2013

Teachers' perceptions of professional development for the use of interactive white boards in Turkey

Erkan Taskin
University of Northern Iowa

TEACHERS' PERCEPTIONS

OF PROFESSIONAL DEVELOPMENT FOR

THE USE OF INTERACTIVE WHITE BOARDS IN TURKEY

An Abstract of a Dissertation

Submitted

in Partial Fulfillment

of the Requirements for the Degree

Doctor of Technology

Approved:

Dr.Mohammed Fahmy, Committee Chair

Dr. Ali Kashef, Co-Advisor Committee Chair

Dr. Michael Licari, Dean of the Graduate College

Erkan Taskin

University of Northern Iowa

August 2013

ABSTRACT

The primary purpose of this study is to investigate Turkish public school teachers' and principals' perceptions regarding professional development opportunities and practices that may be available for interactive whiteboard (IWB) use. The study aims at investigating the following questions: (1) What are Turkish teachers' perceptions of the quantity and quality of IWB training they receive? (2) How does professional development affect teachers' use of an IWB in a Turkish K-12 classroom? (3) What type of professional development do teachers have before and after the installation of the IWB in their classroom? (4) What differences, if any, are there among teachers who are new to the IWB technology, those who have been using it for a short period of time, and those who have been using it for a long time? (5) How do Turkish teachers use IWB in their classroom?

The Participants of this study were a pool of teachers and principals of public schools in Istanbul, Turkey. Both teachers and principals were asked to fill out a survey developed by the investigator which consists of four major areas: frequency of use of IWBs, type of training received, any other training the school provides, and teachers' perceptions of or satisfaction with the IWB training they receive.

The results of the study proved to be very helpful to teachers and schools who use IWBs for instructional purposes. Thus, implications of this study for teachers, principals, and policy makers will be provided.

TEACHERS' PERCEPTIONS
OF PROFESSIONAL DEVELOPMENT FOR
THE USE OF INTERACTIVE WHITE BOARDS IN TURKEY

A Dissertation

Submitted

in Partial Fulfillment

of the Requirements for the Degree

Doctor of Technology

Approved:

Dr. Mohammed Fahmy, Committee Chair

Dr. Ali Kashef, Co-Advisor Committee Chair

Dr. Barry Wilson, Committee Member

Dr. Bulent Uyar, Committee Member

Dr. Robert Decker, Committee Member

Dr. Julie Zhang, Committee Member

Erkan Taskin

University of Northern Iowa

August 2013

DEDICATION

I would like to dedicate this dissertation to my family and friends for support, patience, and understanding that they have bestowed upon me.

ACKNOWLEDGMENTS

I acknowledge Dr. Mohammad Fahmy, chair and committee members, Dr. Ali Kashef, Dr. Barry Wilson, Dr. Robert Decker, Dr. Bulent Uyar and Dr. Julie Zhang for guidance and understanding.

I would like to thank Dr. Ibrahim H. Karatas for his invaluable assistance in the preparation of this dissertation. I appreciate the editorial support of my friend, Mr. Harun Parpucu, Doctoral Candidate.

TABLE OF CONTENTS

LIST OF TABLES

CHAPTER I

INTRODUCTION

Substantial growth in the use of interactive technologies such as the interactive whiteboard (IWB) in Turkish schools over the last decade has been observed. Many teachers report using IWBs as a way to enhance instruction and as means to engage students' attention and interest (Erduran & Tataroglu, 2009). One issue that teachers keep commenting about is the lack of continued training beyond the initial training they receive on how to use the IWBs (Erduran & Tataroglu, 2009). Given the ambitious Turkish government's initiative to infuse technology in every Turkish classroom, it is worthwhile investing the ongoing professional development for teachers to ensure the expected success for both teachers and students. The purpose of this study is to investigate teachers' perceptions of the quality and quantity of professional development which is provided by their schools.

In order to investigate the stated perceptions, a survey has been prepared with 27 questions for both the teachers and school principals. The survey was sent to 36 public schools, and 36 school principals and 66 teachers. The data were analyzed using the mean, percentage and Kruskal Wallis and Mann Whitney U Test in "Statistical Package for the Social Sciences" (SPSS).

Statement of the Problem

Although interactive whiteboards have been in use in most classrooms in public schools in Turkey, no formal evaluation of their effectiveness has been conducted. The

purpose of this study is to investigate instructional effectiveness of IWBs by surveying teachers' and principals' perceptions of IWBs. The data gathered would be useful in identifying aspects of IWBs that help teachers in their instruction, and aspects that do not help, how often they need to train in the use of IWBs, and the updates they might need for their classroom use.

Significance of the Problem

With the rise in types and sophistication of IWBs, teachers are increasingly expressing the need for more and ongoing training (Elaziz, 2008). Schools that make the initial investment in purchasing both IWB hardware and software can maximize their return by investing in frequent professional development for teachers. Benefits of professional development include expanding teachers' scope of use of the IWBs, learning about the different challenges encountered in the classroom when IWBs are used, receiving specialized training for the specific instructional needs of teachers in different disciplines, and learning new and creative ways of engaging today's learners. The proper professional development both at the initial and later phases of use will ensure that teachers are getting the support, skill, and knowledge they need to use the IWB technology to the highest extent possible (Campbell & Martin, 2010).

Research Questions

This study investigatededucators' perceptions of effectiveness of IWB atpublic schools in Istanbul, Turkey. More specifically, the study attempted to answer the following research questions:

- What are Turkish teachers' and principals' perceptions of the quantity and quality of IWB training they receive?
- How does professional development affect teachers' use of an Interactive Whiteboard (IWB) used in TurkishK-12 classrooms?
- What type of professional development do teachers have before and after the installation of the IWB into their classroom?
- What differences, if any, are there among teachers who have more experience on using IWBs and teachers who have less experience?
- How do Turkish teachers use IWBs in their classrooms?

Assumptions

The assumptions of this study were:

- It was assumed that the participants would be representative of the general population who are familiar with IWBs in Turkey.
- It was assumed that the participants would respond to the survey items honestly and will do their best when filling out the survey.
- It was assumed that the participants would have first-hand experience with the use of an IWB.
- It was assumed that the participants would have varying degrees of experience and comfort with and competence in the use of IWBs.

- It was assumed that the teacher participants would have different perceptions from the administrator participants regarding the quality and quantity of professional development for the use of interactive whiteboards.

Limitations

As in all studies, this study had a few limitations. To begin with, the focus was on elementary, middle, and high schools in one city in Turkey, which could limit the generalizability of the findings of the study to other schools in other cities in Turkey and beyond the Turkish context. As a point of clarification, the grade level in Turkey during the time of this study followed the 8 + 4 system where students attend eight-yearelementary schools and then move on to four-year high school. This was changed this academic year (after the data collection was complete) to the 4+4+4 system where students attend four-year elementary school, four-year middle school, and the last four-year high school. This study was solely focused on perceptions of teachers and school principals so students' perceptions are not included. Moreover, the survey was the only instrument that was used to collect data so it would be worthwhile interviewing teachers to corroborate the findings from the survey instrument in a future study.

Definition of Terms

The following terms were used throughout the manuscript with the specific definitions given below:

1. Interactive whiteboards (IWB): The interactive whiteboard is an electronic device that interfaces with a computer. "The computer images are

displayed on the board where they can be viewed or manipulated. Users can control software both from the computer and from the board. Notes can be added, points of interest highlighted, and programs manipulated as one would on a giant touch pad. Resulting notes, drawing, etc. can then be printed out [or loaded to a website] from the computer or saved for future reference" (Bell, 2002, p.1).

2. Peripherals: Computer related devices that are hooked to the computer via cables, increasing the input and output capabilities of the standard computer (Robinson, 2004).
3. Interactive Learning: "Interactive learning systems such as computer-based learning and multimedia give learners many options and control over aspects of the learning process, for example, display control, pace and sequence control. These interactive features are highly valued as they enable the learning to be individualized according to each learner, and are widely believed to enhance instructional outcomes" (McLoughlin & Oliver, 1995, p.1).
4. Professional Development: Guskey (2002) defined professional development in his book "Evaluating Professional Development" as "those processes and activities designed to enhance the professional knowledge, skills, and attitudes of educators so that they, might in turn, improve the

learning of students. It is a process that is (a) intentional, (b) ongoing, and (c) systemic" (Guskey, 2002, p.16).

5. Information Technology: "Information Technology means the use of hardware, software, services, and supporting infrastructure to manage and deliver information using voice, data, and video" (Veeranna & ElShheibia, 2010, p. 226).
6. SmartBoards: SmartBoards, designed by Smart Technologies, connect a number of different technologies into a single unit that assists the instructor and student during the learning process. By pressing on the board, as one would click on a mouse, the user interacts with the board, requesting information, playing movies, listening to the radio, watching video, exchanging e-mail, and accessing the internet (Miller, 2003).

Organization of the Study

In addition to this chapter, there are four more. In the second chapter, a review of the literature is provided. The methodology that was used in the study is described in Chapter 3. The findings of the study are reported in the fourth chapter. In the fifth and final chapter, a discussion of the findings and their implications for practice and future research are offered.

CHAPTER 2

REVIEW OF LITERATURE

This chapter provides a review of literature related to the history, development of interactive whiteboards and their applications as well as their use in instructional settings and the type of IWBs professional development needed for teachers. The review consists of the following four parts: (1) a general introduction and definition of interactive whiteboards; (2) an historical background of IWBs with a focus on who invented it, how, why, where; how IWBs were initially used and how their use changed over time; and historical sketch of the use of IWBs in educational settings, especially in PK-12 settings; (3) a focus on the IWB technology and its advantages and how they can be maximized through carefully planned professional development; and (4) description of types of professional development provided to teachers and impact of the availability or lack of ongoing training on teachers' effectiveness.

Introduction and Definition of Interactive Whiteboards

Interactive whiteboards first came into usage in the 1990s. Initially they were simple touch screen boards used to demonstrate schedules, tables, etc. They were not very practical and students had to stand up and go to where the IWB was to operate it. With advances in digital technology, IWBs improved significantly. The computer connection and the benefits digital technology brought were added on IWBs. Today, an IWB is capable of performing many functions with a wide range of usage in many areas.

Many schools throughout the world use IWBs for instructional purposes (Smith, Hardman, & Higgins, 2006).

IWB is defined by The British Educational Communications and Technology Agency (BECTA, 2003) as:

> "An interactive whiteboard is simply a surface onto which a computer screen can be displayed via a projector. It is touch-sensitive and lets you use a pen on it (or in some cases, a finger) to act like a mouse, controlling the computer from the board itself. Changes made to information projected onto the whiteboard are transferred to the computer and can be saved and retrieved in future lessons. Everything that can be displayed on a computer can be projected onto the whiteboard and, if the computer is linked to speakers and a DVD or video player, multimedia resources can be incorporated too. If the board is connected to the Internet, teachers can have immediate access to appropriate websites to enhance work in the lesson.
>
> There are two main types of interactive whiteboard. Hard boards have a hard magnetic surface behind the screen and need special pens to write on them. Soft boards have a tough membrane on the surface which can be written on with a finger or a special pen. Most interactive whiteboards are supplied with specific software tools to exploit the potential of the board" (The Department for Education and Skills, 2004, p.3)

History of IWB Technology

IWBs were developed so that the users can handle them more easily. In this section, a brief history of IWB technology development is given.

IWBs in Offices

IWB technology was initially invented for presentations in office settings (Glover, Miller, Averis, & Door, 2005). It was common to use blackboards in offices, but blackboards had their limitations. Stefik et al. (1987) stated the following problems of blackboards:

> "[S]pace is limited and items disappear when the space is needed for something else, and rearranging items is inconvenient when they must be manually redrawn and then erased. Handwriting on a chalkboard can be illegible. Chalkboards are also unreliable for information storage" (p. 32).

IWB technology was developed to address the aforementioned disadvantage of traditional boards. IWBs made it possible to print displayed material on the board, save the information for later use, and share the session with remote locations via video-conferencing or e-mail (Greiffenhagen, 2002). It also retained all operations that can be done with conventional blackboard or whiteboard such as marking, erasing, and drawing. As these problems were easily overcome by using a computer, e-boards were developed at Xerox PARC (Palo Alto Research Center Incorporated) to combine the advantages of blackboards and computer technology (Greiffenhagen, 2002). The basic version of IWB was first developed by Xerox PARC in 1990. The industry initially targeted businesses as their primary market for use in small business group meetings and round-tables (Miller, 2003). Since this technology was very expensive, very few companies owned them.

