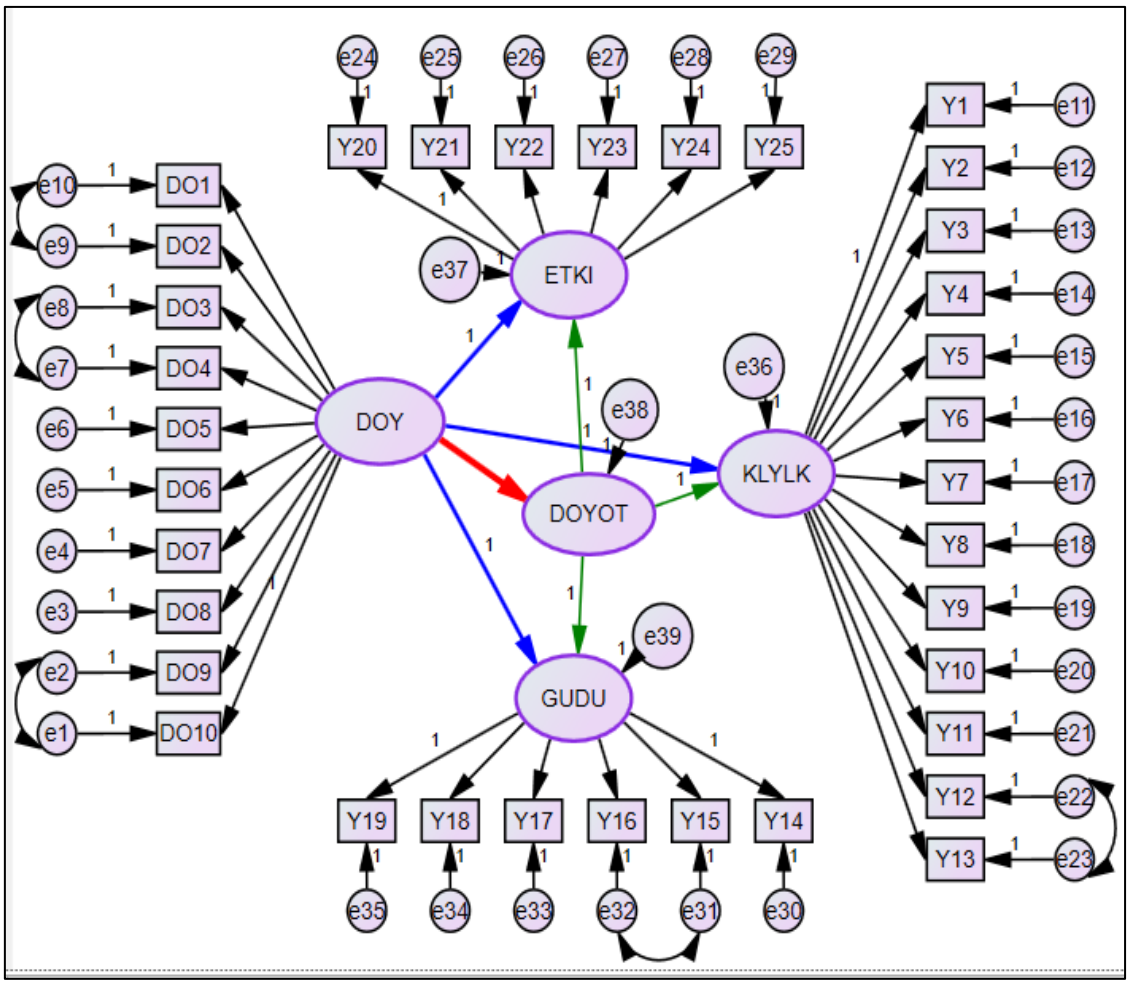

Figure 1: Path analysis diagram

In the path analysis diagram in Figure 1; it is seen that there are ways from the DLS scale to the factors of the DWS scale. While creating the model, a modification was made by establishing covariance analysis between the error terms of some items under the same factor structure. This process is aimed to improve the fit values of the model and obtain healthier results from the path analysis. The model fit values obtained in the path analysis are presented in Table 10.

Table 10: Fit index values for path analysis

Model Fit Indices	Acceptable Compliance Values	Model Fit Values
X^2/sd	$0< X^2/sd< 5$	3.438
GFI	0.85≤GFI≤1.0	0.918
NFI	0.90≤NFI≤1.0	0.924
IFI	0.90≤ IFI ≤1.0	0.869
CFI	CFI≥ 0.97≥ 0.95	0.868
RMSEA	0.00≤RMSEA≤0.08	0.062

Considering the fit index values obtained in the path analysis in Table 10; it is seen that the data in the developed model fit at an acceptable level. However, it is expected that the regression coefficients of the relationship paths predicted in the path analysis will

also show statistical significance. In this direction, the regression coefficients obtained as a result of the path analysis for the model are presented in Table 11.

