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| Research Article / Araştırma Makalesi |

A Study on the Relationship Between School Principles' Technology Leadership and Life-long Learning Competencies

Okul Müdürlerinin Teknoloji Liderliği Yeterlikleri ile Yaşam Boyu Öğrenme Yeterlikleri Arasindaki İlişkinin İncelenmesi[1]

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Keywords

1. Leadership
2. Technology leadership
3.Life-Long learning
4. Correlational survey method
5. Education management

Anahtar Kelimeler

1.Liderlik
2.Teknolojik liderlik
3.Yaşam boyu öğrenme
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Abstract

Purpose: The aim of this study is to examine the relationships between technology leadership competencies and lifelong learning competencies of school principals and to reveal whether technology leadership and life-long learning competencies predict each other.

Design/Methodology/Approach: The research was designed according to the correlational survey method, as one of the quantitative research methods. The sample of the study is from 150 school principals of primary, middle, and high schools, that are public and private schools affiliated to Beykoz, Kadıköy, Üsküdar District Directorate of National Education in the 2017-2018 academic year. The data of the research were collected with the Technology Leadership Competence Scale, the Life-long Learning Competence Scale and the Personal Information Form. The data were analyzed by correlation and regression analyses.

Findings: As a result of the research; we found that technology leadership and life-long learning competency levels affect each other. Among the sub-dimensions of technology leadership, we found that only the dimension of excellence in professional development significantly predicted life-long learning competence. It is seen that life-long learning competence affects the level of technology leadership. However, it was found that none of the life-long learning competency dimensions significantly predicted technology leadership competency.

Highlights: In today's rapidly changing conditions, technology leadership is considered to be important. In this respect, the fact that life-long learning competence and technology leadership competence predict each other leads to the conclusion that steps should be taken to increase the competencies of administrators in this field in order to integrate the rapid changes brought by the digital age into education and training.

Öz

Çalışmanın amacı: Bu araştırmanın amacı okul müdürlerinin teknoloji liderliği yeterlikleri ile yaşam boyu öğrenme yeterlikleri arasındaki ilişkilerin incelenerek teknoloji liderliği ve yaşam boyu öğrenme yeterlikleri düzeylerinin birbirini yordayıp yordamadığını ortaya koymaktır.

Materyal ve Yöntem: Araştırma nicel araştırma yöntemlerinden ilişkisel tarama yöntemine göre desenlenmiştir. Çalışmanın örneklemini 2017-2018 eğitim-öğretim yılında Beykoz, Kadıköy, Üsküdar İlçe Milli Eğitim Müdürlüğüne bağlı resmi ve özel; ilkokul, ortaokul ve lise 150 okul müdürü oluşturmaktadır. Araştırmanın verileri Teknoloji Liderliği Yeterliği Ölçeği, Yaşam Boyu Öğrenme Yeterliği Ölçeği ve Kişisel Bilgi Formu ile toplanmıştır. Veriler korelâsyon ve regresyon analizleri ile çözümlenmiştir.

Bulgular: *Araştırma sonucunda; teknoloji liderliği ve yaşam boyu öğrenme yeterliği düzeylerinin birbirini etkilediği belirlenmiştir. Teknoloji liderliği alt boyutlarından sadece mesleki gelişimde mükemmellik boyutunun yaşam boyu öğrenme yeterliğini anlamlı şekilde yordadığı belirlenmiştir. Yaşam boyu öğrenme yeterliğinin teknoloji liderliği düzeyini etkilediği görülmektedir. Ancak yaşam boyu öğrenme yeterliği boyutlarından hiçbirinin teknoloji liderliği yeterliğini anlamlı şekilde yordamadığı tespit edilmiştir.*

Önemli Vurgular: Günümüzün hızla değişen koşullarında teknoloji liderliğinin önemli olduğu düşünülmektedir. Bu açıdan yaşam boyu öğrenme yeterliği ile teknoloji liderliği yeterliğinin birbirini yorduyor olması dijital çağın getirdiği hızlı değişimlerin eğitim ve öğretime entegrasyonu için yöneticilerin bu alandaki yeterliliklerini artırmaya yönelik adımların atılması gerektiği sonucuna ulaştırmaktadır.

