IN-SERVICE TEACHERS' INTERNET SELF-EFFICACY: A RE-EXAMINATION OF GENDER DIFFERENCES

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ABSTRACT

Teachers' Internet self-efficacy plays a critical role in their web-based professional development and on their students' learning outcomes in Internet-based learning environments. It is therefore important to periodically measure and evaluate teachers' self-efficacy regarding the Internet, which is a dynamic technology, using an instrument that reflects the recent advancements in the Internet technology. By considering radical changes taking place recently on the Internet, this study aimed to explore teachers' Internet self-efficacy by gender by adapting an earlier instrument. To this end, the Internet Self-efficacy Scale (ISS) developed by Kim and Glassman (2013) was used. First, the ISS was adapted into Turkish and the confirmatory factor analysis results revealed that the Turkish version of the ISS could be used as a valid instrument to measure teachers' Internet self-efficacy [$\chi2(df = 106) = 270.836$, NFI = .865, CFI = .912 and RMSEA = .086 (90% C.I.; .073 - .098)]. The coefficient of Cronbach's alpha for the Turkish version of the ISS was found to be 0.92. In this study, survey method was used. The sample of the study consisted of 349 in-service teachers with different majors in Turkey. The data were analyzed using independent sample t-test and the results showed teachers' Internet self-efficacy was considerably high. Additionally, no gender differences in any of the subscales of the ISS including five subscales, namely, reactive/generative, differentiation, organization, communication and search, were found.

Keywords: Internet self-efficacy, in-service teacher, gender, confirmatory factor analysis.

INTRODUCTION

The Internet, where radical changes have occurred over the last decade, is not only a tool that helps get information created by certain web designers anymore but also a platform where all web users (even those with little technical know-how) are able to easily and quickly share their emotions, thoughts and knowledge with others. In other words, through Web 2.0 technologies, which are defined as a new generation platform that provides individuals with opportunities for freedom of action and ease of use, web users are not only the consumer of information but also its creator and publisher (Hew, & Cheung, 2013; Papastergiou, Gerodimos, & Antoniou, 2011; Thompson, 2007). Therefore, the extent of the use of the Web 2.0 technologies such as blog and wiki is expanding day by day. One of the areas where Web 2.0 technologies are widely used is also education. Because Web 2.0 applications, which are called readable and writable web, enable teachers both to access information that will

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contribute to their professional development and to share their experiences, knowledge, thoughts, and teaching materials easily and quickly with their colleagues and students. Moreover, through Web 2.0 technologies, teachers can create online discussion platforms where their students will be able to debate the issues raised in the classroom. In other words, the recent advancements in the Internet technology offers teachers great opportunities to create more flexible (in time and space), interactive and collaborative learning environments that help them to enhance their students' learning outcomes (Chen, & Tseng, 2012; Chiu, & Tsai, 2014; Peng, Tsai, & Wu, 2006; Wang, & Wu, 2008; Wu, & Tsai, 2006). However, being able to adopt new technologies easily and quickly is important for using these technologies effectively.

The concept of self-efficacy, which was brought to life by Bandura (1977) in his social cognitive theory, is one of the most important factors that influence individuals' willingness and ability to use new information technologies (Glassman, & Kang, 2012) and it is a pivotal concept that helps researchers to understand how individuals quickly and easily adopt new technologies and develop new skills using those tools (Hsu, & Huang, 2006; Torkzadeh, & Van Dyke, 2002). Self-efficacy is a psychological concept that refers to an individual's belief (perceived confidence) about his/her capabilities to accomplish specific tasks and activities (Bandura, 1996). Self-efficacy is one of the important factors that shape individuals' behaviors and feelings (Compeau, & Higgins, 1995). Individuals who believe that they are going to be ultimately successful in a given task are more likely to make more effort to accomplish this task and less likely to give up easily even when encountering obstacles or adversity (Kim, & Glassman, 2013; Liu & Wilson, 2010; Ren, 2000). Besides, self-efficacy has a reciprocal relationship with performance. That is, making a great effort to perform a task and being persistent to accomplish this task will increase the likelihood of success, which, in turn, further enhance self-efficacy (Ren, 2000).

Internet self-efficacy which is often defined as individuals' confidence in their ability to use the Internet (Chuang, Lin, & Tsai, 2015; Kao, Tsai, & Shih, 2014; Wu, & Tsai, 2006) is one of the factors that have a strong influence on academic performance of both teachers and learners in contemporary educational environments where the Internet is actively used (Chang, et al., 2014; Liang, & Tsai, 2008; Peng, et al., 2006). Tsai and his colleagues (2011) reported that performance of learners with a higher sense of Internet self-efficacy in Internet-based learning settings may be better than that of those with a lower sense of Internet self-efficacy. For example, Tsai and Tsai (2003) documented that students who had higher confidence in their own capability to use the Internet were more successful in using searching strategies in a Web-based learning task than those who had lower confidence. Similarly, individuals who perceive themselves as highly efficacious in performing a task on the Internet may be more willing to use new Internet applications (e.g. search engines, wikis, blogs) to solve problems they encounter (Kim, & Glassman, 2013). Some studies provide evidence of the relationship between learners' Internet self-efficacy and their motivation and attitude towards web-based continuing learning (Chen, & Tseng, 2012; Kao, Wu, & Tsai, 2011; Liang, & Wu, 2010; Liang, Wu, & Tsai, 2011). Teachers' self-efficacy that has a profound effect on their willingness to use the Internet in their classrooms (Kao, et al., 2014) has become an important issue for investigation by educational researchers for the last two decades. The research conducted in this context indicated that teachers' Internet self-efficacy directly affects their integration of the Internet into their classroom (Chen, 2009) and their attitudes and motivation towards web-based professional development (Kao, & Tsai, 2009; Kao, et al., 2011). In other words, teachers with higher levels of Internet self-efficacy tend both to show higher motivation and attitudes towards web-based professional development and to integrate the Internet more fully into their teaching activities. Moreover, teachers' confidence in their ability to use the Internet is considered as a prerequisite for effective and efficient implementation of Internet-based instruction in their teaching activities (Wu, & Wang, 2015).

