Osmangazi Journal of Educational Research **Volume 10(1), Spring 2023**

RESEARCH Open Access

Suggested Citation: Demirci, C., & Güven, A. (2023). The relationship between teachers' attitudes regarding the use of technology in lessons and lifelong learning. *Osmangazi Journal of Educational Research, 10*(1), 142-156.

Submitted: 20/12/2022 **Revised:** 23/04/2023 **Accepted:** 12/08/2023 **DOI:** 10.59409/ojer.1221967

The Relationship between Teachers' Attitudes Regarding the Use of Technology in Lessons and Lifelong Learning

***Cavide Demirci, **Ahmet Güven**

Abstract. This study aimed to determine the relationship between teachers' attitudes toward lifelong learning and technology usage. Correlational research design was used in the study. The universe of the study consists of a total of 8195 teachers working in Odunpazarı and Tepebaşı districts in Eskişehir city center. The sample of this study consists of 145 teachers determined by using the "easily accessible sampling" method. The data analysis showed that there is no significant relationship between teachers' attitudes about the use of technology and lifelong learning tendencies. As a result of the data analysis, it was concluded that the attitudes toward the use of technology did not show significant differences according to gender, age, and seniority.

Keywords. Teachers' technology usage, lifelong learning, relationship between lifelong learning and technology.

* (Responsible Author) Prof. Dr. Eskisehir Osmangazi University, Faculty of Education, Eskisehir, Türkiye

e-mail: demircicav@gmail.com

**PhD Candidate, Faculty of Education, Eskisehir, Türkiye

e-mail: eltguven@gmail.com

Our lifestyles are changing rapidly. How we communicate, the way we get to our destination, the way we access information, and so many other things in our daily lives are being renewed. Many of us are adapting to this change. Education also takes its share from this change. The presentation of knowledge can be done in many ways, and the processes of learning and teaching are different from the past. The use of information technologies in education has undoubtedly made positive contributions. The Internet has allowed all computers on our planet to connect to each other under certain conditions and has revolutionized education as well as many other areas. The integration of technology in education has increased in recent years. Numerous forms of technology is being used in schools all around the world. Technology offers numerous benefits in education, such as enhancing student engagement, facilitating communication, and improving learning outcomes (Alzahrani & Ragab, 2021).

The speed and size of data communication allow easier access to information and faster transmission of information every day. With the spread of the use of the Internet, web tools defined as web 1.0 and where users unilaterally access information and do not interact with each other have become widespread. The concept of Web 2.0 has been defined by O'Reilly (2005) as a set of new applications and services that enable an engaged environment and structure to be created. As can be understood from this definition, unlike web 1.0, web 2.0 tools have an interaction between the user and the web page or application. For example, the user can upload and save data. It can rearrange the content according to its own use, share it with other users, and create a space of its own. This development has created a revolution in the use of technology in many areas and has spread the use of technological devices in many areas at a great speed. This situation has been reflected in schools and classrooms as lessons that go beyond the use of computers to access information or the use of projectors to reflect visuals, and with smartphones, tablets, smart boards and their interactions at the highest level. At this point, the Internet can be used effectively in the selection and preparation of teaching-related materials, in accessing information, communicating outside the classroom, in collaborative work and in developing communication skills (Malhotra, Dixit, and Uslay, 2002; Tutkun, 2011). These opportunities offered by the Internet to users also contribute to the effective use of IT in education (Akkoyunlu, 2002; Rogers and Finlayson, 2004). It would not be wrong to say that the internet and technology affect many areas of the educational process. At this point, the importance of the use of technology cannot be ignored, but it should also be possible to explain how and for what purpose technology is used in the education process.

There is a direct relationship between the use of technology in education and teachers' technological knowledge competencies (Doğru, Şeren, and Koçulu, 2017). However, Dargut and Çelik stated that in 2010, teachers often did not have enough knowledge about technology.

