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An Examination of School Administrators' Technology Leadership Self-Efficacy

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Abstract

The purpose of this study is to determine school administrators' technology leadership self-efficacy levels and to examine whether school administrators' technology leadership self-efficacy levels differed in terms of school level, professional seniority and participation in IT in-service programs. The survey method design was employed for the study. The sample consisted of 320 school administrators from different educational institutions from a city in Turkey. The Technology Leadership Self-Efficacy Scale which was adapted for the Turkish culture by Hacıfazlıoğlu, Karadeniz and Dalgıç (2011) was used as a data gathering tool. The original form of the scale was developed based on the standards of the International Society for Technology in Education (ISTE). One Way ANOVA and independent samples t-test were used as statistical methods. The analyses showed that school administrators' technology leadership self-efficacy and sub dimensions of this self-efficacy were found to be high. The results also showed that there were significant differences in the scores of technology leadership self-efficacy and its sub dimensions according to professional seniority, participation in IT in-service programs. However, the results revealed that there was no significant difference in the technology leadership self-efficacy levels in terms of school level.

Key words: *school administrator; self-efficacy; technology leadership; technology integration.*

Introduction

In recent years the rapid development and widespread use of information and communication technologies (ICT) has become inevitable in so many areas and especially in the field of education. The concept of technology integration could be defined as using ICT tools such as personal computers, laptops, PDAs, software and internet for instructional purposes (Hew & Brush, 2007). Considering the concept of technology integration, teachers have a great responsibility for it, but school administrators are also responsible for transferring and effectively using computers and other related technologies as well as teachers (Turan, 2002). In other words, school administrators are expected to take on the leadership role in using ICT tools in schools (Akbaba-Altun, 2002). This leadership role is known as technology leadership.

Anderson and Dexter (2005) argued that technology leadership represents the organizational decisions, policies or actions regarding the use of ICT in effective and useful ways all over the school (as cited in Sincar & Aslan, 2011, p. 573). According to Tanzer (2004), a technology leader is a person who coordinates the technology for effective and efficient use in the organization and for this reason affects, directs and manages the organization. School

administrators move away from the perception of being a traditional leadership and they should support and enrich education by using technology and providing others the opportunity to use technology (Can, 2003). Accordingly, school administrators should take on new responsibilities that are different from traditional ones and they should use technology more efficiently.

Since technology dominates today's age, the need for school administrators to adapt to technological developments is indispensable. In this sense, school administrators need to develop themselves in order to meet the new world order (Hacıfazlıoğlu, Karadeniz, & Dalgıç, 2011). For this reason, the new roles of school administrators could be listed as seeking new technologies, establishing computer labs, preparing teachers to integrate ICT effectively across the curriculum. Since computer and computer related technologies are widely being used for school management purposes and instructional activities, school administrators have been urged to have some competencies relating to ICT (Turan, 2002). Technology knowledge is one of the requirements that school administrators should have in order to help teachers develop instructional activities. In this regard, school administrators should be supportive and encouraging which are characteristics of a typical leader (Ertmer et al., 2002). According to Valdez (2004), technology leadership responsibilities may include the following:

- "Indicate support for technology use by word and deed; value and model technology use.
- Understand and acknowledge that teachers need time and support to learn effective uses of technology.
- Provide sufficient technology to make the use of technology viable; provide the technical support necessary to keep the technology operational.
- Pay attention to inequalities in technology access and use that exist in the local communities, and compensate to the extent possible."

The competencies that school administrators need to have about technology leadership are standardized by International Society for Technology in Education (ISTE). These standards are known as National Educational Technology Standards for Administrators (NETS-A) (ISTE, 2002; 2009) which aim to evaluate school administrators' skills about creating digital learning culture, using technology and implementing it effectively in the field of education. NETS-A standards were first prepared in 2002 but revised in 2009. The revised NETS-A standards are comprised of 5 topics. These 5 topics are listed below (ISTE, 2009):

1. "Visionary Leadership: Educational Administrators inspire and lead development and implementation of a shared vision for comprehensive integration of technology to promote excellence and support transformation throughout the organization.
2. Digital Age Learning Culture: Educational Administrators create, promote, and sustain a dynamic, digital-age learning culture that provides a rigorous, relevant, and engaging education for all students.
3. Excellence in Professional Practice: Educational Administrators promote an environment of professional learning and innovation that empowers educators to enhance student learning through the infusion of contemporary technologies and digital resources.
4. Systemic Improvement: Educational Administrators provide digital age leadership and management to continuously improve the organization through the effective use of information and technology resources.
5. Digital Citizenship: Educational Administrators model and facilitate understanding of social, ethical and legal issues and responsibilities related to an evolving digital culture."

Relevant literature provides studies about school administrators' technology leadership competencies (Can, 2003, 2008; Akbaba-Altun, 2004; Tanzer, 2004; Anderson & Dexter, 2005; Şişman-Eren, 2010; Marulcu, 2010; Sezer, 2011; Eren & Kurt, 2011; Sincar & Arslan, 2011; Hacıfazlıoğlu, Karadeniz, & Dalgıç, 2010, 2011, 2011; Banoğlu, 2011; Richardson & McLeod, 2011; Bülbül & Çuhadar, 2012), school administrators' attitudes toward technology (Akbaba-Altun, 2002; Helvacı, 2008; Günbayı & Cantürk, 2011), relationship between school administrators' leadership styles and skills of technology based practices (Hughes & Zachariah, 2001), changes in school administrators' ideas about technology integration and technology leadership while participating in an online professional development course (Ertmer et al., 2002), the relationships among school administrators' technology leadership, teachers' technology literacy, and teaching effectiveness (Chang, 2012), the relationship between school administrators' technology use and strategies of technology integration (Kozloski, 2006). However, there are few studies showing school administrators' technology leadership self-efficacy levels based on ISTE standards.