Table 11: Structural model standardized path coefficients and analysis results of the research model

Hypothesis	Path		Estimate(ß)	S.E	C.R	*p*	Result
H1: Digital Literacy	→	Convenience	5.752	4.862	2.127	0.000*	Accept
H2: Digital Literacy	→	Motivation	5.271	2.986	2.228	0.000*	Accept
H4: Digital Literacy	→	Impact	7.312	3.248	2.997	0.002*	Accept

In Table 11, the hypotheses of the research were tested in accordance with the model created in accordance with the SEM analysis. Hypotheses were confirmed in the test findings. As a result of the analysis, the "p" scores in the relationships between all factors of DLS and DWS were less than 0.05, indicating that the relationships between factor loadings and latent variables are important. In the findings obtained, DLS; DWS predicted convenience factor positively (ß=5.752; p<.05), positively predicted motivation factor (ß=5.271; p<.05), and positively predicted impact factor (ß=7.312; p<.05) detected. According to the values of the regression coefficients, it was found that the digital literacy levels of the pre-service teachers had a statistically positive effect on their attitudes towards writing in the digital environment (p<0.05).

5. Conclusion, Discussion and Recommendations

In this part of the research, the results obtained will be given and discussed with other studies in the literature. In the studies on digital literacy and the digital writing process, it is seen that the effect of digitalization on literacy, reading and writing skills is tried to be revealed. It has been determined that studies in these areas have started to be carried out mainly in the last ten years.

It was determined that the digital literacy of teacher candidates did not differ significantly in terms of gender, but the scores of male students were higher. In the studies conducted by Kozan and Özek (2019), Pala and Başıbüyük (2020) and Bay (2021), it was concluded that gender does not have a decisive effect on digital literacy, in line with this study. There are also studies in the literature with different findings. Comber, Hargreaves and Dorn (1997), Kubiatko, Uşak, Yılmaz and Tasar (2010), Yeşildal (2018), Özerbaş and Kuralbayeva (2018), Kozan and Özer (2019), Yontar (2019), Kaya (2020) and Arslan (2022), it was determined that gender created a significant difference in favor of male students. When the findings obtained in the studies are evaluated together, it can be interpreted that male students are more interested in digital technological tools and therefore they are more competent in using these tools. Kaya (2020) states that men spend their spare time on technological tools, the internet and social media more than women, which is effective in this regard. Maxwell and Maxwell (2014) state that the ways in which men and women learn digital tools are different from each other. He states that digital

skills will not develop equally if this difference is not taken into account in the education provided. Volman (1997), on the other hand, considers the fact that men are better at using digital tools from a different perspective and argues that digital tools are seen as more masculine in these results. Tsai, Lin, and Tsai (2001) stated that men have higher levels of positive emotions and confidence and less anxiety about entering digital environments than women.

It was determined that there was a significant difference in the motivation factor of the scale in terms of the gender variable of the digital writing attitudes of the participants and in favor of male students. It was determined that the digital writing attitudes of the participants differed significantly in terms of convenience and impact factors of the scale according to the grade level variable. It was determined that the significant differences in the groups with significant differences between them were against the second-grade students. In the research findings of Ustabulut (2021), it was determined that gender was a distinctive variable in favor of male participants on digital writing attitude. Although this result supports this study, there are also findings in the literature that contradict these results. Maden et al. (2018), it was found that although gender did not have a significant effect on digital writing, the scores of male students were higher. It is seen that similar results were obtained in the study conducted by Arıkan and Karasu (2016). The results in favor of male participants in the studies coincide with the findings obtained from the digital literacy scale. It is stated that male students think that they are more competent in the skills required for digital writing, that they are more satisfied with writing in a digital environment instead of paper and pen, and that they enjoy this situation (Ustabulut, 2021).

It was determined that the digital literacy of teacher candidates did not differ significantly in terms of grade level variables. However, in the findings of the studies conducted by Özerbaş and Kuralbayeva (2018), Yontar (2019), Kaya (2020) and Bay (2021), in parallel with this study, it was found that class level is not a variable that distinguishes students' digital literacy. However, there are also results in conflict with this study in the studies in the literature. In Arslan's (2022) study, it was determined that there was a significant difference according to grade level and this difference was in favor of subclasses. In the study conducted by Kozan and Özek (2019), it was concluded that class level has an effect on digital literacy. The reason for the differences in the studies in the literature can be shown as working with different groups at different times. In addition, the relatively new nature of digitalization and its effects can be considered effective at this point.

