



The relationship between teacher candidates' lifelong learning tendencies and their digital competencies

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Abstract

Digital competencies and lifelong learning tendencies are among the features that every teacher candidate should have. Therefore, carrying out research on both lifelong learning trends and digital competencies can contribute to the development and updating of teacher education programs. In this context, the aim of this research is to analyse the relationship between lifelong learning tendencies and digital competencies of teacher candidates. In this research, scanning model from descriptive research models and explanatory model from relational research methods were used. The sample of this research consists of 287 teacher candidates selected by simple random sampling method from among teacher candidates studying at this state university. In this study, two scales were used to determine the relationship between the lifelong learning tendencies of teacher candidates and their digital competencies. The first of these scales is the "Lifelong Learning Tendency Scale". The second scale used in the research is the "Digital Competency Scale". There is a significant and moderate relationship between the lifelong learning tendencies scale in general and the competencies of using basic internet tools and the competencies of acquiring and using information in digital environment. Since there is a moderately significant relationship between lifelong learning tendencies and digital competence, these two concepts should be reflected in teacher education programs in a way that supports each other, without considering each other separately.

Keywords: Digital competence, Lifelong learning tendencies, Teacher candidate, Willingness to learn, Openness to development, Relational research methods.

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Contents

1. Introduction	67
2. Method	68
3. Research Findings	69
4. Discussions, Conclusions and Recommendations	72
References	73

Contribution of this paper to the literature

The relationship between lifelong learning tendencies and digital competencies of teacher candidates discussed in this study has been the subject of limited research before. With this aspect, the research will present a new evaluation to the literature in this field.

1. Introduction

In order to adapt to the environment and continue their lives people have been in a constant learning effort throughout history. This learning effort has been given by means of some certain institutions since ancient times and continues to be given through education systems today. However, in today's world where change, development and knowledge production accelerate, the learning outcomes tried to be given through education systems are not enough for individuals to keep up with business life and society throughout their lives. The existence of this situation leads us to the concept of lifelong learning.

Many definitions have been made about the concept of lifelong learning. Lifelong learning is defined by the Organization for Economic Co-operation and Development (OECD) as all purposeful learning activities, whether formal or informal, that are carried out continuously with the aim of developing skills, knowledge, and abilities (Holmes, 2002). The goal of lifelong learning is to ensure that persons of all age groups have equal, easy, and open access to more qualified learning chances and rich learning environments and experiences (Akkoyunlu, 2008).

According to Knapper and Cropley (2000), lifelong learning ensures that knowledge, skills and attitudes are acquired, maintained, developed or completed in a structured way for each individual throughout life. In addition, lifelong learning is a concept that coexist with the learning ability and motivation of individuals. Demirel (2009), on the other hand, defined lifelong learning as “a continuous process that develops an individual's potential and competencies throughout his/her life”.

A lifelong learner is the one who consciously participates in formal and informal learning throughout his or her life. Lifelong learner is inclined for lifelong learning and a highly motivated person who is aware of the need to learn and the relationship between learning and real life. He/she establishes personal goals, applies what have been learned, uses knowledge, and evaluates his/her own learning (Bryce, Frigo, McKenzie, & Withers, 2000; Knapper & Cropley, 2000).

While the phenomenon of inclination is defined as the sincere tendency of loving, wanting, or doing something (TDK, 2023), the inclination for lifelong learning can be defined as a desire to love lifelong learning and the sincere orientation to lifelong learning. Therefore, for lifelong learning to be realized and sustained, individuals need to be inclined for that. Consequently, it is of great importance to know teacher candidates' level of lifelong learning tendencies for the processes in training lifelong learner teachers.

Lifelong learning tendencies are influenced by many factors and affect many factors, as well (Ala-Mutka, 2011). One of those factors is digital competency. The European Commission (EC) has defined digital competency as the safe, critical, and creative use of information and communication technologies in business and everyday life. Digital competences are supported by basic skills such as using computers to access, evaluate, store, share and exchange information, participate in common networks and communicate through the Internet (EC, 2006). In A Framework for Understanding, Developing Digital Competences in Europe (DIGCOMP), the EC has divided digital competences into five different categories. The general framework of those areas is presented below (Ferrari, Punie, & Brečko, 2013).

