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Language Teachers' Digital Literacy and Self-efficacy: Are They Related?

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Research Article

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Abstract

This study focuses on the relationship between digital literacy and teacher self-efficacy and how foreign language teachers' self-efficacy and digital literacy differ corresponding to teachers' gender, experience, major, involvement in ICT training and the amount of time spent online. Participants were 100 foreign language teachers who work at various Colleges of Foreign Languages across Turkey. The quantitative data was collected via two scales; i.e., Digital Literacy Scale (Ng, 2012) and Teacher Sense of Self-efficacy Scale (Tschannen-Moran & Woolfolk-Hoy, 2001). Findings indicate a significant positive correlation between digital literacy and teacher self-efficacy. In addition, digital literacy and teacher self-efficacy differ according to teachers' experience, involvement in ICT-training and the amount of time spent online. However, teacher self-efficacy and digital literacy do not differ significantly based on teachers' gender and majors. Implications and suggestions for further research are discussed.

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Keywords: Digital literacy; teacher self-efficacy; language teacher education; correlational study

Introduction

The transformation of the 21st century classroom into a technologically well-equipped platform has brought about the need for integration of a new dimension into teacher pedagogical content knowledge: technology. This new set of skills and knowledge has been termed as 'technology, pedagogy and content knowledge' (TPACK) (Harris, Mishra & Koehler, 2009). Contextually speaking, the emergency remote teaching context spurred by

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the global Covid19 pandemic has highlighted the essential role of digital literacy skills in language education more than ever. All teachers have had to mainly rely on their ICT skills to do their job and train themselves to employ synchronous computer-mediated communication tools, e.g., Zoom, GoogleTeams, skilfully. Adopting digital tools such as GoogleDocs, Kahoot, YouTube and zillions of others have become a necessity rather than an extra activity since they make online teaching more interactive and meaningful. It would not be wrong to argue that having good digital literacy skills has become a must rather than an add-on for language teachers in the post-pandemic period. The world has moved into a new dimension, and online and hybrid models of teaching are still in practice, and it seems that they will stay in our lives longer than we have expected.

Within this framework, this study envisages that digital literacy, briefly defined as ‘survival skills in the digital era’ (Eshet-Alkalai, 2004), is an integral aspect of TPACK. Digital literacy involves ‘the awareness, attitude and ability to use digital tools’ (Martin & Grudziecki, 2006) which is the core of technology knowledge that teachers need to integrate into their pedagogical content knowledge. Moreover, teacher self-efficacy, defined as ‘teachers’ beliefs that they are capable of carrying out good teaching in the classroom’ (Christophersen, Elstad, Turmo, & Solhaug, 2016), is substantial predictor of a number of variables related to both students and teachers (Ross, 1998); e.g., ‘professional commitment’ (Skaalvik & Skaalvik, 2007; Ware & Kitsantas, 2007), use of innovative ideas (Fuchs, Fuchs & Bishop, 1992), ‘attrition from the teaching profession’ (Klassen & Chiu, 2011; Hong, 2012), students’ motivation and achievements (Guo, Connor, Yang, Roehrig, & Morrison, 2012).

Research Questions

Based on the brief theoretical background discussed, the study aims to find answers to the following three research questions:

1. What is the relationship between language teachers’ self-efficacy and digital literacy?
2. To what extent does this relationship differ according to foreign language teachers’ gender, experience, major, involvement in ICT-based training and the amount of time spent online?

How is Digital Literacy Related to Language Teachers' Self- efficacy?

Digital literacy is an overarching term which is closely related with multiple literacies; e.g., 'media literacy, visual literacy, information literacy, and computer literacy' (Eshet-Alkalai, 2004; Buckingham, 2015; Koltay, 2011). Ng (2012) also proposes a three-dimensional framework for digital literacy that involve technical, cognitive and socio-emotional dimensions. The cognitive dimension refers to skills to critically evaluate information, which covers being informed of and sensitive to legal and ethical issues about the use of digital tools and making intelligent choices about software that suits one's specific purpose and task. Ng (2012) suggests that socio-emotional dimension lies at the intersection of the two literacies and it involves "being able to use the Internet responsibly for communicating, socializing and learning by observing 'netiquette'" (p. 1068).

