The Technology Leadership Competencies of Elementary and Secondary School Directors

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Abstract:

The aim of this study was to investigate the elementary and secondary school directors' technology leadership competencies in relation to some demographic features such as age, length of service and the state of whether taking in-service technology training. The universe of the current study employing descriptive survey model was comprised of 129 school directors working at 76 elementary and secondary schools in Menteşe district of the city of Muğla in 2013-2014 academic year. The sampling of the study consisted of 74 randomly selected school directors. As the data collection instrument, "The Scale of Educational Directors' Technology Leadership Competencies" developed by Banoğlu (2012) was used. This scale has five dimensions that are visionary leadership, digital age learning culture, perfectionism in professional practice, digital citizenship and systematic development. Within the context of the current study, the correlations between the directors' technology leadership competencies and gender, age, length of service and the state of whether taking in-service technology training were analyzed through t-test and One Way ANOVA. The findings of the analyses revealed that the dimension viewed to be the most important by the directors is systematic development. Moreover, a significant correlation was found between age and perfectionism in professional practice and between the state of whether taking in-service technology training and technology leadership, visionary leadership and digital citizenship.

Keywords: *Technology, Leadership, Director, Elementary Education, Secondary Education.*

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Introduction

Technological developments experienced in this information age affect educational systems and accordingly teaching and learning process. As a result of changes occurring in the field of technology, school directors' managerial support for the acquisition of educational technologies by schools, updating the existing technologies, the recruitment of specialized personnel, the use of new tools and equipments by teachers and the training of teachers (Brooks-Young, 2002; Eryaman, 2006, 2007; Tan, 2010). Therefore, schools need to be managed in a technology-friendly manner and should have a good technological infrastructure. In order establish such a good infrastructure, school directors need to lead their schools in this direction (Akbaba and Altun, 2002; Brooks-Young, 2002; Akbaba-Altun and Gürer, 2008; Can, 2008; Hacıfazlıoğlu, Karadeniz and Dalgıç, 2010; Sincar, 2010; Bülbül and Çuhadar, 2012). As a new type of leadership for school directors, technology leadership is defined by Tanzer (2004) as "*the person who takes the initiative in the effective and efficient use of technology in the organization, influences, directs and manages the organization in this direction"* (cited. Akbaba-Altun, 2008). Technology leadership in education is an integrated process involving the motivation of the associates at school for learning, utilization and integration of technology into the environments they are working (Hacıfazlıoğlu et al., 2011a; Hayytov, 2013). In this connection, technology leadership of educational directors is of great importance in terms of the execution of the education system planned within the school, the effective and efficient use of technology during education, instructional and evaluation activities, the encouragement of the personnel working for the integration of technology into system and the provision of continuity in this encouragement (Can, 2008). Therefore, school directors as technology leaders have to take responsibility for the effective use of information and communication technologies in school management and in the class, acquire the required competencies to do so and improve their competencies (Hacıfazlıoğlu et al., 2011a; Bülbül and Çuhadar, 2012).

There are some roles to be undertaken by school directors as technology leaders. These roles are summarized in the literature (Akbaba-Altun, 2002; 2008; Anderson and Dexter, 2005; Can, 2008; Chang, Chin and Mei Hsu, 2008; Görgülü et al., 2013; Hacıfazlıoğlu et al., 2011a; Kozloski, 2006; Sincar, 2009; Turan, 2002; Yu and Durrington, 2006) to be related to the following: Technology-orientation, instructional program, infrastructure, facilitation, planning, communication, personal development, supervision, ethics, safety, technology budget, public relations, change and technology policy.