[1] This study was produced from the master's thesis titled "Examination of the Relationship Between Technology Leadership Competencies of School Principals and Life-Long Learning Competencies" completed in 2017 under the supervision of Assoc. Prof. Yusuf Alpaydın, within the scope of Istanbul Sabahattin Zaim University and Marmara University Joint Education Management Master's Program.

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INTRODUCTION

Today, the rapid development of science and technology forces educational institutions to change and develop. This situation has made it compulsory for education administrators to carry out change and innovation studies at school (Ağaoğlu, Altınkurt, Yılmaz, & Karaköse, 2012). The rapid development of technology has forced the school administrators to have some qualifications and equipment in all areas of education, with the influence of the learning culture that encourages the skills that require innovation, creativity, and innovation collaborations brought by the digital age. This has led to an increase in the effects on education and expectations from the school. As an effective teaching leader with a vision, school administrators take an active role in all processes related to education and training, act as a role model to teachers, students and employees in their institutions, and ensure the integration of technology into education in order to achieve academic and administrative goals. It is necessary to create technology-equipped learning centers and to use technology adequately and creatively (Sincar & Aslan, 2011, p.574).

While the importance of technology use in education increases with the schooling of the Z generation (Cilliers, 2017; Somyürek, 2014), it is seen that teachers and school principals have difficulties in using technology in schools (Çalık, Çoban, & Özdemir, 2019; Hero, 2020). With the pandemic conditions, education in schools has continued as online learning, blended learning or distance learning, resulting in the globalization of education (Harris, 2020). In this sense, it can be said that the use of technology has become even more important in schools. Especially in the period when face-to-face education was suspended due to the COVID-19 global epidemic, it is a question mark what kind of leadership school principals exhibit (Harris, 2020). In this period, when school administrators manage their schools through computers, it is important to clarify what behaviors the school principal should exhibit at the point of eliminating the difficulties.

Within the scope of the programs prepared by the schools during the pandemic period, the teachers also continued their lessons live through distance education through EBA. This situation has revealed how important the competence of teachers and school principals in the use of technology is in the 21st century, which is characterized as the age of information and technology. The preparation of the curriculum for the distance education process, the inclusion of teachers and students in the process, and the coordination of teaching were carried out under the leadership of school principals (Turan, 2020).

Technology leadership arising from the effective use of technology in rapidly developing technology and educational organizations is getting more important day by day (Yahşi, 2020). Technology leadership is a critical element of today's educational leadership, which is one of the most important factors for the successful integration of technology into the education system (Grey-Bowen, 2010). Banoğlu (2011) emphasizes that technology leadership is one of the basic leadership characteristics that education administrators should have in the 21st century. The technology leader is the person who carries out all the managerial activities necessary for the efficient use of technology (Tanzer, 2004). Technology leadership is the relationship between leadership and technology, where managers play a more active role in applying technology and try to bring people and information technology components together (Hamzah, Nordin, Jusoff, Karim, & Yusof, 2010).

Today's understanding of education requires school principals to train themselves not only as educational leaders, but also as technology leaders who use new information technologies and applications (Beytekin, 2014). School principals have one of the biggest responsibilities in the integration of technological developments into learning environments (Çalık et al., 2019). Considering how complex schools are as learning organizations, school administrators should have the necessary technological knowledge and lead the efficient and effective use of technology in educational institutions (Afshari et al., 2009).

The school principal should be technologically literate about information technologies, so that school personnel can also make good use of technology in education, create a teaching environment that facilitates students' motivation to learn, and achieve the goal of an effective school (Yahşi, 2020). Managers have the chance to provide better management while improving their institutions by making use of information and communication technology resources (ISTE, 2009). Effective use of technology in schools can provide support for the creation of a common vision and effective school goals (Edgerson & Kritsonis, 2006). Principals can play a key role in integrating teacher skills and existing technology, as the school administrator's technology leadership influences teachers' technological skills and their integration into the curriculum (Chang, 2012). Information technologies provides opportunities for effective and efficient decision-making in planning, budgeting and determining the development of the school to administrators (MEB, 2007).