Information: Recognizing, embedding, rearranging, storing, organizing, and analysing digital information that is considered relevant and fit for purpose. Communication: Communication in digital environments is the field related to resource sharing via on-line tools, connection, and collaboration with others through digital tools, interacting by participating in communities-networks, and intercultural awareness.

Generating and editing new content (word processors to images and videos); It is the field related to re-integrating previous knowledge by detailing it by considering intellectual property rights and license rights, creative expressions, producing media outputs and programming.

Security: It is the area related to data protection, secure and sustainable use, personal protection, digital identity protection, and security measures.

Problem Solving: It is the field concerned with identifying digital needs and resources, making conscious decisions about which digital tools are the most appropriate according to purpose or needs, solving conceptual problems through digital means, using technologies creatively, solving technical problems, and keeping one's own and others' competencies up to date.

The importance of digital competence is emphasized by many sources. For example, Bawden (2008) states that digital competence is a mandatory skill for individuals so that they can be successfully active in contemporary society. Digital competence areas such as access, use, assessment, and communication are stated to help individuals gain a competitive advantage in the digital world, facilitate their daily lives, and support learning (Livingstone & Helsper, 2007; Van Deursen, Helsper, & Eynon, 2016).

It is also emphasized in the literature that individuals with digital competence also show more conscious and protective behaviours about digital security (Aviram & Eshet-Alkalai, 2006; Eshet, 2004; Fraillon, Ainley, Schulz, Friedman, & Duckworth, 2020). For these reasons, it can be said that digital competence is an essential skill for individuals to succeed in today's world.

In addition to the fact that digital competencies are an element that affects lifelong learning, digital tools have become the most important learning-teaching environment of lifelong learning in the twenty-first century. Digital tools have an important place in the production and sharing of information. Some of the benefits that digital tools provide for lifelong learners can be summarized as follows: they offer their learners a flexible learning opportunity. It makes learning independent of time and space. It also offers learners the opportunity to learn at their own pace (Day, 2002; Trilling & Fadel, 2009).

Today, digital technologies can reach even from the largest cities to villages and even to hamlets, thanks to the combination of internet technology with smart phone technology and the production of hundreds or even

thousands of learning-teaching software suitable for smart phones. In a way, the distances and barriers between the learner and the knowledge are removed thanks to digital tools (Keskin & Yazar, 2015).

Digital competencies and lifelong learning tendencies are among the features that every teacher candidate should have. Therefore, carrying out research on both lifelong learning trends and digital competencies can contribute to the development and updating of teacher education programs. In this context, the aim of this research is to analyse the relationship between lifelong learning tendencies and digital competencies of teacher candidates. Within the framework of this purpose, answers to the following research problems will be sought.

1. What is the level of lifelong learning tendencies of teacher candidates? Does it differ depending upon the independent variables?
2. What is the level of teacher candidates' digital competencies? Does it differ depending upon the independent variables?
3. What is the dimension of the relationship between teacher candidates' lifelong learning tendencies and their digital competencies?

2. Method

2.1. Research Model

General survey model and relational survey model were used in this study, in which the relationship between teacher candidates' lifelong learning tendencies and digital competencies was investigated. Survey research is the description of variable situations and events that exist in nature without any changes. On the other hand, the relational screening investigates the change of more than one variable together. A wide variety of techniques are used in relational survey research, such as crosstabs, clarification analysis, regression analysis, or structural equation modelling (Çepni, 2014; Karasar, 2012; Tuncer, 2020).

2.2. Universe and Sample

In this research, teacher candidates studying in different departments of the education faculty of a state university in the southeast Anatolia region were selected as the universe. The sample in this study was tried to be selected from the population using the stratified random sampling method. Although 307 teacher candidates were reached at the end of the data collection process, the answers given by 20 teacher candidates who did not comply with the data collection principles because of the evaluations were not included in the data set. Thus, the sample of the research consisted of 284 teacher candidates. Some demographic data regarding the sample are given in Table 1.