Purpose of Study and Research Questions

The purpose of this study is to determine school administrators' technology leadership self-efficacy levels and to examine whether there is a difference in self-efficacy levels in terms of school level, professional seniority, and participation in in-service training on IT program. For this purpose, the proposed study attempted to answer the following research questions:

1. What are the levels of school administrators' technology leadership self-efficacy and its sub dimensions?
2. Are there any differences between the levels of school administrators' technology leadership self-efficacy and its sub dimensions in terms of school level, professional seniority, and in-service training in an IT program.

Method

Research Design

The study had a descriptive research design. The survey research method was employed for the study. In a survey research method, the case is described as it is in real life. The general survey model is descriptive and provides results about a population or sample (Karasar, 2005).

Study Group

The study was conducted in a city located in the western part of Turkey. The participants were school administrators (N=320) from different education institutions of the city. The data collection instrument, Technology Leadership Self-Efficacy Scale, was sent to all school administrators in the sample population. After collecting the data, all scales were collected and examined while the data missing and mistakes were eliminated. Finally, 199 scales were obtained to be taken into consideration.

Data Collection Instruments

The technology leadership self-efficacy scale has been used as a data gathering tool. The scale is a 21-item questionnaire that measures levels of school administrators' self-efficacy

for technology leadership. It was adapted for the Turkish culture by Hacıfazlıoğlu, Karadeniz and Dalgıç (2011). Each item was rated on a five-point Likert-type scale ranging from 1 (totally not true for me) to 5 (totally true for me). Cronbach Alpha coefficient value was .97 for the whole scale. For the current study the Cronbach Alpha coefficient value was calculated as .95 which showed the scale had a rather adequate internal consistency.

Data Analysis

Data collected were analyzed by SPSS 18 statistical package program. Descriptive statistics were used to examine the levels of technology leadership self-efficacy of school administrators. The independent samples t-test was used to examine whether there was a difference in the scores of the technology leadership self-efficacy levels for those who participated in an in-service training relating to IT and those who did not. Finally, One Way ANOVA was conducted to examine the difference in the scores of technology leadership self-efficacy levels in terms of school level, professional seniority and participation in an in-service IT program. To determine these differences the Scheffe test was used. According to Stevens (2009) the Scheffe Test is a kind of post-Hoc method which is used for making various comparisons between groups. For instance, Scheffe may be used to test all combinations including complex and pairwise comparisons.

Results

What are the levels of school administrators' technology leadership self-efficacy and its sub dimensions?

In order to examine the levels of school administrators' technology leadership self-efficacy and its sub dimensions descriptive statistics were employed. The results of the analysis are summarized in Table 1.

Table 1.
Descriptive statistics of school administrators' scores on Technology Leadership Self-Efficacy

Technology Leadership Self-Efficacy and its Sub-Dimensions	Number of Items	*M*	*SD*
Visionary Leadership	3	4.03	2.32
Digital Age Learning Culture	5	3.89	3.91
Excellence in Professional Practice	4	4.01	3.21
Systematic Improvement	5	3.78	4.38
Digital Citizenship	4	3.95	3.43
Technology Leadership Self-Efficacy	21	3.92	15.28

As seen in Table 1, the mean results of technology leadership self-efficacy and its sub dimensions are high. The sub dimensions of the technology leadership self-efficacy vary between 3.78 and 4.03. Among the six sub dimensions, Visionary Leadership has the highest

mean value (*M*=4.03*, SD*=2.32*),* whereas Systematic Improvement has the lowest one (*M*=3.78*, SD*=4.38). For the remaining four sub dimensions, the scores are found as *M*=4.01*, SD* =3.21 for Excellence in Professional Practice, *M*=3.95*, SD*=3.43 for Digital Citizenship and *M*=3.89*, SD*=3.91 for Digital Age Learning Culture. The average score for technology leadership self-efficacy is found to be *M*=3.92*, SD* =15.28.

Is there any difference among school administrators' technology leadership self-efficacy levels and its sub dimensions in terms of school level, professional seniority and participation in an in-service IT program training?

The difference in technology leadership self-efficacy levels and its sub dimensions in terms of school level

An independent samples t-test was used to compare the scores of the technology leadership self-efficacy and its sub dimensions for the school level Primary education and Secondary education.

Table 2.
Independent t-test results of school administrators' scores of technology leadership self-efficacy according to school level

Variable	School level	*M*	*SD*	*t*	*p*
Visionary Leadership	Primary education[a]	12.17	2.22	.49	.63
	Secondary education[b]	12.01	2.43		
Digital Age Learning Culture	Primary education[a]	19.85	3.69	1.42	.16
	Secondary education[b]	19.06	4.12		
Excellence in Professional Practice	Primary education[a]	16.02	3.13	.10	.92
	Secondary education[b]	16.06	3.32		
Systematic Improvement	Primary education[a]	19.11	4.23	.62	.54
	Secondary education[b]	18.72	4.56		
Digital Citizenship	Primary education[a]	16.13	3.18	1.37	.17
	Secondary education[b]	15.47	3.68		
Technology Leadership Self-Efficacy	Primary education[a]	83.28	14.73	.90	.37
	Secondary education[b]	81.33	15.88		

[a] *N*=105
[b] *N*=94

As seen from Table 2, school administrators' technology leadership self-efficacy and all of its sub dimensions do not differ significantly between the two groups.

The difference in technology leadership self-efficacy levels and its sub dimensions in terms of professional seniority

In order to explore the scores of technology leadership self-efficacy in terms of professional seniority a One-Way ANOVA between-groups was calculated. The results of the analysis are presented in Table 3.