The standards that school administrators at all levels should have regarding technology leadership are known as NETS-A (National Educational Technology Standards for Administrators) developed by ISTE (International Society for Technology in Education). These standards, which were first determined in 2002 and then republished in 2009, examine the technology leadership characteristics of school administrators and are grouped under 5 headings: 1. Visionary Leadership 2. Digital-Age Learning Culture, 3. Excellence in Professional Development 4. Systemic Improvement 5. Digital Citizenship.

Visionary leadership inspires and leads education administrators to develop and implement a common vision that supports excellence and transformation to enable technology integration into the teaching environment. Digital age learning culture enables education administrators to create and maintain a dynamic learning culture that delivers in-depth and engaging education for all students in the digital age. Excellence in professional development allows education managers support a professional learning and innovation-driven environment that empowers educators to improve student learning by integrating modern technology and digital resources. Systemic improvement refers to the fact that educational leaders are responsible for the efficient use of information and technology resources. It provides leadership and management in the digital age for the continuity of the

organization's development. Digital Citizenship is an understanding of the social, ethical, legal issues and responsibilities that foster a digital culture (Guven, 2015).

In the literature, many studies have been conducted on school administrators' technology leadership (Can, 2003; Bostancı, 2010; Hacıfazlıoğlu, Karadeniz, & Dalgıç, 2010; Küçükali & Ada, 2014; Irmak, 2015; Cantürk & Aksu, 2017), and technology leadership competence (Anderson & Dexter, 2005; Ergişi, 2005; Yu and Durrington, 2006; Banoğlu, 2011; Bülbül and Çuhadar, 2012; Can, 2003, 2008; Eren-Şişman, 2010; Sezer, 2011).

Developments in information and communication technologies, which rapidly change the way of living, learning and working, also cause changes in lifestyles and make it necessary to constantly acquire new knowledge and skills. However, the unique conditions of the information age necessitate the training of individuals who can think critically and have the ability to develop different approaches to problem-solving. This situation highlights the need for a life-long education. (Dağ, 2016). In today's information society, an educated person is defined as an individual who can follow the developments and changes related to himself and apply them to life, question, be open to development, and actively use information and communication technologies (MEB, 2009). In this context, development and adaptation to change are not only possible with the information learned in schools at all educational levels, and the individual needs to constantly renew and develop himself. In this context, one of the most important issues in the world and in Turkey in recent years is life-long learning. Continuous developments in the technological field significantly affect the up-to-dateness of our information. New knowledge and practices are rapidly replacing existing knowledge and practices. The way to keep up with change is through life-long learning.

The concept of life-long learning emerged in order to keep up with the rapidly developing and changing social and cultural life in line with the needs of the age, and has become an important indicator in terms of education level and employment conditions in developed and developing countries (HBÖSB, 2014-2018, p. 9) With an individual, societal, social and economic approach, life-long learning can be defined as all kinds of learning activities that individuals participate throughout their lives in order to improve his/her knowledge, skills, interests and competences (MEB, 2009).

With the widespread use of technological tools, it can be said that the use of all these technological tools has an encouraging role in life-long learning of people (Şentürk et al., 2011, p.66). Adaptation to technological development and change requires continuity in terms of society. It can be recommended that people attend in-service training, courses and seminars when necessary for ensuring continuity and individual development (HBÖSB, 2014-2018, p. 14).

The use of information technologies has become widespread in all education levels, especially with the pandemic process. Especially in adult education, these technologies provide opportunities such as expanding access opportunities, improving interaction, increasing the quality of learning, encouraging the use of learning opportunities, diversifying opportunities to acquire new knowledge and skills, and offering equal opportunities.