Language teachers of the Internet generation need digital literacy skills to be able to "guide them in their educational journey through digital media" (OECD PISA Report, 2010, p. 7). Ng (2012) also postulates that it is the teachers' responsibility to guide learners into exploiting the digital technologies that can contribute to their learning process. Therefore, that language teachers possess digital competencies is essential so that they can equip learners with the needed digital literacy which will help them function properly in the rapidly digitalizing world (Pianfetti, 2001).

Literature is rich in studies that focus on teachers' ICT self-efficacy (Hammond, Reynolds & Ingram, 2011; So, Choi, Lim & Xiong, 2012; Teo, 2014; Hatlevik, 2016, Hatlevik & Hatlevik, 2018) and its relationship with digital literacy and ICT integration into teaching practices (Hammond et al., 2011; Hatlevik, 2017, Hatlevik & Hatlevik, 2018); and teachers' pedagogical beliefs (So et al., 2012). Findings from these studies reveal a positive correlation between teachers' ICT self-efficacy and ICT integration into their teaching, which means that teachers with higher ICT self- efficacy tend to integrate ICT into their teaching more often. Similarly, Ekşi (2011) examined the impact of ICT training on EFL teachers' ICT self-efficacy and computer literacy. She found that gender and experience were not determinant of their ICT self-efficacy and computer literacy; however, ICT self-efficacy supported computer literacy and vice versa.

Based on their findings, Hatlevik and Hatlevik (2018) conclude that general ICT self-efficacy is a prerequisite for the development of ICT self-efficacy in using it for educational purposes. However, they also underpin the need for further research to reveal the

relationships between general self-efficacy and ICT self- efficacy that are termed as respectively teacher self-efficacy and digital literacy in this study. The departure point of this study; therefore, is to explain the relationship between teacher self-efficacy and their digital literacy as individuals rather than only focusing on teachers' ICT self-efficacy and its impact on their teaching practice. Scarcity of studies in the literature that deal with this relationship points to a gap in the literature that this study aims to address. Similarly, how teacher self-efficacy and digital literacy differ based on gender, experience, major, involvement in ICT-based training and the amount of time spent online has also remained largely unexplored despite studies which consider gender and experience as variables (Ekşi, 2011) in teachers' acceptance of technology (Teo, 2014) and teachers' past experiences as a variable in their willingness to integrate ICT into teaching (So et al. ,2012).

Methodology

Research Design

This study employs a cross-sectional, correlational research design based on the quantitative research paradigm. Teacher self-efficacy and digital literacy are continuous dependent variables whereas teachers' gender, experience, major, involvement in ICT training and the amount of time spent online are categorical independent variables.

Participants

Participants of the study were 100 foreign language instructors who work at various Colleges of Foreign Languages across Turkey. The participants were determined via convenience and snowball sampling. The demographic information; e.g., gender, and profile information; e.g., the major, years of experience and amount of time spent online, related to participants is provided in Table 1.

Table 1: *Participants' demographic and profile information*

Gender		Years of Experience			Major						Time spent online (hours)				
Female	Male	1-5	5-10	10+	ELT ^a	ELL ^b	TS ^c	ACL ^d	Ling. ^e	Other	-1	1-2	2-4	4-8	12+
73	27	14	46	40	65	17	3	3	6	6	9	25	49	14	2
N (Total): 100		N (Total): 100			N (Total): 100						N (Total): 100				

^a English Language Teaching
Literature^e Linguistics

^b English Language & Literature

^c Translation Studies

^d American Culture & Literature

The number of the female participants was 73 while the number of male participants was 27. The reason for this imbalance between the number of female and male participants is the fact that the great majority of instructors who teach at Colleges of Foreign Languages around Turkey are female as indicated by the most recent statistics provided by Turkish Board of Higher Education (2019) in Table 2.

Table 2: *Statistics of foreign language instructors who work at Colleges of Foreign Languages around Turkey**

	Male	Female	Total
N	1614	4065	5679

* Retrieved online June 15, 2019 from <https://istatistik.yok.gov.tr/>.