The competencies to be possessed by school directors for technology leadership have been determined by various organizations within the context of "educational technologies standards". ISTE (International Society for Technology in Education) whose headquarter is located in the USA adopted NETS-A (National Educational Technology Standards for Administrators). These standards define information and competencies needed by school directors from every level of schooling to be effective leaders in the application of technology (Şişman-Eren and Kurt, 2011). ISTE first issued NETS- A in 2002 and revised them in 2009. Technology leadership standards of ISTE were subsumed under six headings in 2002 and then they were revised in 2009 and reduced into five dimensions as visionary leadership, digital age learning culture, perfectionism in professional practice, digital citizenship and systematic development (Orhan et al., 2014; Yu and Durrington, 2006). According to these standards, the

characteristics to be possessed by the technology leader are explained as follows: (Hacıfazlıoğlu et al., 2010):

1. Visionary Leadership: Educational directors inspire and lead people to develop and implement a shared vision to realize a comprehensive technological integration across the organization and support perfectionism and transformation.

2. Digital Age Learning Culture: Educational directors create, support and maintain a digital age learning culture offering suitable and attractive education for all students.

3. Perfectionism in Professional Practice: Educational directors try to strengthen professional development and innovation activities to enhance student learning by means of the integration of contemporary technologies and digital resources.

4. Systematic Development: Educational directors offer the leadership and management of digital age for the continuous development by making effective use of information and communications resources.

5. Digital Citizenship: Educational directors design a conception of related social, ethical, legal and responsibilities conducive to the development of digital culture.

These standards developed by ISTE in America gave inspiration to other countries to develop their own standards and many attempts have been made in this direction (Bülbül and Çuhadar, 2012; Görgülü et al., 2013). When the literature of the recent years is examined, it is seen that there is an increase in the number of studies aiming to determine the technological competencies of school directors (Anderson and Dexter, 2005; Duncan, 2011; Grey-Bowen, 2010; Kozloski, 2007; Macualay, 2009; Wang, 2010; Puckett, 2014; Weng and Tang; 2014; Ismail et al., 2015). There is some research directed to determine the technology leadership competencies of school directors on the basis of NETS-A standards (Tanzer, 2004; Akbaba-Altun and Gürer, 2008; Can, 2008; Şişman-Eren, 2010; Hacıfazlıoğlu et al., 2010, 2011a, 2011b; Banoğlu, 2011; Eren and Kurt, 2011; Banoğlu, 2012; Bülbül and Çuhadar, 2012; Çakır, 2012; Görgülü et al., 2013; Hayytov, 2013; Orhan et al., 2014). In this line, the purpose of the current study is to determine the technology leadership competencies of elementary and secondary school directors.

For this purpose, the main problem of the current study is to determine the technology leadership competencies of elementary and secondary school directors. Thus, the current study sought answers to the following questions:

1. What are the leadership competencies of elementary and secondary school directors in relation to visionary leadership, digital age learning, perfectionism in professional practice, digital citizenship and systematic development sub-dimensions?

2. Do the elementary and secondary school directors' technology leadership competencies vary significantly depending on gender, age, length of service and the state of whether taking in-service training about technology?

Method

At the current study, conducted to determine the technology leadership competencies of elementary and secondary school directors, one of the descriptive research methods, survey method, was employed. As there are comparisons made in relation to gender, age, length of service and the state of whether taking in-service training about technology sectioning approach is adopted and as it is intended to determine the relationship between the continuous variables, relational screening approach is adopted (Çepni, 2010).

Universe and Sampling

The universe of the current study employing descriptive survey model is comprised of 129 school directors working at 76 elementary and secondary schools in Menteşe district of the city of Muğla in the spring term of 2013-2014 academic year. The sampling of the study consists of 74 randomly selected school directors. The demographic features of the participants are presented in Table 1.

Table 1**.** *Demographic Features of the Participants*

Demographic variable		N	%
Gender	Male	56	75.7
	Female	18	24.3
Age	20-35 years old	9	12.2
	36-45 years old	22	29.7
	46 years old or older	43	58.1
School	Elementary	21	28.4
	Secondary	22	29.7
	High school	31	41.9
Position	Director	26	35.1
	Vice director	48	64.9
Length of service	11-15 years	18	24.3
	16-20 years	17	23.0
	21 years and more	39	52.7