Table 3.
Means, Standard Deviations, and One-Way Analyses of Variance for the scores technology leadership self-efficacy and its sub dimension in terms of professional seniority

	Less than 10 years		Between 10 and 20 years		More than 20 years				
Variable	*M*	*SD*	*M*	*SD*	*M*	*SD*	*F* (2,194)	*p*	η^2
Visionary Leadership	11.70	2.53	12.59	2.03	12.26	2.13	2.79	.06	.03
Digital age learning culture	18.52	4.22	20.27	3.23	20.47	3.57	5.69	.00	.06
Excellence in Professional Practice	15.49	3.47	16.48	2.92	16.65	2.90	2.77	.07	.03
Systematic Improvement	17.89	4.58	19.89	3.86	20.01	4.05	5.72	.00	.07
Digital Citizenship	15.13	3.59	16.68	3.37	16.18	2.91	4.06	.02	.04
Technology Leadership Self-Efficacy	78.73	16.17	85.91	13.48	85.57	13.86	5.44	.00	.05

The results show that there is statistically significant mean difference in school administrators' technology leadership self-efficacy scores for the groups, *F* (2,194)=5.44, *p*=.00, indicating that as the level of school administrators' seniority increases, the level of technology leadership self-efficacy scores also tends to increase. Post-hoc comparisons using the Scheffe Test show that the mean scores for those who have been working as administrators between 10 and 20 years (*M*=85.91, *SD*=13.48), and those who have been working for more than 20 years (*M*=85.57, *SD*=13.86) are statistically different from those who have been working as administrators for less than 10 years (*M*=78.73, *SD*=16.17). Considering the sub dimensions of technology leadership self-efficacy, it is visible that Digital Citizenship scores differ significantly with respect to professional seniority, *F* (2,194)=4.06, *p*=.02. Post-hoc comparisons show that the mean score for those who have between 10 and 20 years of seniority (*M*=16.68, *SD*=3.37) is significantly different from those who have less than 10 years of professional seniority (*M*=15.13, *SD*=3.59). In addition, the mean score for those who have more than 20 years of professional seniority does not differ significantly from the other groups. Among the sub dimensions, the mean score of Systematic Improvement also differs significantly according to professional seniority, F (2,194)=5.72, *p*=.00 indicating that the mean score of Systematic Improvement for school administrators with more than 20 years of seniority is significantly different (*M*=20.01, *SD*=4.05) from both of the other groups. The Digital Age Learning Culture also differs significantly according to school administrators' professional seniority, *F*(2,194)=5.69, *p*=.00. The results indicated that the mean scores for

Digital Age Learning Culture of administrators with more than 20 years of professional seniority (*M*=20.47, *SD*=3.57) and between 10 and 20 years (*M*=20.27, *SD*=3.23) are significantly different from those who have less than 10 years of seniority.

The difference in technology leadership self-efficacy levels and its sub dimensions in terms of participating in an IT in-service training program

An independent samples t-test was used to compare the scores of the technology leadership self-efficacy and its sub dimensions with regard to participating in an In-service IT Training Program. The results of the analysis are given in Table 4.

Table 3.
Independent t-test results of school administrators' technology leadership self-efficacy according to participating in an In-service IT Training Program

Variable	Participating in an In-service IT Training Program	*M*	*SD*	*t*	*p*	*Cohen's d*
Visionary Leadership	Participated	12.20	2.28	1.11	.27	.18
	Did not Participate	11.77	2.47			
Digital Age Learning Culture	Participated	19.77	3.93	1.87	.06	.31
	Did not Participate	18.56	3.76			
Excellence in Professional Practice	Participated	16.36	3.13	2.50	.01	.41
	Did not Participate	15.04	3.33			
Systematic Improvement	Participated	19.22	4.22	1.65	.10	.27
	Did not Participate	18.02	4.81			
Digital Citizenship	Participated	16.15	3.24	2.45	.02	.41
	Did not Participate	14.77	3.86			
Technology Leadership Self-Efficacy	Participated	83.69	14.71	2.20	.03	.36
	Did not Participate	78.17	16.42			

As shown in Table 4, the t-test is significant for the technology leadership self-efficacy scores, *t* (197)=2.20, *p*=.03 meaning that the scores of administrators who participated in an in-service IT program (*M*=83.69, *SD*=78.17) is significantly higher than those who did not (*M*=78.17, *SD*=16.42). When it comes to the sub dimensions of the scale, it can be seen that those who participated in an in-service IT program yielded significantly higher scores in the sub dimensions of Digital Citizenship and Excellence in Professional Practice. The scores for other sub dimensions do not differ significantly between the two groups.

Discussion and Conclusions

Overall, the results of the study showed that school administrators have high technology leadership self-efficacy. On the other hand among all sub dimensions, they have the highest technology leadership self-efficacy in the sub-dimension of Visionary Leadership followed by Excellence in Professional Practice, Digital Citizenship, Digital Age Learning Culture,

and Systematic Improvement. In other words, school administrators are able to provide and use technology and model technology use in school for educational purposes and encourage teachers to use and integrate technology into teaching and learning processes. Similar findings are found in the literature. Moreover, research in relevant literature shows that school administrators have high technology leadership competencies (Seay, 2004; Tanzer, 2004; Can, 2008; Eren-Şişman, 2010; Banoğlu, 2011; Sincar & Aslan, 2011; Sezer, 2011; Bülbül & Çuhadar, 2012). Anderson and Dexter (2005) examined different school technology leadership characteristics with respect to eight technology leadership component indicators. They indicated that the majority of schools had five leadership characteristics such as Staff Development Policy, Technology Committee, Intellectual Property Policy, Administrators Days, and School Technology Budget. These indicators are related to NETS-A Standards which is consistent with the results of the current study. Since school administrators have high self-efficacy in the sub-dimension of Visionary Leadership, they may be able to develop a vision for technology integration with stakeholders, support the use of technology and also obtain necessary resources. Having high self-efficacy scores in the sub-dimension of Excellence in Professional Practice indicates that school administrators can follow new technologies to integrate them in education and organize a development program for teachers to utilize technology effectively. In addition, high self-efficacy scores in the sub-dimension of Digital Citizenship suggests that school administrators themselves feel responsible for using digital technologies and creating rules for legal, ethical and safe use of digital technology. High self-efficacy in the sub-dimension of Digital Age Learning Culture suggests that school administrators are able to create and develop educational implementations for students and afford digital technologies and other resources for technology enhanced learning environments. In addition, high self-efficacy in the sub-dimension of Systematic Improvement points out that school administrators have high capabilities to develop and manage their institutions with utilizing technology resources effectively.