The numbers specified in Table 2 reveal that the number of female instructors is nearly four times as high as the number of male participants. Similarly, the great majority of the participants had 5 to 10 years of experience (N= 46), followed by the participants who had more than 10 years of experience (N= 40). The number of novice instructors who had 1 to 5 years of experience was the lowest (N=14). The reason for the low number of novice participants may be the advantage of experienced instructors over novice ones in the employment process. It is understandable that administrators of Colleges of Foreign Languages in Turkey would rather hire experienced instructors than novice ones. In addition, the numbers reveal that more than half of the participants (N= 65) have English Language Teaching as their major, which is possibly due to the same reason as the higher number of experienced participants. Finally, the nearly half of the participants (N=49) spend at least 2 to 4 hours a day online while only 9 of them spend less than 1 hour. Therefore, it can be suggested that the great majority of participants in this study are active daily users of the Internet.

Research Instruments

The quantitative data has been collected via two scales; i.e., Teachers' Sense of Efficacy Scale (TSES) (Tschannen-Moran, M., & Woolfolk Hoy, A., 2001) and the Digital Literacy Scale (Ng, 2012). The short form of TSES that includes twelve items with scale points between 1 and 9 indicating the degrees of efficacy that teachers think they have for each item with 1 the lowest and 9 the highest. The scale also consists of three sub-scales; i.e., student attendance (engagement), teaching strategies (instruction) and classroom management. Details about the reliability scores of the TSES are presented in Table 3.

Table 3: *The Cronbach's alpha Coefficients of the TSES and Its Subscales*

	Long Form			Short Form		
	Mean	SD	Cronbach's alpha	Mean	SD	Cronbach's alpha
TSES	7.1	.94	.94	7.1	.98	.90
<i>Engagement</i>	7.3	1.1	.87	7.2	1.2	.81
<i>Instruction</i>	7.3	1.1	.91	7.3	1.2	.86
<i>Management</i>	6.7	1.1	.90	6.7	1.2	.86

In Tschannen-Moran, M., & Woolfolk Hoy, A. (2001). Teacher efficacy: Capturing and elusive construct. *Teaching and Teacher Education*, 17, 783-805.

The Cronbach alpha co-efficient of TSES for the present study has been determined as 0.89 for this study. Similarly, the Cronbach alpha values for the sub-scales have been calculated as 0.84 for engagement, 0.88 for instruction and 0.87 for management for this study.

The second research instrument employed in the study which is Digital Literacy Scale (Ng, 2012) consists of 17 items with a four-point Likert type scale ranging from 1 to 4, which indicate the participants degree of proficiency for each item (1-not proficient, 2-somewhat proficient, 3-proficient, 4- very proficient). The scale has been validated by two experts in ICT education (Ng, 2012). The Cronbach alpha reliability co-efficient of the scale has been calculated as 0.86 for the present study which means that the reliability of the scale is high (Üstündağ, Bahçivan & Güneş, 2017).

Data Collection & Analysis

Data was collected over a three-month period between March and June, 2019. While some participants responded to the scales online via Google Forms, some of them took the paper version. Oral or written consent of the participants was taken prior to the implementation of the scales. The quantitative data was processed via SPSS software. In order determine whether to conduct parametric or non-parametric tests, the data was checked whether it had a normal distribution or not. Among other normality tests; e.g., Kolmogorov-Smirnov test, Shapiro-Wilk test, another way to show that the research sample has a normal distribution is to have skewness and kurtosis values that are close to 0- between +4 and -4 (Ghasemi & Zahediasl, 2012). Accordingly, the skewness (for Teacher Self Efficacy (TSE)=0.713, for Digital Literacy (DL)= 0.459) and kurtosis (for TSE= 0.228, for DL=0.320) values for the research sample of the study are within the acceptable limits for a normal

distribution. Based on this finding that the research sample meets the criteria for normal distribution, parametric tests; i.e., Pearson Correlation and Multivariate Analysis of Variance (MANOVA), were run to test the hypotheses of the study. The skewness and kurtosis values of the research sample are presented in Table 4.