IWBs in Classrooms

Educational institutions could not even consider using this technology at its early stages because of its high cost. As electronic technology evolved, IWBs became much more affordable and rapidly gained popularity. SMART Technologies Inc., introduced the SMARTBoard in 1991, and was the first of its kind to offer users with the convenience of

touch control of a computer which then projects images and text onto a screen (Miller, Glover, & Keele, 2006).

As early as 1984, Higgins and Johns (1984) envisioned “electronic blackboard,” a computer with a large screen that would help teachers to make classroom activities more interactive and engaging. However, the initial use of the interactive whiteboard in education did not begin until the late 1990s. As was the case in office use of IWBs, the advantages of blackboards and computer technology were combined to address the limitations of boards including the inflexibility of prepared materials and the difficulty of giving feedback or making use of individual exercises (Greiffenhagen, 2002). The first SMARTBoard was sold to Donald McDonell, a university professor at the University of Ottawa in 1991 (Betcher & Lee, 2009). Afterwards, it became very popular in primary and secondary schools around the globe (Smith, Higgins, Wall,& Miller, 2005). In England, for example, the prevalence of interactive whiteboards was spurred by the British Primary Schools Whiteboard Expansion Project in 2003. The school project consisted of 97 schools in which IWBs were installed and then staff training and monitoring within the daily educational practice were initiated (Winkler, 2011). In recent years, IWB technologies have become a primary instructional technology to acquire in school systems, particularly in Western Europe, Canada, Australia, Turkey, and the United States.

IWBs are labeled by different names such as Smart boards, electronic or digital whiteboards. The phrase “interactive whiteboard (IWB),” however, outnumbers the two

listed earlier by a factor of nearly 5:1 and over 20:1, respectively (Higgins, Beauchamp & Miller, 2007). As technology advanced, IWB technology evolved. Today, many different companies produce IWBs with different technology, software and hardware configurations.

Advantages of IWBs

As IWBs gain popularity with teachers and trainers, there is an increased debate going on about its advantages and disadvantages in the education process. Gillen, Staarman, Littleton, Mercer, & Twiner (2007) argued that "There is no doubt that IWBs have some interesting affordances that could be of value for classroom teaching" (p.1). One of the most important advantages of IWBs is its versatility. Many different kinds of activities can be done with IWBs. Users can select, display, move and modify images and pictures in ways that conventional classroom display technology cannot. The IWBs had the capacity to increase teaching time by making it easy for teachers to utilize web-based and other resources in their classrooms more efficiently (Slay, Siebörger, &Hodgkinson-Williams,2008). It also provides more opportunities for interaction with visual materials, instructor, and other students' cooperation (Hall & Higgins, 2005) and discussion in the classroom (Levy, 2002), especially in comparison with other information and communication technologies shortly known as ICT technologies (Schroeder, 2008). IWBs have benefit for both students and teachers.

Benefits for Teachers

The benefits that IWBs have for teachers include the following:

- IWB allows teachers and trainers to incorporate ICT into their lessons while teaching in front of the class (Smith, 2001).
- IWB decreases monotony and increases spontaneity and flexibility. It enables teachers to draw on and annotate many different types of online resources (Kennewell & Beauchamp, 2007).
- IWB allows teachers to save and print what is on the board which helps teachers to reduce duplication of effort and to facilitate revision (Walker, 2002).
- IWB provide teachers the opportunity to collaborate with other teachers and to share materials (Glover et al., 2005).
- Many researchers support the idea that it is easy to use. Teachers find it more user-friendly compared to computer in whole-class teaching (Smith, 2001).
- Since it is easy to use and have many tools that can help teachers in the classroom, IWBs make it easier for teachers to change their pedagogy and use more ICT and encourages them to work on their professional development (Koenraad, 2008).

Benefits for Student

The benefits that IWBs have for students include:

- IWB increases students` enjoyment and motivation because of its wide range of multi-media tools. This brings more participation and collaboration in the

classroom, which in return allows students to develop their personal and social skills (Levy, 2002).

- Since it allows users to save and print what is on the board, IWB reduces the need for note taking and allows students to use their time more efficiently. Students spend less time to take notes and spend more time to contemplate on the subject. By doing that, students can more easily deal with and understand more complex concepts because they now have clearer, more efficient and more engaging presentations (Smith, 2001).
- A variety of learning styles can be accommodated by teachers through creative use of the available resources (Bell, 2002).
- IWB provides many tools for students to be more creative in presentations in the classroom which help them to increase their self-confidence (Levy, 2002).
- Since it does not require using keyboard, IWBs will be much more accessible by students with special needs (Goodison, 2002).
- In summary, IWBs have been around for two decades, and with technological advances, IWBs have improved features that made them even more widespread in schools throughout the world. Although IWBs have many advantages for instructors and students(Moss et al., 2007), the advantages can only be realized through ongoing and effective professional development on the effective instructional use of IWBs in the classroom. Thus, it is to a discussion of professional development that we turn next.

Professional Development for IWBs

Many school districts in USA, Britain, and Australia (Emre, Kaya, Özdemir, & Kaya, 2011) are investing large sums of money into IWBs, and some schools are willing andable to afford paying for the necessary training teachers need in order to use them successfully (Emre et al., 2011). Some schools may choose not to invest in IWB professional development because of budget constraints or due to the belief that the teachers will learn to use the boards on their own after the brief and initial training the company provides. Without adequate professional development for teachers, their use of IWBs would be limited. However, since IWBs stimulate higher order thinking in students, teachers need to use them in more individualized instruction (Lacina, 2009). Teachers need professional development support for IWB use subsequent to the initial training by the manufacturers at the time of installation. With adequate support, they could implement better IWB strategies in the classroom, and their instruction would yield better results. When IWBs are used in a school, professional development circles could develop among teachers who use this technology, and teachers start improving their classroom activities (Lewin, Somekh, & Steadman, 2008). For example, Lewin et al.(2008) investigated the impact of IWBs on learning and teaching in elementary schools in the UK. The 2000 children observed in literacy, mathematics, and science, were 7 to 11 year-olds. Nine teachers from various schools were observed and interviewed. Results of the study showed that with the introduction of IWBs into instruction, teachers developed their ICT skills. Use of IWBs generated a learning

environment for teachers and they developed a community of professional development on IWB use. Teachers developed a three-level interactivity method with learners through the use of IWBs. Thus, they improved in pedagogical practices. This allowed children to gain considerably in math, English, and science test scores. Now, the fact that teachers develop learning environments may indicate that teachers need continuous professional development programs in IWB use.

Smith et al. (2006) studied the impact of IWBs on 5th and 6th grade classes in the UK. Their results suggested that IWBs provided more whole class teaching and less work in groups for math and literacy lessons. Although IWBs engage learners better than conventional instruction methods, results showed that IWBs diminished learner answers during the class session (BECTA, 2003). Researchers argued that systematic observation of classes with IWBs and reflection on teaching strategies would be useful for professional development purposes. Lacina (2009), on the other hand, suggests that more individualized instruction with IWBs may be better for students who attend classes. Professional development on IWBs may need to be continuous and it needs to focus on individualized strategies of IWB use. Furthermore, elements of classroom environment such as pedagogy must be taken into consideration. Collaboration of pedagogy and technology knowledge improves the instruction in the classroom. Conventional technology used in instruction is not so complicated. Also conventional white boards do not require much knowledge and higher order skills to use. In the event of lack of technology knowledge, teachers may tend to use IWBs like regular white

boards, without making use of its technological benefits. Glover and Miller (2002) stated that IWBs are not effective technology tools in terms of instruction when used like conventional white boards.

Glover and Miller (2002) investigated the scope of professional development for IWBs in 22 math teachers in the UK. Twenty-two teachers using IWBs were video recorded and investigators analyzed their lessons. Competence with the hardware, ease of software usage, and lesson planning were evaluated. Results showed that some teachers emerged as “experts” during the professional development and the following experiment sessions. Hands-on experiences for professional development purposes are valuable, and they provide technological fluency. Technological fluency in IWBs must be supported by real honest efforts of sharing information among teachers who use IWBs. Professional development may also be achieved with the help of an advisor. They may share years of experience in the profession with younger generations in the most convenient way. Miller and Glover’s (2007) observation revealed that, in professional development of teachers for IWBs, training provided by an advisor with comprehensive technology and pedagogy knowledge would be a good strategy. Schools provided with IWBs may need to be provided with an advisor as part of continuous professional development.

In general, ICT seems to provide independent and self-directed classroom learning among learners. Then, teacher’s role may become more of a facilitator (Hall & Higgins, 2005). This could also be true for IWBs, as part of ICT use, and thus, professional

development for teachers on IWB use may need to be focused on this role of facilitator. A facilitator teacher may initiate the individualized instruction but not the whole class approach. More independence and self-direction may give students choices and scaffold their decision making skills. IWB technology has many features that are suitable for these kinds of practices. These features may include characteristics like touch screen or writing on screen with one's fingers. Kennewell and Beauchamp (2007) are listed the features of IWBs as:

"Speed (making processes happen more quickly than other methods), automation (making previously tedious or effortful processes happen automatically [other than changing the form of representation]), capacity (the storage and retrieval of large amounts of material), range (access to materials in different forms and from a wider range of sources than otherwise possible), provisionality (the facility to change content), and interactivity (the ability to respond to user input repeatedly)" (p.231). These features can all be found in today's IWBs in developed forms. IWB storage capacity can be increased through memory cards or USB usage. Retrieval of documents or any other media is quite easy. A video, a written document or any form of electronic document can be displayed on an IWB. All these factors boost the interactivity which may not be available with other technology tools. Various types of academic subjects may benefit from IWBs. IWBs allow students to get involved in classroom activities. Students can bring their file and connect to the IWB through different means.

Homework is not bound to paper format anymore because various forms of storage can be connected to IWBs.

The most important aspect of effective use of IWBs depends how school principals and teachers feel about using IWBs in education in general and in the classrooms in particular. Çağıltay, Çakıroğlu, Çağıltay, and Çakıroğlu (2001) who investigated the teachers' views on using computers in education in Turkey stated that majority of teachers believe that computers positively influence the process of teaching and learning. Teachers who had never used a computer all their lives even were observed to have views as positive as teachers who knew how to use a computer. Views of elementary teachers in Portugal on using IWBs in the classrooms are in the same direction. According to Gonçalves' (2010), research results, teachers were enthusiastic about IWB because they really believed their pupils learn better and in a more joyful way. However they drew attention to the need of training in order to fully exploit of the potential of their resource. In conclusion, according to Çağıltay et al. (2001), even though the infrastructure for computers is not adequate and teachers are not familiar with this technology, they do not resist computers used in education. However, teachers state their concerns about using computers as inadequate numbers of computers and teachers having inadequate training in that (Çağıltay et al., 2001). Likewise, Türel (2010) stated in his research that 80% of faculty members at public universities had never used an IWB and majority of teachers has not used IWBs installed in their classrooms. Çelik

(2012) showed that teachers were not adequately self-confident in using IWB devices and their features.

Another aspect of effective use of IWBs in classrooms is the fact that teachers receive adequate training on IWB usage. As such, J. Anderson, Northern Ireland Technology, Strategy Coordinator, believes that installing IWBs in classrooms and refraining from paying expenses mean only installing big projectors in the classrooms (John, 2002). Çağıltay et al. (2001), referring to many research results, state the need for not only training teachers on how to use computers but also how to integrate some particular applications in the curriculum. Türel (2010), on the other hand, refer to the fact that teachers need training on how to use IWBs pedagogically but not on the technology details of IWBs. According to Türel (2010), the content of the priority training provided to particularly the teachers should be the process of preparing mobile or fixed smart boards for use. This process includes steps such as physically installing the smart board, installing the software provided along with the board, and calibration of connection between the board and the computer (Türel, 2010).