In this study, there is no significant difference between school administrators' technology leadership self-efficacy and sub dimensions according to school level. According to the literature, Can (2003), Bülbül and Çuhadar (2012) found similar result. This finding could be interpreted in the following way - school level does not have an important effect on the school administrators' technology leadership self-efficacy. But there is significant difference between school administrators' technology leadership self-efficacy and sub dimensions according to professional seniority. That is to say, the more school administrators are experienced in their profession, the higher technology leadership self-efficacy scores they have. According to literature, Sezer (2011) reported a similar result, i.e. a significant difference was found between school administrators' competencies scores of technology leadership roles in sub-dimensions such as Development and Evaluation, Support, Planning and Inspection and professional seniority. Along with their career, school administrators have gained experience in technology leadership. But Tanzer (2004) found that school administrators' technology leadership competencies scores do not differ across professional seniority; Eren-Şişman, (2010) also observed that there is no difference between school administrators' leadership roles in affording and using educational technologies in terms of professional seniority.

The results further revealed that technology leadership self-efficacy scores varied with respect to having participated in an IT in-service program. In the sub dimensions, only Excellence in Professional Practice and Digital Citizenship varied significantly according to having participated in an IT in-service program. In the literature, Eren-Şişman (2010) found that school administrators who participated in an IT professional development program had higher competencies of leadership roles in affording and using educational technologies than those who did not. This finding could be interpreted in a way that IT in-service programs are effective in helping school administrators develop their technology leadership self-efficacy.

Presenting innovative approaches and instructions about using new programs may be beneficial for school administrators to improve their technology knowledge level. For this reason they would feel more competent about technology leadership than those who did not participate in IT in-service programs.

As in other studies which focused on the same research topic (Can, 2003, 2008; Akbaba-Altun, 2004; Tanzer, 2004; Anderson & Dexter, 2005; Şişman-Eren, 2010; Marulcu, 2010; Sezer, 2011; Eren & Kurt, 2011; Sincar & Arslan, 2011; Hacıfazlıoğlu, Karadeniz, & Dalgıç, 2010, 2011, 2011; Banoğlu, 2011; Richardson & McLeod, 2011; Bülbül & Çuhadar, 2012), this study also has some limitations. First of all, we sought to recruit 320 participants working as school administrators in a city located in the western part of Turkey. However, some of the participants did not respond to the survey and some of the surveys were not valid. Overall, a total of 199 school administrators were selected for the data analysis part. For this reason the results of this study cannot be generalized to other situations and to other people except the city where school administrators are working. In order to provide a general picture across the country, it is recommended that additional studies be conducted to draw a more general picture of the phenomena. Secondly, this study examined technology leadership self-efficacy according to a limited number of variables. There may be some other factors explaining school administrators' technology leadership self-efficacy such as computer self-efficacy, attitude towards technology, technology integration self-efficacy and competency, etc. Thirdly, the results of the study are restricted with the standard survey that is provided to the participants. In order to obtain in-depth understandings of the phenomena, it would be beneficial to conduct an interview and observation with school administrators.

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Ispitivanje samoučinkovitosti ravnatelja u upravljanju tehnologijom

Sažetak

Svrha ovoga istraživanja bila je odrediti razinu samoučinkovitosti ravnatelja škola u upravljanju tehnologijom s obzirom na razinu škole, radni staž i sudjelovanje u programu stručnog usavršavanja u području informacijske tehnologije (IT). U istraživanju smo primijenili metodu anketiranja. Uzorak se sastojao od 320 ravnatelja škola is različitih obrazovnih institucija iz gradova u Turskoj. Hacıfazlıoğlu, Karadeniz i Dalgıç (2011)prilagodili su Skalu samoučinkovitosti u upravljanju tehnologijom za tursko okruženje te je korištena kao alat za dobivanje podataka. Izvorni oblik skale razvijen je na osnovu standarda Međunarodnog društva za tehnologiju u obrazovanju (ISTE). Jednosmjerna ANOVA analiza i neovisni t test korišteni su kao statističke metode. Analize su pokazale da su samoučinkovitost ravnatelja u upravljanju tehnologijom te pod-dimenzije ove samoučinkovitosti prilično visoke. Rezultati su također pokazali da postoje značajne razlike u uspjehu samoučinkovitosti u upravljanju tehnologijom i njezinim pod-dimenzijama s obzirom na radno iskustvo i sudjelovanje u IT programima stručnoga usavršavanja. Međutim, rezultati su pokazali da ne postoji značajna razlika u razinama samoučinkovitosti u upravljanju tehnologijom s obzirom na razinu škole.

Ključne riječi: *ravnatelj; samoučinkovitost; tehnološko rukovođenje; tehnološka integracija.*

Uvod

Posljednjih je godina ubrzani razvoj i rasprostranjenost korištenja informacijske i komunikacijske tehnologije (IKT) postao gotovo neizbježan u mnogim područjima a poglavito u području obrazovanja. Koncept tehnološke integracije može se definirati kao korištenje IKT alata poput osobnih računala, prijenosnih računala, PDAova, softvera i interneta u obrazovne svrhe (Hew i Brush, 2007). S obzirom na koncept tehnološke integracije, nastavnici imaju veliku odgovornost, ali su jednako tako odgovorni i ravnatelji kako bi prenijeli i učinkovito koristili računala i ostale tehnologije (Turan, 2002). Drugim riječima, od ravnatelja se očekuje da preuzme ulogu rukovođenja korištenja IKT alata u školama (Akbaba-Altun, 2002). Ovakva uloga ravnatelja poznata je kao tehnološki menadžment.

