
Examining Secondary School Teachers' Self-Efficacies in Interactive Whiteboard Use

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Abstract

The present study aimed to determine secondary school teachers' self-efficacy levels regarding the use of interactive whiteboard and to examine whether their self-efficacy perceptions regarding the use of interactive whiteboard differed with respect to certain variables such as gender, field of teaching, training received on interactive whiteboard use, frequency of using the contents in Educational Informatics Network (EIN), frequency of interactive whiteboard use in lessons, suggesting interactive whiteboard use in lessons to other teachers and interactive whiteboard use time. The research sample included a total of 154 teachers from secondary schools in a district located in Western Anatolia. The study was carried out with the relational survey model, one of quantitative research methods, and as the data collection tool, "Self-Efficacy Scale for Teachers' Interactive Whiteboard Use" was used. The data collected in the study were analyzed using a package software for statistics. For the analysis of the data, the teachers' self-efficacy total and mean scores regarding interactive whiteboard use were examined. The research findings revealed that the teachers had high levels of self-efficacies regarding interactive whiteboard use; that their self-efficacy scores increased as the EIN content use increased; that their self-efficacy scores increased as their interactive whiteboard use time increased; and that the teachers who suggested using interactive whiteboard in lessons had higher levels of self-efficacy when compared to those who did not. In addition, it was found that the teachers' self-efficacy scores did not differ significantly depending on their gender and field of teaching. In the study, several suggestions were put forward for future related studies.

Keywords: Interactive whiteboard, self-efficacy, secondary school teachers

1. INTRODUCTION

The rapid changes in technology has influenced the field of education, and technology has become an indispensable part of in-class activities (Akbaba and Eryılmaz, 2013; Eryılmaz and Salman, 2014). One dimension of integrating technology into education in various areas ranging from the establishment of computer laboratories to students' tablet use has been the use of interactive whiteboard use in classes especially with the Movement of Enhancing Opportunities and Improving Technology [known as FATİH Project in Turkey]. In our country, interactive whiteboards were initially used at universities and then planned to be used in every classroom of all education institutions thanks to FATİH Project executed by the Ministry of National Education (Akıllı tahta, 2016).

Interactive whiteboard, different from the traditional board, presents visual learning activities to students in class as well as helps students structure information more easily by addressing their different learning domains with the help of both audio and visual activities (Ekici, 2008). In literature, there are several studies demonstrating that active use of interactive whiteboard in lessons facilitates students' learning (Önder, 2015; Ayvaci, 2017).

In recent years, the number of studies on teachers' use of interactive whiteboard in class has increased. One study carried out by Altınçelik (2009) aimed to determine the effects of interactive whiteboard in the education process. The study was carried out with 132 teachers from 11 elementary schools where there were interactive whiteboards in Istanbul in the academic year of 2008–2009. The results revealed that interactive whiteboard played an important role in motivating students in terms of learning complex subjects difficult to learn and that younger teachers used the interactive whiteboard more effectively.

In another study, Koçak and Gülcü (2013) aimed to determine teachers' attitudes towards interactive whiteboard applications at schools within the scope of FATİH Project. The study was conducted with 121 teachers at schools where there were interactive whiteboards in Erzincan in the Fall Term of the academic year of 2012–2013. The results demonstrated that the teachers had positive attitudes towards interactive whiteboard. It was also found that the teachers' attitudes towards interactive whiteboard did not differ significantly depending on their years of teaching, gender and age. The results also revealed that the teachers demonstrated more positive attitudes towards interactive whiteboard as their interactive whiteboard use time increased.

In one other study carried out by Tatlı (2014), the researcher tried to determine the views of teachers at secondary schools about the interactive whiteboard and their views about the in-service training they received on interactive whiteboard. The study was carried out with 535 teachers from 10 cities in the academic year of 2012-2013. The results demonstrated that interactive whiteboard use considerably increased attitudes towards and motivation in lessons and that the students became more active in class.

Yalçınkaya and Özkan (2014), in their study, aimed to determine whether secondary school teachers' self-efficacy levels regarding interactive whiteboard use differed significantly with respect to their demographic backgrounds. The study was carried out with 382 teachers from different fields of teaching who worked at secondary schools. The results revealed that the secondary school teachers had high levels of self-efficacy perceptions regarding interactive whiteboard use; that the male teachers had higher levels of self-efficacy perceptions when compared to the female teachers; that there was a significant difference in the participants' self-efficacy perceptions in terms of their ages; that the teachers with more experience in teaching had lower levels of self-efficacy when compared to those with less experience in teaching; and that there was no significant difference in the participants' self-efficacy perceptions with respect to their school type and field of teaching.