Teachers' Technology Usage

Research suggests that teachers' technology usage varies considerably, with some teachers integrating technology into their teaching practices extensively, while others use it minimally or not at all (Bai & Ertmer, 2018). Teachers have mastered every step of the educational process from the planning of the contents of the lessons, the preparation of the materials, the course materials, to the assessment and evaluation, and they can produce the content needed at every step. In some cases, the materials provided to the teachers may be insufficient or incomplete. However, sometimes teachers may not be provided with ready-made lesson materials or plans. In these cases, teachers can produce the materials and plans needed for the lesson thanks to the training they receive and the competencies in their fields. The use of technology in situations such as producing materials in needed times or for supporting and enriching the current lessons. The use of technology in education has been found to have numerous benefits for students. For example, technology can enhance student engagement, facilitate communication and collaboration, and provide access to a wide range of educational resources (Alzahrani & Ragab, 2021). Additionally, technology can support personalized learning, allowing students to work at their own pace and receive feedback tailored to their individual needs (Bai & Ertmer, 2018).

Lifelong Learning

Curiosity and learning have always had an important place in human life. However, education has been one of the basic phenomena of human societies. As formal education institutions, it would not be wrong to characterize schools as places where people receive a large part of their education. With developing technology and advancing science, 21. The century began as the years when people's access to information became faster and easier. In the absence of the Internet and computer technologies, the only resources from which a person could access any information were either a book or a teacher. The rapid change in human life has enabled people to access information quickly and at any time, and to obtain content on a wide range of topics such as videos, articles, directives, etc. on almost any subject. With this process, it has been accepted as a part of our lives by almost everyone that education can be done outside of formal education institutions, which have been questioned and harshly criticized from time to time, and that people can acquire many knowledge and skills through various sources if they wish. Diker Coşkun and Demirel (2012, p. 108). They

defined the concept of "Lifelong Learning" as people acquiring the knowledge and skills they need throughout their lives. In his radical critique of school, "The Unschooled Society," Illich said that people learn almost everything outside of school and through individual experience, stressing that school should be abolished altogether. As an alternative, he emphasized that the system he presented should provide the necessary resources to people who want to learn and help people who have knowledge to share their knowledge.

In 1972, when Illich published his book, he was criticized a lot for how these suggestions could be realized and emphasized that the alternative methods he presented could not be applied. When the concept of "Lifelong Learning" is considered as a whole and how it is applied with 21st century technologies, it would not be wrong to say that Illich's unschooled society is almost realized today. Of course, the big difference is that today there is no such thing as the disappearance of the formal education system and schools. Lifelong Learning is of great importance in terms of increasing people's personal development, knowledge and skills. In particular, the necessity for teachers to be in the understanding of constantly updating themselves shows how necessary the concept of lifelong learning is for educators.

Method

Purpose

The aim of the study is to determine the relationship between the attitudes of classroom teachers regarding the use of technology in lessons and their lifelong learning attitudes.

The sub-problems are,

1-Do teachers' attitudes towards the use of technology vary according to age, gender and seniority?

2-Do teachers' lifelong learning tendencies vary according to age, gender and seniority?

3-Is there a relationship between teachers' attitudes towards the use of technology and their lifelong learning attitudes?

Research Design

Correlational research design from quantitative designs was used in the study. Relational method is the research carried out to determine the relationship between two or more variables and to obtain clues about cause and effect (Büyüköztürk et al., 2012, p.184).

Universe and Sample

The universe can be defined as the group in which the results to be obtained by analyzing the data to be collected in the research will be valid and interpreted (Büyüköztürk et al., 2012, p.80). The universe of the study consists of a total of 8195 teachers working in Odunpazarı and Tepebaşı districts in Eskişehir city center. The sample is "a limited part of it selected from the universe in which work is being done to gather information about its properties; sampling defines the process of determining the properties of the universe and determining the appropriate samples to represent it in order to predict it and all the operations carried out in this process" (Büyüköztürk et al., 2012, p.81). The sample of this study consists of 145 teachers determined by using the "easily accessible sampling" method among a total of 8195 teachers working in Odunpazarı and Tepebaşı districts in Eskişehir city center.