In the last two decades, there have been a great number of attempts to develop reliable and valid instruments for measuring students' and teachers' Internet self-efficacy and these attempts still continue today. Because the Internet is an extraordinarily fast-moving technology and hundreds of new Internet applications that have the potential to promote teaching and learning are being developed every day. Therefore, it is very important to assess individuals' Internet self-efficacy using an updated instrument that reflects the recent improvements in the Internet technology. Although the literature has a great number of studies investigating both pre- and in-service teachers' Internet self-efficacy, the preliminary data on teachers' Internet self-efficacy need to be renewed. Additionally, in Turkey, most of the research on Internet self-efficacy target pre-service teachers (Durmus, & Basarmak, 2014; Kahraman, Yilmaz, Altun, & Erkol, 2013; Topal, & Akgun, 2015; Tuncer, & Ozut, 2012) and not enough studies have been dedicated to exploring Internet self-efficacy among in-service teachers. Therefore, this study aimed to explore in-service teachers' Internet self-efficacy using the ISS that reflects the radical changes recently taking place in the Internet technology and to investigate their Internet self-efficacy by gender.

METHOD

Survey method, which is used to learn about people's attitude, beliefs, values, demographics, behavior, opinions, habits, desires, ideas and other type information, was used in this study. Surveys are frequently used in education for primarily three reasons: versatility, efficiency and generalizability (McMillan, & Schumacher, 2006, p. 233).

Participants

The sample of the study consisted of 349 in-service teachers with different majors at various grade levels, from primary school to high school, in Turkey. Of the sample, 206 (59.0%) were female and the remaining 143 (41.0%) were male. Among the 349 teachers, 172 (49.3%) had 0-5 years of teaching experience, 71 (20.3%) had 6-10 years of teaching experience, 41 (11.7%) had 11-15 years of teaching experience, 33 (9.5%) had 16-20 years of teaching experience, 31 (8.9%) had 21+ years of teaching experience and one (.3%) missing data about his/her teaching experience. Additionally, while 321 teachers (92.0%) reported that they owned a smartphone, the remaining 26 (7.4%) reported that they did not own one. However, two participants (.6%) did not report information about whether they use a smartphone or not. In this study, convenience sampling method was used to collect the data because of budget and time constraints (McMillan, & Schumacher, 2006).
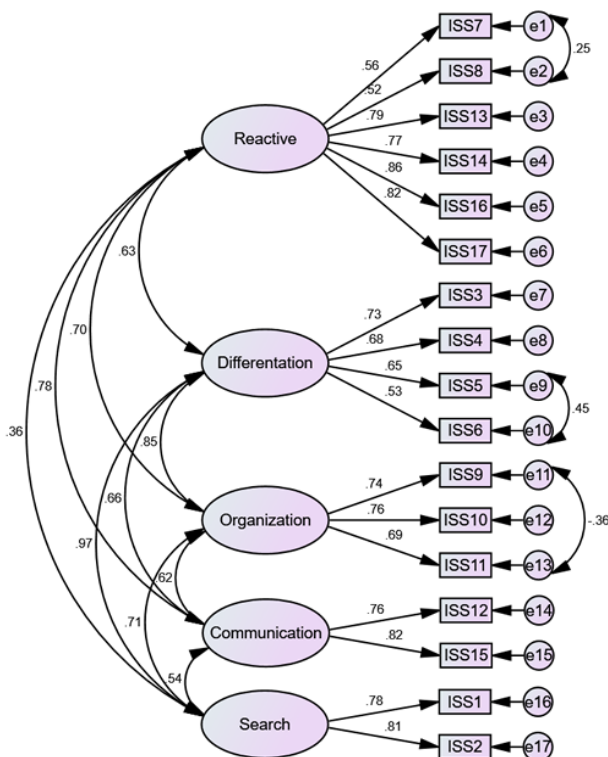
The Scale

To meet the purpose of the study, the Internet Self-efficacy Scale (ISS), originally developed and validated by Kim and Glassman (2013), was used. The original form of the ISS with 17 items (seven-point Likert-type scale ranging from 1, "not at all confident" to 7, "very confident") is composed of five scales, namely, reactive/generative, differentiation, organization, communication and search. These scales are categorized into three general levels of self-efficacy including different tasks ranging from the simple to the complicated. Communication and search are involved in the first level that includes simple tasks and activities that require little cognitive investment such as using social networks (e.g., Facebook) to communicate with others and using search engines (e.g., Google) to search for information. The second level is composed of the scales of organization and differentiation containing more complex and difficult tasks, such as organizing information structured by the platforms like Facebook and using hyperlinks to find information. The third level including the reactive/generative self-efficacy is the level that contains the newest and most complex tasks such as creating original content through blogs.