Table 1. Demographics.

Demographic feature	F	%
Gender		
Female	193	67.2
Male	94	32.8
Total	287	100.0
Age		
20 and below	36	12.5
21-25	147	51.2
26-30	59	20.6
31 and above	45	15.7
Total	287	100.0
Major		
Mathematics	102	35.5
Foreign language	32	11.1
Information technologies	21	7.3
Science	40	13.9
Social sciences	29	10.1
Turkish language and literature	42	14.6
Fine arts	21	7.3
Grade		
1	28	9.8
2	87	30.3
3	43	15.0
4	84	29.3
5	45	15.7
Total	287	100.0

2.3. Data Collection Tools

Two Likert-type scales were used in this study. The first of these scales is the "Lifelong Learning Tendency Scale" developed by Erdoğan and Aarsal (2016) to determine lifelong learning tendencies. During the development of this scale, 1644 pre-service teachers voluntarily participated in the research. To determine the factor structure of the scale to be developed, firstly, exploratory factor analysis was applied on the data. As a result of the exploratory factor analysis, it was determined that the scale consisted of 17 items and two factors. The factors of the scale were named as "Willingness to Learn" (WtL) and "Openness to Development" (OtD) according to the scope of the items they contain. The total variance explained by the province factor of the scale was determined as 43.44%. To test the construct validity of the scale, confirmatory factor analysis was performed on the data. The values obtained because of confirmatory factor analysis confirmed the two-factor structure of the scale. The validity of the scale was also tested with the criterion scale and the relationship between the two scales was determined as ,71. This value means that the criterion scale validity of the scale is high. In the studies on the reliability of the scale, the

Cronbach's alpha internal consistency coefficient was calculated as 0.86 and the test-retest reliability coefficient as 0.76. Studies on the validity and reliability of the scale show that this scale has sufficient validity and reliability to measure the lifelong learning tendency of teacher candidates.

The second scale used in the research is the "Digital Competency Scale" (DCS), which was developed by Yazar and Keskin (2016). During the development phase of the scale, a trial form consisting of 52 items was prepared by scanning the literature and taking expert opinion. The trial form of the scale was applied to a group of 263 pre-service teachers. However, the scale form of 21 people who were considered to be unsuitable for factor analysis was excluded from the analysis. After the arrangements made on the data, exploratory factor analysis was performed on the data obtained from 242 teacher candidates. In the exploratory factor analysis, the KMO (Kaiser-Mayer-Olkin) value was found to be 0.943. This value means that the sample size and the data obtained from the teacher candidates are suitable for exploratory factor analysis. In the item elimination process, items with an item factor load of .40 and below and items with less than .10 difference in their load on more than one factor were not included in the analysis. As a result of the exploratory factor analysis, a 30-item scale consisting of three factors was obtained. Items in this scale explain 59% of the total variance, and each factor has at least 1% eigenvalue. Confirmatory factor analysis was performed to confirm the 3-factor scale structure obtained as a result of the exploratory factor analysis. The values obtained as a result of confirmatory factor analysis confirmed the 3-factor structure of the scale. These values show that the scale has sufficient validity and reliability to measure teacher candidates' digital competencies. The scale consists of three factors: "Basic Computer Usage Competencies" (BCUC), "Basic Internet Tools Usage Competencies" (BITUC), and "Competences in Obtaining and Using Information in Digital Environments" (COUIDE).

2.4. Analysis of Data

Statistical programs were used to organize and analyse the data. First of all, the obtained data were arranged and made ready for analysis. Then, it was analyzed whether the score distribution met the assumptions of normality and homogeneity in order to determine what kind of statistical tests would be used in the analysis of the data. Since the assumptions of normality and homogeneity were met, it was decided to use parametric tests (t-test for independent samples, one-way ANOVA (ANalysis of VAriance) (Büyükoztürk, 2010). In addition, the Pearson correlation coefficient was used to determine the relationship between the digital competence scale and its sub-dimensions and the lifelong learning tendencies scale and its sub-dimensions.