Data Collection Instrument

In the study, a questionnaire including a personal information form and the scale of technology leadership competencies of school directors was employed to collect data. The scale was developed on the basis of "Educational Directors' Technology Leadership Competencies Scale" developed by Banoğlu (2012). It is comprised of 32 items and 5 dimensions and named as "Educational Directors' Technology Leadership Competencies Scale" (EYÖTELYÖ). "Visionary leadership" sub-dimension of the scale consists of 12 items, "digital age learning culture" sub-dimension consists of 3 items, "perfectionism in professional practice" consists of 8 items, "digital citizenship" sub-dimension consists of 6 items and "systematic development" sub-dimension consists of 3 items. The lowest score to be taken from the scale is 32 and the highest score is 160. The reliability of the scale developed by Banoğlu (2012) was analyzed. As a result of the analysis, Cronbach Alpha reliability coefficient of the scale was calculated to be .97. Cronbach Alpha coefficients for the sub-dimensions of the scale were found to be ranging from

.89 to .98. The scale was found to be reliable and valid in the determination of the school directors' technology leadership competencies.

Data Analysis

For the analysis of the collected data, IBM SPSS 21.0 package program was used. In the determination of the school directors' opinions about their technology leadership competencies, statistical measurement tools such as frequencies (f), percentages (%), arithmetic means and standard deviations were used. In order to determine whether the directors' opinions change depending on some variables, t-test was carried out in relation to gender and the state of whether taking in-service training and one-way variance analysis (ANOVA) was conducted in relation to age and length of service. LSD test was used in the detection of the source of the difference found as a result of one-way variance analysis.

Findings

In order to find an answer to the first research question, the means and standard deviations presented in Table 2 related to technology leadership competencies were examined.

Table 2. *Means and Standard Deviations for Educational Technology Leadership Competencies of the Directors*

	Mean	**SS**
Technology Leadership General Factor	4.02	.69
Visionary Leadership Dimension	3.94	.79
Digital Age Learning Culture Dimension	3.95	.79
Perfectionism in Professional Practice	4.05	.75
Digital Citizenship Dimension	4.06	.74
Systematic Development Dimension	4.28	.78

As can be seen in Table 2, while the directors' technology leadership competency was the lowest in terms of "visionary leadership" dimension (Mean= 3.94), the higher competencies were found for "digital age learning culture" dimension (Mean=3.95), "perfectionism in professional practice" dimension (Mean=4.05), "digital citizenship" dimension (Mean=4.06) and "systematic development" dimension (Mean=4.28). General technology competency mean score of the directors working at elementary and secondary schools is 4.02. These findings show that the directors' technology leadership competency level is "good" in terms of general technology leadership and its sub-dimensions.

In order to find an answer to the second research question of the study, the results of t-test related to the correlations between gender and the state of whether taking in-service training about technology and technology leadership competency are presented in Table 3 and Table 6 and the results of one-way variance analysis (ANOVA) related to the correlations between age and length of service and technology leadership competency are presented in Table 4 and Table 5.

Table 3. *The Results of Independent Samples t-test conducted to Reveal Whether the Directors' Technology Leadership Competencies Vary depending on Gender Variable*

	Gender	**N**	**Mean**	**Sd**	**df**	**t**	**p**
Technology Leadership General Factor	Male	56	4.08	.57	72	1.17	.24
	Female	18	3.86	.97			
Visionary Leadership Dimension	Male	56	4.01	.71	72	1.26	.20
	Female	18	3.74	.99			
Digital Age Learning Culture Dimension	Male	56	3.98	.69	72	.63	.52
	Female	18	3.85	1.06			
Perfectionism in Professional Practice	Male	56	4.10	.60	72	.98	.32
	Female	18	3.90	1.10			
Digital Citizenship Dimension	Male	56	4.09	.63	72	.54	.58
	Female	18	3.98	1.02			
Systematic Development Dimension	Male	56	4.38	.64	72	1.81	.07
	Female	18	4.00	1.09			