In one other study, Çiçekli (2014) aimed to determine the views of secondary school teachers about the interactive whiteboard. The study was carried out with 110 teachers using the interactive whiteboard in their classes within the scope of FATİH Project in Istanbul. The teachers participating in the study reported that they used the interactive whiteboard to facilitate students' learning and to maintain permanent learning. The results revealed that use of interactive whiteboard in class increased students' motivation and participation in lessons and made the lessons more entertaining and that the students' motivation decreased in the

case of a technical problem with the interactive whiteboard. The results also demonstrated that the male teachers used the interactive whiteboard more frequently when compared to the female teachers.

In another study carried out by Altın and Kalelioğlu (2015), the researchers aimed to determine the views of high school teachers and students about FATİH Project. The study was conducted with 520 students and 65 teachers from five high schools in Ankara. The research data were collected using the mixed method. The results demonstrated that the students FATİH Project did not contribute to their learning; that there were certain restrictions in the whiteboard and in the tablets; that the contents were not efficient; that their tablets frequently broke down; and that the EİN contents were not appropriate to their ages. As for the teachers, they reported that they should receive training on technology use and that they experienced several problems regarding technical support.

Aslan (2015) conducted a study with 153 preservice teachers from various departments to determine their reasons for approval or rejection to use the interactive whiteboard in their classes. The results of the study revealed that there was a positive relationship between attitudes towards technology and use of the interactive whiteboard and that they used the interactive whiteboard for various purposes such as drawing students' attention to lessons, encouraging them to participate in the lesson and creating visuality. In the study, it was also found that the preservice teachers who did not want to use the interactive whiteboard were not efficient in technology use and in technical support.

In one experimental study carried out with 60 students taking associate-degree education in the department of Computer Programming, Dikmen (2015) aimed to determine the permanency of academic achievement and learning via interactive whiteboard. In the research process, the course of Fundamentals of Programing was taught to the students in the experimental group with the help of the interactive whiteboard, while the traditional teaching method was used for the students in the control group. In the study, a significant difference was found in the academic achievement scores of the students in favor of those in the experimental group. It was also revealed that teaching with the help of the interactive whiteboard was more effective in terms of increasing the students' academic achievement when compared to the education given using the traditional blackboard and that the interactive whiteboard increasing the students' enthusiasm for the course.

In another study carried out by Önder (2015), the researcher aimed to determine the influence of interactive whiteboard use in the 10th grade course of Biology on the students' academic achievements and on their attitudes towards the course. The study was conducted with 50 students from two public high schools. The students were divided into two: experimental group and control group, and their pretest and posttest achievement and attitude scores were compared. In the study, it was found that there was a statistically significant difference between the students taught with the interactive whiteboard and those taught with the traditional blackboard in terms of their academic achievements and their attitudes towards the course of Biology in favor of the interactive whiteboard group.

İdin and Dönmez (2016), in their study, tried to identify the problems regarding FATİH Project and to suggest solutions to these problems. The study was carried out with 12 science teachers from different districts of Ankara. The research data were gathered using the interview method. In the study, the teachers pointed out that the most important tool featured by FATİH Project was the interactive whiteboard and that the interactive whiteboard brought

about several advantages for teaching the Science course (students' motivation in the course, easiness for students to give meaning to the information, saving time and so on).

When the literature is examined, it is seen that thanks to the help of FATİH Project, almost all the secondary schools in our country have been equipped with interactive whiteboards. However, there is no research investigating secondary school teachers' self-efficacies regarding the use of interactive whiteboards. In order to overcome this gap in literature, the present study was conducted. It is thought that determining secondary school teachers' self-efficacies regarding the use of interactive whiteboards at schools as well as examining their self-efficacies will contribute to the field. In addition, the study is also thought to help determine the related problems and then to suggest solutions to these problems. Therefore, the purpose of the study was to determine secondary school teachers' levels of self-efficacy perceptions regarding interactive whiteboard use and to reveal whether their self-efficacies regarding interactive whiteboard use differed with respect to their gender, field of teaching, training received on interactive whiteboard use, frequency of using the contents in Educational Informatics Network, frequency of interactive whiteboard use in lessons, suggesting interactive whiteboard use in lessons to other teachers and interactive whiteboard use time. In line with these purposes, the following research questions were directed:

1.1. Research Questions

- What are teachers' levels of self-efficacy perceptions regarding interactive whiteboard use?
- Do teachers' self-efficacy perceptions regarding interactive whiteboard use differ significantly with respect to their gender?
- Do teachers' self-efficacy perceptions regarding interactive whiteboard use differ significantly with respect to their field of teaching?
- Do teachers' self-efficacy perceptions regarding interactive whiteboard use differ significantly with respect to training they have received on interactive whiteboard use?
- Do teachers' self-efficacy perceptions regarding interactive whiteboard use differ significantly with respect to the frequency of their use of the contents in Educational Informatics Network?
- Do teachers' self-efficacy perceptions regarding interactive whiteboard use differ significantly with respect to frequency of their interactive whiteboard use in lessons?
- Do teachers' self-efficacy perceptions regarding interactive whiteboard use differ significantly with respect to their suggesting interactive whiteboard use in lessons to other teachers?
- Do teachers' self-efficacy perceptions regarding interactive whiteboard use differ significantly with respect to their interactive whiteboard use time?

2. METHOD

2.1. Research Model

The present study was carried out using the relational survey model, one of quantitative research methods. Relational survey models are used to determine whether there is a relationship between two or more variables and to identify the degree of the relationship, if any (Karasar,2012).

2.2. Participants

The study was conducted with 154 teachers (57 male and 97 female) from 10 secondary schools in Karacabey, a district of Bursa, in the academic year of 2016-2017. While determining the research sample, the convenience sampling method was used. This method of sampling is defined as selecting the research sample among participants based on their availability in terms of time, cost and human force (Büyüköztürk et.al., 2016). Table 1 presents the demographic information about the teachers participating in the study (gender and field of teaching).

Table 1. Distribution of the Teachers with Respect to their Gender and Field of Teaching

Field of Teaching	Male	Female	Total
Mathematics	9	17	26
Science	6	16	22
Turkish Language	6	15	21
Social Studies	11	4	15
English Language	3	13	16
Information Technologies	4	6	10
Technology and Design	1	2	3
Music	1	1	2
Visual Arts	2	2	4
Sports and Physical Activities	7	1	8
Guidance and Psychological Counselling	2	2	4
Religious Education and Ethics	3	8	11
Other	2	10	12
Total	57	97	154

2.3. Data Collection and Validity and Reliability of the Data

- In the study, “Interactive Board Use Self-Efficacy Scale” developed by Yalçınkaya and Özkan (2014) was used as the data collection tool. The scale, with its reliability and validity studies conducted, included 23 questions in five dimensions. In line with the items, the dimensions were named as “Usage”, “Efficacy”, “Problem Faced and Related Solutions” “Usage in Different Situations” and “Learning”. In order to determine the extent to which the teachers agreed on the items in scale, five-point Likert-type rating was used: “I Completely agree (5)”, “I Agree (4)”, “I am Neutral (3)”, “I Disagree (2)” and “I Completely Disagree”. The highest score to be received from the scale was 115, and the lowest was 23. The Cronbach Alpha value for the scale was found to be 0,94 (Yalçınkaya and Özkan, 2014). As for the Cronbach Alpha value obtained via the data collected in the present study, it was calculated as 0,95. Büyüköztürk, Çakmak, Akgün, Demirel and Karadeniz (2016) point out that a scale with a Cronbach Alpha value of 0,70 and higher is important for a scale to be regarded as a reliable scale. Accordingly, the scale could be said to be highly reliable.
- In the study, the Interactive Whiteboard Use Self-Efficacy Scale also included a demographic background section with questions directed to the teachers to obtain such information about their gender, age, field of teaching, training received on interactive whiteboard use, frequency of using the contents in Educational Informatics Network, frequency of interactive whiteboard use in lessons, suggesting interactive whiteboard use in lessons to other teachers and interactive whiteboard use time.

In the present study, the research data collected via the Interactive Whiteboard Use Self-Efficacy Scale were coded and analyzed using the package software of SPSS 20. For the purpose of revealing whether the data were coded without any mistake, the appropriateness of the values typed into SPSS to those in the randomly selected survey papers was checked. For the analysis of the data, the teachers' total and mean self-efficacy scores regarding interactive whiteboard use were examined. In order to determine which parametric and non-parametric tests would be used in the analysis process, whether the participants' self-efficacy total scores regarding interactive whiteboard use had a normal distribution with respect to the independent variables in the study was examined. For the normality of the data, skewness and kurtosis values were examined. Table 2 presents these values in relation to the independent variables in the study. In order for data not to differ significantly from normal distribution, skewness should be in the range of -2 and +2 (Drezner, Turel, and Zerom, 2010).