Table 4: *The skewness and kurtosis values of the research sample for teacher self-efficacy and digital literacy*

	TSE*	DL**
<i>N</i>	100	100
<i>Mean</i>	81.68	53.64
<i>Median</i>	82.75	53.8
<i>Mode</i>	80.00	51.00
<i>Skewness</i>	-.713	-.459
<i>Std. Error of Skewness</i>	.241	.241
<i>Kurtosis</i>	.228	-.320
<i>Std. Error of Kurtosis</i>	.478	.478

*Teacher self-efficacy **Digital literacy

The study hypothesizes that there is a positive correlation between foreign language teachers' self-efficacy and their digital literacy. Pearson Correlation test was run in order to examine the relationship between the two variables, which is the first research question of the study. This test is used to test the degree and direction; i.e., positive or negative, of the correlation between two continuous variables which are teacher self-efficacy and digital literacy in this study.

The second hypothesis of the study is that foreign language teachers' self-efficacy and digital literacy differ according to teachers' gender, experience, major, involvement in ICT training and the amount of time spent online. Therefore, MANOVA test was run to examine whether foreign language teachers' self-efficacy and digital literacy differ according to the above-mentioned variables or not. MANOVA test is employed when there is more than one continuous dependent variable, and it has the power to explain whether multiple dependent variables differ according to various independent variables, i.e. groups (O'Brien & Kaiser, 1985). The continuous dependent variables are teacher self-efficacy and digital literacy while independent variables; i.e., groups that represent different dimensions, are teachers' gender, experience, major, involvement in ICT training, and the amount of time they spend online. The data meets the essential conditions to run a MANOVA test. To begin

with, skewness and kurtosis values are between -1 and +1 for each group representing independent variables. The skewness and kurtosis values for each group are presented in Table 5.

Table 5: *Skewness and kurtosis values of the groups related to the independent variables of the study*

	Gender	Experience	Major	Involvement in ICT training	Time spent online	
Skewness values						
TSE	Male	-0.096	1-5 yrs* -.493	ELT	Yes -.484	1-2 hrs** .029
	Female	-.967	5-10 yrs -.335	Others	No -.690	2-4 hrs -.855
			10+ yrs -1.097			4-8 hrs -.583
DL	Male	-.233	1-5 yrs -.135	ELT	Yes -.485	1-2 hrs -.388
	Female	-.382	5-10 yrs -.286	Others	No -.361	2-4 hrs -.535
			10+ yrs -.211			4-8 hrs -.271
Kurtosis values						
TSE	Male	-.810	1-5 yrs -.913	ELT	Yes -.526	1-2 hrs -.024
	Female	.907	5-10 yrs -.588	Others	No .124	2-4 hrs .366
			10+ yrs 1.040			4-8 hrs -.271
DL	Male	-.605	1-5 yrs -1.037	ELT	Yes -.707	1-2 hrs .035
	Female	-.535	5-10 yrs -.345	Others	No -.414	2-4 hrs .348
			10+ yrs -.799			4-8 hrs -1.067

*years **hours

The second condition for running a MANOVA test is a significant linear correlation ($r=0.371$, $p<0.01$) between the dependent variables that are teacher self-efficacy and digital literacy in this study. A third condition is the non-existence of a significant difference between the dependent variables. Box's Test of Equality of Covariance Matrices was used to check if there is a significant difference between teacher self-efficacy and digital literacy and the test did not indicate a significant difference (for gender: $p=.147$; for experience: $p=.377$, for major: $p=.281$; for involvement in ICT-training: $p=.126$; for time spent online: $p=.138$; $p>0.05$). Similarly, error variances of dependent variables are homogenous. Levene's Test of Equality of Error Variances was run to compute error variances and they are presented in Table 6.

Table 6: Error Variances based on Levene's Test of Equality of Error Variances

	Gender	Experience	Major	Involvement in ICT training	Time spent online
	<i>p</i>	<i>p</i>	<i>p</i>	<i>p</i>	<i>p</i>
TSE	.794	.985	.799	.414	.356
DL	.151	.127	.085	.216	.085

$p > 0,05$

Finally, each data is independent from the other and Wilk's Lambda statistics were used to determine to run one-way MANOVA on the data.