It is important to be aware of the opportunities and challenges created by digital technologies in order for each individual to benefit from information technologies in the information society and, this increases the importance of the concept of lifelong learning (Yildiz Durak & Tekin, 2020). In addition, considering the new approaches and methods applied in learning-teaching environments due to the technological developments in the 21st century, it can be said that teachers need to constantly improve their technology literacy skills and therefore they should have life-long learning (LLL) skills (Selvi, 2011).

Hylén (2015) stated that there are basically three reasons for the increasing use of information technologies in the context of lifelong learning. The first reason is that information technology has the capacity to improve learning. The second reason is that information technologies have the potential to expand access to learning opportunities. The last reason is that when using information technologies in the context of lifelong learning, these technologies also provide an opportunity for individuals to acquire digital skills that are necessary and very important for living and working in today's society (Gökkaya, 2014).

Gümüş (2016), on the other hand, emphasized the role of digital technologies in life-long learning in terms of open and distance learning, eliminating the difficulties and limited opportunities in reaching formal education for adults, flexible structure (in terms of time and space), and new career opportunities and diversity.

With change today, the best way to fulfill the inevitable obligations of being an information society is to increase life-long learning and technology leadership competencies. In particular, that our school administrators maintain lifelong learning as the educational dynamics of societies, have the equipment and technology competencies required by the age, and channel the education personnel in the light of these developments, reveals the importance of life-long learning in terms of providing the necessary revision in the society. In this respect, the research is considered important as it includes technology leadership in terms of preparing educational environments for educational leaders and involving education stakeholders in this process, and lifelong learning, which envisages the renewal of information in a dynamic process.

In this respect, it is thought that school principals' lifelong learning competencies are related to technology leadership competencies and may be predictors of each other at a significant level. In the literature review on technology leadership and life-long learning, it was found that there are studies in which different variables are examined. However, no study was found in which school principals were examined together with technology leadership and life-long learning. Therefore, we aim to reveal whether technology leadership explains the dimensions of life-long learning, and to contribute to the literature with original results.

The purpose of this research is to explain whether the technology leadership and life-long learning competencies of school

principals are significant predictors of each other. For this purpose, answers to the following sub-problems will be sought:

1. Is there a significant relationship between the technology leadership competencies of school principals and their life-long learning competencies?

2. Is technology leadership competence of school principals a significant predictor of lifelong learning competencies?

3. Is school principals' life-long learning competence a significant predictor of technology leadership competencies?

METHOD/MATERIALS

The Model of The Study

The purpose of this study is to examine the level of the relationship between school principals' technology leadership competencies and lifelong learning competencies. Relational survey model was used in the research and relational survey models are research models in which two or more than two variables change together and/or the degree of change is tried to be determined (Karasar, 2016). Relational survey model is used in determining the relationships between variables, in studies that try to determine the extent of these relationships and in cases where it is not clear which variable affects which variable (Büyüköztürk et.al., 2013; Karakaya, 2012). In this study, the relationships between school principals' technology leadership competencies and lifelong learning competencies were examined. Relational studies are also designed to obtain data on the cause and effect of the relationship between two or more variables (Büyüköztürk et.al., 2013). In this context, in this study, it was tried to reveal the cause-and-effect relationship between the technology leadership competencies and lifelong learning competencies of the school principals participating in the research. In this study, relational survey model was used and the independent variables of the research were determined as technology leadership and the dependent variable of the research was determined as lifelong learning competencies.

The Universe and The Sample

The universe of the research consists of 390 school principals in public and private primary, secondary and high school institutions affiliated to Beykoz, Kadıköy and Üsküdar District Directorates of National Education. The sample of the study was determined by non-probability convenience sampling method. Convenience sampling, which is one of the non-probability sample types, is also known as the appropriate sample and is based on the principle of collecting data from the easiest and most accessible participants until the required size sample is reached (Gürbüz & Şahin, 2017). The sample number for the population was found to be 121 at the 90% confidence level with the sample calculation formula used for quantitative variable studies. The sample size used in the study adequately represents the population at the 90% confidence level. Considering the size of the determined districts and the difficulties of resources and time for reaching 390 school principals, a sample size of 150 was reached in this study.