First, the permission was obtained from the corresponding author to use the ISS. Then, the ISS was translated into Turkish and then the translated version was validated by three educational technology experts who were fluent in both Turkish and English languages. Afterwards, a native Turkish language expert reviewed the scale for sentence construction. The Turkish version of the ISS was administered to 213 teachers to assess the construct validity of the five-factor model. Among these participants, 108 (50.7%) were female and the remaining 105 (49.3%) were male. Of the participating teachers, 124 (58.2%) had 0-5 years of teaching experience, 27 (12.7%) had 6-10 years of teaching experience, 38 (17.8%) had 11-15 years of teaching experience, 8 (3.8%) had 16-20 years of teaching experience, 16 (7.5%) had 21+ years of teaching experience.

Table 1. Summary of the model fits of CFA models of the Turkish version of ISS

	χ^2	df	χ^2/df	NFI	CFI	RMSEA (90% C.I.)
Original model	336.474	109	3.087	.832	.878	.099 (.087 - .111)
Adjusted model	296.705	108	2.747	.852	.899	.091 (.079 - .103)
Adjusted model	284.284	107	2.657	.858	.905	.088 (.076 - .101)
Final model	270.836	106	2.555	.865	.912	.086 (.073 - .098)

The original factorial structure of the ISS was assessed by CFA with maximum likelihood estimation procedures in AMOS version 21.0.0. The initial model was run and chi-square value that indicates the amount of difference between the expected and observed covariance matrices was found to be 336.474 (df = 109, p < .05) as a result of the analysis of the data from the ISS consisting of 17-item five-factor model. Chi-square value is strongly affected by sample size and it is almost always statistically significant when sample size is large (Byrne, 2010; Kenny, 2014). Therefore, chi-square to df (degrees of freedom) or "χ^2/df" which minimizes the impact of sample size on the model is suggested as one of the alternative ways to measure model fit (Kenny, 2014). Therefore, "χ^2/df" and the other fitness indices such as Root Mean Square Error of Approximation (RMSEA), Comparative Fit Index (CFI), and Normed Fit Index (NFI) have also been computed and the analysis resulted in a poor fit (see Table 1). The modification indices suggested that the fit of the model would be improved by allowing for correlation between the error terms of items 5 and 6 that are included in the same subscale. Therefore, the error terms of items 5 and 6 were correlated and the adjusted model was run again. The results revealed that although the adjusted model was more fit than the original one, fit indices of the adjusted model were still poor. Hence, the other additional paths between the error terms of items, i.e. items 7 and 8, items 9 and 11, suggested by the modification indices were drawn and the last adjusted model was run again. According to the goodness-of-fit indices [(χ^2/df; ≤2 excellent, ≤5 acceptable; Kline, 2011), (NFI; ≥ .90 acceptable; Bentler & Bonett, 1980; Hooper, Coughlan, & Mullen, 2008), (CFI; ≥ .90; Bentler, 1990; Hooper, et al., 2008), and (RMSEA with 90% C.I.; ≤ .05 excellent, ≤ .10 acceptable; Kline, 2011] used to evaluate the degree of fit between the model and the data, the final model fits where χ^2(df = 106) = 270.836, NFI = .865, CFI = .912, RMSEA = .086 (C.I.; .073 - .098) were acceptable.

Graphic 1. The path diagram regarding the Turkish version of the ISS

The Cronbach's alpha which is the most commonly used statistic to measure the reliability of Likert type scales was calculated for each scale of the ISS consisting of five scales, namely, reactive/generative, differentiation, organization, communication and search. The reliability (alpha) coefficients for the five scales were .87, .77, .72, .76, and .78, respectively, and overall alpha was .92. Consequently, the results revealed that the Turkish version of the ISS was a reliable and valid instrument that could be used to measure teachers' Internet self-efficacy.

Data Collection and Analysis

The data were collected in two different formats including paper-pencil and online and were statistically analyzed using SPSS 20.0. To determine if the data are normally distributed, skewness and kurtosis values were calculated. Additionally, Levene's test was used to assess whether variances were homogeneous between groups. After the assumptions were met, independent sample t test was performed on the data to determine whether females and males differed significantly on the ISS scales.

FINDINGS

The results of descriptive statistics and independent sample t test, which was performed for each scale of the ISS after the necessary assumptions had been met, were presented in Table 2-6. The statistics computed regardless of gender showed teachers' mean scores on the scales of the ISS were all over five points (except for the 'reactive/generative' scale) on a seven-point scale. This result implied that the teachers participating in this study tended to demonstrate generally high confidence in using the Internet. While teachers attained similar high scores on the scales of differentiation (M = 5.56, SD = .97), organization (M = 5.64, SD = 1.07) and communication (M = 5.18, SD = 1.65), they had the lowest score (M = 4.51, SD = 1.43) on the scale of reactive/generative and had the highest score (M = 6.35, SD = .79) on the scale of search. The results implied that the teachers in this study tended to have the

highest confidence in their ability to use the Internet to search for information while they tended to have the lowest confidence in their ability to use the Internet to create interesting content that people would be interested in.