As can be seen in Table 3, 56 of the participants were male and 18 were females. The school directors' technology leadership competency scores do not vary significantly depending on gender [$t_{(72)} = 1.17$, $p>.05$]. Though not significant, the male school directors' technology leadership competency is higher than that of the female directors. Moreover, the directors' technology leadership competencies do not vary at visionary leadership dimension [$t_{(72)} = 1.26$, $p>.05$], digital age learning culture dimension [$t_{(72)} = .63$, $p>.05$], perfectionism in professional practice dimension [$t_{(72)} = .98$, $p>.05$], digital citizenship dimension [$t_{(72)} = .54$, $p>.05$] and systematic development dimension [$t_{(72)} = 1.81$, $p>.05$] depending on gender. Again, though not significant, the male directors' visionary leadership, digital age learning culture, perfectionism in professional practice, digital citizenship and systematic development scores are higher than those of the female directors.

Table 4. *The Results of One-way Variance Analysis (ANOVA) conducted to Reveal Whether the Directors' Technology Leadership Competency Scores Vary depending on Age Variable*

Variable				*N*	*Mean*		*Sd*
Technology Leadership Factor	*General*	(1) 35 years old and younger		9	4.33		.34
		(2) 36- 45 years old		22	3.82		.92
		(3) 46 years old and older		43	4.06		.58
		Variance Source	*MS*	*df*	*SS*	*F*	*p*	Difference LSD
		Between Groups	1.79	2	.89	1.90	.15	
		Intra Groups	33.52	71	.47			--
		Total	35.32	73				

As can be seen in Table 4, the results of one-way variance analysis conducted to determine whether the elementary and secondary school directors' technology leadership competency varies significantly depending on age variable revealed that the difference between the arithmetic means of the groups is not significant ($F=1.90;p>.05$). Thus, it can be claimed that school directors' technology leadership competency is not significantly influenced by age variable. Moreover, the school directors' technology leadership competency scores according to

their ages from the highest to the lowest are as follows: 35 years old and younger (4.33), 46 years old and older (4.06) and 36-45 years old (3.82). Thus, it can be argued that the technology leadership competency of the middle-aged directors is relatively lower.

The results of one-way variance analysis conducted to determine whether the elementary and secondary school directors' technology leadership competency varies significantly at visionary leadership sub-dimension depending on age variable revealed that the difference between the arithmetic means of the groups is not significant (F=.79;p>.05). Moreover, the school directors' visionary leadership scores according to their ages from the highest to the lowest are as follows: 35 years old and younger (4.22), 46 years old and older (3.94) and 36-45 years old (3.82). When compared to the other age groups, the visionary leadership mean score of the directors who are in the age group of 35 years old and younger is higher.

The results of one-way variance analysis conducted to determine whether the elementary and secondary school directors' technology leadership competency varies significantly at digital age learning culture sub-dimension depending on age variable revealed that the difference between the arithmetic means of the groups is not significant (F=1.17;p>.05). Moreover, the school directors' digital age learning culture scores according to their ages from the highest to the lowest are as follows: 35 years old and younger (4.22), 46 years old and older (4.03) and 36-45 years old (3.69). When compared to the other age groups, the mean score of digital age learning culture of the directors who are in the age group of 35 years old and younger is higher.

Table 4a. *The Results of One-way Variance Analysis (ANOVA) conducted to Reveal Whether the Directors' Perfectionism in Professional Practice Sub-dimension of Technology Leadership Competency Vary depending on Age Variable*

Variable				*N*	*Mean*		*Sd*
Perfectionism in Professional Practice Dimension	(1) 35 years old and younger			9	4.43		.41
	(2) 36- 45 years old			22	3.75		.98
	(3) 46 years old and older			43	4.13		.61
	Variance Source	*MS*	*df*	*SS*	*F*	*p*	Difference LSD
	Between Groups	3.56	2	1.78	3.36	**.04**	**1>2;3>2**
	Intra Groups	37.59	71	.53			
	Total	41.15	73				