Data Collection Tools

The data collection tools used in this context are the "Teachers' Attitudes towards Technology" Öztürk (2006), "Lifelong Learning Propensity" Gür (2016) scales in Annex-1. To obtain the research data, 300 scales were distributed and 157 of them were returned. 7 of these scales were outliers, they were removed. The data from the remaining 145 scales were analyzed.

Data Analysis

In the analysis of the data, "What are teachers' attitudes towards the use of technology?" and "What are the lifelong learning tendencies of teachers?" For the sub-problems, percentages, arithmetic means, and standard deviations of the answers given to the questions were calculated, and the results obtained were interpreted by showing them in tables. "Independent Sample T-test" and "One-Way Analysis of Variance (ANOVA) were used to determine whether teachers' lifelong learning tendencies and attitudes towards technology use differed in terms of age, gender, seniority variables. The correlation coefficient was examined for the sub-problem "Is there a relationship between attitude to the use of Technology and lifelong learning?" Before the correlation analysis, it was checked whether the data showed normal distribution. After it was determined that the data showed a normal distribution, correlation analysis was performed.

Results

Reliability Analysis

Cronbach's Alpha reliability coefficients for 145 questionnaires applied for the study are given in Table 1.

Table 1.

Reliability Statistics

Scale Coefficient Reliability	Item Number	Cronbach's Alpha
Reflection of Technology Usage to Teaching Process	16	0.898
Self-improvement in Technology Usage in Education	14	0.914
Use of Technology in Education and Classroom ıgement	9	0.895
Liflong Learning Propensity	17	0.992

When the reliability coefficients shown in Table 1 are examined, all parts of the two scales are close to 1.0. These statistics show that reliability is achieved.

Descriptive Statistics

Table 2.

Descriptive Statistics

		n	%
Gender	Male	60	41.4
	Female	85	58.6
Age	18-25	2	1.4
	26-30	10	6.9
	31-35	28	19.3
	36-40	17	11.7
	41 and over	88	60.7
Job Title	Teacher	130	89.7
	Paid Teacher	2	1.4
	Intern Teacher	0	0.0
	Deputy	7	4.8
	Manager	6	4.1
Professional	1-5	14	9.7
Seniority	6-10	13	9.0
	11-15	23	15.9
	16-20	14	9.7
	21 and over	81	55.9
State of Having a	No certificate	39	26.9
Computer Literacy	Obtained from a private institution	19	13.1
Certificate	Obtained with in-service training	87	60.0

According to the descriptive statistics, most of the participants (58%) are females, and the remaining part (42%) is male. When the data is examined in terms of age group, the age group of 41 and over constitutes the majority (61.3%). Most participants (90.0%) work as teachers. It can be seen that most of the teachers (55.3%) have a professional seniority status of 21 years or more.

Most of the participants (60.7%) obtained their computer literacy certificates through in-service training, the participants following this group (26.7%) provided their computer literacy certificates from a private institution, and the remaining participants (12.7%) did not have certification of computer literacy.

Participants' Attitudes towards Technology Use

The data obtained from the scale of technology use in education is examined. The “Teachers' Attitudes towards Technology" scale consists of 3 sub-dimensions. Dimension I is the reflection of the use of technology in education in the educational process, Dimension II, is personal development in the use of technology in education, Dimension III, is the use of technology and classroom management. Before parametric analyzes were performed, it was checked whether the data was distributed normally or not.

Table 3.

Flatness and Distortion Values

	n	Skewness	Kurtosis
Attitude to Use of Techno	145	-.349	-.751
ucation			
Lifelong Learning Propen	145	-1.271	.345

According to the analysis, we can say that the data are distributed normally in terms of flatness and distortion values.

Findings on Gender

Independent sample t-test was used to determine whether teachers' attitudes towards technology use varied according to gender. The findings obtained because of the analysis of the data are shown.