It was determined that the digital literacy levels of the participants included in the study did not differ significantly according to the place of residence variable. The place of residence variable creates a significant difference in the effect factor of the scale on the attitudes of the participants towards digital writing. This difference was determined in favor of those living in the metropolitan city and the student groups living in the district. In the study conducted by Pala and Başıbüyük (2020), it was determined that the sweat experienced by the students distinguishes their digital literacy levels. It was observed

that students living in city centers scored higher than students living in smaller settlements. In the study of Kılıç and Yıldırım (2008), it was found that the level of technology use of students living in the center is higher than students living in rural areas. Here, the fact that students living in the center have easier access to digital tools and have fewer problems with internet access can be cited as reasons.

It was found that the scores of the pre-service teachers in terms of the mother's education level variable did not differ significantly according to the LOS scale, but when the father's education status variable was examined, there was a significant difference between the university and secondary school groups in favor of the university group. A significant difference was determined between the scores of the participants in terms of mother and father educational status variables. It was found that there was a significant difference in all factors of the scale in terms of maternal education status, and the significant difference between the groups that differed was generally in favor of more educated mothers. In terms of the father's educational status variable, it was determined in favor of university between high school and university groups in the effect factor of the scale. In Yeşildal's (2018) study, a significant difference was determined in terms of parental education status and place of residence. It was found that the significant difference in parental education status was in favor of the groups whose parents were more educated. In the study conducted by Pala and Başıbüyük (2020), a significant difference was found in favor of educated parents. In Arslan's (2022) study, no significant difference was found between students' digital literacy scores in terms of parental education status. In the study conducted by Karakuş and Ocak (2019), it was concluded that the educational status of the parents did not have a significant effect on the digital literacy of the students. It is considered important here that digital tools and competences are relatively new. Because the majority of young people who are considered digital natives use digital tools better than their parents. It can be accepted that this situation limits the importance of whether parents are educated or not. Working on this subject, López, Robles, Gómez, and Hernández (2017) determined that families are inadequate in using digital tools and environments compared to their children. Andrade (2004) has shown that there is a great digital change between the two generations as the reason for this. On the other hand, Schartman-Cycyk and Messier (2012) state that it is important for parents to have developed digital literacy levels, not education. It is emphasized that digital literacy may not always show parallelism with educational status. The reason for this is that the difference between families and uneducated families may not be obvious as a result of the fact that digital tools are not widely used during the education period.

It was determined that the scores obtained by the pre-service teachers did not differ significantly according to the branch variable they studied. It was determined that the scores of the teacher candidates participating in the study from the DWS scale differed significantly in the motivation factor of the scale according to the branch variable. When the groups with significant differences were examined, it was determined that the students studying in science, pre-school, psychological and social studies teaching had higher average scores. It was determined that the lowest average score belonged to music

teaching students in general. In the study conducted by Özerbaş and Kuralbayeva (2018) and Yontar (2019), no significant difference was found in terms of branch variable. In the study of Karakuş and Ocak (2019), Arslan (2022), it was determined that the branch variable made a significant difference in the digital literacy of students.

It was determined that the scores of the participants from the digital literacy scale differed significantly in terms of the type of high school they graduated from, and this difference was in favor of the students who graduated from Anatolian high schools between the Anatolian high school and the other group. In the study conducted by Arslan (2022), who graduated from Anatolian high school, there was a significant difference between teacher candidates' digital writing attitudes in terms of the variable of the type of high school they graduated from, and this difference was found in the study by Arslan (2022), who graduated from Anatolian high school compared to students who graduated from other high schools. was found to be higher. In the study conducted by Bay (2021), it was concluded that the type of high school graduated does not have a decisive effect on digital literacy. In their study, Karakuş and Ocak (2019) compared the digital literacy of the students who graduated from vocational high schools and other high schools, and it was determined that there was a significant difference in favor of the students in the other group.

Considering the average scores obtained from the scales in terms of time spent on the Internet, it was seen that the scores of the participants' digital literacy and digital writing attitudes differed significantly in favor of the students who spent longer time on the Internet. Tsai et al., (2001), Usta, Bozdoğan and Yıldırım (2007), Maden et al. (2018), Özerbaş and Kuralbayeva (2018), Pala and Başıbüyük (2020) found that the scores of the participants who spent longer time on the Internet were higher than the others in the studies conducted on teacher candidates. Similar findings were reached in the study conducted by Kaya (2020). Ustabulut (2021) determined in his study that the participants who spent time in digital environments inevitably carried out the act of digital writing and therefore they thought that their competence in this subject increased. It is seen that spending more time on the Internet has a positive effect on students in developing and using digital competencies. As a matter of fact, in the study of Menzi, Çalışkan, and Çetin (2012), it was found that students who spend more time on the Internet see themselves as more competent in technology use than those who use less. In this context, the time spent on the Internet is an effective variable of the digital skills of pre-service teachers.