As can be seen in Table 4.a, the results of one-way variance analysis conducted to determine whether the elementary and secondary school directors' technology leadership competency varies significantly at perfectionism in professional practice sub-dimension depending on age variable revealed that the difference between the arithmetic means of the groups is significant (F=3.36;p<.05). Following this finding, complementary analyses (posthoc) were conducted to determine the source of the difference. First, the homogeneity of the variance was checked and it was decided that the variances are homogenous (LSD= 4.05;p<.05); therefore, LSD test was preferred. The results of LSD analysis showed that this difference is between the age group of 35 years old and younger and the age group of 36-45 years old in favor of the age group of 35 years old and younger (p<,05) and between the age group of 46 years old and older

and the age group of 36-45 years old favoring the age group of 46 years old and older (p<.05). The differences between the arithmetic means of the other groups were not found to be significant (p>.05). Moreover, the school directors' perfectionism in professional practice scores according to their ages from the highest to the lowest are as follows: 35 years old and younger (4.43), 46 years old and older (4.13) and 36-45 years old (3.75).

The results of one-way variance analysis conducted to determine whether the elementary and secondary school directors' technology leadership competency varies significantly at digital citizenship sub-dimension depending on age variable revealed that the difference between the arithmetic means of the groups is not significant (F=1.10;p>.05). Moreover, the school directors' digital citizenship scores according to their ages from the highest to the lowest are as follows: 35 years old and younger (4.33), 46 years old and older (4.08) and 36-45 years old (3.90). When compared to the other age groups, the digital citizenship mean score of the directors who are in the age group of 35 years old and younger is higher.

The results of one-way variance analysis conducted to determine whether the elementary and secondary school directors' technology leadership competency varies significantly at systematic development sub-dimension depending on age variable revealed that the difference between the arithmetic means of the groups is not significant (F=2.62;p>.05). Moreover, the school directors' systematic development scores according to their ages from the highest to the lowest are as follows: 35 years old and younger (4.62), 46 years old and older (4.36) and 36-45 years old (4.00). When compared to the other age groups, the systematic development mean score of the directors who are in the age group of 35 years old and younger is higher.

Table 5. *The Results of One-way Variance Analysis (ANOVA) conducted to Reveal Whether the Directors' Technology Leadership Competency Scores Vary depending on Length of Service*

Variable				*N*	*Mean*		*Sd*
Technology Leadership Factor	*General*	(1) 15 years and less		18	4.20		.51
		(2) 16- 20 years		17	3.89		1.04
		(3) 21 years and more		39	4.00		.57
		Variance Source	*MS*	*df*	*SS*	*F*	*p*	Difference LSD
		Between Groups	.87	2	.43	.89	.41	--
		Intra Groups	34.45	71	.48			
		Total	35.32	73				

As can be seen in Table 5, the results of one-way variance analysis conducted to determine whether the elementary and secondary school directors' technology leadership competency varies significantly depending on the length of service variable revealed that the difference between the arithmetic means of the groups is not significant (F=.89;p>.05). Thus, it can be claimed that school directors' technology leadership competency is not significantly influenced by their length of service. Moreover, the school directors' technology leadership competency scores according to their length of service from the highest to the lowest are as follows: 15 years and less (4.20), 21 years and more (4.00) and 16-20 years (3.89). As a result, it can be argued that the technology leadership competency of the directors having medium length

of service is lower than those of the other groups. The results of one-way variance analysis conducted to determine whether the elementary and secondary school directors' technology leadership competency varies significantly at visionary leadership sub-dimension depending on length of service variable revealed that the difference between the arithmetic means of the groups is not significant (F=.37;p>.05). Moreover, the school directors' visionary leadership scores according to their length of service from the highest to the lowest are as follows: 15 years and less (4.08), 21 years and more (3.90) and 16-20 years (3.88). When compared to the other groups, the visionary leadership mean score of the directors whose length of service is 15 years or less is higher. The results of one-way variance analysis conducted to determine whether the elementary and secondary school directors' technology leadership competency varies significantly at digital age learning culture sub-dimension depending on length of service variable revealed that the difference between the arithmetic means of the groups is not significant (F=1.19;p>.05). Moreover, the school directors' digital age learning culture scores according to their length of service from the highest to the lowest are as follows: 15 years and less (4.20), 21 years and more (3.88) and 16-20 years (3.84). When compared to the other groups, the digital age learning culture mean score of the directors whose length of service is 15 years or less is higher.