Table 4.

Findings on Gender

	Gender	n	X̄	S	SF	P
Reflection of Technology Usage	Male	60	4.58	.43151	1.173	.281
hing Processes	Female	85	4.57	.45228		
Self-improvement in Technolog	Male	60	4.32	.45429	2.264	.135
e in Education	Female	85	4.18	.54392		
Use of Technology in Education	Male	60	4.37	.47463	7.040	.009
sroom Management	Female	85	4.25	.67835		
Lifelong Learning Propensity	Male	60	3.61	1.37056	6.760	.010
	Female	85	3.93	1.11126		

The first sub-dimension in Teachers' Attitudes towards Technology scale, on the teaching processes does not show a significant difference in terms of gender (p> 0.05). The result of this analysis shows us that there is no significant difference between male and female in terms of the reflection of the use of technology on teaching processes. There was no significant difference between male and female participants in the second sub-dimension which is self-improvement of Teachers' Attitudes Towards Technology Scale There was no significant difference between male and female participants in the class management dimension, which is the last dimension of Teachers' Attitudes Towards Technology Scale.

Age-Related Findings

ANOVA (Analysis of Variance) from parametric tests was used to compare the average scores of the scale related to age.

Table 5.

Attitude Towards Technology, Findings on Dimension I (Age)

Dimension	Age	n	$\bar{X}$	Ss	F	P
Reflection of Technology Usage to ing Processes	18-25	2	4.6875	.00000	.602	.661
	26-30	10	4.6183	.59374		
	31-35	28	4.6563	.42236		
	36-40	17	4.6627	.35378		
	41 and over	88	4.5373	.45109		

As a result of the analysis of the variance analysis conducted to determine the difference between the sub-dimension scores of the use of technology in education on the teaching processes and the difference between the participant age groups, there was no significant difference between the sub-dimension scores of the reflection of the use of technology in education on the teaching processes and the participant age groups [p=0.661>0.05].

Table 6.

Attitude towards technology, Findings on Dimension II (Age)

Dimension	Age	n	$\bar{X}$	Ss	F	P
Self-improvement in Technology Usage in Education	18-25	2	4.6429	.10102	1.731	.146
	26-30	10	4.3500	.50893		
	31-35	28	4.4107	.51163		
	36-40	17	4.2647	.57464		
	41 and over	88	4.1640	.49465		

As a result of the variance analysis conducted to determine the difference between the self-improvement sub-dimension scores and age groups in the use of technology in education, no significant difference was found [p=0.146>0.05].

Table 7.

Attitude towards Technology, Findings on Dimension III (Age)

Dimension	Age	n	X̄	Ss	F	P
Use of Technology in Education and Classroom Management	18-25	2	4.5556	.47140	2.022	0.95
	26-30	10	4.4444	.67077		
	31-35	28	4.4841	.55532		
	36-40	17	4.2157	.77027		
	41 and over	88	4.1540	.57363		

The use of technology in education and classroom management sub-dimension scores and variance between age groups were analyzed. As a result of the analysis, there was no significant difference between the use of technology in education and classroom management sub-dimension scores and age groups [p=0.95>0.05].

Table 8.

Lifelong Learning Propensity Age-related Findings

Dimension	Age	n	X̄	Ss	F	P
Lifelong Learning	18-25	2	5.0000	.00000	1.237	.298
Propensity	26-30	10	4.1765	1.16531		
	31-35	28	3.5531	1.45551		
	36-40	17	3.5433	1.48092		
	41 and over	88	3.8603	1.10429		

One-way Anova test was performed to look at the participants' lifelong learning tendencies and whether there was a difference between their age groups. As a result of the analysis, there was no statistically significant difference between the participants' lifelong learning propensity scores and age groups [p=0.298>0.05].

Findings on Seniority

ANOVA (Analysis of Variance) from parametric tests was used to compare the scale score averages related to occupational seniority.

Table 9.