Anderson i Dexter (2005) držali su da tehnološko menadžment podrazumijeva organizacijske odluke, politiku i radnje vezane uz korištenje IKT na učinkovite i korisne načine u cijeloj školi (prema Sincar i Aslan, 2011, str. 573). Prema Tanzeru (2004), tehnološki menadžer je osoba koja koordinira tehnologiju za učinkovito i djelotvorno korištenje u organizaciji i zbog toga utječe, usmjerava i rukovodi organizacijom. Ravnatelji škola udaljavaju od percepcije tradicionalnog upravljanja pa bi samim time trebali podupirati i obogaćivati obrazovanje koristeći tehnologiju te dajući drugima priliku za korištenjem tehnologije (Can, 2003). Shodno tome, ravnatelji škola trebali bi preuzeti nove odgovornosti koje se razlikuju od tradicionalnih te bi trebali učinkovitije koristiti tehnologiju.

S obzirom da tehnologija dominira današnjicom, potreba ravnatelja škola da se prilagode tehnološkom razvoju postaje prijeko potrebna. U tom smislu, ravnatelji trebaju poraditi na svome razvoju kako bi se upoznali s novim svjetskim poretkom (Hacıfazlıoğlu, Karadeniz i Dalgıç, 2011). Iz tog razloga, nove uloge ravnatelja mogu se navesti kao traženje novih tehnologija, otvaranje računalnih laboratorija, priprema nastavnika za učinkovito uključivanje IKT kroz čitav kurikul. S obzirom da se računalo i računalno povezane tehnologije široko koristi u poslovanju škole i za nastavne aktivnosti, ravnatelji su pozvani razviti svoje kompetencije vezane uz IKT (Turan, 2002). Poznavanje tehnologije jedan je od uvjeta koju

ravnatelji škola trebaju imati kako bi svojim nastavnicima pomogli u kreiranju nastavnih aktivnosti. U tom pogledu, ravnatelji škola trebaju podržavati i poticati što su ujedno i tipične karakteristike rukovodioca (Ertmer i sur., 2002). Prema Valdezu (2004) odgovornosti tehnološkog rukovodioca mogu sadržavati sljedeće:

- „Ukazati na podršku za korištenje tehnologije riječju i djelom; cijeniti i modelirati korištenje tehnologije.
- Razumjeti i prihvatit na znanje da nastavnicima treba vremena i podrške kako bi naučili učinkovito koristiti tehnologiju.
- Omogućiti dovoljno tehnologije kako bi korištenje tehnologije bilo održivo; ponuditi tehničku podršku potrebnu kako bi tehnologija ostala funkcionalna.
- Obratiti pozornost na nejednakosti u pristupu i korištenju tehnologije koji postoji u lokalnoj zajednici i kompenzirati do moguće mjere."

Kompetencije koje ravnatelji škola moraju imati o upravljanju tehnologijom standardizirani su od Međunarodnog društva za tehnologiju u obrazovanju (ISTE). Ovi standardi poznati su kao Nacionalni obrazovni tehnologijski standardi za ravnatelje (NETS-A) (ISTE, 2002; 2009) čiji je cilj vrjednovati vještine školskih ravnatelja o stvaranju kulture digitalnog učenja, korištenja tehnologije i učinkovite implementacije tehnologije u području obrazovanja. NETS-A standardi prvi puta su pripremljeni 2002. a izmijenjeni 2009. Izmijenjeni NETS-A standardi sadrže 5 tema. Radi se o sljedećim, niže navedenim temama (ISTE, 2009):

1. „Upravljanje s vizijom: Ravnatelji u obrazovanju nadahnjuju i predvode integraciju tehnologije kako bi promovirali izvrsnost i kako bi poduprli transformaciju unutar organizacije.
2. Kultura učenja u digitalno doba: Ravnatelji u obrazovanju stvaraju, promoviraju i podržavaju dinamičnu kulturu učenja u digitalno doba koja nudi snažnu, bitnu i zanimljivo obrazovanje za sve učenike.
3. Izvrsnost u profesionalnom radu: Ravnatelji u obrazovanju promoviraju okruženje u kojemu dominira profesionalno učenje i inovacija koja osnažuje nastavnike da obogate učenje kroz infuziju suvremenih tehnologija i digitalnih izvora.
4. Sustavno usavršavanje: Ravnatelji u obrazovanju omogućuju rukovođenje i menadžment u digitalno doba kako bi sustavno usavršavali organizaciju kroz učinkovito korištenje informacijskih i tehnologijskih izvora.
5. Digitalno građanstvo: Ravnatelji u obrazovanju modeliraju i omogućuju razumijevanje društvenih, etičkih i pravnih pitanja te odgovornosti vezanih uz rastuću digitalnu kulturu."

Relevantna literatura nudi istraživanja o sljedećem: kompetencijama ravnatelja u upravljanju tehnologijom (Can, 2003, 2008; Akbaba-Altun, 2004; Tanzer, 2004; Anderson i Dexter, 2005; Şişman-Eren, 2010; Marulcu, 2010; Sezer, 2011; Eren i Kurt, 2011; Sincar i Arslan, 2011; Hacıfazlıoğlu, Karadeniz i Dalgıç, 2010, 2011, 2011; Banoğlu, 2011; Richardson i McLeod, 2011; Bülbül i Çuhadar, 2012), stavovima koje ravnatelji imaju prema tehnologiji (Akbaba-Altun, 2002; Helvacı, 2008; Günbayı i Cantürk, 2011), odnosu između stilova upravljanja i tehnologijskih vještina u praksi (Hughes i Zachariah, 2001), promjeni u idejama ravnatelja o integraciji tehnologije i upravljanju tehnologijom za vrijeme sudjelovanja u stručnom usavršavanju putem on-line tečaja (Ertmer i sur., 2002), odnosu među ravnateljima vezanim uz upravljanje tehnologijom, tehnologijskoj pismenost nastavnika, učinkovitosti poučavanja (Chang, 2012), odnosu korištenja tehnologije kod ravnatelja i strategijama za integraciju tehnologije (Kozloski, 2006). Međutim, postoji tek nekoliko istraživanja koja ukazuju na razinu samoučinkovitosti ravnatelja u upravljanju tehnologijom zasnovanim na ISTE standardima.