3. Research Findings

3.1. Findings on the Gender Variable

When Table 2 is examined, it is seen that there is a significant difference in favour of male teacher candidates in the digital proficiency scale and in all its sub-dimensions ($p < 0.05$). However, there was no significant difference between female teacher candidates and male teacher candidates in the lifelong learning tendencies scale and in all sub-dimensions ($p > 0.05$).

Table 2. T-Test results of teacher candidates' digital competencies and lifelong learning tendencies by gender.

Factor	Gender	N	X	SD	Df	t	p
Basic computer usage competencies	Female	193	3.08	0.90	285	-5.83	0.00
	Male	94	3.73	0.83			
Basic internet tools usage competencies	Female	193	3.97	0.83	285	-2.43	0.00
	Male	94	4.21	0.68			
Competences in obtaining and using information in digital environments	Female	193	3.86	0.82	285	-2.75	0.00
	Male	94	4.13	0.68			
Digital competency scale total	Female	193	3.64	0.74	285	-4.24	0.00
	Male	94	4.02	0.68			
Willingness to learn	Female	193	4.68	0.58	285	-0.28	0.78
	Male	94	4.7	0.46			
Openness to development	Female	193	4.78	0.59	285	0.35	0.73
	Male	94	4.76	0.50			
Lifelong learning tendency scale total	Female	193	4.73	0.55	285	0.04	0.97
	Male	94	4.73	0.46			

3.2. Findings on the Age Variable

According to Table 3, when the digital competencies of the teacher candidates according to their ages were evaluated, it was determined that there was a significant difference between the teacher candidates in the 21-25 age range and the teacher candidates in the 26-30 age range in the "Basic Computer Use Competencies" dimension of the digital proficiency scale in favour of the teacher candidates in the 21-25 age range ($p < 0.05$). When the lifelong learning tendencies scores of the teacher candidates according to their ages were evaluated, a significant difference was found in the dimension of "development to openness" and in favour of those in the 21-25 age range between those aged 20 and under and those in the age range of 21-25 ($p < 0.05$).

3.3. Findings on the Major Variable

When Table 4 is examined, it is determined that the department with the highest average in the "Basic Computer Use Competencies" dimension of the digital proficiency scale is "information technology teacher candidates" and there is a significant difference between it and the averages of all other departments. In the "Competences to Use Basic Internet Tools" dimension of the digital proficiency scale, a significant difference was found between "information technologies teacher candidates" and "science teaching candidates" and "Turkish language and literature teacher candidates" in favour of "information technologies teacher candidates". Similarly, in the "Competences to Acquire and Use Information in Digital Environments" dimension of the scale, a significant

difference was found between "information technology teacher candidates" and "science teaching candidates" and "Turkish language and literature teacher candidates" in favour of "information technologies teacher candidates". When the digital proficiency scale is examined in general, a significant difference was found between "information technology teacher candidates" and "mathematics", "science", "social studies", "Turkish language and literature" and "fine arts" teacher candidates in favour of "information technologies teacher candidates".

Table 3. ANOVA test results of teacher candidates' digital competencies and lifelong learning tendencies by age.