Attitude towards Technology, Dimension I Findings on Seniority

Dimension	Seniority	n	X̄	Ss	F	P
Reflection of Technology Usage to Teaching Processes	1-5	14	4.6693	.50606	.814	.519
	6-10	13	4.5000	.39198		
	11-15	23	4.6855	.40839		
	16-20	14	4.6473	.39193		
	21 and over	81	4.5405	.45679		

As a result of the analysis of variance conducted to determine the difference between the scores of the self-improvement sub-dimension and professional seniority in the use of technology in education, no significant difference was found [p=0.519>0.05].

Table 10.

Attitude Towards Technology, Dimension II Findings on Seniority

Dimension	Seniority	n	X̄	Ss	F	P
Self-improvement in Technology Usage in Education	1-5	14	4.4796	.48318	2.059	.089
	6-10	13	4.2802	.58209		
	11-15	23	4.4037	.44898		
	16-20	14	4.2449	.60978		
	21 and over	81	4.1499	.49107		

As a result of the analysis of variance conducted to determine the difference between the self-improvement sub-dimension scores and the occupational seniority groups in the use of technology in education, no significant difference was found [p=0.089>0.05].

Table 11.

Attitude towards Technology, Dimension III Findings on Seniority

Dimension	Seniority	n	X̄	Ss	F	P
Use Of Technology in Education and Classroom Management	1-5	14	4.4762	.58215	1.634	.169
	6-10	13	4.3675	.51197		
	11-15	23	4.3816	.72073		
	16-20	14	4.3413	.71007		
	21 and over	81	4.1399	.56704		

As a result of the analysis of variance conducted to determine the difference between the scores of technology use and classroom management sub-dimension in education and professional seniority groups, no significant difference was found [p=0.169>0.05].

Table 12.

Lifelong Learning Propensity Findings on Seniority

Dimension	Seniority	n	X̄	Ss	F	P
Lifelong learning propensity	1-5	14	4.1020	1.32681	1.901	.114
	6-10	13	3.1584	1.32937		
	11-15	23	3.8107	1.44871		
	16-20	14	3.3235	1.63094		
	21 and over	81	3.9325	1.01226		

As a result of the analysis of variance performed to determine the difference between lifelong learning propensity scores and occupational seniority groups, no significant difference was found [p=0.114>0.05].

The relationship between teachers' attitudes towards technology use and lifelong learning tendencies

Pearson correlation analysis was performed to determine the relationship between teachers' attitudes about technology use and lifelong learning tendencies. The findings are shown in the table.

Table 13.

The Relationship between Attitudes towards Technology Use and Life-Long Learning

	n	Pearson R	p
Reflection of Technology Usage to Teaching Processes	145	-.014	.866
Self-improvement in Technology Usage in Education	145	.002	.979
Use of Technology in Education and Classroom Management	145	-.066	.428

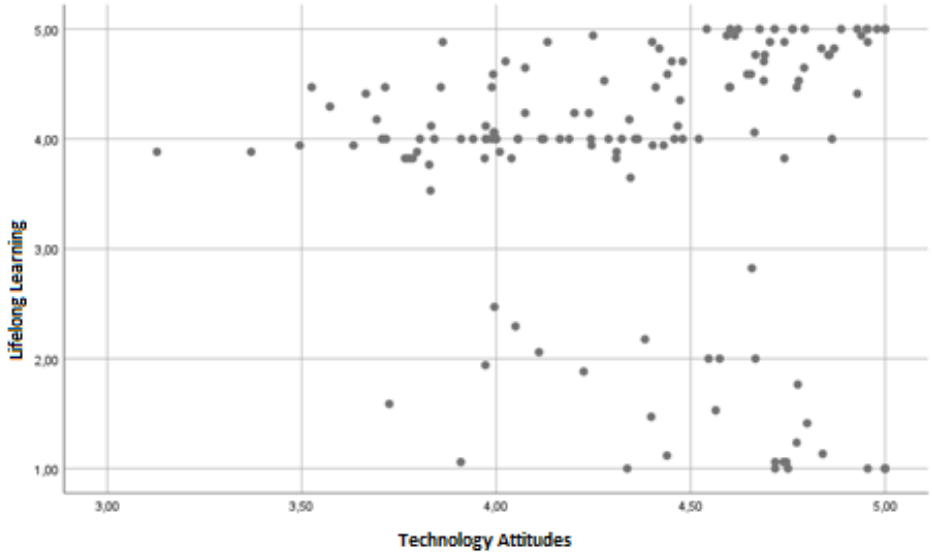
When the relationship between teachers' attitudes towards the use of technology and lifelong learning tendencies is examined, it is seen that there is no significant relationship between the dimension of the reflection of the use of technology in education on teaching processes and lifelong learning tendencies. [r= -0.14, p=0.866 >0.05]