Table 2. Skewness and Kurtosis Values in Relation to the Independent Variables

Independent Variable			Skewness	Kurtosis
Gender		Female	-,479	-,499
		Male	-,838	,679
In-service Received	Training	Yes	-,812	,659
		No	-,438	-,459
Use of EIN Content		Always	-,815	-,171
		Often	-,935	-,024
		Sometimes	-,309	-,230
		Rarely	-,666	-,002
		Never	,165	-1,635
Use of Whiteboard	Interactive	Every lesson	-,854	-,359
		When necessary	-,744	,571
		When there is an appropriate material	-,742	,238
		Only for certain lesson subjects	-,331	1,263
		Never	-,494	-1,308
Suggesting Whiteboard Use	Interactive	I suggest it	-,691	,130
		I don't suggest it at all	,726	-,195
Interactive Use Time	Whiteboard	1 Year	-,438	-,412
		2 Years	-,631	,152
		3 Years	-1,239	,932
		4 Years or Longer	-,803	-,245
Field of Teaching		Mathematics	-,030	-1,318
		Science	-,461	-,469
		Turkish Language	-,663	1,375
		Social Studies	-,741	,553
		English Language	-,353	-1,381
		Information Technologies	-,928	,603
		Technology Design	-,722	
		Music		
		Visual Arts	-1,735	2,997
		Sports and Physical Activities	-,339	-,608
		Guidance and Psychological Counselling	,631	-,964
		Religious Education and Ethics	-450	-1,245
Other	,294	-1,199		

When Table 2 is examined, it is seen that the skewness and kurtosis values for all the independent variables, except for one, were in the range of -2 and +2. Accordingly, the data could be said to demonstrate a normal distribution (Drezner, et.al., 2010). According to Table 2, the independent variable which did not have a normal distribution was visual arts. In order to compare the data which demonstrated a normal distribution, parametric tests (t-test and F test (Anova)) and non-parametric tests (Mann-Whitney U and Kruskal Wallis H) were applied (Büyüköztürk et.al., 2016).

3. FINDINGS

This part presents findings regarding the teachers' levels of self-efficacies in relation to interactive whiteboard use as well as findings regarding whether their self-efficacies differed depending on their gender, school type, field of teaching, in-service training received, EFN content use, interactive whiteboard use, suggesting interactive whiteboard use and on their interactive whiteboard use time.

When the research data collected in the study were examined, it was seen that the lowest self-efficacy score was 52, and the highest was self-efficacy score was 115. The teachers' interactive whiteboard self-efficacy mean score was 93,87. When this mean score was divided by 23, it was found that the teachers' levels of interactive whiteboard use self-efficacy were at the levels of "I Agree" ($\bar{X}=4,08$). In addition, when it was compared with 115, the highest to be produced by the scale, the teachers could be said to have high levels of self-efficacy.

In the study, the sub-dimensions of the scale applied to the teachers were "Usage", "Efficacy", "Problem Faced and Related Solutions" "Usage in Different Situations" and "Learning". When the teachers' scores for these dimensions were examined, it was seen that the lowest mean score was 3,91 for the dimension of "Usage in Different Situations", and the highest mean score was 4,29 for the dimension of "Efficacy". Based on this finding, it could be stated that the teachers did not use the printers connected to the interactive whiteboard at schools and that they were open to learning in all cases, though.

When the data collected in the study were examined, it was found that the male teachers' interactive whiteboard use self-efficacy mean score was 95,54, while it was 92,89 for the female teachers. When the groups regarding an independent variable are compared with the scores regarding a dependent variable, independent measurements t-test is used to determine whether there is a significant difference between the mean scores in the case of a normal distribution of the data (Büyüköztürk et.al., 2016). For the purpose of determining whether the difference between the male and female teachers' interactive whiteboard use self-efficacy scores was significant or not, t-test was applied. Table 3 presents the t-test results.

Table 3. T-test Results of Self-Efficacy Scores with Respect to Gender

Gender	N	\bar{X}	Ss	Sd	t	p
Male	57	95.54	15.089	152	1.091	.277
Female	97	92.89	14.290			

When Table 3 is examined, it is seen that the teachers' self-efficacy scores did not differ significantly depending on their gender ($t_{(152)}=1.091$, $p>.05$). Based on this finding, it could be stated that there was no relationship between the teachers' interactive whiteboard use self-efficacies and their gender.

Table 4 presents the descriptive statistics regarding the distribution of the teachers' interactive whiteboard use self-efficacy scores with respect to their fields of teaching.