Of the school principals constituting the sample, 100 (66.7%) were male, 50 (33.3%) were female; 112 (74.7%) of them have undergraduate education, 38 (21.3%) of them have postgraduate education. 33 (22%) of the school principals participating in the research are in the age range of 25-34 years, 69 of them (46%) 35-44 years, and 48 of them are (32%) 45 and over. Of the school principals included in the study, 32 (21.3%) had 1-10 years, 85 (56.7%) 11-20 years, 33 (22%) had 21 or more years of professional seniority. In terms of managerial experience, 40 (26.7%) of the participants had 1-2 years; 58 (38.7%) had 3-4 years; 52 of them (34.7%) had 5 years or more managerial experience. Of the school principals in the study, 56 (37.3%) work in primary school, 43 (28.7%) in secondary school, and 51 (34%) in high school. Of the teachers, 37 (24.7%) are classroom teachers, 56 (38.7%) are science and social teachers, 55 (36.7%) are teachers of other branches.

Data Collection Instruments

"Technology Leadership Competence Scale" and "Life-Long Learning Competence Scale" were applied in the 2017-2018 academic year after obtaining the necessary permission from the Istanbul Provincial Ministry of National Education and the developers of the scales for data collection. Research data were collected on a voluntary basis by going to schools within the framework of a predetermined program. Informed consent was obtained from the individuals before participating in the study. In addition, the confidentiality principle was taken into account during the data collection process and the participants were informed about this issue.

Analysis of the research results was carried out with the SPSS program. The assumption of normality in the study was determined by taking into account the skewness and kurtosis values. It is accepted that the normality assumption is valid in studies where skewness and kurtosis values are ±1.50 (Tabachnick & Fidel, 2013). While the skewness and kurtosis values of the technology leadership sub-dimensions were -.099 and -.222, the skewness and kurtosis values of the lifelong learning subdimensions were -.164 and -.209.

Correlation analysis was used to investigate the relationships between the variables, and simple and multiple regression analyses were used to determine the predictive level of the variables. Regression analysis is used to determine how the independent variables explain the dependent variables (Büyüköztürk, 2018). Before the data analysis, the data were examined for outliers to determine whether they were suitable for multiple linear regression analysis. Mahalanobis distance was calculated to determine the outlier values. Mahalanobis distance is used to determine how far a variable is from the mean and center of other variables. In this way, outlier values can be detected (Esen and Timor, 2019). In this framework, 8 data points, which were determined to be

extreme values in the study, were excluded from the data and the study was continued with the data obtained from 150 participants. In order to determine whether the multiple linear regression analysis has a multicollinearity issue, VIF and Tolerance values were examined. It was determined that there was no correlation value above .80, which can be defined as multicollinearity (Table 3), tolerance values were higher than .20, VIF values were less than 10 and, CI values were less than 30. The Durbin-Watson value was checked to examine the condition of the errors being independent. It was found that the value is between 1-3 (DW=1.78) and does not pose a problem. It was shown that the data obtained depending on the examinations were suitable for multiple linear regression analysis. The data obtained in the study were analyzed with the multiple linear regression analysis method. The significance level of .05 was used in the study (Akbulut, 2010; Büyüköztürk, 2011).

FINDINGS

In the findings part of the research; firstly, the arithmetic mean and standard deviation values of the research group's technology leadership and lifelong learning proficiency scores, then the simple correlation analysis coefficients for the variables, and finally the multiple linear regression analysis results for predicting each other of technology leadership and lifelong learning competencies are given.

The arithmetic mean and standard deviation values of the research group's technology leadership proficiency level scores are given in Table 1.

Table 1. The Arithmetic Mean and Standard Deviation Values of the Scores of School Principals from the Technology Leadership Competencies Scale and its Sub-Dimensions

Dimension	N	$\overline{X}$	Ss
Visionary leadership	150	3,93	8,527
Digital age learning culture	150	4,09	2,218
Excellence in professional development	150	4,02	5,401
Systemic improvement	150	3,85	2,396
Digital citizenship	150	4,09	4,731
Total Scale	150	3,99	21,018

The technology leadership proficiency average of the sample participating in the research was found as 3.99. While the dimension with the highest average among the dimensions of technology leadership was digital age learning culture and digital citizenship, it was seen that the dimension with the lowest average was the dimension of systemic improvement. The arithmetic mean and standard deviation values of the research group's life-long learning proficiency level scores are given in Table 2.