It is seen that there is no significant relationship between the self-development dimension and lifelong learning tendencies in the use of technology in education. [r= 0.002, p=0.979 >0.05]

It is seen that there is no significant relationship between the use of technology in education and the classroom management dimension and lifelong learning tendencies. [r=-066, p=0.428>0.05]

Table 14.

Scatter-Dot Graph of Lifelong Learning Tendencies and Attitudes towards Technology



Scatter-dot graph shows that there is no relationship between two variables.

Conclusion and Discussion

No matter how good the professional skills of teachers are, the use of technology is important for implementation of these skills. At this point, it can be said that the use of technology is a necessity for every teacher. In the past years, student grades, records, attendance, and many other works were carried out with pen and paper, while at the end of the twentieth century, as in most jobs, many tasks were carried out on computer and internet basis. In addition, technological devices, and software such as smart boards, internet, computers are used in the education process. At this point, it is indispensable for teachers to use technology.

The process in which teachers use technology and develop it themselves recalls the concept of lifelong learning. Lifelong learning means that people improve themselves, learn new things, and therefore be in a constant state of updating. When these two concepts are considered, the question of whether there is a relationship between these two concepts occurs. Studies on this subject are very limited. In a study conducted by Özçiftçi and Çakır, (2015) in which the lifelong learning tendencies of teachers and their self-efficacy in educational technology standards were examined, a moderate and positive and significant relationship was found between these two variables. While

educational technology standards self-efficacy and attitudes towards using technology are different concepts, they are basically similar issues that express teachers' use of technology.

In this study, no significant relationship was found between teachers' attitudes about the use of technology and lifelong learning tendencies. As a result of the analysis made in the study, it was concluded that the attitudes towards the use of technology did not show significant differences according to gender, age and seniority, and it was seen that this result coincided with many studies in the literature. Among similar research, Torkzadeh (2002), Türel (2012), Koçak and Gülcü (2013), Yörük (2013), Çınarer, Yurttakal, Ünal and Karaman (2016) did not find it statistically significant according to gender in using educational technologies.

In the study, it was concluded that teachers' attitude towards the use of technology was positive. Similarly, in a study conducted with teacher candidates, Korkmaz (2011) found that teacher candidates' attitudes towards instructional technologies were at a good level. It’s not surprising to see results of research showing teachers incorporating technology into their teaching practices especially during COVID-19 many teachers relied on technology to deliver their lessons remotely. It wouldn’t be wrong to say that technology has the potential to improve the quality of education.

Teachers' technology usage is becoming increasingly common in the classroom. In order to take full advantage of technology hardware and software in schools must be complete and usable and must be periodically updated and renewed. Considering that teachers' use of technology is a necessity, in-service training can be organized for the software that teachers use most. Also when we take into account that teachers will use technology intensively while performing their profession, various courses related to this subject can be included in the curricula of education faculties.

About Authors

First Author: Cavide Demirci is a member of Eskisehir Osmangazi University. She works at the Faculty of Education. She is currently working at the Educational Sciences Department. She gained her doctorate degree at Hacettepe University.