Table 4. Descriptive Statistics Regarding Self-Efficacy Scores with Respect to Field of Teaching

Field of Teaching	N	\bar{X}	Ss
Mathematics	26	91.96	14.287
Science	22	100.27	9.009
Turkish Language	21	92.62	13.507
Social Studies	15	87.33	17.859
English Language	16	95.19	12.325
Information Technologies	10	111.30	3.974
Technology Design	3	99.33	4.041
Music	2	62.50	9.192
Visual Arts	4	99.50	7.853
Sports and Physical Activities	8	89.63	17.880
Guidance and Psychological Counselling	4	83.75	19.755
Religious Education and Ethics	11	90.27	14.464
Other	12	91.83	12.777
Total	154	93.87	14,59

When Table 4 is examined, it is seen that the field of teaching with the lowest self-efficacy mean score was “music” ($\bar{X}=62.50$) and that the one with the highest self-efficacy mean score was “information technologies” ($\bar{X}=111.30$). In order to reveal whether the teachers' self-efficacy scores differed significantly in terms of their field of teaching, Kruskal Wallis H test was applied. Table 5 presents the results of this test.

Table 5. Kruskal Wallis H Test Results Regarding Self-Efficacy Scores with Respect to Field of Teaching

Field of Teaching	N	Mean Rank	sd	χ^2	p
Mathematics	26	70,31	12	33,93	0,001
Science	22	95,73			
Turkish Language	21	73,05			
Social Studies	15	62,20			
English Language	16	79,25			
Information Technologies	10	137,45			
Technology Design	3	89,83			
Music	2	5,75			
Visual Arts	4	91,75			
Sports and Physical Activities	8	66,06			
Guidance and Psychological Counselling	4	50,38			
Religious Education and Ethics	11	62,95			
Other	12	68,42			
Total	154				

The analysis results presented in Table 5 demonstrate that the teachers' interactive whiteboard self-efficacy scores differed significantly depending on their field of teaching [$\chi^2_{(12)}=33,93$, $p<0,05$]. In order to determine which groups caused the difference in the teachers' interactive whiteboard self-efficacy scores, Mann-Whitney U test was applied for every two groups. The results revealed a statistically significant difference between the interactive whiteboard self-efficacy scores of the information technologies teachers and those of the music teachers ($p<0,05$).

Table 6 presents the descriptive statistics regarding the distribution of the teachers' interactive whiteboard self-efficacy scores with respect to receiving in-service training on interactive whiteboard use.

Table 6. Descriptive Statistics Regarding Self-Efficacy Scores with Respect to Receiving In-Service Training

Receiving In-Service Training	N	\bar{X}	Ss
Yes	68	95.93	13.607
No	86	92.24	15.219
Total	154	93.87	14,59

When Table 6 is examined, it is seen that the teachers receiving in-service training ($\bar{X}=95.93$) had higher scores than those who did not receive any in-service training ($\bar{X}=92.24$). In order to determine whether the difference between the teachers' interactive whiteboard self-efficacy scores with respect to receiving in-service training was significant or not, independent samples t-test was applied. Table 7 shows the t-test results.

Table 7. T-test Results Regarding Self-Efficacy Scores with Respect to Receiving In-Service Training

Receiving In-Service Training	N	\bar{X}	Ss	Sd	t	p
Yes	68	95.93	13.607	152	1.562	.120
No	86	92.24	15.219			
TOTAL	154	93.87	14.59			

When Table 7 is examined, it is seen that there was no significant difference between the teachers' interactive whiteboard self-efficacy scores with respect to receiving in-service training ($t_{(152)}=1.562$, $p>.05$). Depending on this finding, it could be stated that the teachers' self-efficacy scores did not statistically significantly differ in terms of receiving in-service training.

Table 8 presents the descriptive statistics regarding the distribution of the teachers' interactive whiteboard self-efficacy scores with respect to using EFN contents.

Table 8. Descriptive Statistics Regarding Self-Efficacy Scores with Respect to EIN Content Use

EIN Content Use	N	\bar{X}	Ss
Never	13	89.85	13.508
Rarely	33	89.55	16.925
Sometimes	58	91.59	13.691
Often	37	100.22	12.820
Always	13	101.00	10.685
Total	154	93.87	14,59

When Table 8 is examined, it is seen that when grouped in accordance with EIN content use, the lowest self-efficacy mean score belonged to “Rarely” ($\bar{X}=89.55$) while the highest self-efficacy mean score belonged to “Always” ($\bar{X}=111.00$). For the purpose of determining whether the difference between the teachers’ self-efficacy scores was significant with respect to EIN content use, independent samples ANOVA test was used. The results can be seen in Table 9.