Cilj istraživanja i istraživačka pitanja

Cilj ovoga istraživanja je odrediti razine samoučinkovitosti ravnatelja u upravljanju tehnologijom i proučiti postoji li razlika u razinama samoučinkovitosti s obzirom na razinu škole, radno iskustvo, sudjelovanje u IT programu stručnoga usavršavanja. U tu svrhu, predloženo istraživanje pokušat će pronaći odgovore za sljedeća pitanja:

1. Koje su razine samoučinkovitosti ravnatelja u upravljanju tehnologijom i njezinim pod-dimenzijama?
2. Postoje li razlike između razina samoučinkovitosti ravnatelja u upravljanju tehnologijom i njihovim pod-dimenzijama s obzirom na razinu škole, radno iskustvo, stručno usavršavanje u IT programu.

Metoda

Nacrt istraživanja

Istraživanje je deskriptivnog karaktera. Metoda ankete korištena je u istraživanju. Kroz metodu ankete, slučaj je opisan kao u stvarnom životu. Model ankete je deskriptivan model i nudi rezultate o populaciji ili uzorku (Karasar, 2005).

Uzorak

Istraživanje je provedeno u gradu lociranom u zapadnom dijelu Turske. Ispitanici su ravnatelji škola (N=320) iz različitih obrazovnih institucija u gradu. Instrument za prikupljanje podataka, skala samoučinkovitosti u upravljanju tehnologijom poslana je svim ravnateljima u uzorku. Nakon prikupljanja podataka, sve skale analizirane su a iz analize su izbačeni nedostatni upitnici ili oni s pogreškom. U konačnici, ukupno je prikupljeno 199 važećih upitnika.

Instrumenti za prikupljanje podataka

Skala za samoučinkovitost u upravljanju tehnologijom korištena je kao instrument za prikupljanje podataka. Skala se sastojala od upitnika od 21 čestice koja mjeri razine samoučinkovitosti ravnatelja u upravljanju tehnologijom. Skalu su za tursko okruženje prilagodili Hacıfazlıoğlu, Karadeniz i Dalgıç (2011). Svaka čestica odmjerena je na skali likertovog tipa od 1 (netočno za mene) do 5 (točno za mene). Cronbach Alpha procjena koeficijenta bila je .97 za cijelu skalu. Za ovo istraživanje Cronbach Alpha koeficijent biloj postavljen na .95 što je pokazalo da skala ima prilično odgovarajuću unutarnju konzistenciju.

Analiza podataka

Prikupljeni podaci analizirani su putem statističkog programa SPSS 18. Deskriptivna statistika korištena je kako bi se ispitale razine samoučinkovistosti ravnatelja za upravljanje tehnologijom. Korišten je nezavisni t-Test za utvrđivanje razlika među rezultatima razina samoučinkovitosti ravnatelja za upravljanje tehnologijom za one koji su sudjelovali u IT programu stručnog usavršavanja i onih koji nisu. Konačno, jednosmjerna ANOVA korištena je kako bi se ispitale razlike u rezultatima samočinkovitosti upravljanja tehnologijom u odnosu na razinu škole, radno iskustvo i stručno usavršavanje u IT programu. Kako bi se te razlike odredile korišten je Scheffe test. Prema Stevensu (2009) Scheffe Test je vrsta post-hoc metode koja se

koristi za razne usporedbe među grupama. Primjerice, prema Scheffeu sve kombinacije uključujući složene i udvojene mogu biti testirane.

Rezultati

Koje su razine samoučinkovitosti ravnatelja u upravljanju tehnologijom i koje su njezine pod-dimenzije?

Kako bi izmjerili razine samoučinkovitosti ravnatelja u upravljanju tehnologijom i njezine pod-dimenzije korištena je deskriptivna statistika. Rezultati analize prikazani su u Tablici 1:

Tablica 1.

Kao što je prikazano u Tablici 1, srednja vrijednost za samoučinkovitost upravljanja tehnologijom i njezinim pod-dimenzijama prilično su visoke. Pod-dimenzije za samoučinkovitost upravljanja tehnologijom variraju između 3,78 i 4,03. Među šest pod-dimenzija, *Upravljanje s vizijom* ima najveću srednju vrijednost (*M*=4,03*, SD* =2,32*),* dok *Sustavno usavršavanje* ima najnižu (*M*=3,78*, SD* =4,38). Preostale četiri pod-dimenzije imaju sljedeće rezultate *M*=4,01*, SD* =3,21 za *Izvrsnost u profesionalnom radu*, *M*=3,95*, SD* =3,43 za *Digitalno građanstvo* i *M*=3,89*, SD* =3,91 za *Kulturu učenja u digitalno doba*. Prosječan rezultat za samoučinkovitost upravljanja tehnologijom je *M*=3,92*, SD* =15,28.

Postoji li razlika među razinama samoučinkovitosti ravnatelja u upravljanju tehnologijom i njezinim pod-dimenzijama u odnosu na razinu škole (osnovna, srednja), radno iskustvo i sudjelovanje u IT programima stručnoga usavršavanja?

Razlika u razinama samoučinkovitosti upravljanja tehnologijom i njezine pod-dimenzije u odnosu na razinu škole

Nezavisni t-test korišten je kako bi se usporedili rezultati samoučinkovitosti u upravljanju tehnologijom i njezinim pod-dimenzija prema razini škole – Osnovnoškolsko obrazovanje i Srednjoškolsko obrazovanje.