Factor	Age	N	X	SD	Df	F	p	Diff.
Basic computer usage competencies	20 and below	36	3.46	0.87	283	6.56	0.00	2-3
	21-25	147	3.08	0.91				
	26-30	59	3.64	0.92				
	31 and above	45	3.46	0.86				
Basic internet tools usage competencies	20 and below	36	3.75	1.08	283	2.61	0.05	
	21-25	147	4.11	0.75				
	26-30	59	4.15	0.72				
	31 and above	45	3.97	0.70				
Competences in obtaining and using information in digital environments	20 and below	36	3.72	1.07	283	2.15	0.94	
	21-25	147	4.04	0.72				
	26-30	59	3.99	0.81				
	31 and above	45	3.82	0.65				
Digital competency scale total	20 and below	36	3.64	0.94	283	1.29	0.27	
	21-25	147	3.74	0.69				
	26-30	59	3.92	0.77				
	31 and above	45	3.75	0.67				
Willingness to learn	20 and below	36	4.50	0.83	283	2.36	0.07	
	21-25	147	4.76	0.41				
	26-30	59	4.65	0.63				
	31 and above	45	4.68	0.49				
Openness to development	20 and below	36	4.47	0.94	283	5.61	0.00	1-2
	21-25	147	4.88	0.37				
	26-30	59	4.75	0.61				
	31 and above	45	4.74	0.50				
Lifelong learning tendency scale total	20 and below	36	4.49	0.88	283	4.27	0.01	1-2
	21-25	147	4.82	0.34				
	26-30	59	4.70	0.60				
	31 and above	45	4.71	0.46				

Table 4. ANOVA test results of teacher candidates' digital competencies and lifelong learning tendencies by major.

Factor	Major	N	X	Sd	Df	F	p	Diff.
Basic computer usage competencies	Mathematics	102	3.23	0.81	280	6.78	0.00	1-3
	Foreign language	32	3.47	0.85				
	Information technologies	21	4.36	0.82				
	Science	40	3.33	0.79				
	Social sciences	29	3.18	0.97				
	Turkish language and literature	42	3.01	1.12				
	Fine arts	21	2.99	0.74				
Basic internet tools usage competencies	Mathematics	102	4.08	0.67	280	5.22	0.00	2-4.6
	Foreign language	32	4.45	0.54				
	Information technologies	21	4.56	0.63				
	Science	40	3.76	0.94				
	Social sciences	29	4.04	0.73				
	Turkish language and literature	42	3.90	0.99				
	Fine arts	21	3.69	0.68				
Competences in obtaining and using information in digital environments	Mathematics	102	4.01	0.67	280	5.45	0.00	1-4
	Foreign language	32	4.32	0.54				
	Information technologies	21	4.46	0.67				
	Science	40	3.58	0.94				
	Social sciences	29	3.98	0.63				
	Turkish language and literature	42	3.78	0.93				
	Fine arts	21	3.67	0.82				
Digital competency scale total	Mathematics	102	3.77	0.62	280	6.43	0.00	1-3
	Foreign language	32	4.08	0.56				
	Information technologies	21	4.46	0.68				
	Science	40	3.56	0.79				
	Social sciences	29	3.73	0.60				
	Turkish language and literature	42	3.56	0.96				
	Fine arts	21	3.45	0.62				
Willingness to learn	Mathematics	102	4.69	0.49	280	4.98	0.00	1-4
	Foreign language	32	4.81	0.27				
	Information technologies	21	4.86	0.19				
	Science	40	4.35	0.91				
	Social sciences	29	4.90	0.19				
	Turkish language and literature	42	4.79	0.40				
	Fine arts	21	4.49	0.67				
Openness to development	Mathematics	102	4.82	0.45	280	3.73	0.00	1-4

Factor	Major	N	X	Sd	Df	F	p	Diff.
	Foreign language	32	4.91	0.33				2-4
	Information technologies	21	4.79	0.36				
	Science	40	4.48	0.99				4-6
	Social sciences	29	4.86	0.40				
	Turkish language and literature	42	4.92	0.32				
	Fine arts	21	4.55	0.66				
Lifelong learning tendency scale total	Mathematics	102	4.76	0.44	280	4.67	0.00	1-4
	Foreign language	32	4.86	0.27				2-4
	Information technologies	21	4.82	0.26				3-4
	Science	40	4.41	0.92				4-5.67
	Social sciences	29	4.88	0.23				
	Turkish language and literature	42	4.86	0.33				
	Fine arts	21	4.52	0.63				

When the scale of lifelong learning tendencies is examined, it is seen that the averages are high, but there are significant differences between some departments. In the "willingness to learn" sub-dimension of the scale, it is seen that the lowest average is "science teacher candidates" and differs significantly with all other departments. In the "openness to development" dimension of the scale, "science teacher candidates" had the lowest average and there was a significant difference between them and "mathematics", "foreign languages" and "Turkish language and literature" teacher candidates. When the scale is examined in general, it is seen that the group with the lowest average is "science teacher candidates" and there is a significant difference in favour of "mathematics", "foreign languages", "information technologies", "social sciences" and "Turkish language and literature" teacher candidates.