Table 9. ANOVA results Regarding Self-Efficacy Scores with Respect to EIN Content Use

	Sum of Squares	Sd	Mean Squares	F	p
Between Groups	3281.189	4	820.297	4.168	.003
Within Groups	29326.213	149	196.820		
Total	32607.403	153			

According to the analysis results presented in Table 9, there was a significant difference between the teachers’ interactive whiteboard self-efficacy mean scores with respect to EIN content use ($[F_{4-149}]=4.168, p<.05$). In order to which groups caused the significant difference between the teachers’ interactive whiteboard self-efficacy scores, Scheffe test was applied. The results demonstrated that there was a statistically significant difference between the teachers who “Rarely” used EIN contents and those who “Often” used EIN contents ($p<0,05$).

Table 10 presents the descriptive statistics regarding the distribution of the teachers’ interactive whiteboard self-efficacy scores with respect to interactive whiteboard use.

Table 10. Descriptive Statistics Regarding Self-Efficacy Scores with Respect to Interactive Whiteboard Use

Interactive Whiteboard Use	N	\bar{X}	Ss
Never	7	81.86	20.161
Only for certain lesson subjects	17	80.47	10.654
When there is an appropriate material	19	91.63	14.580
When necessary	70	94.89	12.577
Every lesson	41	100.78	13.623
Total	154	93.87	14,59

When Table 10 is examined, it is seen that when the teachers were grouped with respect to their interactive whiteboard use in lessons, the lowest self-efficacy mean score belonged to “Only for certain lessons subjects” ($\bar{X}=80.47$) while the highest self-efficacy mean scores belonged to “Every lesson” ($\bar{X}=100.78$). In order to determine whether the difference between

the difference between the teachers' self-efficacy scores was significant with respect to their interactive whiteboard use, ANOVA test for independent measures was used. The results can be seen in Table 11.

Table 11. ANOVA Results Regarding Self-Efficacy Scores with Respect to Interactive Whiteboard Use

	Sum of Squares	Sd	Mean Squares	F	p
Between Groups	6187.779	4	1546.945	8.724	,000
Within Groups	26419.624	149	177.313		
Total	32607.403	153			

The analysis results presented in Table 11 demonstrated that there was a significant difference between the teachers' interactive whiteboard self-efficacy mean scores with respect to their interactive whiteboard use ($[F_{(4-149)}=8.724, p<.05]$). For the purpose of determining which groups caused the difference between the teachers' interactive whiteboard self-efficacy scores, Scheffe test was used. The results revealed significant differences between the teachers who "Never" used the interactive whiteboard and those who used it in "Every lesson"; between the teachers who used the interactive whiteboard "Only for certain lesson subjects" and those who used it "When necessary"; and between the teachers who used the interactive whiteboard "Only for certain lesson subjects" and those who used it in "Every lesson" ($p>0,05$).

Table 12 shows the descriptive statistics regarding the distribution of the teachers' interactive whiteboard self-efficacy scores with respect to suggesting other teachers to use interactive whiteboard in lessons.

Table 12. Descriptive Statistics Regarding Self-Efficacy Scores with Respect to Suggesting Other Teachers to Use Interactive Whiteboard in Lessons

Suggesting Interactive Whiteboard Use	N	\bar{X}	Ss
Does not suggest it	10	86.60	14.879
Suggests it	144	94.51	14.411
Total	154	93.87	14,59

When Table 12 is examined, it is seen that the teachers who suggested Interactive whiteboard use had higher scores ($\bar{X}=94.51$) than those of the teachers who did not suggest interactive whiteboard use in lessons ($\bar{X}=86.60$). In order to determine whether the difference between the teachers' interactive whiteboard self-efficacy scores was significant with respect to suggesting other teachers to use interactive whiteboard in lessons, independent samples t-test was applied. The results can be seen in Table 13.

Table 13. T-test Results Regarding Self-Efficacy Scores with Respect to Suggesting Interactive Whiteboard Use in Lessons

Suggesting Interactive Whiteboard Use in Lessons	N	\bar{X}	Ss	Sd	t	p
Does not suggest	10	86.60	14.879	152	-2.100	.037
Suggests	144	94.51	14.411			
TOTAL	154	93.87	14.59			

When Table 13 is examined, it is seen that there was a significant difference between the teachers' self-efficacy mean scores with respect to suggesting other teachers to use interactive whiteboard in lessons [$t_{(152)}=-2.100$, $p<.05$]. Depending on this finding, it could be stated that the teachers' self-efficacy scores differed statistically significantly with respect to suggesting other teachers to use interactive whiteboard in lessons.

Table 14 presents the descriptive statistics regarding the distribution of the teachers' interactive whiteboard self-efficacy scores with respect to their interactive whiteboard use time.