Findings and Discussion

In this section, the findings are presented along with discussions based in the literature. The two research questions are based on the following hypotheses that are either confirmed or falsified depending on the findings.

- H. 1. There is a positive correlation between foreign language teachers' self-efficacy and digital literacy. (Research question 1)
- H. 2. Foreign language teachers' self-efficacy and digital literacy differ according to teachers' gender, experience, major, involvement in ICT training and the amount of time spent online. (Research question 2)

The Relationship Between Foreign Language Teachers' Self-efficacy and Digital Literacy

In order to discover the answer to the first research question of the study, Pearson correlation test was run on the data that revealed a positive significant correlation between foreign language teachers' self-efficacy and their digital literacy ($r=0,371$, $p<0,01$), which is in accordance with the findings from other studies in the literature that point to a positive association between teacher ICT self- efficacy and self-efficacy in using ICT in teaching (Hammond et al, 2011; So et al., 2012; Teo, 2014; Hatlevik, 2017; Hatlevik & Hatlevik, 2018). The related findings are presented in Table 7.

Table 7: *The correlation between teacher self-efficacy and digital literacy*

		TSE	Digital Literacy
TSE	Pearson Correlation	1	.371**
	<i>p</i>		.000
	<i>N</i>	100	100
Digital Literacy	Pearson Correlation	.371**	1
	<i>p</i>	.000	
	<i>N</i>	100	100

** . Correlation is significant at the 0.01 level (2-tailed).

This finding reveals that teachers with higher sense of self-efficacy also possess higher digital literacy. The more self-efficacious a teacher is, the higher digital literacy they have; and, the higher digital literacy a language teacher has, the more self-efficacious s/he is. Therefore, the hypothesis one that there is a positive correlation between teacher sense of self-efficacy and digital literacy has been confirmed.

How Teachers' Self-Efficacy and Digital Literacy differ according to Gender, Experience, Involvement in ICT-based Training, Major and the Amount of Time Spent Online

In order to find the answer to the second research question of the study, one- way MANOVA test, the conditions of which were discussed in detail in data analysis, was run for each variable. No significant difference with regard to gender was observed according the findings ($F(2-97) = 1.995, p > 0.05$, Wilks' $\lambda = .960$, partial $\eta^2 = .040$). Relevant findings are presented in Table 8.

Table 8: *Difference in teacher self-efficacy and digital literacy based on gender*

Dependent Variable	Gender	<i>n</i>	\bar{X}	<i>S</i>	<i>df</i>	<i>F</i>	<i>p</i>
TSE	Male	27	80	11.30	1-98	.820	.367
	Female	73	82	10.93			
DL	Male	27	55	7.01	1-98	1.692	.196
	Female	73	52	9.7			

In accordance with this finding, Ekşi (2011) also found no significant difference in foreign language teachers' ICT self-efficacy and digital literacy in terms of gender. However, the findings indicated a significant difference in teacher self-efficacy and digital literacy corresponding to their experience levels ($F(4-192) = 2.683, p < 0.05$, Wilks' $\lambda = .897$, partial $\eta^2 = .053$). Results from one-way MANOVA are presented in Table 9.

Table 9: *Difference in teacher self-efficacy and digital literacy based on teachers' experience levels*

Dependent Variable	Experience	<i>n</i>	\bar{X}	<i>S</i>	<i>df</i>	<i>F</i>	<i>p</i>
Teacher Self-Efficacy	1-5 years	14	82.71	10.93	2-97	.203	.817
	6-10 years	46	82.08	10.58			
	10+ years	40	80.85	11.75			
Digital Literacy	1-5 years	14	58.92	6.41	2-97	5.360	.006
	6-10 years	46	54.71	7.97			
	10+ years	40	50.55	10.23			

The findings did not indicate a significant difference in teacher self-efficacy and digital literacy based on teachers' majors, either ($F(2,97) = 2,459, p > 0,05, \text{Wilks}'\lambda = .952, \text{partial } \eta^2 = .048$). Majors other than ELT have been categorized as others which included majors, i.e., American Language and Culture Studies, Translation Studies, English Language and Literature, Linguistics and others. The study aimed to examine whether being trained as an English language teacher made a difference in teachers' self-efficacy and digital literacy; however, the findings showed that it did not. Relevant findings are presented in Table 10.