In Mills and Schmertzing's (2005) research conducted to investigate the effect staff development training has on how teachers use interactive whiteboard in their classrooms and found that both the frequency and the quality of, teachers' IWB use increased after they received training. Also, the frequent use of the ACTIVBoard by teachers resulted in better student response as well as engagement. When the researchers compared their pre-training and post-training data, they found that the

teachers reported using IWBs much more frequently. More specifically, the researchers indicated that four weeks after the teachers received the IWBs training, all teachers now reported not only using the board more frequently but also used the many interactive features of the board. Before the training began, 11 teachers indicated that they did not know how to use the ACTIVStudio software to create and save flipcharts. However, all 11 teachers used the software to create a 6-10 page flipchart lesson related to their area of instruction on the last day of training. In addition, after the training, all teachers started using whiteboards interactively in their classrooms, and nine of the teachers who received the training used the ACTIVotes for student assessment. Two of these nine teachers had no training before. Interviews conducted after the training by the researchers with five of the teachers revealed that teachers' use of the interactive whiteboard had increased. The positive findings were further corroborated by surveys of students which also showed an increase in IWB use by both teachers and students. The increase, however, was not as high as students had expected. Based on the findings of this study, the regular use of the ACTIVBoard by teachers leads to better student response and higher classroom engagement. The high and positive student engagement was observed in teachers' classrooms after the training and was manifested through students' high participation rate and degree of focus during the lesson. Moreover, students were on task, were more attentive, and participated actively in class. More students raised their hands to answer the thoughtful questions posed by their teachers, and asked their teacher's permission to write their answers on the IWB (Mills &

Schmertzing, 2005). Lai (2010) echoed the findings of Mills and Schmertzing (2005), in her research study which investigated the effectiveness of training that Taiwanees middle school teacher participated in to improve their IWB skills. The findings showed that teachers valued using IWBs in their classrooms and considered attending training workshops as crucial. The teachers also pointed out that they appreciated knowing and learning more about various IWB uses which they believed would be helpful to their instructional practice.

In addition, content, time, and variety of IWB usage training are considered. It is stated that training provided to teachers should begin before IWBs are installed and be ongoing. Training content including pedagogical aspects of using the boards effectively in their classes as well as technical characteristics such as hardware, installation, and usage should be organized. On the other hand, besides designing training by experts for specific times and durations, the training should also be designed to provide the medium for teachers to improve, learn from one another, and follow up and receive feedback through online availability (Lai, 2010).

Effective use of IWBs is also associated with the IWB usage time. According to Jang and Tsai's (2012), when experienced teachers' ratings were compared to novice teachers, the former reported getting increased students' attention during class, and that the use of IWB helped them to explain complex and abstract concepts more easily and clearly. Hsieh (2011) investigating pre-service teachers' views on using IWBs and E-

Textbook, showed that pre-service teachers think IWBs and E-Textbook are important educational devices but they need longer time in order to develop skills to use them.

Using IWBs in the classrooms has disadvantages as well as advantages. Using IWBs in the classroom has its advantage for attracting students' attention through various teaching styles, making the class fun, organizing group works within classroom, using many various audio, visual, and interactive education materials (Türel, 2010). On the other hand, disadvantages of IWB use are reported as encountering technical problems, difficulty of providing inadequate content, and students not being able to see the screen due to daylight.

Research has shown that using IWB in a classroom is beneficial to both students and teachers. However, professional development for teachers is needed in order to use IWBs effectively and take the most out of the technology. In the next section, details of research method used in this study are discussed.

CHAPTER 3

METHODOLOGY

The purpose of this study was to investigate teachers' perceptions regarding professional development opportunities and practices that may be available for them for IWB use. This chapter describes the methodology which was used for conducting the study. More particularly, the participants, the research instrument, and procedure will be described in the next sections.

This study is hoped to contribute to the existing body of knowledge about Turkish teachers' perceptions of IWBs; the amount of professional development they receive; how professional development affect teachers' use of an interactive whiteboard (IWB) into Turkish K-12 classrooms; the type of professional development teachers have before and after the installation of the IWB into their classroom; the differences between new IWB users and the teachers who have been using it for some time; and ultimately how Turkish teachers use IWB in their classroom.

Participants

The participants in this study were both teachers who have been using IWBs in their public school settings, and the principals of their respective schools. Teachers with varying lengths of experience with IWBs (beginning, moderate users, and veteran users) served as the primary participants in the study. The secondary participants were the principals of the schools where the teacher participants work. Both male and female teachers were included, and the criteria for selection were based solely on their

experience with IWBs, and were drawn from 36 public schools in Beylikduzu and Arnavutkoy, Istanbul, Turkey.

Participants of the study are 36 school principals and 66 teachers employed in 36 different schools in towns of Beylikduzu and Arnavutkoy, Istanbul, Turkey. When deciding about the study group, the schools with at least one IWB installation and with teachers actively using it were included.

Initially, 60 schools were found to be appropriate for the study (since they had IWBs) out of totally 158 schools in two towns[1]. Surveys were given to 40 school principals and 80 teachers who volunteered to participate in the study. Among the returned surveys, those from 36 school principals and 66 teachers filled out the survey in consistence with the instructions. Teachers were randomly selected from each school with a goal of getting a pool of 66 teachers, and principals randomly selected from each school with a goal of getting a pool of 36 principals with varying years of IWB use. The principals of the schools where the teacher participants teach were asked to fill out the Survey since they are the ones who provide professional development opportunities for their faculty.

The survey was administered in 36 public schools in September, 2011, and the survey was sent to 66 teachers and 36 principals in these schools. Demographic characteristics of the participants are shown on Table 1:

[1]The numbers of the school and the teachers were taken from the official websites of the National Education Directorate of Beylikduzu and Arnavutkoy: beylikduzu.meb.gov.tr, arnavutkoy.meb.gov.tr.

Table 1
Frequencies and percentages related to participants' demographic characteristics

		f	%
POSITION	Principal	36	35.3
	Teacher	66	64.7
SEX	Female	38	37.3
	Male	64	62.7
IWB USAGE EXPERIENCE	1-5 years	98	96.1
	6-10 years	4	3.9
IWB USAGE TRAINING RECEIVED OR NOT	Yes	54	52.9
	No	48	47.1
SCHOOL LEVEL	Elementary	21	20.6
	High School	81	79.4
	TOTAL	102	100

Instruments

A survey instrument assessing teachers' and principals' perceptions of professional development for IWB uses was developed by the researcher. Copies of this instrument both in English and Turkish are included in Appendices C, D, E, and F.

The advantages of a survey are that the empirical data it produces is from real life observations. Generalizations can be made about the population sampled with an acceptable degree of accuracy. Also, a researcher can get the data much more quickly when using a survey instrument (Büyüköztürk, 2005).

The survey used in this study is called the Interactive White Board (IWB) Survey that assesses teachers' use of IWBs in their classrooms and their perceptions about the

training they receive or should receive. The instrument consists of a 27-item, Likert scale survey ranging from Strongly Agree (6 points) to Strongly Disagree (2 points), with N/A (1 point). The survey covers five major areas that were investigated through the research questions: the quantity and quality of professional development teachers receive, influence of professional development on teachers' use of IWBs into K-12 Turkish schools, type of training received, differences between new beginners and experienced teachers in IWB use, and how Turkish teachers use IWBs in classroom. Examples of items for the quantity and quality of professional development include, “I used IWB extensively in my instruction,” “I use IWB to attract students attention" and items indicating type of training teachers receive include, “I received full training before the installation of IWB in my classroom,” “I received continuous training after the installation of my IWB in my classroom.” Examples of items for other areas mentioned above include, “My experiences make me a better user of IWB in the classroom,” “My older colleagues are happy with the quantity and quality of professional development,” and "My students use IWB directly during instruction."

The reasons for using a survey to collect data for this study were threefold. First, the study aimed at determining what professional development teachers were given when IWBs were introduced into their classroom; the second aim was to find out how the IWBs were being used in their classrooms; and thirdly, to assess how teachers felt about the professional development they have received.

Principals of the same schools that the teacher participants come from were also surveyed to provide another source of data on how the principals perceived the professional development around IWBs in their respective schools. The principals filled out the same survey described above. The survey used for both teachers and principals has been developed by the researcher.

The survey was organized in two sections that investigated demographics and the above-mentioned areas. The questions were answered through a 6-point Likert scale as "6-Strongly Agree," "5-Agree," "4-Neutral," "3-Disagree," "2-Strongly Disagree," and "1-N/A."

For the demographic data part, participants were asked to identify their school, levels they teach, years of experience, and whether it is elementary, middle, or high school. This was followed by the second part that has the survey questions. The survey covered five major areas that were investigated through the research questions: the quantity and quality of professional development teachers receive, influence of professional development on teachers' use of IWBs into K-12 Turkish schools, type of training received, differences between new beginners and experienced teachers in IWB use, and how Turkish teachers use IWBs in classroom.

Procedure

The procedure that was followed in this study was comprised of four steps or phases: (1) Translation of the two instruments from English to Turkish; (2) Piloting of the two instruments with a sample of 15 Turkish teachers and 5 principals; (3) Seeking

permission to conduct the study in schools; and (4) contacting potential teacher and principal participants of the study in accord with the procedures described below.

Phase 1: Translation of Instruments

The Survey was translated from English to Turkish by a professional translation agency, The Euro Translation Office (in Izmir, Turkey). To enhance inter-rater reliability, the translation of the survey was presented to a second translator to check on the accuracy and readability of the translation.

Also, any of the Turkish written comments on either instrument that the participants of the study made were translated into English and reported in the results chapter.

Phase 2: Piloting of Instruments

Once the survey questions were translated and validated, the researcher piloted them using a sample of public teachers and principals. The Directorate of the National Education of Beylikduzu provided the list of schools with IWBs. The researcher purposefully selected the 5 schools within close proximity. The pilot participants were instructed to fill out the instruments and then provide comments on clarity of instructions and items, and solicit their recommendation for any changes to make the instrument easier to use. The feedback received from the pilot participants was used to revise the instruments before administering them to the actual participants of the study.

Phase 3: Securing Permission from Schools

Before contacting any school either for the pilot study or the survey, the

researcher presented his study proposal to the Directorate of the National Education of Beylikduzu for approval. Once approval was received, the researcher used the letter from the Ministry of Education to directly contact public schools to solicit their participation in the study. The description of the objectives and methodology of the study were shared with the school principals and any questions regarding the survey were answered. Copies of all correspondence (in English and Turkish languages) are in Appendices A and B.

Phase 4: Administering the Instruments to Collect Data

The researcher instructed principals to encourage the participation of only those teachers who use IWBs. Once the principals gave the research permission to conduct the study, the researcher provided hard copies of the Survey instruments to give to teachers to fill out. Also, each principal was given a copy of the survey to fill out. The teachers and principals were given two weeks to fill out the instruments. The researcher checked in with each school's principal a week after the instruments had been distributed to answer any questions.

The researcher went to each school to collect the surveys from the schools after the two week-period was over. The survey instrument was sent to the principals and teachers through the Head of the Istanbul Public School District Office.

Ethical Considerations

This study was conducted in accordance with University of Northern Iowa Policies and Procedures for Protection of Human Research Participants. The researcher

submitted his study for IRB approval. The identity and interests of research participants were protected throughout the study.

Informed Consent

Participation in this study was voluntary, and participants were free to withdraw from the study at any time. The participants were sufficiently informed about the research study. For the purposes of this study, all participants were given an Information Letter by their school's principal that explained the scope and purpose of the study. As the study concentrated on teachers' perceptions, and they were reached through school administrations, the first to receive the Informed Consent forms were the principals. Then, teachers were contacted. However, the teachers were not asked to return a Consent Form as their return of the survey implied their consent for participation.

The Participants' Rights

All participating principals and teachers were told that they were free to accept or decline participation in this research. They were clearly informed that they could withdraw from the study at any time they chose. They were also informed that they were able to ask questions about this study anytime they wanted. This information was also given directly to the participants.

Confidentiality and Anonymity

Information gathered concerning this research was kept confidential. Confidentiality included the names of all schools, principals and teachers that were used in this study. All participants were assured that their names would not be mentioned in

this research; instead they would be given pseudonyms. The survey was posted to the teachers directly online with an access code given to the participants by the Istanbul Public School District Office. Participants were ensured that access to their responses was restricted to the researcher and the researcher's advisor.

Data Analysis

The data collected through surveys were analyzed and their quantitative results tabulated and presented in Chapter 4. For data from the Survey, percentages related to each major part of the survey were reported as a response to the research questions of the study. In addition, in order to analyze the differences of participants' responses on five independent variables such as sex, position, school level, experience, and receiving training, Mann Whitney U Test was used since data obtained from the survey were not normally distributed and proportional in intervals (McKnight & Najab, 2010).

The Mann Whitney U Test is considered as a non-parametric counter part of the T test. No condition is required about data distribution for this test. However, the data are required to be collected randomly. Through Mann Whitney U Test, the hypothesis that two independent groups come from the main bodies with the same distribution is tested; this test should be conducted when requirements for T test are not available. If the requirements are met, T test should be conducted with priority since T test is more powerful (Sheskin, 2003).

Drawing Conclusion

Once the data were analyzed, the researcher reflected on the extent to which the data answered the research questions. More specifically, the focus was on impact of professional development on teachers' actual practice.