To check whether the data met the assumption of normality, skewness and kurtosis statistics were calculated for each scale of the ISS and these values were found to be between +1 and -1 for all the scales, except search self-efficacy. Skewness and kurtosis values calculated for search self-efficacy scores were between +2 and -2. Consequently, these pieces of evidence showed the data met the assumption of normality. Additionally, the results of the Levene's test computed to test if the variances are equal in groups were presented as follows: $(F_{(347)} = .002, p = .964)$ for reactive/generative self-efficacy, $(F_{(347)} = .148, p = .701)$ for differentiation self-efficacy, $(F_{(347)} = .062, p = .804)$ for organization self-efficacy, $(F_{(347)} = 4.552, p = 0.34)$ for communication self-efficacy and $(F_{(347)} = .034, p = .853)$ for search self-efficacy. As shown from the results, the assumption of homogeneity of variances was violated only in the scale of communication self-efficacy.

Table 2. The results of independent sample t-test for reactive/generative self-efficacy scores

Sources	Gender	N	M	SD	t	df	p
Reactive/generative self-efficacy	Female	206	4.50	1.43	-.141	347	.888
	Male	143	4.52	1.45			

As would be expected, both female and male teachers attained the lowest mean score on the scale of reactive/generative self-efficacy that included the items that reflected difficult and complicated activities. As shown in Table 2, the reactive/generative self-efficacy mean scores for female and male teachers were 4.50 (SD = 1.43) and 4.52 (SD = 1.45), respectively. Using the alpha level of .05, an independent sample t test was conducted to determine whether the mean score of female teachers was significantly different from that of male teachers and the results showed there was no a statistically significant difference in the reactive/generative self-efficacy scores between male and female teachers $(t_{(347)} = -.141, p > .05)$.

Table 3. The results of independent sample t-test for differentiation self-efficacy scores

Sources	Gender	N	M	SD	t	df	p
Differentiation self-efficacy	Female	206	5.55	.99	-.349	347	.727
	Male	143	5.58	.93			

Differentiation self-efficacy scale was the second one that included the items that reflected complicated tasks, and therefore it was expected that the participants would attain lower scores on this scale but both female and male teachers reported relatively high scores. That is, the differentiation self-efficacy mean score attained by the female teachers was 5.55 (SD = .99) while the mean score attained by the male teachers was 5.58 (SD = .93). As shown in Table 3, the results of the independent sample t test revealed that the difference between the mean score attained by female teachers and that attained by male teachers was not significant $(t_{(347)} = -.349, p > .05)$.

Table 4. The results of independent sample t-test for organization self-efficacy scores

Sources	Gender	N	M	SD	t	df	p
Organization self-efficacy	Female	206	5.63	1.07	-.279	347	.780
	Male	143	5.66	1.07			

As shown in Table 4, organization mean scores for female and male teachers were 5.63 (SD = 1.07) and 5.66 (SD = 1.07), respectively. Although the organization self-efficacy mean score of male teachers was higher than that of female teachers, no a statistically significant difference between organization self-efficacy mean scores of female teachers and male teachers was found (t(347) = -.279, p > .05).

Table 5. The results of independent sample t-test for communication self-efficacy scores

Sources	Gender	N	M	SD	t	df	p
Communication self-efficacy	Female	206	5.18	1.73	-.016	347	.988
	Male	143	5.19	1.53			

In this study, it was expected that the participants would attain high scores on the scale of communication self-efficacy that was categorized under the level that included simple tasks. Contrary to this expectation, both female and male teachers had low scores on this self-efficacy scale. Table 5 demonstrated that communication self-efficacy mean score of female teachers (M = 5.18, SD = 1.73) was almost the same as that of male teachers (M = 5.19, SD = 1.53) and not surprisingly, no significant difference was found between the mean scores of female and male teachers (t(347) = -.016, p > .05).

Table 6. The results of independent sample t-test for search self-efficacy scores

Sources	Gender	N	M	SD	t	df	p
Search self-efficacy	Female	206	6.37	.79	.523	347	.601
	Male	143	6.32	.78			

As would be expected, the highest mean scores of both the male and female teachers were found in response to the questions on the search self-efficacy including simple activities such as searching for information on the Internet using search engines. Table 6 clearly demonstrated that the difference between search self-efficacy score of female teachers (M = 6.37, SD = .79) and self-efficacy score of male teachers (M = 6.32, SD = .78) was rather small. The results of the independent sample t test indicated that the mean score of female teachers was not significantly different from that of male teachers (t(347) = .523, p > .05). In other words, the difference in the search self-efficacy mean scores between female and male teachers was not significant.

DISCUSSION and CONCLUSION

Teachers having a high level of Internet self-efficacy are crucial in terms of the quality of education because teachers' confidence in their ability to use the Internet affects their motivation, attitude and performance in Internet-based educational environments. Furthermore, the Internet is a dynamic technology and hence examining teachers' Internet self-efficacy periodically using an instrument with items that reflect the recent developments in the Internet technology is very important. The present study attempted to identify teachers' Internet self-efficacy and investigate their self-efficacy according to gender using the ISS that reflects the recent Internet applications. First, the ISS was adapted into Turkish and CFA results revealed that the Turkish version of the ISS was deemed to be sufficiently valid for measuring teachers' Internet-self efficacy. Also, the Turkish version of the ISS had a high reliability (Cronbach's Alpha = .92). The results of the analysis indicated that although teachers had relatively low mean score on the reactive/generative self-efficacy scale (M = 4.51), their mean scores on the other scales of the ISS were over five points on the seven-

point scale. This result implied that teachers tended to demonstrate high levels of confidence in their own capability to use the Internet.

