Teachers and Interactive White Boards: A Qualitative Investigation in the Margin of Technophobia

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This study aimed at investigating teachers' Interactive White Boards (IWB) integration in the margin of psychological model of technophobia (Brosnan, 1998). The data were collected by a questionnaire including nine open-ended questions and demographics. The study was conducted in qualitative approach. 80 teachers participated from different disciplines and regions of Turkey. According to results, teachers' meaning units assigned to usefulness, ease of use, self-efficacy and fun were more frequent than (f = 345) non-usefulness, difficulty of use, inefficacy, and anxiety (f = 217). The study emphasized a range of factors from diffusion of innovation and cultural aspects concerning the adoption of IWBs.

Keywords: ICT in education, teachers, technology usage, interactive white boards (IWBs), technophobia, content analysis.

INTRODUCTION

The way education takes place involves diverse variations in that it could be achieved through a blend of lectures with textbooks, computers, or smartphones along with other methods (Lee, 2012). Furthermore, education might extend far beyond different forms of media, ranging from printed books to highly interactive digital books that may have the affordance of engaging users' senses (Radu, 2014). One way to engage users' senses involves the use of interactive white boards (IWBs) for teaching and learning practices. However, it is important to differentiate the technical interactivity from the dialogic interactivity (Littleton, 2010; Mercer, Hennessy, & Warwick, 2010; Smith, Higgins, Wall, & Miller, 2005). On the one hand, the technical interactivity includes numerous system-based functions; such as, drag-drop, hide-reveal, or annotation of objects displayed. On the other hand, the dialogic interactivity emanates through orchestrating reciprocal and mutual classroom interaction between the teacher and the student (Mercer et al., 2010). Although there is no doubt that IWBs have inherent technical affordances to facilitate a more interactive means of delivery, that affordance is only significantly reached according to the degree in which the user chooses to take advantage of these affordances (Haldane, 2007). In that essence, Smith et al. (2005: 99) cautioned that "such technology should be used in unique and creative ways above and beyond that which is possible when teaching with normal white boards or other projection methods". Although the inherent multi-modality feature of the IWB should not be denied altogether and might serve opportunities for teachers, it is more conceivable that the pedagogical interactivity should take precedence over and determine the use of IWBs (Beauchamp, Kennewell, Tanner, & Jones, 2010; Kennewell, Tanner, Jones, & Beauchamp, 2008; Mercer et al., 2010). Based on this view, it becomes ever more important to investigate how IWBs are being adopted for instructional purposes.

In many classrooms, the IWB is becoming one of the most widely installed default educational resources (Johnson & Kress, 2003; Maher, 2011). For instance, in Turkey where the integration of IWBs into classrooms is in its infancy, 432,288 IWBs were installed in classrooms by the end of 2012 (MNE, 2012). In the UK, IWBs were installed in about 70% of the classrooms, and in New South Wales (NSW), Australia, approximately 25% of the classrooms had IWBs (Lee, 2010; Maher, 2011). IWBs are being widely installed in many classrooms around the globe, which makes it important to investigate the role of IWBs in teaching-learning processes. Previous studies on IWB use have shown numerous ways in which teachers adopted IWBs for students' learning (Harlow, Cowie, & Heazlewood, 2010). For example, IWBs had the potential of facilitating a diverse range of multi-modality (Gillen, Kleine Staarman, Littleton, Mercer, & Twiner, 2007; Mercer et al., 2010; Twiner, Coffin, Littleton, & Whitelock, 2010), improving the quality of students' work (Wikan, Mølster, Faugli, & Hope, 2010), or facilitating a more dialogic pedagogy (Mercer et al., 2010; Warwick, Mercer, Kershner, & Staarman, 2010). Furthermore, IWBs were able to make both teachers and students more enthusiastic regarding courses (Kaya & Aydın, 2011; Şad & Özhan, 2012; Serow & Callingham, 2010). Nevertheless, there might be several barriers in integrating IWBs into teaching practices, examples include, but are not limited

to, technical thresholds (Çoklar & Tercan, 2014; Somyürek, Atasoy, & Özdemir, 2009; Şad & Özhan, 2012; Türel, 2012; Türel, 2011; Wright, 2010), lack of compatible digital materials (Çoklar & Tercan, 2014; Keser & Çetinkaya, 2013; Türel, 2012), or teachers' pedagogical philosophies of learning with technology (Adeola, 2018; Amar and David, 2018; Azzaro and Agudo, 2018; Corbin and Bugden, 2018; Dixon, 2018; Hinkelman, 2018; Kim, Kim, Lee, Spector, & DeMeester, 2013; Kok, Bester, & Esterhuizen, 2018; Omare, Mwalw'a, & Mutisya, 2018; Selwood, 2018; Schlebusch, 2018; Sugar, Crawley, & Fine, 2004).