The results of one-way variance analysis conducted to determine whether the elementary and secondary school directors' technology leadership competency varies significantly at perfectionism in professional practice sub-dimension depending on length of service variable revealed that the difference between the arithmetic means of the groups is not significant (F=1.55;p>.05). Moreover, the school directors' perfectionism in professional practice scores according to their length of service from the highest to the lowest are as follows: 15 years and less (4.29), 21 years and more (4.03) and 16-20 years (3.85). The results of one-way variance analysis conducted to determine whether the elementary and secondary school directors' technology leadership competency varies significantly at digital citizenship sub-dimension depending on length of service variable revealed that the difference between the arithmetic means of the groups is not significant (F=.76;p>.05). Moreover, the school directors' digital citizenship scores according to their length of service from the highest to the lowest are as follows: 15 years and less (4.21), 21 years and more (4.06) and 16-20 years (3.90). When compared to the other age groups, the digital citizenship mean score of the directors whose length of service is 15 years or less is higher.

The results of one-way variance analysis conducted to determine whether the elementary and secondary school directors' technology leadership competency varies significantly at systematic development sub-dimension depending on length of service variable revealed that the difference between the arithmetic means of the groups is not significant (F=.67;p>.05). Moreover, the school directors' systematic development scores according to their length of service from the highest to the lowest are as follows: 15 years and less (4.42), 21 years and more (4.29) and 16-20 years (4.11). When compared to the other age groups, the systematic development mean score of the directors whose length of service is 15 years or less is higher.

Table 6. *The Results of Independent Samples t-test conducted to Determine Whether the Directors' Technology Leadership Competency Scores Vary Significantly depending on the State of Whether Taking In-service Training about Technology*

	Taking in-service training	**N**	**Mean**	**Sd**	**df**	**t**	**p**
Technology Leadership General Factor	Yes	65	4.09	.69	72	2.11	**.03**
	No	9	3.57	.54			
Visionary Leadership Dimension	Yes	65	4.02	.78	72	2.23	**.02**
	No	9	3.40	.67			
Digital Age Learning Culture Dimension	Yes	65	3.99	.81	72	1.16	.24
	No	9	3.66	.52			
Perfectionism in Professional Practice Dimension	Yes	65	4.11	.74	72	1.79	.07
	No	9	3.63	.68			
Digital Citizenship Dimension	Yes	65	4.12	.73	72	2.00	**.04**
	No	9	3.61	.66			
Systematic Development Dimension	Yes	65	4.33	.80	72	1.32	.18
	No	9	3.96	.58			

As can be seen in Table 6, 65 of the directors have taken in-service training about technology and 9 have not. The school directors' technology leadership competency scores vary significantly depending on the state of taking in-service training about technology [$t_{(72)} = 2.11$, $p<.05$]. This difference is in favor of the directors having taken in-service training about technology. Moreover, visionary leadership scores [$t_{(72)} = 2.23$, $p<.05$] and digital citizenship scores [$t_{(72)} = 2.00$, $p<.05$] of the directors having taken in-service training are significantly higher than those of the ones not having taken. On the other hand, having taken in-service training about technology does not lead to significant differences in relation to digital age learning culture dimension [$t_{(72)} = 1.16$, $p>.05$], perfectionism in professional practice dimension [$t_{(72)} = 1.79$, $p>.05$] and systematic development dimension [$t_{(72)} = 1.32$, $p>.05$]. The technology leadership competency scores and scores from its sub-dimensions taken by the directors having taken in-service training about technology are higher.

Discussion and Results

The findings of the current study revealed that the school directors' general technology leadership competency mean score, visionary leadership mean score, digital age learning culture mean score, perfectionism in professional practice mean score are "high" and their systematic development mean score is "very high". In this regard, it can be argued that the directors view their technology leadership competency as high. This finding concurs with the findings reported by Ergişi (2005), Kozloski (2007), Can (2008), Macaulay (2009), Eren-Şişman (2010), Banoğlu (2011), Hacıfazlıoğlu et al., (2011a), Bülbül and Çuhadar (2012); yet, not supported by the findings of Erden and Erden (2007), Sincar and Aslan (2011).