CHAPTER 4

FINDINGS

In this chapter, the findings obtained from the survey instrument are presented. The study aimed at exploring teachers' perceptions of professional development for the use of IWBs in Turkey. The data are presented under five headings, each related to one of the five research questions investigated in this study. The five headings used included:

1. Quantity and quality of the training on IWB use provided to teachers
2. The effect of the training on teachers' use of IWBs
3. The effect of training received prior to or following IWB installation in the classroom
4. The effect of IWB usage time on using IWBs effectively
5. Teachers' purposes and methods of use of IWBs in the classroom

The data related to each of these areas are presented next.

Quantity and Quality of the Training on IWB use Provided to Teachers

Data related to the first research question (What are Turkish teachers' and principals' perceptions about the quantity and quality of IWB training they receive?) are presented in this section. The data include responses to 1st, 2nd, 3rd, 4th, 5th, 14th, and 19th survey questions. Frequency and percentages of teachers' responses to points related to the quantity and quality of the training on IWB use are presented in Table 2.

Table 2.

Frequency and percentages of principals' and teachers' responses to items related to the quantity and quality of the training on IWB use

	N/A (1)		Strongly Disagree (2)		Disagree (3)		Neutral (4)		Agree (5)		Strongly Agree (6)	
	f	%	f	%	f	%	f	%	f	%	f	%
1. I received professional development on IWB use.	8	7.8	18	17.6	15	14.7	18	17.6	23	22.5	20	19.6
2. The professional development I received on IWBs was adequate.	10	9.8	21	20.6	22	21.6	17	16.7	22	21.6	10	9.8
3. The professional development I received on IWBs was well-organized.	8	7.8	17	16.7	20	19.6	26	25.5	22	21.6	9	8.8
4. I think teachers need to receive adequate professional development before they use IWBs in classroom.	0	0	7	6.9	4	3.9	7	6.9	24	23.5	60	58.8
5. I think teachers need to receive continuous professional development on use of IWBs in classroom..	3	2.9	11	10.8	21	20.6	18	17.6	26	25.5	23	22.5
14. The initial training I received was very useful.	10	9.8	16	15.7	21	20.6	18	17.6	31	30.4	6	5.9
19. Older teachers at our school are pleased with the quality and quantity of professional development.	9	8.8	17	16.7	22	21.6	32	31.4	18	17.6	4	3.9

Upon examining the responses provided in relation to the quantity and quality of education on smart board usage, it was observed that 42.1% of the participants received IWB usage training, 32.3% didn't receive it, and 17.6% stated no views.

According to the analysis, 42.2% of the school administrators and teachers considered the professional training provided as inadequate; 31.4% consider it as adequate; and 16.7% were nuetral. 30.4% of the school administrators and teachers thought that the training related to IWB was well-organized; 36.3% felt that it was not well-organized; and 25.5% were nuetral about it. The rate of school administrators and teachers who thought that teachers needed adequate professional development before they using IWBs was 82.3%; the rate of school administrators and teachers who thought that teachers did not need adequate professional development before using IWBs was 10.8%; and 6.9% were neutral about this. In response to the question about ongoing professional development for IWB usage, 48% stated that they needed to receive ongoing professional development; 3.4% thought they did not need ongoing professional development; and 17.6% were neutral about this. 36.3% of the school principals and teachers considered the training provided as very beneficial; 36.3% thought it was not very beneficial; and 17.6% were neutral on that. Upon examining the teachers' and principals' views, it was observed that 21.5% thought that senior teachers at schools were happy with the quantity and quality of the professional training; 38.3% thought that they were not happy with it; and 31.4% were neutral on that.

Mann-Whitney U Test showing the difference of participants' responses to 1st survey question, on variables of position, sex, school level, experience, and receiving training is presented in Table 3.

Table 3.
Table of Mann-Whitney U Test Showing the Difference of Participants' Responses to 1st Survey Question, on Variables of Position, Sex, School Level, Experience, and Receiving Training

		N[2]	Mean	Z Value	P
Position	Principal	36	3.0833	-3.622	**.000**
	Teacher	66	4.3182		
Sex	Female	38	4.2632	-1.746	.081
	Male	64	3.6563		
School level	Elementary	21	3.0000	-2.904	**.004**
	High School	81	4.1111		
Experience	Novice	98	3.9286	-1.517	.129
	Experienced	4	2.7500		
Training	Received	54	4.7407	-5.694	**.000**
	Not Received	48	2.9167		

As can be observed on Table 3, participants' responses to the question of whether they completed the IWB training statistically significantly differ on variables of position, school level, and training. When mean values are examined in order to know what group the differences are in favor of, it is observed that differences are in favor of teachers, participants employed in high schools, and those who completed IWB usage training. Thus, it is seen that teachers, those employed in high schools, and those who completed IWB usage training have higher scores in relation to IWB usage training completion.

[2]Number of participants

Mann-Whitney U Test showing the difference of participants' responses to 2nd survey question, on variables of position, sex, school level, experience, and receiving training is presented in Table 4.

Table 4.
Table of Mann-Whitney U Test showing the difference of participants' responses to 2nd Survey Question, on variables of Position, Sex, School Level, Experience, and Receiving Training

		N	Mean	Z Value	P
Position	Principal	36	3.0000	-2.470	.014
	Teacher	66	3.7576		
Sex	Female	38	3.5263	-.243	.808
	Male	64	3.4688		
School level	Elementary	21	2.5714	-3.071	**.002**
	High School	81	3.7284		
Experience	Novice	98	3.4898	-.053	.958
	Experienced	4	3.5000		
Training	Received	54	4.0926	-4.215	**.000**
	Not Received	48	2.8125		

As can be observed on Table 4, participants' responses to the question of the efficiency of the IWB usage training statistically significantly differ on variables of school level, and training. When mean values are examined in order to know what group the differences are in favor of, it is observed that differences are in favor of participants employed in high schools, and those who completed IWB usage training. Thus, it is seen that IWB usage training completed by those employed in high schools and those who completed IWB usage training has higher scores.

Mann-Whitney U Test showing the difference of participants' responses to 3rd survey question, on variables of position, sex, school level, experience, and receiving training is presented in Table 5.

Table 5.
Table of Mann-Whitney U Test showing the difference of participants' responses to 3rd Survey Question, on variables of Position, Sex, School Level, Experience, and Receiving Training

		N	Mean	Z Value	P
Position	Principal	36	3.1667	-2.294	.022
	Teacher	66	3.8788		
Sex	Female	38	3.7895	-.841	.401
	Male	64	3.5313		
School level	Elementary	21	2.7143	-3.104	**.002**
	High School	81	3.8642		
Experience	Novice	98	3.6531	-1.047	.295
	Experienced	4	3.0000		
Training	Received	54	4.2222	-4.369	**.000**
	Not Received	48	2.9583		

As can be observed on Table 5, participants' responses to the question of whether the IWB usage education was well-organized statistically significantly differ on variables of school level and training. When mean values are examined in order to know what group the differences are in favor of, it is observed that differences are in favor of participants employed in high schools and those who completed IWB usage training. Thus, it is seen that IWB usage training completed by those employed in high schools and those who completed IWB usage training is well-organized.

Mann-Whitney U Test showing the difference of participants' responses to 4th survey question, on variables of position, sex, school level, experience, and receiving training is presented in Table 6.

Table 6.
Table of Mann-Whitney U Test showing the difference of participants' responses to 4th Survey Question, on variables of Position, Sex, School Level, Experience, and Receiving Training

		N	Mean	Z Value	P
Position	Principal	36	5.5000	-2.992	**.003**
	Teacher	66	5.0909		
Sex	Female	38	5.0263	-1.608	.108
	Male	64	5.3594		
School level	Elementary	21	5.4286	-2.203	.028
	High School	81	5.1852		
Experience	Novice	98	5.2551	-.516	.606
	Experienced	4	4.7500		
Training	Received	54	5.3704	-.637	.524
	Not Received	48	5.0833		

As can be observed on Table 6, participants' responses to the question of adequate professional development before starting to use the IWBs statistically significantly differ on variable of position. When mean values are examined in order to know what group the differences are in favor of, it is observed that differences are in favor of principals. Thus, it is seen that more school principals believe that teachers need to receive professional development on IWB use before they start using them.

Mann-Whitney U Test showing the difference of participants' responses to 5th survey question, on variables of position, sex, school level, experience, and receiving training is presented in Table 7.

Table 7.
Table of Mann-Whitney U Test showing the difference of participants' responses to 5th Survey Question, on variables of Position, Sex, School Level, Experience, and Receiving Training

		N	Mean	Z Value	P
Position	Principal	36	5.0833	-4.768	**.000**
	Teacher	66	3.7121		
Sex	Female	38	3.8421	-1.893	.058
	Male	64	4.4062		
School level	Elementary	21	5.0000	-2.919	**.004**
	High School	81	3.9877		
Experience	Novice	98	4.2551	-2.089	.037
	Experienced	4	2.7500		
Training	Received	54	4.1296	-.312	.755
	Not Received	48	4.2708		

As can be observed on Table 7, participants' responses to the question of ongoing professional development on IWB use statistically significantly differ on variables of position and school level. When mean values are examined in order to know what group the differences are in favor of, it is observed that differences are in favor of principals and those employed in high schools. Thus, it is seen that school principals and teachers need to receive ongoing professional development on IWB use.

Mann-Whitney U Test showing the difference of participants' responses to 14th survey question, on variables of position, sex, school level, experience, and receiving training is presented in Table 8.

Table 8.
Table of Mann-Whitney U Test showing the difference of participants' responses to 14th Survey Question, on variables of Position, Sex, School Level, Experience, and Receiving Training

		N	Mean	Z Value	P
Position	Principal	36	3.1667	-2.088	.037
	Teacher	66	3.8485		
Sex	Female	38	3.6316	-.071	.943
	Male	64	3.5938		
School level	Elementary	21	3.0000	-1.920	.055
	High School	81	3.7654		
Experience	Novice	98	3.6429	-1.236	.216
	Experienced	4	2.7500		
Training	Received	54	4.3889	-5.790	**.000**
	Not Received	48	2.7292		

As can be observed on Table 8, participants' responses to the question of how beneficial the initial training on IWB use was statistically significantly differ on variable of receiving professional development. When mean values are examined in order to know what group the differences are in favor of, it is observed that differences are in favor of those who received professional development. Thus, it is seen that those teachers who received professional development received beneficial initial training.

Mann-Whitney U Test showing the difference of participants' responses to 19th survey question, on variables of position, sex, school level, experience, and receiving training is presented in Table 9.

Table 9.
Table of Mann-Whitney U Test showing the difference of participants' responses to 19th Survey Question, on variables of Position, Sex, School Level, Experience, and Receiving Training

		N	Mean	Z Value	P
Position	Principal	36	2.8333	-3.760	**.000**
	Teacher	66	3.8182		
Sex	Female	38	3.5526	-.509	.611
	Male	64	3.4219		
School level	Elementary	21	2.5714	-3.411	**.001**
	High School	81	3.7037		
Experience	Novice	98	3.4490	-.939	.348
	Experienced	4	4.0000		
Training	Received	54	3.4444	-.220	.825
	Not Received	48	3.5000		

As can be observed on Table 9, participants' responses to the question of whether senior teachers are pleased with the quality and quantity of IWB usage training statistically significantly differ on variables of position and school level. When mean values are examined in order to know what group the differences are in favor of, it is observed that differences are in favor of teachers and those employed in high schools. Thus, it is seen that teachers and those employed in high schools state that senior teachers are more pleased with the quality and quantity of professional development on IWB usage.

The Effect of the Training on Teachers' Use of IWBs

Data related to the second research question (How does professional development affect teachers' use of an Interactive Whiteboard (IWB) used in Turkish K-12 classrooms?) are the focus of this section. These data cover responses to 6th, 7th, 8th, 9th, and 10th of the survey. Frequency and percentages of responses to items related to the effect of the training on teachers' use of IWBs are presented in Table 10.