Generally, the use of IWBs has been reported as offering opportunities both for teachers and students, but also as involving certain barriers to use that must be overcome. Furthermore, the value and importance of teachers as stakeholders of IWB integration regarding instruction is one of the most widely held beliefs for a more effective adoption processes (Ertmer, 2005; Haldane, 2007; Kim et al., 2013; Reedy, 2008). Teachers and their pedagogical philosophies are placed into a critical position that will determine what to use and how to use it for improving student learning (Mama and Hennessy, 2010; Schussler, Poole, Whitlock, & Evertson, 2007). In that essence, the role of a teacher in exploiting and benefiting from digital tools to improve student learning is being approached via two main assumptions. On one hand, technical skills and technological competency are the primary drivers of interactive and dialogic approaches that might actually prompt teachers to change their pedagogical practices (Ertmer, 2005; Miller & Glover, 2010). On the other hand, pedagogical interactivity may come first and then teachers become motivated to seek new technological capability (Miller & Glover, 2010). Through these paradigms, there might be more complex factors that could intervene in the process, as well. For instance, Schussler et al. (2007) illustrated the complexity of a classroom situation and proposed a multi-dimensional model labelled as "hypertextual function" to describe teachers' thinking, practice, and development related to the integration of technology into instruction. According to this model, the process of technology integration was context-dependent and there was a link between each of the five layers; which were presented as, familiarity, facility, transparency, connectivity, and collegiality. Along with possible contextual factors that might have a role in inhibiting or enabling a more effective technology integration processes, the nuances of technology integration should not be solely attributed to the contextual or external factors, because of the fact that "ultimately, the decision regarding whether and how to use technology for instruction rests on the shoulders of classroom teachers" (Ertmer, 2005: 27). In this way, the argument that the perceived benefits of technology might be more influential than external factors was another perspective which warranted further investigation (Ertmer, 2005; Mama and Hennessy, 2010). Thus, it gains importance to study barriers that might be intrinsic to teaching and which challenge teachers to effectively integrate technology into their teaching practices. In other words, although teachers might have cutting-edge technologies in their classrooms, there may be factors inhibiting them from effectively integrating technology into their instruction. One such psychological influence factor, is known as technophobia.

THEORETICAL FRAMEWORK

Technology Integration

In recent years, numerous theoretical models of technology integration have been proposed to understand factors influencing the integration and use of technology. Such a list would include Technology Acceptance Model (TAM), Theory of Reasoned Action (TRA), and the Unified Theory of Acceptance and Use of Technology (UTAUT). Brosnan (1998) also developed a model called as "The Psychological Model of Technophobia" on the basis of Theory of Reasoned Action (Fishbein & Ajzen, 1975) and Technology Acceptance Model (Davis, Bagozzi, & Warshaw, 1989). Technophobia is conceptualized as a form of avoidance in which anxiety and attitude combine and result in the resistance of new technology (Brosnan, 1998). Rather than involving the fear of job displacement or concerns over the effects of screen radiation, technophobia is "a negative affective and attitudinal response to technology" (Brosnan, 1998: 10). Brosnan (1998) stated that this model was not a definitive model of technophobia, but instead it was within a context. In this regard, to understand which of the factors might influence teachers' IWB use in the context of classroom instruction, this study employed the psychological model of technophobia as it includes effective constructs which were validated in previous studies. A summary of these factors and numerous previous studies is illustrated in Table 1.

Table 1

Determinants of the psychological model of technophobia

Factors	Previous studies
Experience	Abdullah & Ward, 2016; Chang, Hajiyev, & Su, 2017
Ease of use	Callum, Jeffrey, & Kinshuk, 2014; Moreno, Cavazotte, & Alves, 2017; Raza, Qazi, & Umer, 2017
Anxiety	Bolandifar & Noordin, 2015; Chiu, 2017; Chiu & Churchill, 2016; Nikou & Economides, 2017; Nistor, Göğüş, & Lerche, 2013
Fun	Abdullah & Ward, 2016; Chang, Hajiyev, & Su, 2017; Zare & Yazdanparast, 2013; Teo, & Noyes, 2011
Self-efficacy	Huang, 2017; Jeong & Kim, 2017; Kulviwat, C. Bruner II, & P. Neelankavil, 2014; Song, & Kong, 2017;
Usefulness	Lai, 2017; Moreno, Cavazotte, & Alves, 2017; Tarhini, Hone, Liu, & Tarhini, 2017; Teo, Huang, & Hoi, 2017

Furthermore, since it is important to test technology integration models within different cultures and settings to reveal which of the factors are applicable to target users, this study used the constructs of the psychological model of technophobia. Figure 1 illustrates the model and the constructs.

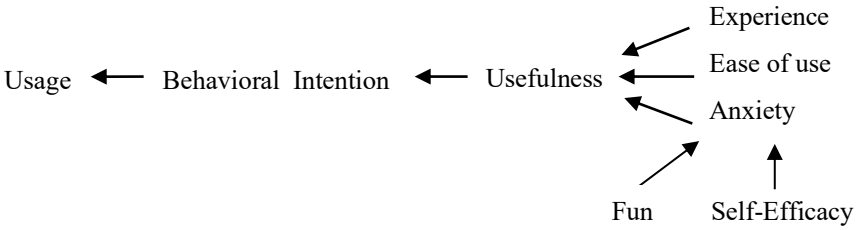


Figure 1. The psychological model of technophobia, Brosnan (1998)

According to this model, the actual usage of a technology is predicted by the behavioural intention, and the behavioural intention, in turn, is predicted by the perceived usefulness of that specific technology. Furthermore, usefulness is predicted by three main factors, which are experience, ease of use, and anxiety. It implies that those teachers, for instance, who report using IWBs frequently in the past and perceive it to be more effort free, and are not anxious will perceive the IWB to be useful. As suggested by this model, anxiety is predicted by two factors, which are fun and self-efficacy, implying that perceiving IWBs to be fun will predict lower levels of anxiety.