Table 2. The Arithmetic Mean and Standard Deviation Values of School Principals' Scores from the Life-Long Learning Competencies Scale and its Sub-Dimensions

Dimension	N	$\overline{X}$	Ss
Self-Management Competencies	150	4,12	7,755
Learning to Learn Competencies	150	4,10	7,237
Initiative and Entrepreneurship Competencies	150	4,16	5,779
Obtaining Information Competencies	150	4,32	3,926
Digital Competencies	150	4,30	4,263
Decision-Making Competencies	150	4,07	2,842

The average of life-long learning competencies of the participants participating in the research was found as 4.16. Among the life-long learning dimensions, the highest average was of information obtaining and digital competencies, while the lowest average dimension was seen to be the decision-making competence dimension.

Table 3. The Results of The Correlation Analysis Between Life-Long Learning and Technology Leadership Competencies of School Principals

		Technology Leadership Competence
Life-Long Learning	r	,539**
	p	,000
	n	150

**P<.01

As seen in Table 3, it was found that there is a significant positive relationship between life-long learning and technology leadership competence. Based on this finding, it can be said that as life-long learning competence increases, technology leadership

competence also increases. In addition, when Table 3 is examined, it can be defined as multicollinearity among the predictive variables. It was also observed that there was no correlation value above 80.

Table 4 presents the results of the simple regression analysis performed to understand whether the level of technology leadership competence has an effect on the general level of life-long learning competence.

Table 4. The Effect of Technology Leadership on Life-Long Learning Competencies

Variables	B	Std. Error	(β)	R^2	t	p
Constant	2,356	,236			9,986	,000*
Technology Leadership	,454	,058	,539	,290	7,784	,000*

When Table 4 is examined, it is seen that the level of technology leadership significantly predicts the level of life-long learning competence (p<.05). Technology leadership explains 29% of life-long learning proficiency level (R2= .290).

The results of the multiple regression analyses conducted to determine to what extent the sub-dimensions of the technology leadership scale predict lifelong learning are presented in Table 5.

Table 5. Results of Multiple Regression Analyses Between Life-Long Learning and Technology Leadership Competencies of School Principals

Variables	B	Std. Error	(β)	t	p
Constant	116,025	12,160		9,542	,000
Visionary Leadership	,169	,431	,051	,393	,695
Digital Age Learning Culture	1,457	1,552	,114	,939	,349
Excellence in Professional Development	1,575	,776	,301	2,028	,044*
Systemic Improvement,	-1,170	1,464	-,099	-,799	,426
Digital Citizenship	1,370	,760	,229	1,802	,074

*p<0,05

As seen in Table 5, when the results of the multiple regression analysis regarding the predictive value of visionary leadership, digital age learning culture, excellence in professional development, systemic improvement, and digital citizenship on of life-long learning in technology leadership is examined, it was concluded that only the excellence in professional development dimension had a significant effect on lifelong learning (p<.05).

The results of the simple regression analysis performed to understand whether the level of life-long learning competencies have an effect on the level of technology leadership are given in Table 6.

Table 6. The Effect of Lifelong Learning Competencies on Technology Leadership

Variables	B	Std. Error	(β)	R^2	t	p
Constant	1,323	,345			3,833	,000
Life-Long Learning	,639	,082	,539	,290	7,784	,000*

*p<0,05

When Table 6 is examined, it is seen that the level of life-long learning competence significantly predicts the level of technology leadership (p<.05). Life-long learning explains 29% of the technology leadership competence level (R2= .290).

The results of multiple regression analyze conducted to determine to what extent life-long learning sub-dimensions predict technology leadership are presented in Table 7.