Second Author: Ahmet Güven is an English language teacher. He got his master's degree in Educational Administration, Inspection, Planning, and Economics in 2012. He received his second master's degree in Curriculum and Instruction field at Osmangazi University in 2021. He is currently doing his Ph.D. in the field of Curriculum and Instruction in the same University.

Conflict of Interest

It has been reported by the authors that there is no conflict of interest.

Funding

No funding was received.

Ethical Standards

There is ethics committee approval for this research.

ORCID

Cavide Demirci https://orcid.org/0000-0003-4789-4286

Ahmet Güven https://orcid.org/0000-0001-8156-2096

References

Akkoyunlu, B. (2002). Teachers' use of the Internet and teacher opinions on this issue. *Hacettepe University Journal of Faculty of Education, 22*, 1-8.

Alzahrani, A. I., & Ragab, M. (2021). Teachers' perceptions of the use of technology in teaching and learning: A systematic review. *Education and Information Technologies, 26*(4), 3223-3244. https://doi.org/10.1007/s10639-021-10534-7

Bai, H., & Ertmer, P. A. (2018). Teacher beliefs and technology integration practices: A critical relationship. *Computers & Education, 126*, 1-14. https://doi.org/10.1016/j.compedu.2018.06.012

Büyüköztürk, Ş., Çakmak, E. K., Akgün, Ö. E., Karadeniz, Ş. and Demirel, F. (2012). *Scientific research methods.* Ankara: Pegem.

Çınarer, G., Yurttakal, A.H., Ünal, S. and Karaman, İ. (2016). Examination of teachers' attitudes towards education with technological Tools According to Various Variables the Case of Yozgat Province. *Electrical-Electronics and Computer Symposium* 11-13 May, Tokat.

Diker Coşkun, Y. and Demirel, M., (2012). Lifelong learning tendencies of university students. *Hacettepe University Journal of Faculty of Education, 42*, 108-120.

Gür-Erdoğan, D. ve Arsal, Z. (2016). Lifelong learning propensity scale development study. *Sakarya University Journal of Education, 6*(1), 114-122. http://dx.doi.org/10.19126/suje.32361

Koçak, Ö. and Gülcü, A. (2013). "Teacher Attitudes towards Lcd Panel Interactive Board Applications Used in Fatih Project", *Kastamonu Education Journal, 21*(3), 1221- 1234.

Korkmaz, Ö., & Master, E. (2010). "Teacher Candidates' Perceptions of Computer Competencies and Technology Use and Their Attitudes towards the Teaching Profession", *International Journal of Human Sciences, 7* (1), 1335-1349.

Malhotra, N. K., Dixit, A., and Uslay, C. (2002). Integrating internet technology in marketing research education. *Marketing Education Review, 12*(3), 26-33.

O'reilly, T. (2009). *What is web 2.0.* USA: O'Reilly Media, Inc.

Öztürk, T. (2006). *Evaluation of the competencies of social studies teacher candidates for the use of technology in education (Balıkesir province example)* (Master's thesis). Gazi Üniversitesi Eğitim Bilimleri Enstitüsü, Ankara.

Rogers, L., and Finlayson, H. (2004). Developing successful pedagogy with information and communications technology: How are science teachers meeting the challenge? *Technology, Pedagogy and Education, 13*(3), 287–305.

Şahin, M. C., and Arslan Namli, N. (2019). Examination of teacher candidates' attitudes to use technology in education. *Turkish Journal of Social Research, 23*(1), 95-112.

Torkzadeh, G.T. (2002). Effects of Training on Internet Self-Efficacy and Computer User Attitudes. *Computers in Human Behavior*. *18*(5), 479-494.

Tutkun, Ö. F. (2011). Internet access, use and sharing levels among students during the teaching-learning process. *The Turkish Online Journal of Educational Technology, 10*(3), 152-160.

Türel, Y. K. (2012). "Teachers' negative attitudes towards smart board use: problems and needs", *Primary Education Online, 11*(2), 423-439.