There are numerous studies from different fields of study reporting that technophobia is amongst the factors contributing to low levels of technology integration, along with creating barriers to technology use. For instance, Mosweu, Bwalya, and Mutshewa (2017) investigated the factors influencing the adoption of a document system by extending the UTAUT model with technophobia, attitude, complexity and incompatibility. The study revealed that technophobia was amongst the factors that contributes to low adoption and use of the system. Ma, Du, Cen, and Wu (2016) investigated the adoption of mobile internet services with a sample of socioeconomically disadvantaged people. The study found that although users experienced several advantages of mobile internet services, there were also numerous internal psychological barriers to the adoption, one of which was technophobia. Similarly, Omeluzor, Oyovwe-Tinuoye, and Abayomi (2016) investigated librarians' use of social networking in academic libraries in south-east Nigeria and the study revealed that there were both benefits and challenges of adopting social networking for academic libraries. Technophobia was found to be one of those challenges. Brosnan et al. (2012) compared the use of the Internet between the two groups of technophobic and non-technophobic university students. The study revealed a correlation between changes in Internet-related anxiety and changes in Internet usage for the technophobic group. Furthermore, it was reported that although there was no difference in Internet usage between the two groups at the beginning of the academic term, towards the end of the academic year technophobic group decreased their Internet usage as opposite to non-technophobic group.

Building on previous studies and taking into consideration the previously validated constructs in the psychological model of technophobia, this study aimed to examine teachers' specifications with respect to those constructs in order to

reveal which of the constructs might significantly affect the integration of IWBs into classroom instruction. Specifically, this study has three main purposes: (1) to reveal for what purposes IWBs are being used; (2) to detect the frequency and percentage of teachers' specifications among the constructs of the psychological model of technophobia; and (3) to link the findings with diffusion of innovation and cultural aspects of technology integration. The findings of the study are considered to be important since it will reveal how teachers from various disciplines adopt IWBs, as well as possible inhibiting factors. Furthermore, this study will enable policy makers and researchers to gain deeper insights with respect to the factors influencing teachers' decisions to integrate IWBs into their instruction. This paper also contributes to the literature relating to theories and models of technology integration into instruction recommending that technology integration should be expanded to new contexts (IWBs), users (teachers), and cultural settings (Turkey) (El-Masri & Tarhini, 2017; Venkatesh & Zhang, 2010).

METHODOLOGY

The study was carried out with a qualitative descriptive approach drawing on deductive content analysis. The reason for this is that it is an appropriate method for employing relatively low levels of interpretation of participants' specifications (Vaismoradi, Turunen, & Bondas, 2013). On the other hand, the primary aim of content analysis is to describe the characteristics of the document's content by examining who says what, to whom, and with what effect (Bloor & Wood, 2006). The method is performed by counting occurrences of themes, words, or phrases within one or more documents and the main concern is the surface meaning of the document rather than hidden agendas (Bloor & Wood, 2006). Hence, the qualitative descriptive deductive content analysis approach enables researchers to reveal who said what with respect to the research questions under scrutiny. Since the primary purpose of the study is to reveal frequencies and percentages of participants' specifications with respect to constructs of the psychological model of technophobia, a descriptive deductive content analysis approach was considered to be appropriate to analyse the text data.

Participants

The participants of the study were 80 teachers who participated on a voluntary basis. The participants were recruited on the basis of having IWBs installed in their classrooms, and that they were using IWBs for instructional purposes. Table 2 illustrates demographics of the participants.

Table 2
Demographics of the participants

		f	%
Gender	Female	35	44
	Male	45	56

Study of field	Information and Communication Technologies Teacher	20	32
	Foreign Language Education Teacher (English & German)	14	22
	Mathematics Teacher	7	11
	Social Sciences Teacher	4	6
	Science Education Teacher	4	6
	Religious Culture and Moral Knowledge Teacher	4	6
	Turkish Language Teacher	3	5
	Counsellor Teacher	2	3
	Classroom Teacher	1	2
	Art / Visual Arts Teacher	1	2
	Music Teacher	1	2
	Bureau Management Teacher	1	2
	Technology and Design	1	2
Age	Max: 61, Min: 22, Avg.: 36, Sd.: 9,3		

As it is illustrated in Table 2, there were teachers from various disciplines, but the most widely reached ones are information and communication technology (ICT) teachers (n = 20, 30%) and foreign language education teachers (n = 14, 15%). Participants were asked to state for how many years they have been using IWBs for instructional purposes, and the average was 2.4 years. Furthermore, they indicated their level of having self-efficacy in using IWBs using a 5-point Likert scale and the average reported value here was 3.6 (1 being low self-efficacy, 5 being high).

Questionnaire

The data were gathered through a questionnaire (Appendix A) that was developed by the researchers after the relevant literature was investigated. The questionnaire consisted of nine open-ended descriptive questions asking participants to specify their thoughts with respect to each of the factors identified in the model proposed by Brosnan (1998). Along with open-ended descriptive questions, there were three statements to gather demographics of the participants. Several debriefing sessions were carried out among the researchers to finalize the questionnaire. After the researchers agreed upon the final version, the data gathering process was initiated.

Data collection

The data was gathered by both online and paper-and-pencil methods. Although the online questionnaire was kept accessible for a predetermined time duration, the paper and pencil method was applied. The questionnaire was distributed to teachers who were continuing their Master of Education degree studies at a faculty of education.

Data analysis

Based on the psychological model of technophobia (see Figure 1) the data were analysed through a descriptive deductive content analysis approach. The researchers generated a 2-sided spectrum of viewpoints which is illustrated in Figure 2.