This study found that female and male teachers had about the same overall Internet self-efficacy. In other words, the instrument used in this study consists of five scales involving different tasks ranging from the simple to the complicated and no gender difference in neither the scales involving simple tasks nor the scales involving difficult tasks was found. This result could suggest that the traditional gender gap in which the males were more confident in their ability to use the Internet than females may be narrowing or disappearing (Tsai, & Lin, 2004; Tsai, & Tsai, 2010). Similar results were also reported in many recent studies performed on teachers and students (Erdamar, Demirkan, Saracoglu, & Alpan, 2017; Kahraman et al., 2013; Tsai, & Tsai, 2010). Narrowing or disappearing in the gender gap in Internet self-efficacy was not a surprising finding. Because, in recent years, the Internet has become an indispensable part of education and daily life and it is often used by both female and male teachers for different educational and daily activities such as searching on the Internet using search engines like Google, sharing documents with students using file-sharing tools like Dropbox, collaborating with colleagues using collaboration tools like Google Drive and communicating with students and peers using online communication tools like Facebook and e-mail. It is believed that these basic Internet activities play an important role in enhancing teachers' Internet self-efficacy and in narrowing the gap Internet self-efficacy between female and male teachers. However, some studies still report that males tend to feel more confident about their ability to use the Internet than females (Chang et al., 2014; Morse, Gullekson, Morris, & Popovic, 2011).

Until the mid-1990s, the use of computer was perceived as a primarily masculine activity (Comber, Colley, Hargreaves, & Dorn, 1997; Turkle, 1997; Whitley, 1997) and hence computer-related activities were generally more popular among males than females (Hawkins, 1985). Most prior research strongly supported that males were more comfortable, more confident and more enthusiastic when working with computers than females (Durndell, Haag, & Laithwaite, 2000; Massoud, 1991; Shashaani, 1997; Siann, Macleod, Glissov, & Durndell, 1990) and that males, compared to females, had more positive attitudes towards computers (Kadijevich, 2000; Levin, & Gordon, 1989). Computer games that appeal to males, role models, family and peer support, prior experience, socioeconomic status, the 'masculine' image of computers and stereotypes were reported as the sources of gender differences in computer-related behaviors (Meelissen, & Drent, 2008; Shashaani, 1994; Sullivan, 1989; Tsai, & Tsai, 2010; Vekiri, & Chronaki, 2008).

Similarly, the Internet, which is an extension of computer technology, was also heavily dominated by males until 2000s and therefore, the results of the studies investigating individuals' attitudes, self-efficacy and anxiety regarding the Internet were typically in favor of males rather than females (Durndell, & Haag, 2002; Torkzadeh, & Van Dyke, 2002; Tsai, Lin, & Tsai, 2001). In other words, males had, in general, more confidence, more positive attitudes and lower anxiety regarding the Internet than females. However, since the beginning of 2000s, the number of the studies reporting that Internet gender gap is rapidly diminishing has dramatically increased. Women's increasing Internet use is shown among the causes of which the traditional gender gap in Internet-related issues is narrowing (Tsai & Lin, 2004). Until the mid-1990s, females were significantly less likely to use the Internet than males (Ono, & Zavodny, 2003) and Bimber (2000) reported that socioeconomic status was one of the factors that limit women's access to the Internet and that the gender gap in Internet use would decrease, as the difference in socioeconomic status became smaller. A survey conducted by Pew Research Center indicates that in the 2000s, the gender gap in access to the Internet began to narrow and that nowadays the Internet is almost equally utilized by both males and females (Perrin & Duggan, 2015). The increasing use of smartphones, which integrate the

Internet with mobile technology, by both males and females may have contributed to reducing the gender gap in Internet use by making the Internet easier to access. Poushter (2016) reported that smartphone ownership rates have increased at an extraordinarily fast pace since 2013 in the emerging economies like Turkey. In parallel with this report, the large majority of the teachers (92.0%) in this study have also expressed that they own a smartphone. According to a survey conducted on people of different ages in the United States of America, about 90% of those who own smartphones use the Internet (Smith, 2015). The use of smartphones that allow users to access the Internet without time limits or space constraints may lead to a richer Internet experience. In other words, smartphones integrate the Internet with mobile technology and hence smartphone users are more likely to spend more time using the Internet. The role of Internet experience in Internet-related issues (e.g., attitudes and self-efficacy regarding the Internet) has often been investigated in relevant studies. The studies attempting to explore the role of Internet experience on Internet self-efficacy indicated that students with higher Internet experience tended to show significantly higher self-efficacy beliefs when using the Internet (Chu, & Tsai, 2009; Wu, & Tsai, 2006; Tsai, & Tsai, 2003; 2010). Moreover, experience is considered as the strongest one (Eastin, & LaRose, 2000; Wu, & Wang, 2015) among four factors identified by Bandura (1994) as sources of self-efficacy. Likewise, prior experience in using the Internet is seen as the most effective way of strengthening individuals' Internet self-efficacy.