3.4. Findings on the Grade Variable

Table 5. ANOVA test result of teacher candidates' digital competencies and lifelong learning tendencies by grade.

Factors	Grade	N	X	SD	Df	F	p	
Basic computer usage competencies	1	28	2.90	0.87	282	2.85	0.02	1<5
	2	87	3.29	0.92				
	3	43	3.14	0.88				
	4	84	3.37	0.82				
	5	45	3.58	1.11				
Basic internet tools usage competencies	1	28	3.73	0.91	282	1.41	0.23	
	2	87	4.09	0.78				
	3	43	4.02	0.74				
	4	84	4.08	0.74				
	5	45	4.14	0.85				
Competences in obtaining and using information in digital environments	1	28	3.59	0.83	282	2.05	0.09	
	2	87	4.06	0.79				
	3	43	3.94	0.75				
	4	84	3.98	0.71				
	5	45	3.93	0.88				
Digital competency scale total	1	28	3.41	0.73	282	2.24	0.06	
	2	87	3.82	0.71				
	3	43	3.70	0.71				
	4	84	3.81	0.67				
	5	45	3.88	0.90				
Willingness to learn	1	28	4.48	0.77	282	1.81	0.13	
	2	87	4.77	0.49				
	3	43	4.66	0.50				
	4	84	4.74	0.44				
	5	45	4.63	0.66				
Openness to development	1	28	4.57	0.94	282	1.74	0.15	
	2	87	4.83	0.47				
	3	43	4.81	0.47				
	4	84	4.84	0.43				
	5	45	4.69	0.67				
Lifelong learning tendency scale total	1	28	4.53	0.84	282	1.91	0.11	
	2	87	4.80	0.46				
	3	43	4.73	0.45				
	4	84	4.79	0.37				
	5	45	4.66	0.64				

When Table 5 was examined, a significant difference was found in the digital proficiency scale only in the "Basic Computer Use Competencies" dimension. Among the groups, a significant difference was found between the teacher candidates in the first year and the teacher candidates who continued the pedagogical formation program in favor of the teacher candidates who continued the pedagogical formation program. There was no significant difference between groups either in the sub-dimensions of the lifelong learning tendencies scale or in the scale in general.

3.5. Correlation between Lifelong Learning Tendencies and Digital Competencies

Table 6. Correlation table between lifelong learning tendencies and digital competencies.

Correlations					
Factors	Correlation	BCUC	BITUC	COUIDE	DCS
WtL	Pearson correlation	0.25**	0.43**	0.46**	0.42**
	Sig. (2-Tailed)	0.00	0.00	0.00	0.00
	N	287	287	287	287
OtD	Pearson correlation	0.067	0.376**	0.386**	0.298**
	Sig. (2-Tailed)	0.256	0.00	0.00	0.00
	N	287	287	287	287
LLTS	Pearson correlation	0.166**	0.423**	0.448**	0.378**
	Sig. (2-Tailed)	0.01	0.00	0.00	0.00
	N	287	287	287	287

Note: ** significant difference.

Table 6 presents that, there is a significant but "moderate" relationship between the "willingness to learn" factor, which is the sub-factor of the Lifelong Learning tendencies scale, and all the sub-factors of the digital proficiency scale and the overall scale. There is a significant but "weak" relationship between the "Openness to Development" factor, which is the second factor of the lifelong learning education scale, and the general and sub-dimensions of the digital competence scale, "Competences to Use Basic Internet Tools", and "Competences to Acquire and Use Information in Digital Environments". There is a "weak" but significant relationship between the general scale of lifelong learning tendencies and the general dimensions of the digital proficiency scale and the dimensions of "Competences to Use Basic Internet Tools" and "Competences to Acquire and Use Information in Digital Environments". There is a significant but "very weak" relationship between the general lifelong learning tendencies scale and the "Basic Computer Use Competencies" sub-dimension of the digital proficiency scale.