Table 10.
Frequency and percentages of responses to items related to the effect of the training on teachers' use of IWBs

	N/A (1)		Strongly Disagree (2)		Disagree (3)		Neutral (4)		Agree (5)		Strongly Agree (6)	
	f	%	f	%	f	%	f	%	f	%	f	%
6. The training I received on IWBs made me more confident using IWBs comfortably.	8	7.8	12	11.8	11	10.8	27	26.5	29	28.4	15	14.7
7. Teachers at our school can use IWB more effectively following the training.	10	9.8	20	19.6	14	13.7	18	17.6	27	26.5	13	12.7
8. The initial training teachers received enabled them to teach more effectively.	10	9.8	13	12.7	17	16.7	20	19.6	33	32.4	9	8.8
9. My teachers' use of IWBs in their classrooms is good for their students.	6	5.9	6	5.9	9	8.8	27	26.5	32	31.4	22	21.6
10. My teachers let their students use IWBs individually when available.	5	4.9	10	9.8	10	9.8	26	25.5	38	37.3	13	12.7

Once the data were analyzed, it was found that 22.6% of school principals and teachers thought that professional training they received on IWBs did not increase their self-confidence to comfortably and competently use IWBs; 43.1% thought that the professional training they received on IWBs increased their self-confidence to comfortably and competently use IWBs; and 26.5% were neutral in their rating. 39.2% of the participants stated that teachers at their schools used IWBs in their classrooms more effectively upon training; 33.3% stated that teachers could not use IWBs effectively; and 17.6% were neutral on that. 41.2% of the principals and teachers stated that the initial training provided to teachers at schools helped them teach more effectively. 29.4% thought that it did not help them teach more effectively; and 19.6% stated they were neutral on the issue. 53% of the principals stated that teachers' use of IWBs in their classrooms at schools was beneficial for students; 14.7% of the principals stated it was not beneficial for students; and 26.5 % were neutral on that. 50% of the principals said that teachers encouraged students in their classrooms to use IWBs when convenient; 19.6% said teachers did not encourage students to use IWBs when convenient; and 25.5% were neutral on that.

Mann-Whitney U Test showing the difference of participants' responses to 6th survey question, on variables of position, sex, school level, experience, and receiving training is presented in Table 11.

Table 11.
Table of Mann-Whitney U Test showing the difference of participants' responses to 6th Survey Question, on variables of Position, Sex, School Level, Experience, and Receiving Training

		N	Mean	Z Value	P
Position	Principal	36	3.9167	-.118	.906
	Teacher	66	4.0455		
Sex	Female	38	4.0000	-.326	.744
	Male	64	4.0000		
School level	Elementary	21	3.5714	-1.234	.217
	High School	81	4.1111		
Experience	Novice	98	4.0204	-.839	.401
	Experienced	4	3.5000		
Training	Received	54	4.7037	-5.219	**.000**
	Not Received	48	3.2083		

As can be observed on Table 11, participants' responses to the question of whether the professional development received on IWB use makes them more confident in using IWBs comfortably in the classroom statistically significantly differ on variable of receiving professional development. When mean values are examined in order to know what group the differences are in favor of, it is observed that differences are in favor of those who received professional development. Thus, it is seen that professional development on IWB use increased the confidence of those who received the professional development in using IWBs more comfortably in the classroom.

Mann-Whitney U Test showing the difference of participants' responses to 7th survey question, on variables of position, sex, school level, experience, and receiving training is presented in Table 12.

Table 12.
Table of Mann-Whitney U Test showing the difference of participants' responses to 7th Survey Question, on variables of Position, Sex, School Level, Experience, and Receiving Training

		N	Mean	Z Value	P
Position	Principal	36	3.6667	-.032	.974
	Teacher	66	3.7121		
Sex	Female	38	3.3947	-1.513	.130
	Male	64	3.8750		
School level	Elementary	21	3.1429	-1.670	.095
	High School	81	3.8395		
Experience	Novice	98	3.7347	-1.300	.194
	Experienced	4	2.7500		
Training	Received	54	4.3704	-4.509	**.000**
	Not Received	48	2.9375		

As can be observed on Table 12, participants' responses to the question related to teachers' more effective use of IWBs after professional development on IWBs statistically significantly differ on variable of receiving professional development. When mean values are examined in order to know what group the differences are in favor of, it is observed that differences are in favor of those who received professional development. Thus, it is seen that users use IWBs more effectively in their classrooms after they received the professional development on using IWBs.

Mann-Whitney U Test showing the difference of participants' responses to 8th survey question, on variables of position, sex, school level, experience, and receiving training is presented in Table 13.

Table 13.

Table of Mann-Whitney U Test showing the difference of participants' responses to 8th Survey Question, on variables of Position, Sex, School Level, Experience, and Receiving Training

		N	Mean	Z Value	P
Position	Principal	36	3.4167	-1.756	.079
	Teacher	66	3.9848		
Sex	Female	38	3.8421	-.312	.755
	Male	64	3.7500		
School level	Elementary	21	3.2857	-1.592	.111
	High School	81	3.9136		
Experience	Novice	98	3.7755	-.318	.750
	Experienced	4	4.0000		
Training	Received	54	4.2407	-3.277	**.001**
	Not Received	48	3.2708		

As can be observed on Table 13, participants' responses to the question of whether the professional development participants initially received made them teach more effectively statistically significantly differ on variable of receiving professional development. When mean values are examined in order to know what group the differences are in favor of, it is observed that differences are in favor of those who received the initial professional development. Thus, it is seen that the initial professional development on IWB use made those who received the initial professional development teach more effectively.

Mann-Whitney U Test showing the difference of participants' responses to 9th survey question, on variables of position, sex, school level, experience, and receiving training is presented in Table 14.

Table 14.
Table of Mann-Whitney U Test showing the difference of participants' responses to 9th Survey Question, on variables of Position, Sex, School Level, Experience, and Receiving Training

		N	Mean	Z Value	P
Position	Principal	36	4.5000	-1.290	.197
	Teacher	66	4.2879		
Sex	Female	38	4.2368	-1.171	.242
	Male	64	4.4375		
School level	Elementary	21	4.7143	-2.088	.037
	High School	81	4.2716		
Experience	Novice	98	4.3776	-.765	.444
	Experienced	4	4.0000		
Training	Received	54	4.6852	-2.580	.010
	Not Received	48	4.0000		

As can be observed on Table 14, participants' responses to the question of whether teachers' use of IWBs in the classroom is good for the students statistically significantly differ on no variable. Thus, it is seen that all participants equally value the good of IWB use in the classroom for students.

Mann-Whitney U Test showing the difference of participants' responses to 10th survey question, on variables of position, sex, school level, experience, and receiving training is presented in Table 15.

Table 15.
Table of Mann-Whitney U Test showing the difference of participants' responses to 10th Survey Question, on variables of Position, Sex, School Level, Experience, and Receiving Training

		N	Mean	Z Value	P
Position	Principal	36	4.0833	-.578	.563
	Teacher	66	4.2424		
Sex	Female	38	4.0789	-.722	.470
	Male	64	4.2500		
School level	Elementary	21	4.1429	-.129	.897
	High School	81	4.1975		
Experience	Novice	98	4.2449	-2.255	.024
	Experienced	4	2.7500		
Training	Received	54	4.6111	-3.386	.001
	Not Received	48	3.7083		

As can be observed on Table 15, participants' responses to the question of whether teachers encourage students to use IWBs in the classroom when available statistically significantly differ on variable of receiving professional development. When mean values are examined in order to know what group the differences are in favor of, it is observed that differences are in favor of those who received professional development. Thus, it is seen that those who received professional development on IWB encourage the students to use IWB when available more.

The Effect of Training Received Prior to or Following IWB Installation in the Classroom

Data related to the third research question (What type of professional development do teachers have before and after the installation of the IWB into their classroom?) are focused on in this section. These data include responses to 11th, 12th, 13th, 15th, and 16th of the survey questions. Frequency and percentages of responses to items related to the type of training received prior to or following IWB installation in the classroom are presented in Table 16.

Table 16.
Frequency and percentages of responses to items related to the type of training received prior to or following IWB installation in the classroom

	N/A (1)		Strongly Disagree (2)		Disagree (3)		Neutral (4)		Agree (5)		Strongly Agree (6)	
	f	%	f	%	f	%	f	%	f	%	f	%
11. My teachers received full training before IWBs were installed in their classrooms.	10	9.8	34	33.3	19	18.6	20	19.6	10	9.8	9	8.8
12. My teachers received full training after IWBs were installed in their classrooms.	9	8.8	25	24.5	28	27.5	20	19.6	15	14.7	5	4.9
13. My teachers received continuous training after IWBs were installed in their classrooms.	11	10.8	32	31.4	23	22.5	20	19.6	8	7.8	8	7.8
15. All teachers at our school received initial training before they started using IWBs in their classrooms.	7	6.9	14	13.7	13	12.7	19	18.6	34	33.3	15	14.7
16. All teachers at our school received continuous training after they started using IWBs in their classrooms.	6	5.9	21	20.6	13	12.7	27	26.5	26	25.5	9	8.8

Some of the school principals (18.6%) stated that their teachers received full training before IWB installation in their classrooms; 51.9% said their teachers did not receive training before IWB installation; and 18.6% did not state anything about this. 19.6% of school principals stated that their teachers received full training upon IWB installation in their classrooms; 52% said their teachers did not receive training upon IWB installation in their classrooms; and 19.6% were neutral on this. 15.6% of school principals stated that their teachers received ongoing training upon IWB installation in their classrooms; 53.9% said that their teachers did not receive ongoing training upon IWB installation in their classrooms; and 19.6% were neutral on this. 48% of school principals stated that all teachers at their schools received initial training prior to using IWB in their classrooms; 26.4% said that all of their teachers did not receive initial training before IWB use in their classrooms; and 18.6% were neutral on this. 34.3% of principals stated that all teachers at their schools received ongoing training after they started using IWBs; 33.3% said that they did not receive ongoing training after they started using IWBs; and 26.5% were neutral on that.

Mann-Whitney U Test showing the difference of participants' responses to 11th survey question, on variables of position, sex, school level, experience, and receiving training is presented in Table 17.

Table 17.
Table of Mann-Whitney U Test showing the difference of participants' responses to 11th Survey Question, on variables of Position, Sex, School Level, Experience, and Receiving Training

		N	Mean	Z Value	P
Position	Principal	36	2.8333	-1.522	.128
	Teacher	66	3.2879		
Sex	Female	38	3.0526	-.263	.792
	Male	64	3.1719		
School level	Elementary	21	2.2857	-2.884	**.004**
	High School	81	3.3457		
Experience	Novice	98	3.1429	-.416	.677
	Experienced	4	2.7500		
Training	Received	54	3.7037	-4.242	**.000**
	Not Received	48	2.4792		

As can be observed on Table 17, participants' responses to the question of whether teachers received complete professional development before IWBs were installed in their classrooms statistically significantly differ on variables of school level and receiving professional development. When mean values are examined in order to know what group the differences are in favor of, it is observed that differences are in favor of those employed in high schools and those who received professional development. Thus, it is seen that those employed in high schools and those who received professional development received complete training before IWBs were installed in their classrooms.

Mann-Whitney U Test showing the difference of participants' responses to 12th survey question, on variables of position, sex, school level, experience, and receiving training is presented in Table 18.

Table 18.
Table of Mann-Whitney U Test showing the difference of participants' responses to 12th Survey Question, on variables of Position, Sex, School Level, Experience, and Receiving Training

		N	Mean	Z Value	P
Position	Principal	36	3.0000	-.967	.333
	Teacher	66	3.7879		
Sex	Female	38	3.2105	-.255	.799
	Male	64	3.6875		
School level	Elementary	21	3.0000	-.572	.568
	High School	81	3.6420		
Experience	Novice	98	3.5408	-.750	.453
	Experienced	4	2.7500		
Training	Received	54	4.2037	-3.485	**.000**
	Not Received	48	2.7292		

As can be observed on Table 18, participants' responses to the question of whether teachers received complete professional development after IWBs were installed in their classrooms statistically significantly differ on variable of receiving professional development. When mean values are examined in order to know what group the differences are in favor of, it is observed that differences are in favor of those who received professional development. Thus, it is seen that those who received professional development received complete training after IWBs were installed in their classrooms.

Mann-Whitney U Test showing the difference of participants' responses to 13th survey question, on variables of position, sex, school level, experience, and receiving training is presented in Table 19.

Table 19.
Table of Mann-Whitney U Test showing the difference of participants' responses to 13th Survey Question, on variables of Position, Sex, School Level, Experience, and Receiving Training

		N	Mean	Z Value	P
Position	Principal	36	3.1667	-.205	.838
	Teacher	66	3.7576		
Sex	Female	38	2.8684	-.753	.451
	Male	64	3.9531		
School level	Elementary	21	3.0000	-.421	.674
	High School	81	3.6914		
Experience	Novice	98	3.5612	-.257	.797
	Experienced	4	3.2500		
Training	Received	54	3.6667	-4.422	**.000**
	Not Received	48	3.4167		

As can be observed on Table 19, participants' responses to the question of whether teachers received ongoing professional development after IWBs were installed in their classrooms statistically significantly differ on variable of receiving professional development. When mean values are examined in order to know what group the differences are in favor of, it is observed that differences are in favor of those who received professional development. Thus, it is seen that those who received professional development received ongoing professional development after IWBs were installed in their classrooms.