As emphasized in the previous articles, teachers' Internet self-efficacy is an issue that should be addressed in a serious way. It is very important that teachers are able to use the Internet effectively for their professional development and their students' learning outcomes. In other words, teachers frequently use the Internet for educational purposes such as accessing content, resources and materials for professional development and teaching, working with colleagues collaboratively and sharing teaching materials with students. High Internet self-efficacy is considered to be one of the most critical factors that are required for the effective use of the Internet. The Internet is a technology that changes at an extraordinary pace and teachers who are confident in using the Internet will be more likely to adopt innovations in the Internet technology that can be used to support teaching and learning than those who are not. Therefore, it is very important to organize in-service training programs that will help teachers to improve their confidence and enthusiasm regarding both basic and advanced use of the Internet and to encourage them to participate in these programs. Because the literature has evidence suggesting that a properly designed training can be a highly effective way to significantly enhance individuals' Internet self-efficacy (Kim, Glassman, Bartholomew, & Hur, 2013; Ren, 2000; Torkzadeh, Chang, & Demirhan, 2006; Torkzadeh, & Van Dyke, 2002). However, the relevant literature (Wu, & Wang, 2015) and also the current study have revealed that teachers generally tended to have lower confidence in using the Internet for advanced purposes rather than for basic purposes. Therefore, one of the most important goals of training programs should be to increase teachers' advanced Internet self-efficacy by providing them experiences that reach beyond their daily Internet-based activities.

In conclusion, the study found that there were no gender differences in any of the scales categorized under three dimensions including a variety of tasks, some of which are simple and some of which are complicated. The gender gap regarding Internet-related issues is expected to gradually narrow because, especially through mobile technology, women can have the opportunity to spend more time on the Internet than they did in the past.

LIMITATIONS

This study has some limitations that are worth noting. Perhaps the most important limitation is that the data of the present study were collected only from 349 teachers who were non-randomly selected because of time and budget constraints and therefore, the generalizability

of the results is limited. Due to this, it is clear that similar studies should be replicated on a larger population that will be assigned using random sampling method. In addition, the present study was performed using quantitative measures, which may not be adequate to obtain in-depth insights into teachers' self-efficacy regarding the Internet. Therefore, mixed research methods may be used in future research to provide a full understanding of teachers' Internet self-efficacy.

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REFERENCES

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, 84, 191-215.

Bandura, A. (1994). Self-efficacy. In V. S. Ramachaudran (Ed.), Encyclopedia of human behavior (Vol. 4, pp. 71-81). New York: Academic Press. (Reprinted in H. Friedman [Ed.], Encyclopedia of mental health. San Diego: Academic Press, 1998).

Bandura, A. (1996). Multifaceted impact of self-efficacy beliefs on academic functioning. *Child Development*, 67, 1206-1222.

Bentler, P. M. (1990). Comparative fit indexes in structural modeling. *Psychological Bulletin, 107*(2), 238–246.

Bentler, P. M., & Bonett, D. G. (1980). Significance tests and goodness of fit in analysis of covariance structures. *Psychological Bulletin, 88*(3), 588–606.

Bimber, B. (2000). Measuring the gender gap on the Internet. Social Science Quarterly, 81(3), 868-876.

Byrne, B. M. (2010). *Structural equation modeling with AMOS: Basic concepts, applications, and programming* (2nd ed.). Madison, NY: Routledge.

Chang, C.-S., Liu, E., Z.-F., Sung, H.-Y., Lin, C.-H., Chen, N.-S., & Cheng, S.-S. (2014). Effects of online college student's Internet self-efficacy on learning motivation and performance. *Innovations in Education and Teaching International, 51*(4), 366-377.

Chen, H.-L. (2009). *Internet self-efficacy and behavior in integrating the Internet into instruction: a study of vocational high school teachers in Taiwan*. 4th European Conference on Technology Enhanced Learning, EC-TEL 2009: Learning in the Synergy of Multiple Disciplines, vol. 5794, 706-711.

Chen, H.-R., & Tseng, H.-F. (2012). Factors that influence acceptance of web-based e-learning systems for the in-service education of junior high school teachers in Taiwan. *Evaluation and Program Planning*, 35, 398-406.

Chiu, Y.-L., & Tsai, C.-C. (2014). The roles of social factor and Internet self-efficacy in nurses' web-based continuing learning. *Nurse Education Today*, 34, 446-450.

Chu, R. J-C., & Tsai, C.-C. (2009). Self-directed learning readiness, Internet self-efficacy and preferences towards constructivist Internet-based learning environments among higher-aged adults. *Journal of Computer Assisted Learning*, 25, 489-501.

Chuang, S.-C., Lin, F.-M., & Tsai, C.-C. (2015). An exploration of the relationship between Internet self-efficacy and sources of Internet self-efficacy among Taiwanese university students. *Computers in Human Behavior*, 48, 147-155.

Comber C., Colley, A., Hargreaves, D. J. & Dorn, L. (1997). The effects of age, gender and computer experience upon computer attitudes. *Educational Research, 39*(2), 123-133.

Compeau, D., & Higgins, C. A. (1995). Computer self-efficacy: development of a measure and initial test. *MIS Quarterly, 19*(2), 189-211.

Durmus, A., & Basarmak, U. (2014). Ogretmen adaylarının egitsel internet kullanım oz-yeterlik inancları ve problemli internet kullanım durumları arasındaki ilişkinin incelenmesi [Investigation of the relation between teacher candidates Internet self-efficiency belief and their problematic intended use]. *Ahi Evran University Journal of Kirsehir Education Faculty, 15*(3), 49-67.

Durndell, A., & Haag, Z. (2002). Computer self-efficacy, computer anxiety, attitudes towards the Internet and reported experience with the Internet, by gender, in an East European sample. *Computers in Human Behavior*, 18, 521-535.

Durndell, A., Haag, Z., & Laithwaite, H. (2000). Computer self-efficacy and gender: a cross cultural study of Scotland and Romania. *Personality and Individual Differences*, 28, 1037-1044.