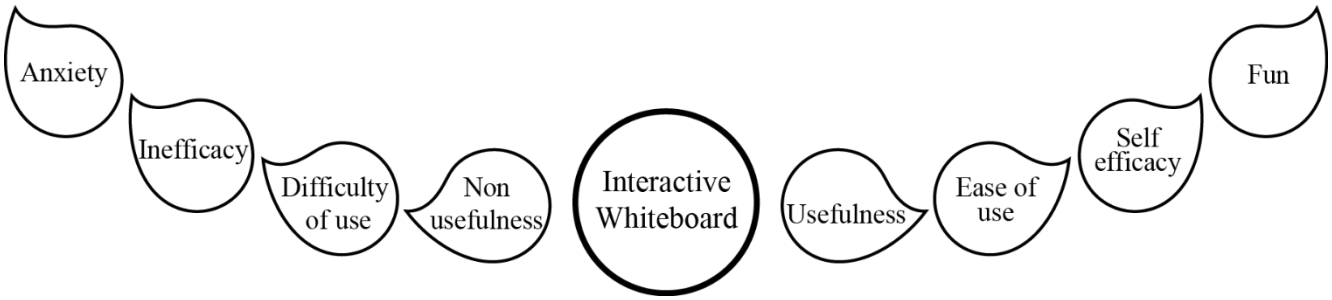


Figure 2. The coding scheme

As it is illustrated in Figure 2, whereas the technophobia involves anxiety or avoidance attitudes toward the use of IWBs, technophilia stands on at the opposite side. In contrast. For assigning the meaning units with respect to the coding scheme, definitions and conceptualizations regarding the labels of codes were derived from the relevant literature. Table 3 briefly illustrates the definitions.

Table 3

Brief definitions of the labels

Concepts	Definitions
Fun	One's perception of IWBs as being fun
Self-efficacy	Being more confident on using IWBs
Ease of use	The degree of one's expectation that the target system is effortless
Usefulness	Subjective probability of using a specific application will lead an increase in performance
The use of IWBs	Informants' current aims of using IWBs in their instruction
Non usefulness	Subjective probability of using a specific application will lead a decrease in performance
Difficulty of use	The degree of one's expectation that the target system requires effort
Inefficacy	Being less confident on using IWBs
Anxiety, fears	Negative affective and attitudinal response to IWBs

After the conceptualizations were completed, researchers determined basic definitions regarding how the concepts for coding processes should be established as offered by Graneheim and Lundman (2004). Table 4 illustrates the concepts of the analysis procedure.

Table 4

Concepts of the qualitative content analysis procedure

Manifest content was largely used, yet the latent content was also compiled in case it is necessary
The whole segments of an instrument was used as unit of analysis
Words, segments of a statement, the whole statement or the whole paragraph
The whole text, especially in latent content, was condensed for assigning to relevant code
The use of a model enabled to generate codes, categories, or themes
The parts or whole of participants' texts the basis of coding scheme
Codes were generated in a deductive approach based on the model
Categories were gathered from the model and relevant literature
The research question determined the theme of this research; that is the use of IWB for instructional practices

After the concepts for the assignment of coding was completed, the two of the researchers started to assign each and every meaning units under unit of analysis. The assignment of the unit of analysis with respect to codes and themes lasted until the agreement between the researchers was achieved.

Trustworthiness

Pitney (2004) and Shenton (2003) offered numerous provisions for establishing aspects of credibility, transferability, dependability, and conformability for the trustworthiness of a qualitative study. For instance, in this study, for the credibility aspect, we included a wide range of teachers from across several disciplines. For the transferability aspect, detailed descriptions for data collection, data analysis methods, and participants were illustrated (Lincoln, and Guba, 1985). For the dependability aspect, the presentation of preliminary findings enabled the researchers to gain reflective comments along with feedback. For the conformability aspect, teachers' own specifications were illustrated.

Limitations

This study used a qualitative approach and focused primarily on teachers from various fields and disciplines in Turkey. A number of limitations of the study should be mentioned. First, due to the qualitative nature of the study, the results are not statistically representative of the entire teachers using IWBs for instructional purposes in Turkey. The reason for a limited generalizability of the study that only aimed at revealing insights into constructs that might influence the integration of IWBs is because of the limited number of available and willing participants. Despite the fact that this study focused on teachers having IWBs installed in their classrooms and who were using it for teaching-learning practices, the researchers acknowledged that the study group is not homogenous and that there is potential within-group variation, including gender, age, socio-economic status, experience, and self-efficacy. The study was conducted by three researchers who continuously discussed findings throughout the analysis of the data. However, to some extent, the findings no doubt include investigator bias and are thus somewhat limited in terms of analytic validity. Furthermore, the results are based on teachers' opinions and specifications which might limit the effective triangulation of data sources, as well.

FINDINGS

Participants of the study were asked to state their current usage of IWBs for instructional purposes. Table 5 illustrates frequencies and percentages assigned with respect to participants' specifications.

Table 5
The use of IWBs

	f	%		f	%
Presenting course content	44	26	Sharing digital interactive books	2	1
Watching videos	30	18	Drawing ready-made shapes	2	1
In-class applications	18	11	Recording voices	1	1
Practicing questions	17	10	Recording course online	1	1
Sharing graphics	13	8	Teaching computers	1	1
Connecting to the Internet	10	6	Trying software	1	1
Enhancing diverse modality	6	4	More concrete instruction	1	1
Sharing games	6	4	Performance grading	1	1
Listening to podcasts	4	2	Classic white board	1	1
Sharing animations	4	2	Experiments	1	1
Listening to music	3	2	Accessing information	1	1
Total				168	100

As it is illustrated in Table 5, the primary means of the usage of IWBs was making presentations along with demonstrating video, graphics or animations. In other words, it was primarily being used for the purpose of supplementing multi-modality.

Participants of the study were asked to state whether it was easy or difficult to use the IWBs for instructional purposes. Table 6 illustrates frequencies and percentages assigned with respect to participants' specifications.