Table 10: *Difference in teacher self-efficacy and digital literacy based on teachers' majors*

Dependent Variable	Group	<i>n</i>	\bar{X}	<i>S</i>	<i>df</i>	<i>F</i>	<i>p</i>
TSE	ELT	65	80.38	11.01	1-98	2.60	.110
	Other	35	84.08	10.78			
DL	ELT	65	54.16	8.23	1-98	.617	.434
	Other	35	53.64	10.74			

One-way MANOVA was also run to determine whether teacher self-efficacy and digital literacy differed based on teachers' involvement in ICT training activities. Consequently, a significant difference related to teachers' involvement in ICT training activities was observed according the findings ($F(2,97) = .8924, p < 0.05, \text{Wilks}'\lambda = .845, \text{partial } \eta^2 = .155$). The figures are presented in Table 11.

Table 11: *Difference in teacher self-efficacy and digital literacy based on teachers' involvement in ICT training*

Dependent Variable	Group	<i>n</i>	\bar{X}	<i>S</i>	<i>df</i>	<i>F</i>	<i>p</i>
TSE	Yes	28	85.03	9.27	1-98	3.702	.057
	No	72	80.37	11.42			
DL	Yes	28	59.35	6.88	1-98	17.700	.000
	No	72	51.41	9.00			

Similarly, the findings revealed a significant difference based the time teachers spend online ($F(8-186) = 2.370$, $p < 0.05$ Wilks' $\lambda = .897$, partial $\eta^2 = .093$). Relevant findings are presented in Table 12.

Table 12: *Difference in teacher self-efficacy and digital literacy based on the time teachers spend online*

Dependent Variable	Group	<i>n</i>	\bar{X}	<i>S</i>	<i>df</i>	<i>F</i>	<i>p</i>
TSE	1-2 hrs	25	78.60	10.02	4-94	.982	.421
	2-4 hrs	49	82.16	10.63			
	4-8 hrs	14	85.50	9.71			
	12+ hrs	2	79.0	21.21			
	Less than an hour	9	80.66	15.14			
DL	1-2 hrs	25	51.56	8.15	4-94	4.407	.003
	2-4 hrs	49	54.12	8.79			
	4-8 hrs	14	59.85	5.36			
	12+ hrs	2	56.0	18.38			
	Less than an hour	9	45.33	10.39			

It can be concluded that foreign language teachers' self-efficacy and digital literacy differ based on teachers' experience levels, involvement in ICT-training and the time they spend online; however, their gender and majors do not make a significant difference in their teacher self-efficacy and digital literacy. Therefore, it can be argued that ICT-based professional development activities and spending time online can foster foreign language

teachers' self-efficacy and digital literacy; however, formal teacher training alone does not make a significant difference in teacher self-efficacy and digital literacy. Similarly, the finding that teachers' experience levels make a significant difference in their self-efficacy and digital literacy may also imply that teachers' self-efficacy and digital literacy are dynamic qualities which evolve and change over time rather than being fixed qualities that remain the same.

Conclusions and Implications

This study focused on the relationship between foreign language teachers' digital literacy and teacher self-efficacy. Findings revealed a positive significant correlation between teachers' digital literacy and teacher self-efficacy, which means that higher digital literacy means higher teacher self-efficacy and vice versa.

This study also aimed to understand how foreign language teachers' self-efficacy and digital literacy differ based on gender, experience, majors, involvement in ICT training and the amount of time spent online. Results indicated that foreign language teachers' self-efficacy and digital literacy significantly differ based on teachers' experience levels, involvement in ICT training and the amount of time spent online. However, foreign language teachers' self-efficacy and digital literacy do not differ significantly based on their gender and majors. Time spent online was found to be determinant of teacher self-efficacy and digital literacy. In other words, spending time online makes a difference in their self-efficacy and digital literacy. This is probably a consequence of their increased familiarity with accessing, choosing and using digital tools and feeling more confident to use these tools in their teaching, which lead to greater self-efficacy.