Mann-Whitney U Test showing the difference of participants' responses to 15th survey question, on variables of position, sex, school level, experience, and receiving training is presented in Table 20.

Table 20.
Table of Mann-Whitney U Test showing the difference of participants' responses to 15th Survey Question, on variables of Position, Sex, School Level, Experience, and Receiving Training

		N	Mean	Z Value	P
Position	Principal	36	3.5833	-1.941	.052
	Teacher	66	4.2576		
Sex	Female	38	4.0789	-.195	.845
	Male	64	3.9844		
School level	Elementary	21	3.5714	-1.402	.161
	High School	81	4.1358		
Experience	Novice	98	4.0408	-.912	.362
	Experienced	4	3.5000		
Training	Received	54	4.8889	-6.430	**.000**
	Not Received	48	3.0417		

As can be observed on Table 20, participants' responses to the question of whether teachers received initial professional development before IWBs were installed in their classrooms statistically significantly differ on variable receiving professional development. When mean values are examined in order to know what group the differences are in favor of, it is observed that differences are in favor of those who received professional development. Thus, it is seen that those teachers at schools which offered professional development received initial training before they started using IWBs.

Mann-Whitney U Test showing the difference of participants' responses to 16th survey question, on variables of position, sex, school level, experience, and receiving training is presented in Table 21.

Table 21.
Table of Mann-Whitney U Test showing the difference of participants' responses to 16th Survey Question, on variables of Position, Sex, School Level, Experience, and Receiving Training

		N	Mean	Z Value	P
Position	Principal	36	3.2500	-2.464	.014
	Teacher	66	3.9697		
Sex	Female	38	3.9211	-1.060	.289
	Male	64	3.5937		
School level	Elementary	21	3.0000	-2.467	.014
	High School	81	3.9012		
Experience	Novice	98	3.7347	-.662	.508
	Experienced	4	3.2500		
Training	Received	54	4.3519	-4.645	**.000**
	Not Received	48	3.0000		

As can be observed on Table 21, participants' responses to the question of whether all teachers at their schools received ongoing professional development after they started using IWBs statistically significantly differ on variable of receiving professional development. When mean values are examined in order to know what group the differences are in favor of, it is observed that differences are in favor of those who received professional development. Thus, it is seen that all teachers at schools offering professional development on IWB use received ongoing professional development after they started using IWBs.

The Effect of IWB Use Time on Using IWBs Effectively

Data related to the fourth research question (What differences, if any, are there among teachers who have been using IWBs for 1-5 years and teachers who have been using them for 6-10 years?) are addressed in this section. These data include responses to 17th, 18th, 20th, and 21st of the survey questions. Frequency and percentages of

responses to items related to the effect of IWB use duration on using IWBs effectively are presented in Table 22.

Table 22.
Frequency and percentages of responses to items related to the effect of IWB usage time on using IWBs effectively

	N/A (1)		Strongly Disagree (2)		Disagree (3)		Neutral (4)		Agree (5)		Strongly Agree (6)	
	f	%	f	%	f	%	f	%	f	%	f	%
17. My teachers' experiences make then better users of IWBs in the classroom.	5	4.9	14	13.7	18	17.6	10	9.8	33	32.4	22	21.6
18. Since I am a new user, I do not use IWB very often.	10	9.8	18	17.6	26	25.5	18	17.6	23	22.5	7	6.9
20. Experienced teachers are more comfortable with IWBs.	7	6.9	8	7.8	10	9.8	26	25.5	37	36.3	14	13.7
21. At our school, teachers who are familiar with technology are more comfortable with IWBs.	3	2.9	4	3.9	5	4.9	12	11.8	41	40.2	37	36.3

Most of the school principals (54%) stated that experiences of teachers at schools made them better IWB users; 31.3% said that experiences did not make teachers better IWB users; and 9.8% were neutral on that. 29.4% of the school principals stated that they did not use IWBs very often since they were new users; 43.1% said that they used IWBs; and 17.6% were neutral on this. 50% of the school principals said that

teachers at their schools were more comfortable using IWBs; 17.6% stated that teachers were not comfortable using IWBs; and 25.5% were neutral on this. 76.5% of the school principals stated that teachers who are knowledgeable about technology felt more comfortable about the IWBs; 8.8% said that they were not comfortable using IWBs; and 11.8% were neutral on this.

Mann-Whitney U Test showing the difference of participants' responses to 17th survey question, on variables of position, sex, school level, experience, and receiving training is presented in Table 23.

Table 23.
Table of Mann-Whitney U Test showing the difference of participants' responses to 17th Survey Question, on variables of Position, Sex, School Level, Experience, and Receiving Training

		N	Mean	Z Value	P
Position	Principal	36	3.9167	-1.112	.266
	Teacher	66	4.2879		
Sex	Female	38	4.0263	-.765	.445
	Male	64	4.2344		
School level	Elementary	21	3.8571	-.982	.326
	High School	81	4.2346		
Experience	Novice	98	4.1633	-.168	.866
	Experienced	4	4.0000		
Training	Received	54	4.8889	-5.274	**.000**
	Not Received	48	3.3333		

As can be observed on Table 23, participants' responses to the question of whether teachers' experiences make then better users of IWBs in their classrooms statistically significantly differ on variable of receiving professional development. When mean values are examined in order to know what group the differences are in favor of, it is observed that differences are in favor of those who received professional development. Thus, it is seen that teachers who are experienced in IWB use become better users of IWBs compared to those who received IWB usage training.

Mann-Whitney U Test showing the difference of participants' responses to 18th survey question, on variables of position, sex, school level, experience, and receiving training is presented in Table 24.

Table 24.
Table of Mann-Whitney U Test showing the difference of participants' responses to 18th Survey Question, on variables of Position, Sex, School Level, Experience, and Receiving Training

		N	Mean	Z Value	P
Position	Principal	36	3.3333	-.590	.555
	Teacher	66	3.5303		
Sex	Female	38	3.5526	-.406	.685
	Male	64	3.4063		
School level	Elementary	21	3.2857	-.329	.742
	High School	81	3.5062		
Experience	Novice	98	3.4796	-.730	.465
	Experienced	4	3.0000		
Training	Received	54	3.7222	-2.022	.043
	Not Received	48	3.1667		

As can be observed on Table 24, participants' responses to the question of how often the new users use IWBs statistically significantly differ on no variable. Thus, it is seen that all participants state the same level of IWB using frequency.

Mann-Whitney U Test showing the difference of participants' responses to 20th survey question, on variables of position, sex, school level, experience, and receiving training is presented in Table 25.

Table 25.
Table of Mann-Whitney U Test showing the difference of participants' responses to 20th Survey Question, on variables of Position, Sex, School Level, Experience, and Receiving Training

		N	Mean	Z Value	P
Position	Principal	36	4.0000	-.620	.535
	Teacher	66	4.2727		
Sex	Female	38	4.0789	-.939	.347
	Male	64	4.2344		
School level	Elementary	21	3.8571	-.219	.827
	High School	81	4.2593		
Experience	Novice	98	4.2143	-1.331	.183
	Experienced	4	3.2500		
Training	Received	54	4.2778	-.948	.343
	Not Received	48	4.0625		

As can be observed on Table 25, participants' responses to the question of how comfortable the experienced teachers are with IWBs statistically significantly differ on no variable. Thus, it is seen that all participants stated that experienced teachers are equally comfortable with IWBs.

Mann-Whitney U Test showing the difference of participants' responses to 21st survey question, on variables of position, sex, school level, experience, and receiving training is presented in Table 26.

Table 26.
Table of Mann-Whitney U Test showing the difference of participants' responses to 21st Survey Question, on variables of Position, Sex, School Level, Experience, and Receiving Training

		N	Mean	Z Value	P
Position	Principal	36	4.8333	-.279	.780
	Teacher	66	4.9545		
Sex	Female	38	4.8421	-.735	.462
	Male	64	4.9531		
School level	Elementary	21	4.7143	-.053	.958
	High School	81	4.9630		
Experience	Novice	98	4.9388	-1.603	.109
	Experienced	4	4.2500		
Training	Received	54	5.2222	-2.907	**.004**
	Not Received	48	4.5625		

As can be observed on Table 26, participants' responses to the question of how comfortable the teachers familiar with technology at their schools are with IWBs statistically significantly differ on variable receiving professional development. When mean values are examined in order to know what group the differences are in favor of, it is observed that differences are in favor of those who received professional development on IWB. Thus, it is seen that teachers who received professional development on IWB usage state that teachers familiar with technology at their schools are more comfortable with IWBs.

Teachers' Purpose and Methods of Using IWBs in The Classroom

Data related to the fifth research question (What differences, if any, are there among teachers who have been using IWBs for 1-5 years and teachers who have been using them for 6-10 years?) are covered in this section. These data include responses to

22nd, 23rd, 24th, 25th, 26th, and 27th of the survey items. Frequency and percentages of responses to items related to how teachers use IWBs in the classroom are presented in Table 27.

Table 27.
Frequency and percentages of responses to items related to how teachers use IWBs in the classroom

	N/A (1)		Strongly Disagree (2)		Disagree (3)		Neutral (4)		Agree (5)		Strongly Agree (6)	
	f	%	f	%	f	%	f	%	f	%	f	%
22. Teachers at our school use IWBs only as a projector during instruction.	10	9.8	12	11.8	31	30.4	29	28.4	9	8.8	11	10.8
23. My teachers use IWBs much during instruction.	12	11.8	11	10.8	12	11.8	30	29.4	18	17.6	19	18.6
24. Teachers at our school use IWBs in order to attract students' attention.	7	6.9	7	6.9	12	11.8	20	19.6	42	41.2	14	13.7
25. Teachers at our school use IWBs directly during instruction.	9	8.8	10	9.8	10	9.8	38	37.3	28	27.5	7	6.9
26. Teachers of our school use IWBs as main technology element in classroom.	11	10.8	8	7.8	13	12.7	24	23.5	36	35.3	10	9.8
27. Teachers at our school do not use IWBs very often in the classroom.	7	6.9	11	10.8	20	19.6	36	35.3	23	22.5	5	4.9

Some of school principals (19.6%) stated that teachers at their schools utilize IWBs only as projectors during the class; 42.2% said that teachers do not use IWBs; and 28.4% were neutral on this. 36.2% of the school principals stated that teachers at their

schools used IWBs very much during the classes; 22.6% said that teachers did not use IWBs very much; and 29.4% were neutral on that. 54.9% stated that teachers at their schools utilized IWBs in order to attract students' attention; 18.7% said that teachers did not use IWBs in order to attract students' attention; and 19.6% were neutral on this. 34.4% of the school principals and teachers who took the questionnaire stated that the students in their schools directly used IWBs during class; 19.6% stated that students did not directly use IWBs during class; and 37.3% were neutral on this. 45.1% of the school principals stated that teachers at their schools utilized IWBs as the main technology element in their classrooms; 20.5% said that teachers did not use them as main technology elements in their classrooms; and 23.5% were neutral on this. 27.4% of the school participants stated that teachers at their schools did not very OFTEN use IWBs in their classrooms; 30.4% said that teachers used IWBs very often; and 35.3% were neutral on this.

Mann-Whitney U Test showing the difference of participants' responses to 22nd survey question, on variables of position, sex, school level, experience, and receiving training is presented in Table 28.

Table 28.
Table of Mann-Whitney U Test showing the difference of participants' responses to 22nd Survey Question, on variables of Position, Sex, School Level, Experience, and Receiving Training

		N	Mean	Z Value	P
Position	Principal	36	3.8333	-1.924	.054
	Teacher	66	3.2727		
Sex	Female	38	3.4737	-.470	.638
	Male	64	3.4687		
School level	Elementary	21	3.8571	-1.724	.085
	High School	81	3.3704		
Experience	Novice	98	3.4592	-.239	.811
	Experienced	4	3.7500		
Training	Received	54	3.5926	-.800	.424
	Not Received	48	3.3333		

As can be observed on Table 28, participants' responses to the question of whether teachers at their schools use IWBs only as a projector statistically significantly differ on no variables. Thus, it is seen that all participants stated equal views of whether teachers at their schools use IWBs only as projectors during instruction.

Mann-Whitney U Test showing the difference of participants' responses to 23rd survey question, on variables of position, sex, school level, experience, and receiving training is presented in Table 29.