Table 6
Specifications for ease of use vs. difficulty of use

Ease of use	f	%	Difficulty of use	f	%
Similar to computer	30	47	Technical thresholds	18	23
Similar to smartphone	14	22	Problems with internet connection	15	19
General easy to use	10	16	The spread of viruses	10	13
With professional assistance	3	5	Electricity problems	8	10
Available software to learn	3	5	Problems with Windows OS	7	9
Trial and error	3	5	Problems with calibration configurations	5	6
Being an expert	1	2	Long process for turning on	4	5
			File opening errors	3	4
			Computer use	3	4
			Complex software	3	4
			Loss of data	2	3
Total	64	100		78	100

As it is illustrated in Table 6, whereas the frequency of meaning units assigned to ease of use was 64, the frequency of meaning units assigned to difficulty of use was 78. Here are several statements from teachers' own specifications.

> *"It is easy to use, because it is a little bigger of the computer." (P3)*
>
> *"If you do not have a certain level of technological competency, then it becomes difficult to use." (P5)*
>
> *"It does not require any special knowledge. Basic computer knowledge is sufficient." (P7)*
>
> *"Using IWB is easy for anyone interested in technology." (P9)*

Participants of the study were asked to state whether they perceived themselves as having self-efficacy for using IWBs for instructional purposes. Table 7 illustrates frequencies and percentages assigned with respect to participants' specifications.

Table 7
Specifications for self-efficacy vs. inefficacy

Self-efficacy	f	%	Inefficacy	f	%
Technical competency	30	47	Lack of IWB use competency	10	29
Self-efficacy in IWB use	19	30	Lack of technical competency	9	26
Self-efficacy in using digital materials	7	11	Lack of professional development	6	18
Getting professional assistance	4	6	Lack of producing digital materials	5	15
General self-efficacy	3	5	Lack of accessing digital materials	4	12
Self-efficacy of supervising	1	2			
Total	64	100		34	100

As it is illustrated in Table 7, although the frequency of meaning units assigned to self-efficacy was 64, the frequency of meaning units assigned to inefficacy was 34. Here are several statements from teachers' own specifications.

> *"Since there is a new progress every day, I have difficulty in catching up with innovations." (P2)*
>
> *"I sometimes have problems with technical matters, yet I try to solve the problems by getting technical assistance from ICT teachers." (P4)*
>
> *"Since I use smartphone and tablet PCs in my daily life, I could easily adapt myself in using IWB." (P8)*

Participants of the study were asked to state whether the use of IWBs for instructional purposes was fun or if they had numerous anxieties relating to its use. Table 8 illustrates frequencies and percentages assigned with respect to participants' specifications.

Table 8
Specifications of Anxiety vs. Fun

Anxiety	f	%	Fun	f	%
Breaking down the IWB	14	23	Instructions gets more fun	48	80
Students use of ready-made materials	9	15	The use of IWB is fun	12	20
Inappropriate use	7	11			
Falling behind new progress	5	8			
Electricity shortage	4	6			
Pedagogic concerns	3	5			
Maintenance concerns	3	5			
Less motivated teachers	2	3			
Curriculum overload	2	3			
Teachers use of ready-made materials	2	3			
Students' misuse	2	3			
Being insufficient for students	2	3			
Virus spread	2	3			
The danger of radiation	1	2			
Lack of technical assistance	1	2			
Losing prestige in front of students	1	2			
Windows OS	1	2			
The danger of facing inappropriate content	1	2			
Total	62	100		60	100

As it is illustrated in Table 8, while the frequency of meaning units assigned to anxiety was 62 and the frequency of meaning units assigned to fun was 60. Here are several statements from teachers' own specifications.

> *"Since IWBs were installed recently, there is no quality problems at the moment. However, in 2-3 years there will be problems with calibration configurations, speed problems, and it will close just in the middle of the lesson… I mean the machine will break down as it is used and this will generate a hidden tension during the lessons. Is it going to trouble you again?" (P19)*

> *"When I plan the lesson in accordance with the use of IWB, the probability of electricity shortage concerns me." (P24)*

> *"The use of IWBs are enjoyable. Even I as a teacher feel happy as I interact with the IWB. Furthermore, students who are afraid to get up to solve the questions on the board raise their hands, and they just want to solve the problem to touch on IWB." (P35)*

> *"Now, there is no IWB in our houses and I am an ICT teacher. So, we have to learn it at school; that is, in front of students, which I sometimes concern that my students will think I do not know how to use it."*

> *"Believe me, my kids love IWB. I guess I cannot handle my lessons without IWBs, anymore." (P39)*

Participants of the study were asked to state whether they found IWBs useful or not. Table 9 illustrates frequencies and percentages assigned with respect to participants' specifications.

Table 9

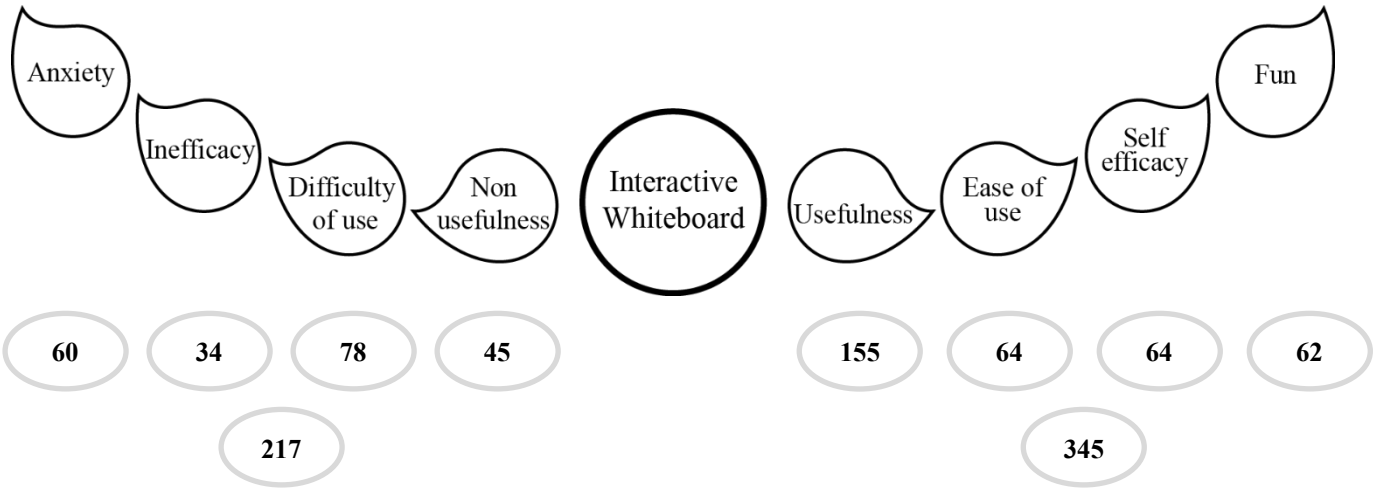
Specification for Usefulness vs. Non-usefulness