In light of the findings of the current study, it can be claimed that the school directors see themselves most competent at "Systematic Development" sub-dimension and it is followed by "Digital Citizenship", "Perfectionism in Professional Practice", "Digital Age Learning Culture"

and "Visionary Leadership". Banoğlu (2011) conducted a study to determine the elementary and secondary school directors' technology leadership competencies and found that the lowest competency belongs to "leadership and vision" sub-dimension and this finding is similar to our finding. The school directors view their competency at "systematic development" sub-dimension as "high" and this can be interpreted as their putting forth the required effort to establish and maintain the technological infrastructure conducive to teaching and learning processes at school and they regard their competency at "digital citizenship" sub-dimension as "very high" and this can be interpreted as their supporting the generation and maintenance of the policies for the legal, ethical and secure use of technology at school environment and trying to enhance the interaction based on digital tools and digital access that can meet the needs of students. High competency of the school directors in relation to digital learning sub-dimension contributes to effective use of information and communications technologies at school environment. Furthermore, the directors' viewing their competency at "perfectionism in professional practice" as very high is of great importance in terms of comfortable use of information and communications technologies and provision of the necessary time and resources. The school directors' regarding their "visionary leadership" competency as very high is important for the formation of comprehensive technology at school because effective leadership to construct the infrastructure and understanding of technology at school is of vital importance (Anderson and Dexter, 2005; Wang, 2010; Bülbül and Çuhadar, 2012).

In the current study, it was found that the school directors' technology leadership competency scores and scores taken from its sub-dimensions do not vary significantly depending on gender and length of service. This finding concurs with the findings of Baltacı (2008), Çetin-Yılmaz (2008), Görgülü et al., (2013), Can (2008), Şişman-Eren (2010). In addition, the school directors' technology leadership competency and visionary leadership scores, digital age learning culture, digital citizenship and systematic development scores do not vary significantly depending on age. This finding is similar to the finding reported by Hayytov (2013). A significant difference was found between perfectionism in professional practice and age. At perfectionism in professional practice sub-dimension, a significant difference was found between the age group of 35 years old and younger and the age group of 36-45 years old in favor of the age group of 35 years old and younger and between the age group of 46 years old and older and the age group of 36-45 years old in favor of the age group of 46 years old and older. It is seen that the school directors from the younger and older age groups have more positive attitudes regarding perfectionism in professional practice sub-dimension and thus it can be concluded that they are more willing and consistent towards the use of technology for professional development.

The school directors' general technology leadership competency score, visionary leadership and digital citizenship scores were found to be varying significantly depending on the state of whether taking in-service training about technology. The technology leadership competency score, visionary leadership score and digital citizenship score of the directors not having taken in-service training about technology were found to be significantly lower than those of the directors having taken in-service training about technology. Thus, it can be argued that in-service training about technology can make positive contributions to the directors' technology leadership competency, visionary leadership and digital citizenship. This finding is not supported by Hayytov (2013).

In the current study conducted to determine the school directors' technology leadership competencies, it was found that the school directors' technology leadership score, digital citizenship score, perfectionism in professional practice score, digital age learning culture score and visionary leadership score are "high" and their systematic leadership score is "very high" and technology leadership competency and its sub-dimensions do not vary significantly depending on gender, age and length of service but vary significantly depending on the state of whether taking in-service training about technology. Moreover, it was concluded that the directors' perfectionism in professional practice scores vary significantly depending on age and visionary leadership and digital citizenship scores vary significantly depending on the state of whether taking in-service training about technology. Thus, following suggestions can be made for researchers, directors and the Ministry of National Education:

1. Attempts should be made to improve the middle-aged school directors' perfectionism in professional practice.

2. Greater emphasis should be put on in-service trainings.

3. Researchers need to focus on research aiming to reveal directors' technology leadership competency.

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