Table 7. Results of The Multiple Regression Analyzes Between Life-Long Learning and Technology Leadership Competencies of School Principals

Variables	B	Std. Error	(β)	t	p
Constant	42,262	11,295		3,742	,000
Self-Management Competencies	-,202	,405	-,074	-,499	,619
Learning to Learn Competencies	,561	,453	,193	1,238	,218
Initiative and Entrenepreneurship Competencies	,682	,623	,187	1,095	,275
Obtaining Information Competencies	,298	,683	,056	,436	,664

Variables	B	Std. Error	(β)	t	p
Digital Competencies	,797	,538	,162	1,483	,140

When the results of the multiple regression analysis regarding the prediction of the dependent variable technology leadership by the independent variables life-long learning competencies and its sub-dimensions was examined, no significant effect was found in any sub-dimension.

DISCUSSION

In this study, it was revealed whether there is a relationship between technology leadership and life-long learning, and whether technology leadership and life-long learning levels predict each other significantly. The findings were discussed within the scope of the literature.

The average life-long learning competencies of the participants in the study were found to be 4.16 (strong). When this result is compared with the results in the literature, it is seen that there are similarities and differences. In the research carried out to determine the life-long learning tendencies of teachers within the scope of related studies (Özçiftçi, 2014; Kılıç & Ayvaz Tuncel, 2014; Ayra, 2015; Dündar, 2016), it was concluded that teachers' lifelong learning tendencies are high. Contrary to this study; Tunca, Şahin Alkın, and Aydın (2015) found the life-long learning levels of teacher candidates to be low.

The technology leadership proficiency average of the participants in the study was found as 3.99 (strong). When similar studies are examined in the literature, it is seen that there are studies supporting that school administrators' technology leadership self-efficacy is high (Doğan, 2018; Bülbül & Çuhadar, 2012; Banoğlu, 2011; Sincar & Aslan, 2011; Eren & Şişman, 2010, Ergişi, 2005). The study by Song, Liang, Liu, and Walss (2005) differs from the results of our research.

In the study, it was seen that the dimension with the lowest average among the dimensions of technology leadership competencies was the dimension of systematic development. Unlike the results of the research, in a metaphorical study on the technological leadership of school administrators (Hacıfazlıoğlu, Karadeniz, & Dalgıç, 2011), the metaphors produced by school administrators were divided into 5 conceptual categories, and systemic improvement took place in the 2nd category with the highest level. The trainings and studies that school administrators will participate in for systematic development are very important. School administrators can be a model for the use of technology in schools, and can encourage teachers to integrate technology into teaching and learning processes.

As a result of the research, it was found that there is a positive and significant relationship between technology leadership and life-long learning competencies. As life-long learning competence increases, technology leadership competence also increases. This finding is similar to the study conducted by Kabataş and Karaoğlan Yılmaz (2018). Kabataş and Karaoğlan Yılmaz (2018) found that there is a positive relationship between teachers' life-long learning and their self-efficacy towards educational technology standards. The fact that there is a positive relationship between life-long learning and technology leadership in the study suggests that technology leadership is necessary to keep up with the times in today's changing conditions. In this respect, it reveals the conclusion that steps should be taken to increase the technology competencies of managers. It is thought that technology leadership characteristics can be improved with in-service trainings to be given to school administrators. Şişman-Eren (2010) stated that technology leadership behaviors of principals differ with the training they receive. According to Yahşi (2020), as a result of examining the technology leadership self-efficacy of school principals according to the variable of receiving education in the field of IT, there is a significant difference in favor of managers who have received IT education in all of the total scores and sub-scores. This finding can be interpreted as IT in-service programs are effective in helping school administrators develop their technology leadership self-efficacy. In addition, it can be said that in-service training in the field of IT is beneficial in terms of using new programs and developing innovative approaches. School management also needs to improve themselves and they need to participate in in-service training activities together with other teachers.

CONCLUSION AND RECOMMENDATIONS

As a result of this study, it was seen that technology leadership and life-long learning variables were significant predictors of each other. While technology leadership explains 29% of life-long learning competence level, life-long learning explains 29% of technology leadership competence level.