Tablica 4

Kao što prikazuje Tablica 2, samoučinkovitost ravnatelja za upravljanje tehnologijom i svim njezinim pod-dimenzijama ne razlikuje se značajno između dvije skupine.

Razlika u samoučinkovitosti upravljanja tehnologijom i njezinim pod-dimenzijama u odnosu na radno iskustvo

Kako bismo istražili rezultate samoučinovitosti upravljanja tehnologijom u odnosu na radno iskustvo, provela se jednosmjerna ANOVA među skupinama. Rezultati analize prikazani su u Tablici 3:

Tablica 3.

Rezultati pokazuju da postoji statistički značajna razlika u srednjoj vrijednosti kod rezultata samoučinkovitosti ravnatelja u upravljanju tehnologijom za skupine F (2,194) = 5,44, p = .00, što govori da kako raste radno iskustvo ravnatelja tako rastu i rezultati koji ukazuju na razinu samoučinkovitosti u upravljanju tehnologijom. Post-hoc usporedbama koristeći Scheffe test rezultati srednje vrijednosti onih koji rade kao ravnatelji između 10 i 20 godina (*M*=85,91, *SD*=13,48) i onih koji rade više od 20 godina (*M*=85,57, *SD*=13,86) statistički se razlikuju od onih

koji rade manje od 10 godina (*M*=78,73, *SD*=16,17). S obzirom na pod-dimenzije samoučinkovitosti u upravljanju tehnologijom, razvidno je da se rezultati za *Digitalno građanstvo* značajno razlikuju u odnosu na radno iskustvo *F* (2,194) = 4,06, *p* = .02, Post-hoc usporedbe pokazuju da se srednje vrijednosti za one koji imaju između 10 i 20 godina radnog iskustva (*M*=16,68, *SD*=3,37) značajno razlikuju od onih koji imaju manje od 10 godina radnoga iskustva (*M*=15,13, *SD*=3,59). Nadalje, srednji rezultat za one koji imaju više od 20 godina radnoga iskustva ne razlikuje se značajno od dvije spomenute skupine. Među pod-dimenzijama, srednji rezultat za *Sustavno usavršavanje* također se značajno razlikuje u odnosu na radno iskustvo, F (2,194) = 5,72, *p* = .00 što ukazuje da se srednji rezultat za *Sustavno usavršavanje* za ravnatelje s više od 20 godina radnoga iskustva značajno razlikuje (*M*=20,01, *SD*=4,05) od dvije preostale skupine. *Kultura učenja u digitalno doba* također se znatno razlikuje u odnosu na radno iskustvo ravnatelja, *F* (2,194) = 5,69, *p* = .00. Rezultati su pokazali da se srednje vrijednosti za *Kulturu učenja u digitalno doba* kod ravnatelja s više od 20 godina radnoga iskustva (*M*=20,47, *SD*=3,57) i od onih između 10 i 20 godina (*M*=20,27, *SD*= 3,23)značajno razlikuju od onih koji imaju manje od 10 godina radnoga iskustva.

Razlika u razinama samoučinkovitosti u upravljanju tehnologijom i njezinim pod-dimenzijama u odnosu na sudjelovanje u IT programima stručnoga usavršavanja

Nezavisni t test korišten je kako bi usporedio rezultate samoučinkovitosti upravljanja tehnologijom i njezinim pod-dimenzijama u odnosu na sudjelovanje u IT programima stručnoga usavršavanja. Rezultati analize prikazani su u Tablici 4.

Tablica 5

Kao što je prikazano u Tablici 4, t test je značajan za rezultate samoučinkovitosti upravljanja tehnologijom, *t* (197) = 2,20, *p* = .03 što ukazuje da su rezultati ravnatelja koji su sudjelovali u IT programu stručnoga usavršavanja (*M*=83,69, *SD*=78,17) značajno viši od onih koji nisu (*M*=78,17, *SD*=16,42). S obzirom na pod-dimenzije skale, može se zaključiti da su oni koji su sudjelovali u IT programu stručnoga usavršavanja imali značajno bolje rezultate u pod-dimenzijama *Digitalno građanstvo* i *Izvrsnost u profesionalnom radu*. Rezultati za ostale pod-dimenzije nisu se značajno razlikovali za dvije skupine.

Diskusija i zaključci

Općenito, rezultati istraživanja pokazali su da ravnatelji imaju visoku samoučinkovitost upravljanja tehnologijom. S druge strane, među pod-dimenzijama, imaju najveću samoučinkovitost upravljanja tehnologijom u odnosu na pod-dimenziju *Upravljanje s vizijom*, *Izvrsnost u profesionalnom radu*, *Digitalno građanstvo*, *Kultura učenja u digitalno doba* i *Sustavno usavršavanje*. Drugim riječima, ravnatelji bi trebali omogućiti i koristiti tehnologije i modelirati korištenje tehnologije u školi u obrazovne svrhe te potaknuti nastavnike na korištenje i integraciju tehnologije u nastavi i učenju. Nadalje, istraživanja iz relevantne literature pokazuju da ravnatelji imaju visoke kompetencije za upravljanje tehnologijom (Tanzer, 2004; Seay, 2004; Can, 2008; Eren-Şişman, 2010; Banoğlu, 2011; Sincar i Aslan, 2011; Sezer, 2011; Bülbül i Çuhadar, 2012;). Anderson i Dexter (2005), istražili su različite karakteristike upravljanja tehnologijom s obzirom na osam indikatora sastavnica upravljanja tehnologijom. Ustanovili su da većina škola pokazuje pet karakteristika upravljanja poput Politike usavršavanja kadra, Odbor za tehnologiju, Politika intelektualnog vlasništva, Dani ravnatelja, Proračun za školsku tehnologiju. Ovi indikatori povezani su s NETS-A standardima koji su sukladni rezultatima ovoga istraživanja. S obzirom da ravnatelji imaju visoku samoučinkovitost u pod-dimenziji *Upravljanje s vizijom*, mogli bi razviti viziju za integraciju