Eastin, M. S., & LaRose, R. (2000). Internet self-efficacy and the psychology of the digital divide. *Journal of Computer-Mediated Communication*, 6(1), Retrieved November 7, 2016 from http://onlinelibrary.wiley.com/doi/10.1111/j.1083-6101.2000.tb00110.x/full

Erdamar, G., Demirkan, O., Saracoglu, G., & Alpan, G. (2017). Lise ogretmenlerinin yaşam boyu ogrenme egilimleri ve egitsel internet kullanma oz-yeterlik inancları [The relaıionship between high school teachers' life-long learning tendencies and their educational Internet use self-effıcacy beliefs]. *Abant Izzet Baysal Universitesi Egitim Fakultesi Dergisi, 17*(2), 636-657.

Glassman, M., & Kang, M. (2012). Intelligence in the Internet age: The emergence and evolution of Open Source Intelligence (OSINT). *Computers in Human Behavior, 28*(2), 673-682.

Hawkins, J. (1985). Computers and girls: rethinking the issues. *Sex Roles*, 13, 165-180.

Hew, K. F., & Cheung, W. S. (2013). Use of web 2.0 technologies in K-12 and higher education: the search for evidence-based practice. *Educational Research Review*, 9, 47-64.

Hooper, D., Coughlan, J., & Mullen, M. R. (2008). Structural Equation Modelling: Guidelines for determining model fit. *The Electronic Journal of Business Research Methods, 6*(1), 53-60.

Hsu, T., & Huang, L. C. (2006). *Developing an Internet Self-Efficacy Scale of 2006 (ISE06)*. In T. Reeves & S. Yamashita (Eds.), Proceedings of E-Learn: World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education 2006 (pp. 2000-2008). Chesapeake, VA: Association for the Advancement of Computing in Education (AACE).

Kadijevich, D. (2000). Gender differences in computer attitude among ninth-grade students. *Educational Computing Research, 22*(2), 145-154.

Kahraman, S., Yilmaz, Z. A., Erkol, M., & Yalcin, S. A. (2013). Ogretmen adaylarının egitsel ınternet kullanımı oz yeterlik inanclarının incelenmesi [Investigation of pre-service teachers' self-efficacy beliefs of educational Internet use]. *Elementary Education Online, 12*(4), 1000-1015.

Kao, C.-P., & Tsai, C.-C. (2009). Teachers' attitudes toward web-based professional development, with relation to Internet self-efficacy and beliefs about web-based learning. *Computers & Education, 53*(1), 66-73.

Kao, C.-P., Wu, Y.-T., & Tsai, C.-C. (2011). Elementary school teachers' motivation toward web-based professional development, and the relationship with Internet self-efficacy and belief about web-based learning. *Teaching and Teacher Education*, 27, 406-415.

Kao, C.-P., Tsai, C.-C., & Shih, M. (2014). development of a survey to measure self-efficacy and attitudes toward web-based professional development among elementary school teachers. *Educational Technology & Society, 17*(4), 302–315.

Kenny, D. A. (2014). *Measuring model fit*. Retrieved February 1, 2015, from http://davidakenny.net/cm/fit.htm

Kim, Y., & Glassman, M. (2013). Beyond search and communication: Development and validation of the Internet Self-efficacy Scale (ISS). *Computers in Human Behavior*, 29, 1421–1429.

Kim, Y., Glassman, M., Bartholomew, M., & Hur, E. H. (2013). Creating an educational context for Open Source Intelligence: The development of Internet self-efficacy through a blogcentric course. *Computers & Education*, 69, 332-342.

Kline, R. B. (2011). *Principals and practice of structural equation modeling* (3rd ed.). New York: Guilford.

Levin, T., & Gordon. C. (1989). Effects of gender and computer experience on attitudes toward computers. *Journal of Educational Computing Research, 5*(1), 69-88.

Liang, J.-C., & Tsai, C.-C. (2008). Internet self-efficacy and preferences toward constructivist Internet-based learning environments: A study of pre-school teachers in Taiwan. *Educational Technology & Society, 11*(1), 226-237.

Liang, J.-C., & Wu, S.-H. (2010). Nurses' motivations for Web-based learning and the role of Internet self-efficacy. *Innovations in Education and Teaching International, 47*(1), 25-37.

Liang, J.-C., Wu, S.-H., & Tsai, C-C., (2011). Nurses' Internet self-efficacy and attitudes toward web-based continuing learning. *Nurse Education Today*, 31, 768-773.

Liu, O. L., & Wilson, M. (2010). Source of self-efficacy beliefs: development and validation of two scales. *Journal of Applied Measurement, 11*(1), 24-37.

McMillan, J. H., & Schumacher, S. (2006). *Research in education: Evidence based inquiry* (6th ed.). New York, Pearson Education.

Massoud, S. L. (1991). Computer attitudes and computer knowledge of adult students. *Journal of Educational Computing Research*, 7, 269-291.

Meelissen, M. R. M., & Drent, M. (2008). Gender differences in computer attitudes: Does the school matter? *Computers in Human Behavior*, 24, 969-985.

Morse, B. J., Gullekson, N. L., Morris, S. A., & Popovich, P. M. (2011). The development of a general Internet attitudes scale. *Computers in Human Behavior*, 27, 480-489.

Ono, H., & Zavodny, M. (2003). Gender and the Internet. *Social Science Quarterly, 84*(1), 111-121.