4. Discussions, Conclusions and Recommendations

In this section, findings from the research were discussed firstly within the framework of the digital competence scale and then the lifelong learning tendencies scale. The relationship between digital competencies and lifelong learning tendencies was also examined and some results were reached later on.

It was observed that there was a significant difference in favour of male teacher candidates in the overall digital competence scale and in all sub-dimensions. When the literature was examined, in some studies (Özerbaş & Kuralbayeva, 2018; Şahin & Kalkan, 2022; Yazar & Keskin, 2016; Yontar, 2019), it was seen that men's digital competencies are significantly higher while women's digital competencies are significantly higher in some other studies (Boyacı, 2019; Tor, Başaran, & Arık, 2022; Yılmaz & Dogusoy, 2020). On the other hand, no significant difference was found between male and female teachers in some studies (Babacan, 2022; Kara, 2021; Şad & Nalçacı, 2015; Sakalli, 2015). When the digital competencies of the teacher candidates were evaluated based on the age variable, within the dimension of "Use of Basic Computer Competences" in digital competencies scale, it was seen that there is a significant difference between the teacher candidates in the 21-25 age range and 26-30 range in favour of the ones in the 21-25 age range.

When the relevant studies were examined in terms of age variable, it was found that a study mentions significantly lower digital proficiency against the age of 18-20 (Boyacı, 2019) while other one reaches a significantly higher results in favour of the age of 20 and below (Şahin & Kalkan, 2022). In some studies (Yaman, 2019; Yılmaz & Dogusoy, 2020; Yontar, 2019), no significant difference was found based on the age variable. When digital competencies were evaluated in the context of the field variable, a significant difference was found in favour of information technologies. Karakuş and Gürbüz (2019); Yılmaz and Dogusoy (2020) and Şad and Nalçacı (2015) reached a similar conclusion that stems from the fact that information technology teachers work in the digital field. Yazar and Keskin (2016), on the other hand, found significantly higher digital competencies among the pedagogical formation students studying in the field of science.

Based on the class variable, it was seen that the digital competencies of the formation students are significantly higher than the 1st grades within the dimension of the "Use of Basic Computer Competences". It can be said that experience is effective in this result. While no significant difference was found in some studies (Babacan, 2022; Kara, 2021; Şahin & Kalkan, 2022; Sakalli, 2015; Yılmaz & Dogusoy, 2020; Yontar, 2019) found a significant difference in favour of 1st graders. In addition, Yaman (2019) found the digital proficiency of the 1st and 2nd graders, and Boyacı (2019) found only the first graders to have significantly lower digital competencies. Thus, it can be said that different outcomes were obtained in terms of class variable.

According to the findings, no significant difference was found between female teacher candidates and male teacher candidates in the lifelong learning tendencies scale and in all its sub-dimensions. When the literature was examined, it was seen that some studies did not show a significant difference (Güzel, 2017; Tunca, Şahin, & Aydın, 2015; Yasa, 2018), however some studies that showed a significant difference in favor of female teacher candidates were in the majority (Aydın, 2018; Bilici & Bağcı, 2020; Boyacı, 2019; Bulaç & Murat, 2019; Gökyer & Türkoğlu, 2018; Kozikoğlu & Altunova, 2018; Kurt, Cevher, & Arslan, 2019; Özoğlu & Esra, 2021; Şahin, Sarıtaş, & Çatalbaş, 2020; Yazar & Keskin, 2016). No research was found in favour of male teacher candidates. It can be said that lifelong learning tendencies of female teacher candidates are higher than male teacher candidates.