Table 14. Descriptive Statistics Regarding Self-Efficacy Scores with Respect to Interactive Whiteboard Use Time

Interactive Whiteboard Use Time	N	\bar{X}	Ss
1 Year	39	88.72	14.677
2 Years	90	93.74	14.236
3 Years or longer	25	102.36	12.155
Total	154	93.87	14,59

When Table 14 is examined, it is seen that when the teachers' self-efficacy scores were grouped with respect to their interactive whiteboard use time, the lowest self-efficacy mean score belonged to "1 year" ($\bar{X}=88.72$) while the highest self-efficacy mean score belonged to "3 years or longer" ($\bar{X}=102.36$). In order to determine whether the difference between the teachers' self-efficacy scores was statistically significant with respect to their interactive whiteboard use time, independent samples ANOVA test was applied. The results can be seen in Table 15.

Table 15. ANOVA Results Regarding Self-Efficacy Scores with Respect to Interactive Whiteboard Use Time

	Sum of Squares	Sd	Mean Squares	F	p
Between Groups	2838.623	2	1419.311	7.199	.001
Within Groups	29768.780	151	198.144		
Total	32607.403	153			

According to the analysis results presented in Table 15, there was a significant difference between the teachers' interactive whiteboard self-efficacy mean scores with respect to their interactive whiteboard use time ($[F_{2-151}]=7.199$, $p<.05$). For the purpose of determining which groups caused the difference between the teachers' interactive whiteboard self-efficacy scores, Scheffe test was used. The results revealed a significant difference between the teachers who used interactive whiteboard for "1 year" and those who used interactive whiteboard for "3 years or longer" ($p>0,05$).

4. DISCUSSION, CONCLUSION AND SUGGESTIONS

The present study aimed to determine secondary school teachers' levels of self-efficacy perceptions regarding interactive whiteboard use and to investigate whether their interactive whiteboard self-efficacies differed in accordance with their gender, field of teaching, receiving training on interactive whiteboard use, their frequencies of using E1N contents, their frequencies of using interactive whiteboard in lessons, suggesting other teachers to use interactive whiteboard in lessons and in accordance with their interactive whiteboard use

time. In the study, it was found that the secondary school teachers' self-efficacies regarding interactive whiteboard use were at the level of "I Agree" ($\bar{X}=4,08$). Based on this finding, the teachers could be said to have high levels of self-confidence and desire to use interactive whiteboard. This result is consistent with the results of another study carried out with secondary school teachers by Yalçınkaya and Özkan (2014). The fact that the secondary teachers' self-efficacies regarding interactive whiteboard use within the scope of FATİH Project at secondary schools were at the level of "I Agree" could be considered to be a positive result.

In the study, it was found that there was no significant difference found between the participants' interactive whiteboard self-efficacies with respect to their gender. In one study, Şensoy (2004) revealed that teachers' computer self-efficacy beliefs did not differ depending on their gender. Studies conducted by Çiçekli (2014) and by Koçak and Gülcü (2013) reported similar findings in their studies. However, Yalçınkaya and Özkan (2014) found that male secondary school teachers had higher levels of interactive whiteboard self-efficacies when compared to female secondary school teachers. Accordingly, it could be stated that there is a need for further research to investigate whether there is a relationship between gender and interactive whiteboard use in lessons.

In the study, it was found that the teachers' interactive whiteboard self-efficacies did not significantly differ depending on their field of teaching except for the fields of music and information technologies. Yalçınkaya and Özkan (2014) reported similar results in their study. The fact that the teachers' interactive whiteboard self-efficacies did not differ with respect to their fields of teaching and that especially the information technologies teachers' self-efficacies did not differ from the self-efficacies of the teachers from other fields of teaching could be said to be an interesting finding, which could be investigated in future studies.

In the study, it was found that the teachers' interactive whiteboard self-efficacies did not significantly differ with respect to receiving in-service training on interactive whiteboard use. In one study, Tatlı (2004) reported similar results. In another study carried out by Altın and Kalelioğlu (2015), the teachers stated that they wanted to receive in-service training on interactive whiteboard use. When these results are compared to the related results obtained in the present study, it could be stated that teachers' technology efficacies gradually increase in line with technology integration experienced in all areas of life.

In the study, when the teachers' interactive whiteboard self-efficacies were examined with respect to whether their self-efficacies differed with respect to EİN content use, it was found that there was a significant difference in favor of the teachers who "often" used EİN contents. In this respect, teachers could be encouraged to use EİN so that they can increase their self-efficacies regarding interactive whiteboard use. In related literature, there is no research comparing teachers' interactive whiteboard self-efficacies with respect to using EİN contents.