Table 29.
Table of Mann-Whitney U Test showing the difference of participants' responses to 23rd Survey Question, on variables of Position, Sex, School Level, Experience, and Receiving Training

		N	Mean	Z Value	P
Position	Principal	36	4.0000	-.923	.356
	Teacher	66	3.7879		
Sex	Female	38	3.6316	-1.333	.183
	Male	64	4.0000		
School level	Elementary	21	3.5714	-.723	.470
	High School	81	3.9383		
Experience	Novice	98	3.9490	-2.563	.010
	Experienced	4	1.7500		
Training	Received	54	4.4630	-3.942	**.000**
	Not Received	48	3.1875		

As can be observed on Table 29, participants' responses to the question of how often teachers uses IWBs during instruction statistically significantly differ on variable of receiving professional development. When mean values are examined in order to know what group the differences are in favor of, it is observed that differences are in favor of those who received professional development. Thus, it is seen that participants who received professional development on IWB usage state that teachers use IWBs during instruction more often.

Mann-Whitney U Test showing the difference of participants' responses to 24th survey question, on variables of position, sex, school level, experience, and receiving training is presented in Table 30.

Table 30.
Table of Mann-Whitney U Test showing the difference of participants' responses to 24th Survey Question, on variables of Position, Sex, School Level, Experience, and Receiving Training

		N	Mean	Z Value	P
Position	Principal	36	3.5833	3.300	**.001**
	Teacher	66	4.5758		
Sex	Female	38	4.4737	-1.271	.204
	Male	64	4.0781		
School level	Elementary	21	3.2857	-3.213	.001
	High School	81	4.4691		
Experience	Novice	98	4.2449	-.711	.477
	Experienced	4	3.7500		
Training	Received	54	4.7778	-4.395	**.000**
	Not Received	48	3.6042		

As can be observed on Table 30, participants' responses to the question of whether teachers at their schools use IWBs in order to attract students' attention statistically significantly differ on variables of position, school level, and receiving professional development. When mean values are examined in order to know what group the differences are in favor of, it is observed that differences are in favor of teachers, those employed in high schools, and those who received professional development on IWB usage. Thus, it is seen that teachers, those employed in high schools, and those who received professional development on IWB usage think that more teachers use IWBs in order to attract students' attention during instruction.

Mann-Whitney U Test showing the difference of participants' responses to 25th survey question, on variables of position, sex, school level, experience, and receiving training is presented in Table 31.

Table 31.
Table of Mann-Whitney U Test showing the difference of participants' responses to 25th Survey Question, on variables of Position, Sex, School Level, Experience, and Receiving Training

		N	Mean	Z Value	P
Position	Principal	36	3.7500	-.175	.861
	Teacher	66	3.9091		
Sex	Female	38	4.0263	-.997	.319
	Male	64	3.7500		
School level	Elementary	21	3.5714	-.232	.816
	High School	81	3.9259		
Experience	Novice	98	3.9184	-2.465	.014
	Experienced	4	2.2500		
Training	Received	54	4.2778	-3.270	**.001**
	Not Received	48	3.3750		

As can be observed on Table 31, participants' responses to the question of whether students at their schools use IWBs directly during instruction statistically significantly differ on variable receiving professional development. When mean values are examined in order to know what group the differences are in favor of, it is observed that differences are in favor of those who received professional development on IWB usage. Thus, it is seen that those who received professional development on IWB usage state that more students directly use IWBs during instruction.

Mann-Whitney U Test showing the difference of participants' responses to 26th survey question, on variables of position, sex, school level, experience, and receiving training is presented in Table 32.

Table 32.
Table of Mann-Whitney U Test showing the difference of participants' responses to 26th Survey Question, on variables of Position, Sex, School Level, Experience, and Receiving Training

		N	Mean	Z Value	P
Position	Principal	36	3.6667	-1.420	.155
	Teacher	66	4.0909		
Sex	Female	38	3.8947	-.475	.635
	Male	64	3.9687		
School level	Elementary	21	3.4286	-1.692	.091
	High School	81	4.0741		
Experience	Novice	98	4.0102	-1.851	.064
	Experienced	4	2.2500		
Training	Received	54	4.6296	-4.921	**.000**
	Not Received	48	3.1667		

As can be observed on Table 32, participants' responses to the question of whether teachers at their schools use IWBs as main technology tool statistically significantly differ on variable receiving professional development. When mean values are examined in order to know what group the differences are in favor of, it is observed that differences are in favor of those who received professional development on IWB usage. Thus, it is seen that those who received professional development on IWB usage state that teachers use IWBs as main technology tools in their classrooms.

Mann-Whitney U Test showing the difference of participants' responses to 27th survey question, on variables of position, sex, school level, experience, and receiving training is presented in Table 33.

Table 33.
Table of Mann-Whitney U Test showing the difference of participants' responses to 27th Survey Question, on variables of Position, Sex, School Level, Experience, and Receiving Training

		N	Mean	Z Value	P
Position	Principal	36	3.6667	-.065	.948
	Teacher	66	3.7273		
Sex	Female	38	3.7105	-.075	.940
	Male	64	3.7031		
School level	Elementary	21	3.4286	-.282	.778
	High School	81	3.7778		
Experience	Novice	98	3.7143	-.143	.887
	Experienced	4	3.5000		
Training	Received	54	3.7778	-.090	.928
	Not Received	48	3.6250		

As can be observed on Table 33, participants' responses to the question of how often teachers at their schools use IWBs in their classrooms statistically significantly differ on no variables. Thus, it is seen that all participants state that teachers at their schools use IWBs equally often.

CHAPTER 5

SUMMARY, DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

This chapter includes the findings, their implications and also makes recommendations for practitioners, policy makers and researchers in the area of IWB usage in the classrooms.

Summary

As was mentioned in Chapter 1, the primary purpose of this study was to investigate Turkish public school teachers' and principals' perceptions regarding professional development opportunities and practices that may be available for interactive whiteboard (IWB) use. The study aimed at investigating the following questions:

1. What are Turkish teachers' perceptions of the quantity and quality of IWB training they receive?
2. How does professional development affect teachers' use of an IWB in a Turkish K-12 classroom?
3. What type of professional development do teachers have before and after the installation of the IWB in their classroom?
4. What differences, if any, are there among teachers who are new to the IWB technology, those who have been using it for a while, and those who have been using it for a long time?
5. How do Turkish teachers use IWB in their classroom?

The study included a total of 102 participants employed at 36 different schools in Istanbul, Turkey. Thirty-six (35.3%) of the participants were school principals and 66 (64.7%) were teachers. Whereas the majority (96.1%) of the participants were experienced in IWB use for 1-5 years, more than half (52.9%) received IWB training at least once.

Research findings are presented under five headings related to the aforementioned research questions. The research findings can be summarized as follows:

1. Quantity and Quality of the Training on IWB Use Provided to Teachers

1.1. According to almost half the participants (42.2%), IWB training provided to school administrators and teachers was inadequate.

1.2. According to one third of participants (36.3%), IWB training sessions provided to school administrators and teachers were not well-organized.

1.3. Again according to one third of participants (36.3%), IWB training provided to school administrators and teachers was not as effective as expected.

1.4. Majority of the participants (82.3%) thought that school administrators and teachers really needed training in the use of IWBs.

1.5. Almost half the participants (48%) thought that in order to meet this need, they need to receive ongoing training and professional development.

2. The Effect of the Training on Teachers' Use of IWBs

2.1. IWB training increased school administrators' and teachers' self-confidence (43.1%).

2.2. They used IWB more effectively in their classrooms after receiving the training (39.3%).

2.3. The initial training on IWB usage contributed to more effective teaching (41.2%).

2.4. According to school principals (53%), teachers' use of IWBs in their classrooms was very beneficial for students.

2.5. Principals (50%) encouraged their teachers to use IWBs in their classrooms.

3. The Effect of Training Received Prior to or Following IWB Installation in the Classroom

3.1. At most of the schools (51.9%), teachers were not able to receive IWB training prior to installation of IWBs in their classrooms.

3.2. According to school principals, the training should be provided at the beginning (48%).

3.3. According to school principals, the training should be continued upon installation of the IWB (52%).

3.4. School principals thought that ongoing training would be beneficial (53.9%).

4. The Effect of IWB Usage Time on Using IWBs Effectively

4.1. Use of IWBs for longer periods increased teachers' ability to use IWBs effectively (54%).

4.2. Teachers who used IWBs for the first time used them less effectively than experienced and more interested teachers do (43.1%).

4.3. Teachers who were experienced on IWBs and were studious and eager to use IWBs more comfortably in their classrooms and this in return motivated them to use IWBs more (76.5%).

5. Teachers' Purposes and Methods of Use of IWBs in the Classroom

5.1. Teachers who received quality training about how to use IWBs and were experienced utilize IWBs very effectively and get students' attention to the lessons through IWBs (54.9%).

5.2. Most of these teachers (45.1%) used IWBs as the main technology element in their classrooms.

Discussion

Results of the research were discussed below within the context of the five research questions.

This study contributes to the existing body of knowledge of Turkish teachers' perceptions of IWBs; the amount of professional development they receive; how professional development affect teachers' use of an interactive whiteboard (IWB) into Turkish K-12 classrooms; the type of professional development teachers have before and after the installation of the IWB into their classroom; the differences between new IWB users and the teachers who have been using it for some time; and ultimately how Turkish teachers use IWB in their classroom.

1.Quantity and Quality of IWB Usage Education

Recently many studies on teachers' attitudes towards IWBs (Alshawareb & Abu Jaber, 2012; Çağıltay et al., 2001; Gonçalves, 2010; Hsieh, 2011; Kirkscey, 2012), levels of using IWBs effectively (Çelik, 2012), the effect of IWB usage training on using IWBs effectively (Türel, 2010; Winkler, 2011), inadequate aspects of IWB usage trainings (Lai, 2010), the difference between experienced and inexperienced teachers' effective uses of IWBs (Campbell & Martin, 2010; Kennewell & Morgan, 2003) and positive and negative aspects of using IWBs in the classroom (Jang & Tsai, 2012; John, 2002; Smith et al., 2005) have been conducted. On the other hand, according to Çağıltay et al. (2001), knowledge deficiency and inadequate training are the two main problems of technology use in education.

The present research study presents similar findings as well. To begin with, the quality and quantity of IWB training or professional development opportunities provided to teachers in Turkey are inefficient and insufficient. IWB training provided to school administrators and teachers were neither adequate (42,2%) nor well-organized (36.3%). Hence, IWB training provided to school administrators and teachers were not as effective as expected (36.3%), therefore, school administrators and teachers were observed to be unhappy with trainings. However, school administrators and teachers stated that they really needed the IWB usage training (82.3%) and in order to meet this need, they wanted to receive ongoing education (48%). Yet, according to Smith et al. (2005), one of the most frequent issues raised by teachers and students alike was the

need for a good and long enough training so that they can optimally use the IWBs . This dissatisfaction was observed to be related to various reasons including inefficient content, not well-organized, inadequate and not continous, not adequately introducing the importance of professional development to teachers (Türel, 2010), and training provided without any regard toward the characteristics of adult education (Lai, 2010).

In addition, Gregory and Connolly (2009) indicated that in order for a process of training to be successful, clear targets should be determined, step-by-step implementation process should be planned, training should be compatible with learners' interests and levels, and learners should be provided with feedback . Furthermore, teachers need IWB training in each one of the following three areas: (1) IWB technical knowledge and skills; (2) IWB teaching methods; and (3) IWB activity development (Türel & Johnson, 2012).

As can be observed from other studies conducted previously and the participants' responses in relation to the first research question, in order for teachers to use IWBs effectively in the classroom, they should receive a qualified and well-organized training with well-outlined content. The content of such training should include the three items mentioned above and making sure that the training is ongoing.

2. The Effect of IWB Usage Training on Teachers' Use of IWBs

Data obtained from the survey about the effect of IWB training on teachers' use of IWBs also provided clear results. IWB training increased school administrators' and teachers' self-confidence (43.1%) and they used IWB more effectively in their classrooms

upon the training (39.3%) since according to principals and teachers, the initial training on IWB usage contributed to more effective teaching (41.2%). In addition, according to school principals (53%), teachers' use of IWBs in their classrooms is very beneficial for students. For this reason, principals (50%) encouraged their teachers to use IWBs in their classrooms. Lai (2010) also had similar results. Lai's reserach confirm the fact that teachers found training workshops to be valuable. More specifically, the teachers expressed that the practical IWB uses were extremely important and helpful to their teaching. On the other hand, Lai (2010) found teachers who lacked experience with IWB valued the training. In addition, Lai also found that the teachers felt that IWB was easy to use but they were very concerned about how to integrate IWB into their classroom (2010).

As can be observed from other studies conducted previously and the participants' responses in relation to the second research question, training prepared for teachers to be able to use IWBs effectively in the classroom increases their self-confidence and lets them use IWBs more conveniently, and students benefit more from the classes conducted with IWBs. Previous studies as well as results of this research show that teachers are eager to receive a quality training in order to be able to use IWBs effectively and the school principals support this process.