It has been determined that the digital literacy and digital writing attitudes of the participants in terms of computer, smartphone, tablet and smartwatch variables differ significantly in favor of the students who have these tools. It is seen that having digital tools to connect to the Internet has a positive effect on students' digital competencies. When the digital tools of the participants are examined, it has been determined that the number of students who have smartphones and computers is quite high. Having the necessary tools to access this information whenever they need it also has a positive effect on their digital competencies. When the studies supporting this finding are examined in the literature, it is seen that the results supporting this finding are obtained. In the study

conducted by Özerbaş and Kuralbayeva (2018), similar findings were reached and it was determined that having digital tools had a positive effect on students' digital literacy. It can be commented that the fact that students who have digital tools easily enter digital environments and spend a long time is effective in this result. In fact, when this result is considered together with the time spent on the internet, it is seen that the results are compatible with each other. In Usta et al.'s (2007) study, it was determined that students who have a personal computer have more positive attitudes towards internet use. Karakuş and Ocak (2019), Pala and Başıbüyük (2020) determined that students who have a computer have higher digital literacy levels than those who do not. Taken together, the findings of the studies show that most young people have technological tools and this situation positively affects their skills in digital fields.

In the path analysis diagram applied in line with the purpose of the research; It seems that there are ways from the DLS scale to the factors of the DWS scale. While creating the model, a modification was made by establishing covariance analysis between the error terms of some items under the same factor structure. This process is aimed to improve the fit values of the model and obtain healthier results from the path analysis. Considering the fit index values obtained in the path analysis; it is seen that the data in the developed model fit at an acceptable level. However, it is expected that the regression coefficients of the relationship paths predicted in the path analysis will also show statistical significance. In this direction, it is necessary to look at the regression coefficients obtained as a result of the path analysis for the model and verify the results. Research results were tested in accordance with the model created in accordance with the SEM analysis. The results are confirmed in the test findings. As a result of the analysis, the "p" scores in the relationships between all factors of DLS and DWS were less than 0.05, indicating that the relationships between factor loadings and latent variables are important. In the findings obtained, DLS; it was found that DWS predicted convenience, motivation and impact factors positively. According to the values of the regression coefficients, it was found that the digital literacy levels of the pre-service teachers had a statistically positive effect on their attitudes towards writing in the digital environment, being positive in all factors. It is seen that there are studies examining the relationship between digital literacy and different variables in the literature. Kul (2020) examined the relationship between digital literacy and internet addiction and found that there was no relationship between them. Kozan and Özek (2019) examined the relationship between digital literacy and awareness of cyberbullying and determined that there was a positive relationship between them. In other words, as the level of digital literacy increases, there is an increase in the level of sensitivity to cyberbullying. Kaya (2020) determined that there is a positive correlation between students' digital literacy and digital citizenship levels.

It is seen that the studies on digital literacy, reading and writing are relatively limited and the studies to be done will support the literature. In the findings of the studies, it is seen that especially men are more competent in digital skills compared to women. Although it is stated that there may be different reasons for this, priority should

be given to increasing the skills of women in this regard. It has been determined that the development of digital literacy, reading and writing skills improves remembering skills and reflective thinking (DeeLucas & Larkin, 1995), comprehension and planning skills (Sullivan & Puntambekar, 2015. At this point, the curriculum should be updated to develop these skills. Of course, only updating in the programs is effective). It is an expected result that the digital skills of new generation teachers are better than that of senior teachers. For this, it is important to provide pre-service teachers with in-service training on the use of digital tools and access to digital environments. Ruggiero and Mong (2013) determined that pre-service teachers who received technology education had a higher level of digital skills compared to those who did not. It was observed that the increase in the time spent in the digital environment increased their digital skills. It is especially important that students are given the homework they will do in digital environments from an early age. Of course, it should be recognized that the highest level of dissemination of digital access in schools is also important here. It is seen that the need for printed resources will decrease with the development of digital literacy, reading and writing skills. In this way, paper waste will be prevented. Considering that digitalization is an inevitable return to life, it is important to determine the competencies of teachers and teacher candidates in this regard. However, this study can be carried out at different levels. In this study, digital literacy and writing attitudes in the digital environment were investigated together. Again, these variables can be investigated together with positive variables such as motivation, self-efficacy, and metacognition or negative variables such as anxiety, insecurity and asociality.

Conflict of Interest Statement

The author declares no conflicts of interest.

About the Author

Aysel Arslan is an Assistant Professor at Sivas Cumhuriyet University, Faculty of Education, Department of Educational Sciences. Her areas of interest are teaching methods and techniques, learning processes, cooperative learning, self-efficacy, digital learning, multicultural education, preschool education, and educational materials.

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