tehnologije s dionicima, podržavajući tehnologiju i nabavljajući potrebne izvore. S obzirom na visoke rezultate samoučinkovitosti u pod-dimenziji *Izvrsnost u profesionalnom radu*, ravnatelji bi mogli pratiti nove tehnologije kako bi ih integrirali u obrazovanje i organizirali program usavršavanja za nastavnike vezan uz učinkovito korištenje tehnologije. Nadalje, visoki rezultat samoučinkovitosti u pod-dimenziji *Digitalno građanstvo* sugerira da se sami ravnatelji osjećaju odgovornima za korištenje digitalnih tehnologija i u stvaranju pravila za legalno, etično i sigurno korištenje digitalne tehnologije. Visoka samoučinkovitost u pod-dimenziji *Kultura učenja u digitalno doba* sugerira da su ravnatelji kadri stvoriti i razviti obrazovne primjene za studente i priuštiti digitalne tehnologije i ostale izvore za tehnološki obogaćeno okruženje za učenje. Nadalje, visoka samoučinkovitost u pod-dimenziji *Sustavno usavršavanje* ukazuje na to da ravnatelji imaju velike mogućnosti razviti i upravljati svojim institucijama kada je riječ o učinkovitom korištenju tehnologijskih resursa.

U ovome istraživanju nema značajnih razlika između samoučinkovitosti ravnatelja u upravljanju tehnologijom i pod-dimenzijama prema razini škole (osnovna, srednja). Prema literaturi, Can (2003), Bülbül i Çuhadar (2012) došli su do sličnih rezultata. Ovaj pronalazak može se interpretirati na sljedeći način – razina škole nema važan učinak na samoučinkovitost ravnatelja u upravljanju tehnologijom. Međutim, postoji značajna razlika između samoučinkovitosti ravnatelja u upravljanju tehnologijom i pod-dimenzije prema radnome iskustvu. Drugim riječima, što je duži radni staž ravnatelja to su viši rezultati samoučinkovitosti upravljanja tehnologijom. Prema literaturi, Sezer (2011) donosi slične rezultate da ne postoji značajna razlika između kompetencija ravnatelja za upravljanje tehnologijom u pod-dimenzijama kao što su Razvoj i Vrednovanje, Podrška, Planiranje i Nadzor s obzirom na radni staž. Kroz karijeru, ravnatelji su stekli iskustvo u upravljanju tehnologijom. Međutim, Tanzer, (2004) pronalazi da se rezultati kompetencija ravnatelja za upravljanje tehnologijom ne razlikuju u odnosu na radno iskustvo; Eren-Şişman, (2010) primijetio je da ne postoje razlike u rukovodećim ulogama ravnatelja kada je riječ o pružanju i korištenju obrazovnih tehnologija s obzirom na radno iskustvo.

Rezultati su također otkrili da se rezultati samoučinkovitosti upravljanja tehnologijom razlikuju s obzirom na sudjelovanje i IT programu profesionalnog usavršavanja. U pod-dimenzijama, samo se *Izvrsnost u profesionalnom radu* i *Digitalno građanstvo* znatno razlikuju s obzirom na sudjelovanje u IT programima stručnoga usavršavanja. Eren-Şişman (2010) donosi slične rezultate, odnosno da ravnatelji koji su sudjelovali u IT programu stručnoga usavršavanja imaju veće kompetencije u ulogama upravljanja tj. u pružanju i korištenju obrazovnih tehnologija od onih koji nisu sudjelovali. Taj pronalazak mogao bi se interpretirati na način da su IT programi stručnoga usavršavanja učinkoviti u razvoju samoučinkovitosti ravnatelja za upravljanje tehnologijom. Prezentiranje inovativnih pristupa i uputa o korištenju novih programa može biti korisno za ravnatelje kako bi unaprijedili znanje o tehnologiji. Iz tog razloga osjećali bi se kompetentnije u upravljanju tehnologijom od onih koji nisu sudjelovali u IT programima stručnoga usavršavanja.

Kao i ostale studije iste teme istraživanja (Can, 2003, 2008; Akbaba-Altun, 2004; Tanzer, 2004; Anderson i Dexter, 2005; Şişman-Eren, 2010; Marulcu, 2010; Sezer, 2011; Eren i Kurt, 2011; Sincar i Arslan, 2011; Hacıfazlıoğlu, Karadeniz i Dalgıç, 2010, 2011, 2011; Banoğlu, 2011; Richardson i McLeod, 2011; Bülbül i Çuhadar, 2012) i ovo istraživanje ima svoja ograničenja. Inicijalno smo planirali 320 sudionika ravnatelja iz grada u zapadnom dijelu Turske. Međutim, neki od ravnatelja nisu se odazvali anketi a neke od anketa nisu bile valjane. Ukupno 199 ravnatelja škola odabrano je za analizu. Zbog toga iz rezultata ne možemo generalizirati na ostale situacije i ostale ljude osim na grad u kojemu rade ravnatelji. Kako bi se dobila općenita slika diljem zemlje, preporučaju se dodatna istraživanja koja bi dala bolji prikaz fenomena. Nadalje, ovo istraživanje fokusiralo se na samoučinkovitost upravljanja tehnologijom u odnosu na ograničeni broj varijabli. Moguće je da postoje i drugi faktori koji

objašnjavaju samoučinkovitost upravljanja tehnologijom poput samoučinkovitosti u korištenju računalom, stavu prema tehnologiji, samoučinkovitosti u integraciji tehnologije i kompetentnost, itd. Konačno, rezultati istraživanja su ograničeni sa standardnom anketom koju su dobili pristupnici. Kako bi se došlo do širih razumijevanja fenomena, bilo bi korisno provesti intervjue i promatrati ravnatelje.