In the light of these findings, a number of suggestions can be made for foreign language education policy-makers, administrators and teacher educators. To begin with, the emphasis on enhancing digital literacy can be increased in ICT-based teacher training programs by highlighting the role of spending online time in teacher self-efficacy and digital literacy. Secondly, school administrators may prioritize providing more space for teachers' access to the Internet and digital tools so that they can increase their level of digital literacy, and; thus, teacher self-efficacy. Finally, policy-makers can ensure that continuous support to engage teachers with the digital tools is provided both during pre-service and in-service foreign language teacher education so that teachers' digital literacy will catch up with the

rapidly changing digital world, which also ensures that teacher self-efficacy will also remain high.

The study also has its limitations. Firstly, this study was conducted with 100 participants from Turkey. Further research on the study variables and their relationship with digital literacy and teacher self-efficacy can be conducted with larger samples in geographically and culturally various research contexts, which may yield different results. Secondly, this study is a cross-sectional, quantitative study. Therefore, further studies could be conducted with longitudinal, qualitative research designs that may provide a more comprehensive account of the connection between digital literacy and teacher self-efficacy. These further studies may yield richer results related to the impact of ICT-training or teachers' majors and other variables. Finally, this study focused only whether the participants were involved in ICT-based professional development activities or not. Therefore, further research with more specific categories related to teachers' involvement in ICT-based teacher training could be designed so that the effectiveness of these ICT-based teacher training programs can be evaluated.

The Research and Publication Ethics Statement

The author declares that data for the study was collected between March and June 2019 as also indicated in the study. Therefore, Ethics Committee Approval is not an obligation for this study.

The Conflict of Interest Statement

In line with the statement of Committee on Publication Ethics (COPE), I hereby declare that I had no conflicting interests regarding any parties of this study.

Contributions of authors

The author has designed the research project and collected data via research instruments. Data analysis was carried out with the help of another colleague, Gülfem Dilek Yurttaş Kumlu.

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References

- Buckingham, D. (2015). Defining digital literacy: what do young people need to know about digital media? *Nordic Journal of Digital Literacy*, 21-34. Retrieved 15.05.19 from <http://creativecommons.org/licenses/by-nc-sa/4.0/>.
- Christophersen, K. A., Elstad, E., Turmo, A., & Solhaug, T. (2016). Teacher education programmes and their contribution to student teacher efficacy in classroom management and pupil engagement. *Scandinavian Journal of Education Research*, 60, 240–254. doi: 10.1080/00313831.2015.1024162
- Ekşi, G. (2011). Foreign language instructors' computer and information literacy perceived self-efficacy: a school of foreign languages case. *ELT Research Journal*, 1(1), 91-108. Retrieved from <https://dergipark.org.tr/en/pub/eltrj/issue/5473/74364>
- Eshet-Alkalai, Y. (2004). Digital literacy: a conceptual framework for survival in the digital era. *Journal of Multimedia and Hypermedia*, 13(1), 93–106.
- Fuchs, L. S., Fuchs, D., & Bishop, N. (1992). Instructional adaptation for students at risk. *Journal of Educational Research*, 86, 70-84.
- Ghasemi, A. & Zahediasl, S. (2012). Normality tests for statistical analysis: a guide for non-statisticians. *International Journal of Endocrinology Metabolism*, 10(2), 486-489. doi: 10.5812/ijem.3505
- Guo, Y., Connor, C. M., Yang, Y., Roehrig, A. D., & Morrison, F. J. (2012). The effects of teacher qualification, teacher self-efficacy, and classroom practices on fifth graders' literacy outcomes. *Elementary Schooling Journal*, 113, 3–24. doi: 10.1086/665816
- Hammond, M., Reynolds, L., & Ingram, J. (2011). How and why do student teachers use ICT? *Journal of Computer Assisted Learning*, 27, 191–203. doi: 10.1111/j.1365-2729.2010.00389.x
- Harris, J., Mishra, P. & Koehler, M. (2009). Teachers' technological pedagogical content knowledge and learning activity types: curriculum-based technology integration reframed. *Journal of Research on Technology in Education*, 41(4), 393–416.
- Hatlevik, I. K. R. & Hatlevik, O. E. (2018). Examining the relationship between teachers' ICT self-efficacy for educational purposes, collegial collaboration, lack of facilitation and the use of ICT in teaching practice. *Frontiers in Psychology*, 9. doi: 10.3389/fpsyg.2018.00935
- Hatlevik, O. E. (2017). Examining the relationship between teachers' self-efficacy, their digital competence, strategies to evaluate information and use of ICT at school. *Scandinavian Journal of Educational Research*, 61, 555–567. doi: 10.1080/00313831.2016.1172501