When the lifelong learning tendencies scores of the candidate teachers were evaluated according to the age variable, a significant difference was found between those aged 20 and below and those aged 21-25, in favour of those aged 21-25, in the dimension of "openness to development" and the overall scale. In the studies conducted by Yasa (2018) and Gökyer and Türkoğlu (2018), lifelong learning competencies of teacher candidates aged between 17-20 differ significantly compared to other age groups. Özçiftçi (2014) did not find a significant difference in the lifelong learning tendencies according to age. It is seen that there are different outcomes in the literature regarding

the age variable. According to the variable of the teacher candidates' fields, it was observed that the average of science teacher candidates in general and sub-dimensions of the lifelong learning scale was the most significantly lower than other fields. Similarly, in the study conducted by Yasa (2018), lifelong learning tendencies of science teacher candidates were found to be significantly lower in some sub-dimensions.

On the other hand, lifelong learning tendencies were found to be significantly higher among science and social science teacher candidates in studies by Tunca et al. (2015), primary school mathematics teacher candidates by Bulaç and Murat (2019) Turkish teacher candidates by Duymuş and Sulak (2018), and science teacher candidates by Boyacı (2019). The findings differ based on the field variable. This might stem from the fact that teacher candidates participating in the research are from different universities, in different classes and ages.

No significant difference was found in the scale of lifelong learning tendencies and its sub-dimensions according to the university grade variable. This result is in accordance with the outcomes from Boyacı (2019). On the other hand, Yasa (2018); Gökyer and Türkoğlu (2018) and Kurt et al. (2019) found the lifelong learning tendencies of the teacher candidates in the first-grade of university to be significantly high Tunca et al. (2015), however Bilici and Bağcı (2020) concluded that lifelong learning tendencies of the teacher candidates in the first grade of university were significantly low. These differences may arise from the fact that teacher candidate participants study at different universities. When the correlation coefficients between the digital competence scale and the lifelong learning tendencies scale are examined, it can be said that there is a significant and moderate relationship across the scales.

There is a significant and moderate relationship between the lifelong learning tendencies scale in general and the competencies of using basic internet tools and the competencies of acquiring and using information in digital environment. There is a significant and weak relationship between the openness to development dimension of the lifelong learning tendencies scale and the competences of using basic internet tools of the digital competences scale and the competences of acquiring and using information in the digital environment. There is a significant and moderate relationship between the willingness to learn dimension of the lifelong learning tendencies scale and the competences of using basic internet tools of the digital competences scale and the competences of acquiring and using information in the digital environment. When the related studies in the literature were examined, it was seen that there are similar results. Boyacı (2019) found a positive and moderate relationship between lifelong learning tendencies and digital literacy level. Bilici and Bağcı (2020) found a positive and moderately significant relationship between candidate teachers' lifelong learning tendencies and their readiness for e-learning. On the other hand, Özoğlu and Esra (2021) found a very low positive correlation between candidate teachers' lifelong learning tendencies and their digital literacy. As a result, lifelong learning tendencies and digital competence can be considered as concepts that are related to each other and contribute to the development of each other.

Digital competence and lifelong learning are two concepts that support and complete each other. While digital competence facilitates lifelong learning processes, lifelong learning helps individuals keep their digital competences up to date and succeed in the digital world. Therefore, today, digital competence and lifelong learning have an important place in terms of the success and competitiveness of individuals.

Since we live in a rapidly changing time, it is important that the candidates who will practice the teaching profession should graduate as individuals who are both inclined to lifelong learning and gain digital competencies before starting their jobs. In this context, the following recommendations can be made based on the findings from the research.

- The process of establishing digital competence should be started in pre-school and primary schools. For this reason, every teacher candidate should be equipped with digital competence in pre-service education.
- Since women's lifelong learning tendencies are higher than men's, qualitative research can be conducted to investigate the reason for this situation.
- Since there is a moderately significant relationship between lifelong learning tendencies and digital competence, these two concepts should be reflected in teacher education programs in a way that supports each other, without considering each other separately.
- Relational screening studies between lifelong learning trends and digital competence should be done more with different and large samples.

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