Usefulness	f	%	Non-usefulness	f	%
More engaging			Less engaging	-	-
Gaining students' attention	15	10			
More enthusiastic students	12	8			
Actively involving students	8	5			
More motivated students	3	2			
More engaging courses	2	1			
Practicing more over example questions	1	1			
More effective			Less effective		
Supports diverse modality	22	14	Student management	10	22
Knowledge retention	13	8	Staring the screen tires	2	4
Better knowledge comprehension	10	6	Less effective courses	1	2
More effective courses	8	5			
More concrete courses	5	3			
Reduces health problems	3	2			
Visibility by all students	3	2			
Classroom management	1	1			
Easily remembered information	1	1			
The quality of the screen	1	1			
More constructivist learning	1	1			
Positive attitude towards the course	1	1			
More efficient			Less efficient		
Better time management	25	16	Time management	12	27
Better endeavor management	8	5	Increased work load	8	18
More paper savings	5	3	Classroom management	1	2
Opportunity to do what I can not	3	2			
More efficient courses	2	1			
Reduces writing efforts	1	1			
Getting rid of weights of heavy books	1	1			
			Lack of materials	5	11
			Non-usefulness	4	9
			Lack of automatic correction	1	2
			Difficulty of readability	1	2
Total	155	100		45	100

As it is illustrated in Table 9, whereas the frequency of meaning units assigned to the usefulness was 155, the frequency of meaning units assigned to non-usefulness was 45. Here are several statements from teachers' own specifications.

> *"The use of IWB is useful, because it enables active participation and enjoyable learning." (P49)*
>
> *"Since the use of IWB saves time, it allows students to see different kinds of questions, as well as gains students' attention towards the lessons." (P51)*
>
> *"The use of IWB sometimes increases tensions between the school managers. Because, viruses spread frequently. Furthermore, they do not see it as lesson in which you make use of the IWB." (P52)*

Figure 3 below illustrates all the frequencies assigned to each factor under the psychological model of technophobia and the reversed codes.



As it is illustrated in Figure 3, the frequency of meaning units assigned to the technophobia aspect was 217 and the frequency of meaning units assigned to technophilia aspect was 345.

DISCUSSION

Summary of Findings

Based on the psychological model of technophobia proposed by Brosnan (1998), the current study investigated how teachers from various field of disciplines use IWBs for instructional purposes. To find ways for possible barriers and enablers of teachers' IWB integration into classroom instruction, it was necessary to investigate how and why teachers might integrate IWBs differently. In this sense, the findings of the study revealed nine primary aspects for the use of IWBs in

classroom teaching. Along with revealing for what purposes IWBs were being used by teachers, there were four aspects revealing teachers' dispositions with respect to constructs of the psychological model of technophobia, and four extending over the reversed constructs.

To begin with, teachers' current use of IWBs were examined. The findings revealed that IWBs were primarily being used for presentation considerations for complementing multi-modality; in other words, in a teacher-centred, direct instruction manner. In fact, this finding is consistent with previous studies caution that technical interactivity of IWBs may not necessarily lead to a more interactive way of teaching and learning (Cuban, 2001; Kim et al., 2013; Schussler et al., 2007; Serow & Callingham, 2010). Furthermore, presenting content without any level of interaction does not carry pedagogical benefits over traditional white boards (Kim et al., 2013). In fact there is a large amount of research emphasizing that even if schools offer technological and infrastructural resources to teachers, it does not guarantee that teachers will innovatively integrate technology into school processes. For instance, Cuban (2001: 134) illustrated evidence that even if technological resources were available in a classroom setting, "the overwhelming majority of teachers employed the technology to sustain existing patterns of teaching rather than to innovate". Schussler et al. (2007) found that a classroom having more technological resources may not necessarily lead to a more interactive and dialogic way of teaching and learning. Mama and Hennessy (2010) reported that the more interactive course took place in a classroom setting that is was defined as typical rather than in the innovative one, which highlighted the value and importance of teachers' beliefs regarding teaching and learning with ICTs. In that essence, Kim et al. (2013) reported that teachers with more sophisticated epistemological beliefs had closer conceptions towards being a student-centred teacher which led a more seamless use of technology; implying that the focus and emphasis remained on student learning rather than on the technology. Despite technology integration focuses on how teaching should be practiced (Kim et al., 2013), there has not been much research on how cultural aspects might have an influence on a more effective IWB use or effective technology integration for teaching practice, which might be one of the suggestions of this study. Below, cultural aspects will be discussed in light of this suggestion.