- Hong, J., Y. (2012). Why do some beginning teachers leave the school, and others stay? understanding teacher resilience through psychological lenses. *Teachers and Teaching, Theory and Practice*, 18, 417–440. doi: 10.1080/13540602.2012.696044
- Klassen, R. M., & Chiu, M. M. (2011). The occupational commitment and intention to quit of practicing and pre-service teachers: influence of self-efficacy, job stress, and teaching context. *Contemporary Educational Psychology*, 36, 114–129. doi: 10.1016/j.cedpsych.2011.01.002
- Koltay, T. (2011). The media and the literacies: media literacy, information literacy, digital literacy. *Media Culture Society*, 33, 211-221. doi: 10.1177/0163443710393382
- Martin, A., & Grudziecki, J. (2006). DigEuLit: Concepts and tools for digital literacy development. Retrieved from <http://www.ics.heacademy.ac.uk/italics/vol5iss4/martin-grudziecki.pdf>
- Ng, W. (2012). Can we teach digital natives digital literacy? *Computers & Education*, 59, 1065–1078. doi:10.1016/j.compedu.2012.04.016
- O'Brien, R. G., & Kaiser, M. K. (1985). MANOVA method for analyzing repeated measures designs: an extensive primer. *Psychological Bulletin*, 97(2), 316–333. <https://doi.org/10.1037/0033-2909.97.2.316>
- Organisation for Economic Co-operation and Development (OECD) (2010). *Are students ready for a technology-rich world? What PISA studies tell us*. Paris: OECD.
- Pianfetti, E. S. (2001). Focus on research: teachers and technology: digital literacy through professional development. *Language Arts, Texts, Technology & Thinking*, 78 (3), 255-262.2012
- Ross, J. A. (1998). Antecedents and consequences of teacher efficacy. In J. Brophy, *Advances in research on teaching*, Vol. 7 (pp. 49-74). Greenwich, CT: JAI.
- Skaalvik, E. M., & Skaalvik, S. (2007). Dimensions of teacher self-efficacy and relations with strain factors, perceived collective teacher efficacy, and teacher burnout. *Journal of Educational Psychology*, 99, 611–625. doi: 10.1037/0022-0663.99.3.611
- So, H.-J., Choi, H., Lim, W. Y., & Xiong, Y. (2012). Little experience with ICT: are they really the Net Generation student-teachers? *Computers & Education*, 59, 1234–1245. doi: 10.1016/j.compedu.2012.05.008
- Statistics of foreign language instructors who work at Colleges of Foreign Languages around Turkey from Turkish Board of Higher Education Information Management System. Retrieved online June 15, 2019 from <https://istatistik.yok.gov.tr/> .
- Teo, T. (2014). Unpacking teachers' acceptance of technology: tests of measurement invariance and latent mean differences. *Computers & Education* 75, 127–135. doi: 10.1016/j.compedu.2014.01.014

- Tschannen-Moran, M., & Hoy, A. (2001). Teacher efficacy: capturing an elusive concept. *Teaching and Teacher Education, 17*, 783–805. doi: 10.1016/j.tate.2006.05.003
- Üstündağ, T. M., Bahçivan, E. & Güneş, E. (2017). Turkish adaptation of digital literacy scale and investigating pre-service science teachers' digital literacy. *Journal of Education and Future, 12*, 19-29.
- Ware, H., & Kitsantas, A. (2007). Teacher and collective efficacy beliefs as predictors of professional commitment. *Journal of Educational Research, 100*, 303–310. doi: 10.3200/JOER.100.5.303-310.