Papastergiou, M., Gerodimos, V., & Antoniou, P. (2011). Multimedia blogging in physical education: Effects on student knowledge and ICT self-efficacy. *Computers and Education*, 57, 1998-2010.

Peng, H., & Tsai, C.-C. & Wu, Y.-T. (2006). University students' self-efficacy and their attitudes toward the Internet: the role of students' perceptions of the Internet. *Educational Studies, 32*(1), 73-86.

Perrin, A., & Duggan, M. (2015). *Americans' Internet access: 2000-2015*. Retrieved September 11, 2016, from http://www.pewinternet.org/2015/06/26/americans-internet-access-2000-2015/

Poushter, J. (2016). *Smartphone ownership and Internet usage continues to climb in emerging economies*. Retrieved September 11, 2016 from http://www.pewglobal.org/2016/02/22/smartphone-ownership-and-internet-usage-continues-to-climb-in-emerging-economies/

Ren, W.-H. (2000). Library instruction and college student self-efficacy in electronic information searching. *The Journal of Academic Librarianship, 26*(5), 323-328.

Shashaani, L. (1994). Gender-differences in computer experience and its influence on computer attitudes. *Journal of Educational Computing Research, 11*(4), 347-367.

Shashaani, L. (1997). Gender differences in computer attitudes and use among college students. *Journal of Educational Computing Research, 16*(1), 37-51.

Siann, G., Macleod, H., Glissov, P. & Durndell, A. (1990). The effect of computer use on gender differences in attitudes to computers. *Computers & Education*, 14, 183-191.

Smith, A. (2015). U.*S. smartphone use in 2015*. Retrieved October 14, 2016 from
http://www.pewinternet.org/2015/04/01/us-smartphone-use-in-2015/

Sullivan, K. P. (1989). *Gender differences in computer attitudes and utilization in grades 4, 8, and 11*. Retrospective Theses and Dissertations. Iowa State University. Paper 16675.

Thompson, J. (2007). Is education 1.0 ready for web 2.0 students? Innovate: *Journal of Online Education, 3*(4). Article 5. Retrieved October 10, 2016, from
http://nsuworks.nova.edu/cgi/viewcontent.cgi?article=1095&context=innovate

Topal, M., & Akgun, O. E. (2015). Egitim fakultesinde okuyan ogretmen adaylarının egitim amaclı internet kullanımı oz-yeterlik algılarının incelenmesi: Sakarya Universitesi ornegi [Investigation of educational Internet use self-efficacy perceptions of prospective teachers enrolled at a faculty of education: Sakarya University Sample]. *Kastamonu Egitim Dergisi, 23*(1), 343-364.

Torkzadeh, G., & Van Dyke, T. P. (2002). Effects of training on Internet self-efficacy and computer user attitudes. *Computers in Human Behavior*, 18, 479-494.

Torkzadeh, G., Chang, J. C. J., Demirhan, D., (2006). A contingency model of computer and Internet self-efficacy. *Information Management, 43*(4), 541-550.

Tsai, C.-C., Chuang, S.-C., Liang, J.-C., & Tsai, M.-J. (2011). Self-efficacy in Internet-based learning environments: a literature review. *Educational Technology & Society, 14*(4), 222-240.

Tsai, C.-C., & Lin, C.-C. (2004). Taiwanese adolescents' perceptions and attitudes regarding the Internet: exploring gender differences. *Adolescence, 39*(156), 725-734.

Tsai, C.-C., Lin, S. S. J., & Tsai, M.-J. (2001). Developing an Internet Attitude Scale for high school students. *Computers & Education*, 37, 41-51.

Tsai, M.-J., & Tsai, C.-C. (2003). Information searching strategies in web-based science learning: The role of Internet self-efficacy. *Innovations in Education and Teaching International*, 40, 43-50.

Tsai, M.-J., & Tsai, C.-C. (2010). Junior high school students' Internet usage and self-efficacy: A re-examination of the gender gap. *Computers & Education*, 54, 1182-1192.

Tuncer, M., & Ozut, A. (2012). Sınıf ogretmeni adaylarının egitsel internet kullanımına yonelik oz yeterlik inancları [Self-efficacy perception of preservice class teachers to educational Internet usage]. *International Periodical for the Languages, Literature and History of Turkish or Turkic, 7*(2), 1079-1091.

Turkle, S. (1997). *Life of the screen: Identity in the age of the Internet*. New York: Touchstone

Vekiri, I., & Chronaki, A. (2008). Gender issues in technology use: Perceived social support, computer self-efficacy and value beliefs, and computer use beyond school. *Computers & Education*, 51, 1392-1404.

Wang, S.-L., & Wu, P.-Y. (2008). The role of feedback and self-efficacy on web-based learning: The social cognitive perspective. *Computers & Education*, 51, 1589-1598.

Whitley, B. E., (1997). Gender differences in computer-related attitudes and behavior: a meta-analysis. *Computers in Human Behavior, 13*(1), 1-22.

Wu, Y.-T., & Tsai, C.-C. (2006). University students' Internet attitudes and internet self-efficacy: a study at three universities in Taiwan. *Cyberpsychology & Behavior, 9*(4), 441-450.

Wu, Y. T., & Wang, L.-J. (2015). The Exploration of elementary school teachers' Internet self-efficacy and information commitments: a study in Taiwan. *Educational Technology & Society, 18*(1), 211-222.