Along with examining the current ways of the use of IWBs for instructional purposes, the study examined meaning units of teachers assigned to the constructs identified by Brosnan (1998) within the psychological model of technophobia. To reveal the frequencies and the percentages of participants' meaning units, two poles were structured from participants' own specifications. On one end of the spectrum, non-usefulness, difficulty of use, inefficacy, and anxiety were clustered and on the other end of the spectrum reversed constructs were created as usefulness, ease of use, self-efficacy, and fun. The findings of the study revealed that although meaning units of teachers' assigned to usefulness, ease of use, self-efficacy and fun (n = 345) outweighed the reversed dispositions (n = 217), it is worth noting that there were concerns raised by the participants regarding the use of IWBs, along with numerous benefits.

First of all, usefulness was the most frequently assigned code with teachers' meaning units of IWB use. This finding is consistent with the psychological model of technophobia emphasizing that the behavioural intention to use IWB is directly predicted by the factor of usefulness. In fact, this finding is also consistent with contemporary technology integration models highlighting that perceived usefulness is one of the pivotal predictors of technology use (Sun, Liu, & Peng, 2014; Venkatesh, Thong, & Xu, 2016). However, to overcome the barriers for effective technology integration and teaching practice, teachers' specifications concerning non-usefulness of IWB use should also be considered. For instance, several of the meaning units were assigned to time management problems due to technical thresholds, possible problems with managing students in classroom, increased workload to prepare digital materials compatible with IWBs along with a lack of digital materials. This finding is also consistent with previous studies which found that lack of compatible digital materials for the use of IWBs might hurdle the more effective integration processes (Çoklar & Tercan, 2014; Keser & Çetinkaya, 2013; Türel, 2012). Even though usefulness of IWBs for instructional purposes might provide an initial insight for explaining the widespread use of it, it is also important to reveal and overcome non-usefulness of IWBs to enhance technology integration and teaching practice within school processes.

Second, the ease of use and difficulty of use aspects of IWB were also examined and difficulty of use was found to be assigned more frequently. This finding suggests that although ease of use for the use of IWBs is pertinent, difficulty of use should be considered to overcome. For instance, technical thresholds, problems with internet connection and restrictions, the electricity shortage or virus problems might hurdle teachers to acknowledge that IWBs are useful for instructional purposes. This finding suggest that difficulty of use should be intervened through several strategies in consistent with the schools' needs, such as providing additional professional development or technical assistance and supervision.

Third, teachers' meaning units concerning whether they had self-efficacy or not to effectively adopt IWBs were examined. The findings of the study revealed that the participants generally had self-efficacy to effectively use IWBs. However, there were also those specifying that they lacked competency for using IWBs, they were not effective since they had no technical competency and they felt lower efficacy due to the lack of professional development. At this point, it might be important to prioritize professional development and assistance for better and more effective technology integration.

One of the interesting findings of the study was about the anxiety and fun aspect of IWB use. Although fun aspect of IWB use was slightly assigned with more meaning units, it is one of the most important suggestions of this study that there were as many meaning units assigned to the anxiety aspect of IWB use. It is worth noting that teachers might experience both technophobia and technophilia dispositions regarding different constructs of the psychological model of technophobia, and depending on the specific context of the learning. This may be important in terms of developing better and more effective teaching practices

along with technology integration. The anxiety surrounding the possibility of IWB breaking down, students' accustomed way of accessing ready-made artefacts, inappropriate means of use both by students and teachers, or electricity shortage were several of teachers' expressed anxieties regarding the use of IWBs. These anxieties might overcome any of the more effective teaching-learning processes, suggesting that there is a definite need to focus on teachers' anxieties regarding the use of IWBs.

Theories of Technology Integration and Culture

The findings of the study suggest that teachers' acknowledgement of the use of IWBs for instructional purposes in a two-sided spectrum; one including benefits and the other challenges. At this point, this study posits and discusses the current findings from the perspective of cultural dimensions and its relationship with the diffusion of innovations (Basalla, 1988; Hofstede, Hofstede, & Minkov, 2010; Rogers, 2004). The query arising from the above-mentioned findings requires a more critical scrutiny for why teachers adopt IWBs in a form of presenting the course materials, rather than adopting a more interactive pedagogy. The assumption that installing IWBs into classroom teaching to lead teachers have more technical competency and expect them to generate more interactive forms of teaching is mainly constructed around the diffusion of innovations theory proposed by Rogers (1983). According to this theory "diffusion is the process through which an innovation, defined as an idea perceived as new, spreads via certain communication channels over time among the members of a social system" (Rogers, 2004: 13). However, the findings of this study revealed that although teachers had IWBs installed in their classrooms, they still continued to adopt and use them ways that coincided with their previous practices, rather than generating a more interactive pedagogy. At this point, it is crucial to approach such a nuance from the standpoint of the evolution of technology proposed by Basalla (1988). According to this theory, necessity is acquired as the mother of invention and he notes that "if technology exists primarily to supply humanity with its most basic needs, then we must determine precisely what those needs are and how complex a technology is required to meet them" (Basalla, 1988: 6). Reflecting on the installation of IWBs into classroom teaching from such a perspective might enable deeper insights concerning how technology is being adopted within a social system and how it might become more effective. Regardless of teachers' predetermined needs, a given curriculum or set of regulations within an educational system might contribute as a barrier rather than enabler for adopting IWBs. In that essence, the evidence that IWBs are being primarily adopted to fulfill the needs of the educational system rather than one's own instructional needs might seem conceivable in providing an example for the evolution of technology. In fact, at this point it may be crucial to ask whether there is a need for installing an IWB to enhance or facilitate a more interactive pedagogy that might lead mutual interaction between the teacher and students, alike. If an educational system of a culture does not encourage a form of reciprocal interaction that may improve students' learning as contemporary learning theories propose (Luckin et al., 2012; Selwyn, 2016, Vygotsky, 1978), is there a need for any specific technology to be installed or adopted in teaching-learning processes for teachers

to act in that way? The question is difficult to clearly understand first glance, and thus warrants further investigation. Looking at this issue from the perspective of Hofstede's cultural dimensions theory might provide an insight to overcome the difficulty of adopting new technologies into classroom teaching.