There is a positive relationship between life-long learning and technology leadership. When the results of multiple regression analysis regarding whether the predictive variables of Visionary Leadership in Technology Leadership, Digital Age Learning Culture Excellence in Professional Development, Systemic Improvement, and Digital Citizenship predict lifelong learning, which is the dependent variable, it was concluded that there was a significant relationship ($R= .569$, $R2= .324$, $p<.01$). According to the standardized regression coefficient (β), the relative importance of the predictor variables on life-long learning is as the following: Excellence in professional development, Digital Age Learning Culture, Digital citizenship, Visionary Leadership, and Systemic Improvement. When the t-test results regarding the significance of the regression coefficients were examined, it was seen that the excellence in professional development sub-dimension was an important (significant) predictor, while the other sub-dimensions did not have a significant relationship. Unlike the results of the research, Görgülü and Küçükali (2018) determined that teachers have the lowest self-efficacy in professional development. It can be interpreted that the school principal explains the importance of lifelong learning by including technology trainings within the school for the integration of technology, which is one

of the elements of the excellence sub-dimension in professional development, with education and training, as well as in-service trainings that will enable teachers to learn by doing and experiencing for the necessary adaptation to the rapidly developing technology.

When the results of the multiple regression analysis regarding the prediction of technology leadership, which is the dependent variable, by the independent variables of "Self-Management Competencies, Learning to Learn Competencies, Initiative and Entrepreneurship Competencies, Information Obtaining Competencies, Digital Competencies and Decision Making Competencies", which are the subdimensions of life-long learning, it was concluded that there was a significant relationship ($R= .554$, $R^2= .307$, $p<.01$). According to the standardized regression coefficient (β), the relative importance of the predictor variables on lifelong learning is as the following: digital competencies, decision-making competencies, initiative and entrepreneurship, learning to learn competencies, self-management competencies, and knowledge management competencies. Similar to the results of the research, it is seen that digital competencies are at the forefront in studies on technology leadership of school administrators (Durnalı, 2019; Eren & Kurt ,2011; Hsiang & Tang, 2014). Related studies show that school administrators are conscious of the use of technology leadership strategies and that these administrators generally have a high level of effectiveness in school management. Similar to the results of the research, Gulpan and Baja (2020) found that school principals also benefit from technology in the decision-making and policy-making process in their study. Considering the fact that the entire communication network between national education and school is made through the internet and computer in school management, and also considering the distance education during the pandemic process, this explains the reason why digital competencies are at the forefront of life-long learning, .

The use of information technologies has become widespread in all education levels, especially with the pandemic process. School administrators should be able to monitor the rapid changes that occur in educational environments, adopt technology, and have the ability to manage the process, especially in the process of increasingly widespread distance education (Nworie, 2012). A good technology leader will make a big difference in integrating technology into schools, so school administrators, as technology leaders, should support technology integration in school management and its use in the classroom, and help staff acquire the necessary competencies.

In order for the necessary technological hardware and software for educational environments to be selected correctly, school administrators should determine the requirements and make vision analyses. It should consider the needs of the users, cooperate with the internal and external stakeholders of the school and involve them in the decision process.

School administrators should exhibit their leadership roles more in order to use technology more effectively in educational environments. School administrators should use more tools such as school website, e-mail, social media etc. for a more effective communication process independent of time and environment in the communication and cooperation process with teachers, students and parents.

The fact that there is a positive relationship between the technological leadership competencies of school principals and their lifelong learning, is considered important in terms of creating new horizons for schools and educators by increasing the technology leadership competencies of school leaders, in order not to fall behind the rapidly changing technological changes in the world.

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Examples of author contribution statements

Author 1 developed the plan and theory of the research under the mentorship of author 2. Author 3 assisted with data collection and analysis. The author 2 made editing and correction studies at every stage of the research. Author 1 and author 3 jointly undertook the writing of the conclusion and discussion.

Researchers' contribution rate

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

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