When the teachers' interactive whiteboard self-efficacies were examined with respect to whether their self-efficacies differed with respect to suggesting interactive whiteboard use in lessons, it was seen that there was a significant difference in favor of the teachers who suggested using interactive whiteboard. In one study carried out by Altınçelik (2009), the teachers suggested interactive whiteboard use to increase motivation and permanency in learning at elementary school level (Altınçelik, 2009). Accordingly, it could be stated that

teachers with high levels of interactive whiteboard use self-efficacy suggested using interactive whiteboard in lessons.

When the teachers' interactive whiteboard use self-efficacies were examined with respect to their frequency of using interactive whiteboard in lessons, no significant related difference was found. This result was consistent with the findings reported by Tatlı (2014). In another study, Çiçekli (2014) pointed out that teachers' self-efficacies did not differ depending on their frequency of using interactive whiteboard in lessons. In this respect, further in-depth research could be conducted to identify the reasons why the teachers' interactive whiteboard use self-efficacies did not significantly differ with respect to their frequency of using interactive whiteboard in lessons.

In the present study, the research sample did not include any teachers from elementary school and high school levels. Future studies could be conducted with teachers from other different teaching levels. In the study, some of the teachers were given in-service training on interactive whiteboard use. In future studies, which could be conducted using the experimental research design, all the participating teachers could be provided such training, and their self-efficacies before and after the in-service training could be compared. The present study was carried out using the quantitative research method, and future studies could be conducted using the mixed method research design to determine the related views of participating teachers.

Ortaokullarda Görev Yapan Öğretmenlerin Etkileşimli Tahta Kullanımı Konusundaki Öz Yeterliklerinin İncelenmesi

ÖZET

Bu çalışmada, ortaokullarda görev yapan öğretmenlerin etkileşimli tahta kullanımı konusundaki öz yeterliklerinin hangi düzeyde olduğunun belirlenmesi ve etkileşimli tahta kullanımına yönelik öz yeterlik algılarının cinsiyet, branş, etkileşimli tahta kullanımı ile ilgili eğitim alma durumu, Eğitim Bilişim Ağında yer alan içerikleri kullanma sıklığı, derslerde etkileşimli tahta kullanma sıklığı, derslerde etkileşimli tahta kullanmayı diğer öğretmenlere önerme durumu, etkileşimli tahta kullanma süresi değişkenleri açısından farklılık gösterip göstermediğinin incelenmesi amaçlanmıştır. Araştırmanın örneklemini, Batı Anadolu’da bulunan bir ilçedeki ortaokullarda görev yapan 154 öğretmen oluşturmuştur. Örnekleme, uygun örnekleme yöntemi kullanılarak belirlenmiştir. Araştırma nicel araştırma yöntemlerinden ilişkisel tarama modeline uygun olarak yürütülmüş; veri toplama aracı olarak da “Öğretmenlerin Etkileşimli Tahta Kullanımına Yönelik Öz Yeterlikleri Ölçeği” kullanılmıştır. Verilerin analizinde öğretmenlerin etkileşimli tahta kullanımına yönelik öz yeterlik puanlarının toplamları ve ortalamaları incelenmiştir. Araştırma sonucunda elde edilen bulgulara göre öğretmenlerin etkileşimli tahta kullanımına yönelik öz yeterliklerinin yüksek olduğu; EBA içerik kullanımını artıkça öz yeterlik puanlarının arttığı; etkileşimli tahta kullanım süresi artış gösterdikçe öz yeterlik puanlarının da buna yönelik artış gösterdiği; derslerde etkileşimli tahta kullanımını öneren öğretmenlerin öz yeterliklerinin, etkileşimli tahta kullanımını önermeyen öğretmenlere göre daha yüksek olduğu sonucuna varılmıştır. Öğretmenlerin öz yeterlik puanlarının cinsiyet ve branşlara göre anlamlı farklılık göstermediği de araştırmada elde edilen bulgular arasındadır. Araştırma sonucunda öğretmenlerin etkileşimli tahta kullanımına yönelik öz yeterliklerinin artırılmasına ve gelecek araştırmalara yönelik önerilerde bulunulmuştur.

Anahtar Kelimeler: etkileşimli tahta, öz yeterlik, ortaokul öğretmenleri

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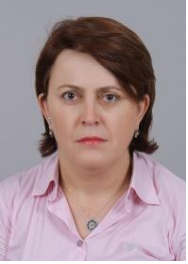
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