Culture is defined as "the collective programming of the mind that distinguishes the members of one group or category of people from others" (Hofstede, Hofstede, & Minkov, 2010: 6). Cultures where there is a large power distance amongst the members of a society, for instance, accept and expect in classroom settings that teachers have the absolute authority, they are respected or even feared, the teacher-centred instruction is outlined for following the intellectual paths determined by the teacher and there must be a strict order in the classroom in which teacher initiates all the communication (Hofstede, Hofstede, & Minkov, 2010; Kang & Chang, 2016). Furthermore, students in large power distance cultures speak up in case they are invited to, they generally afraid of disagreeing with their teachers or expected not to challenge their teachers, and the quality of a student's learning profoundly depends on the excellence of her/his teachers (Hofstede, Hofstede, & Minkov, 2010). Looking at Turkey as an example of such a culture where large power distances occur (Hofstede, Hofstede, & Minkov, 2010) it might enable us to understand why teachers adopt IWBs in a way that tends to support teacher-centred rather than more interactive pedagogical practices. The primary assumption for installing IWBs into classrooms in Turkey relies on the idea that IWBs will enable a more effective and interactive approach within classroom teaching along with enhancing multi-modality of teaching-learning processes (MD, 2015; MNE, 2012). The findings of this study revealed that rather than generating a more effective and/or interactive pedagogical approach to classroom teaching, IWBs were seen as a means of fulfilling one's own needs as determined both within cultural and political space of Turkish Educational System, and thus not leading to this type of interactive pedagogical approach. If the culture of an educational system, and the actual wider culture itself, attributes roles to teachers and students in a way in which teachers are seen as the authority figures and students as the receiver of the information, is it conceivable to blame the technology for inhibiting a more interactive pedagogical approach to classroom teaching? Rather, to what extent it is conceivable that the use of IWBs might generate a more interactive pedagogical processes during classroom instruction by keeping cultural considerations out of classroom settings? Clearly thee questions remain elusive and warrant further and deeper investigation.

Suggestions for IWB Integration and Future Research

The results of this study revealed that teachers might both see the integration of IWBs into instruction as beneficial, along with having barriers either individual or external. In this respect, rather than approaching the integration of IWBs in a dichotomous (use/non-use) manner, stakeholders should take into consideration the idea of approaching the integration of technology in a process manner. In fact, Hall (2010) argued that teachers should not be classified as using technology one day, and then not using it another day. It generally includes a process of implementation and consists of different levels of use (Hall, 2010). In this respect,

future studies might investigate instructional settings where IWBs are being used and that reveal deeper insights concerning the barriers that teachers have experienced individually and externally. Furthermore, cultural dispositions at an individual level, such as individualist/collectivist or issues relating to power distance, might be measured quantitatively and teachers' insights with respect to technology integration into instruction could be collected qualitatively to reveal the possible cultural influences on technology integration.

CONCLUSION

Although this study includes numerous limitations as mentioned earlier, the method and framework for analyzing qualitative data through establishing a connection between teachers' dispositions toward the use of IWB and the constructs of the psychological model of technophobia might serve as an understanding for possible individual influences on technology integration into school processes. Technology integration is a multi-layered process and has complex interconnections between different stakeholders within a school setting. Both individual/internal and external factors might have a role in enabling a more effective integration process, along with cultural perspectives. Since the use and integration of technology into instruction is of interest for teachers, researchers, and policy makers this study might enable further insight regarding a different paradigm for a more effective technology integration; that is, individual and cultural considerations. The ultimate goal of this study was to contribute to technology integration research by taking into consideration the interrelationships between teachers' current use of IWBs, their individual dispositions and the possible influence of their cultural backgrounds.

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APPENDIX

Dear teacher,

This study examines the use / nonuse of interactive white boards (IWBs) for instructional purposes. It is kindly expected that you respond to the questions listed below and state your thoughts in detail. It will take approximately 20 minutes to complete the questionnaire, and the data will be used only for the research purpose.

Thank you so much for devoting your valuable time to fulfil the questionnaire.

- Gender:
- Age:
- Study of field:
- For how many years have you been using IWBs for instructional purposes?
- Please indicate your level of self-efficacy in using IWBs for instructional purposes? Note that 1 (one) represents quite do not have self-efficacy and 5 quite have self-efficacy.

1. For what kind of instructional purposes (actual usage) do you use interactive white boards (IWBs)?
2. The use of IWBs for instructional purposes is easy (ease of use), because …
3. The use of IWBs for instructional purposes is difficult (difficulty of use), because …
4. What are the dimensions that you have self-efficacy (self-efficacy) in using IWBs for instructional purposes?
5. What are the dimensions that you have inefficacy (inefficacy) in using IWBs for instructional purposes?
6. What kind of situations make you frightened or worried (anxiety) about the use of IWBs for instructional purposes?
7. Do you find it fun (fun) to use IWBs for instructional purposes?
8. What are the benefits (usefulness) of using IWBs for instructional purposes?
9. What are the thresholds (non-usefulness) of using IWBs for instructional purposes?

* Note that the questionnaire was in Turkish and language validity was not established for the English version.