3.The effect of Training Received Prior to or Upon IWB Installation in the Classroom

Another research question was about the IWB usage training being more effective provided whether prior to or upon installation of IWB in the classroom. The

following results were obtained in relation to this question in the research: at most of the schools (51.9%), teachers were not able to receive IWB training prior to installation of IWBs in their classrooms. However, according to school principals, the training should be provided at the beginning (48%) and should be continued upon installation of the IWB (52%). In addition, school principals thought that ongoing training would be beneficial (53.9%). Lai (2010) also stated that in order for IWB training to be effective, time, duration, and method of training are important to consider. IWB training would be well to include additional sessions and longer time so that teachers would have the opportunity to share their thoughts, address problems they may encounter, and discuss practical ways of IWB use in their teaching area. Also, for continuity purposes in professional development, creating a web platform would be an easy solution to help teachers to acquire new skills and gain knowledge. For example, online discussion of useful tips beyond training, workshops, which may furthermore build an online community of practice dedicated to effective use of IWB technolgy would be most helpful to teachers (Lai, 2010).

As can be observed from other studies conducted previously and the participants' responses in relation to the third research question, in order for teachers to use IWBs effectively in the classroom, training should be diversified in terms of duration and methods. It is observed that training should begin before the IWBs are installed; it should be ongoing; processes where teachers can learn from one another should be

developed; online education opportunities should be utilized; and feedback related to training should be organized following the training.

4. Effect of Duration on Effective Use of IWBs

This research investigated the effect of teachers' duration of IWB use experience in classrooms on teachers' effective use of IWBs as well. According to the data obtained from the survey, use of IWBs for longer periods increases teachers' ability to use IWBs effectively (54%). Teachers who used IWBs for the first time used them less effectively than experienced and more interested teachers do (43.1%). In addition, teachers who were experienced on IWBs and were studious and eager use IWBs more comfortably in their classrooms and this in return motivated them to use IWBs more (76.5%). On the other hand, teachers who were less informed about IWBs deal with IWBs less. In a similar study, it was found that teachers who newly started teaching were more eager and efficient in IWB usage, compared with others (Kirkscey, 2012). Student teachers were particularly willing to spend extra time to practice with technology and to use the interactive features of the IWB to make instruction more effective with children (Kennewell & Morgan, 2003). Consequently, even though young and newly starting teachers are more eager and intent on IWB usage, IWB usage experience was observed to be strongly connected to IWB usage duration (Bunch, Robinson & Edwards, 2012). On the other hand, De Vita, Verschaffel and Elen (2012) state that teachers with good experience in teaching with technological tools are more likely inclined to consider managing a new tool as easy, but when faced with actual difficulties, this perspective

changes. Within the same study, it was found that teachers experienced in IWB usage had higher levels of eagerness and awareness towards advanced areas of IWB use.

As can be observed from other studies conducted previously and the participants' responses in relation to the fourth research question, teachers' effective use of IWBs is associated with IWB use time and experience. Teachers who used IWBs for longer time put IWBs into use more effectively in the classrooms. On the other hand, compared with senior teachers, novice teachers are observed to be nore familiar with computer technologies; to be more eager to use IWBs, and to make more efforts to develop.

5. Purposes and Methods of Teachers' Use of IWBs in the Classrooms

The last research question was about teachers' purposes and methods of using IWBs in the classroom. Data obtained from the questionnaire revealed the following findings on teachers' purpose and methods of using IWBs: teachers with IWBs in their classrooms have very little use of IWBs and they even use IWB only as a projector. However, teachers who received quality training about how to use IWBs and are experienced utilize IWBs very effectively and get students' attention to the lessons through IWBs (54.9%). Most of these teachers (45.1%) used IWBs as the main technology element in their classrooms. In a study supporting this, Türel and Johnson (2012) stated that teachers believed that IWBs could be used to facilitate learning and instruction under the following conditions: (1) collobration with collegues, (2) experimenting with effective instructional strategies using IWB, and (3) more frequent

teacher use of IWBs to improve IWB competency. Commonly mentioned in other studies is that: If we teach or train teachers about smart board usage (nowadays technologies updated software) they will become more knowledgeable and they will be more interested to teach the students. However, this usage needs to be in distinctive and innovative ways that can result in student motivation in learning. As John (2002) indicated “the technology is not standing still. Consequently, it could be argued that such technology should be used in unique and creative ways above and beyond that which is possible when teaching with normal whiteboards or other projection methods” (as cited in Smith et al., 2005, p. 99).

As can be observed from other studies conducted previously and the participants’ responses within survey in relation to the fifth research question, whereas teachers with adequate experience and training use IWBs throughout the instruction process and encourage their students to use them, teachers without experience and training tend to use IWBs reluctantly and IWBs become tools with no effect.

Conclusions

Based on the data analyses in the fourth chapter and the dicussion above, conclusions of this research which investigated school principals’ and teachers’ perceptions of IWB usage may be listed as follows:

1. What are Turkish teachers’ and principals’ perceptions of the quantity and quality of IWB training they receive?

About the quality and quantity of IWB usage training, it was concluded that training related to school principals' and teachers' IWB usage was currently inadequate and not well-organized and thus does not meet teachers' and school principals' needs.

On the other hand school principals and teachers desperately need IWB usage training and they would like the IWB usage training to be ongoing. Well-orgainzed and adequate training is needed in order for teachers to use IWBs more effectively. Training time, conten, and method should be diverse.

2. How does professional development affect teachers' use of an Interactive Whiteboard (IWB) used in Turkish K-12 classrooms?

On the effect of the training on teachers' use of IWBs, it was concluded that IWB usage training increased school principals' and teachers' self-confidence, contributed to making them use IWB more effectively in their classrooms, and supported the effectiveness of instruction. Both school principals and teachers believe that IWB use in the classroom is very beneficial and school principals encourage teachers to use IWBs. After teachers receive IWB usage training, the fact that their increased eagerness and efforts to use IWBs should be considered and this should be ongoing is closely connected with the training efficiency in time, content, and method.

3. What type of professional development do teachers have before and after the installation of the IWB into their classroom?

About the effect of training received prior to or following IWB installation in the classroom, it was evident thatMany schools do not receive IWB usage training before

they actually start using IWBs. However, IWB training is expected to be delivered prior to IWB installation and to be ongoing.

4. What differences, if any, are there among teachers who have more experience on using IWBs and teachers who have less experience?

It has been concluded relating to the effect of IWB usage time on using IWBs effectively,there is a linear relationship between skills of IWB usage and duration of IWB experience. Teachers using the IWBs for a longer duration use them more effectively and are more enthusiastic about using IWBs in their classrooms. On the other hand, as observed in previous studies, younger and newly-graduated teachers are more eager to use IWBs and they put in more effort to improve in order to be able to use IWBs effectively.

5. How do Turkish teachers use IWBs in their classrooms?

Regarding to teachers' purposes and methods of use of IWBs in the classroom, it was evident that teachers who received IWB usage training and are experienced users of IWBs can attract students' attention more in their classrooms. These teachers prefer IWBs as the main instruction tool due to the mentioned benefits.

Recommendations

Based on the findings of this study, the following reccomendations for educational policy makers, implementers, students, and researchers can be presented:

Recomendations for Educational Policy Makers

Effective use of IWB in the classrooms depends on ongoing professional development conducted through various methods. Often it is not effective to expect the training to be funded by the schools. Therefore, IWB usage trainings within teachers' professional development should be funded in order for IWB usage at schools to be effective.

Likewise, another way of making training ongoing is that IT experts or IT teachers should be employed at schools in order to regularly maintain IWB usage and provide teachers with continuous training. Thus, teachers will have the opportunity to reach an expert when needed and meet their needs with the help of the expert.

In addition, process of IWB usage in the classroom requires maintaining and sustaining a new educational culture and environment at schools. This all requires receiving help from the IWB expert personnel. For that, technical personnel should be available at school in order to solve problems (hardware, software, connection, network, updates, firewall, internet, antivirus etc.) related to basic system faster and sooner.

Recommendations for Implementers

Teachers' use of IWBs in their classrooms requires a two-dimensional training. First of all, senior teachers may need basic computer training in order to catch up with the IWB technology with which they are less familiar, compared to younger teachers. Therefore, school administration and IBT companies should offer a two-phase training to teachers in order for students and teachers to have optimal gains:

1st phase. Basic computer training. This training should include basic computer skills.

2nd phase. IWB usage training. This training should include the following: basic IWB system usage skills and usage of special programs related to some courses in IWB.

School principals should plan some initiative with each experinced IWB user-teacher presenting seminar for 15 minutes each week in order to encourage within-organization and within-department learning and development. Experiences on more effective instrcution with IWB should be shared among teachers.

In addition, in order to enrich the forms of IWB trainings and particularly have teachers learn from one another, school principals should organize meetings for sharing experiences of those more effectively using IBTs both within the school at large and departments. Thus, collective work and within-organization development should be supported. Prior to signing an agreement for installation of IWBs in classrooms, school administrators should request at least a month's training and trial period related to system and software use. School administrators also investigate whether related companies provide continuous technical support and upgradings of the used software before they sign any agreements.

School administration should express their need for the type of program they want from the company, with help of teachers, prior to deciding about the IWB software.

Teachers should definitely prepare to be more effective before they use smartboards in their classrooms. The initial content of a topic will provide teachers with economy of time and ease in later development and renewal of content. School administrators should seek ways of adapting newly added technology to existing IWBs. For instance, on IWBs, projector is enough addition to the system, thanks to the innovation in wall-marker use. No additional board is needed as it can be used on any surface such as wall, curtain, glass, etc. Even though you have aprojectir, buying the external device makes it smart. School administrators should follow up with such innovations and seek ways to adapt these to their schools and how teachers could learn about these innovations.

Recommendations for Students

Based on the findings of the study, graduate technology students need to be competent in the use of IWB software and look for ways to improve both the technology and its use so that school teachers and administrators will find it even easier and more attractive to use.

Recommendations for Future Research

Findings and results obtained through this research on the effectiveness of IWB usage training showed that some issues require research. Experimental studies should investigate what methods are most effective in IWB usage training and whether an expert from outside the school or a teacher within the school is more effective training teachers. Online or distance education models to support teachers' use of IWBs should

also be investigated. In addition, this research includes quantitative data, so perhaps a qualitative study would provide more insight and depth into the same issue.

REFERENCES

Alshawareb, A., & Jaber, M. A. (2012). Teacher's attitudes toward using interactive white boards in the teaching and learning process in Jordan. *International Journal of Instructional Media, 39* (4), 319-330.

Bell, M. A. (2002). Why use an interactive whiteboard? A baker's dozen reasons. Retrieved from http://teachers.net/gazette/JAN02/mabell.html

Betcher, C., & Lee, M. (2009). *The interactive whiteboard revolution: Teaching with IWBs*. Aust Council for Ed Research.

The British Educational Communications and Technology Agency (BECTA) (2003). *What the research says about interactive whiteboards*. Retrieved from http://www.becta.org.uk

Bunch, J. C., Robinson, J. S., & Edwards, M. C. (2012). Measuring the Relationship between Agriculture Teachers' Self-Efficacy, Outcome Expectation, Interest, and Their Use of Interactive Whiteboards. *Journal of Agricultural Education*, 53(1), 67-80.

Büyüköztürk, Ş. (2005). Anket geliştirme. *Türk Eğitim Bilimleri Dergisi, 3*(2), 133-151.

Çağıltay, K., Çakıroğlu, J., Çağıltay, N., & Çakıroğlu, E. (2001). Öğretimde bilgisayar Kullanımına ilişkin öğretmen görüşleri. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi*, *21*(1), 19-28.

Campbell, C. & Martin, D. (2010) Interactive Whiteboards and the first year experience: Integrating IWBs into pre-service teacher education, *Australian Journal of Teacher Education, 35*(6), 68-75.

Çelik, S.(2012) Competency Levels of Teachers in Using Interactive Whiteboards. *Contemporary Educational Technology*, 2012, 3(2), 115-129.

The Department for Education and Skill (2004). *Use of interactive whiteboards in history*. Retrieved from 14 March, 2011 http://publications.teachernet.gov.uk/eOrderingDownload/DfES-0812-2004_History.pdf.

De Vita, M., Verschaffel, L., & Elen, J. (2012). Acceptance of interactive whiteboards by Italian mathematics teachers. *Educational Research* (ISSN: 2141-5161), 3(7), 553-565.

Elaziz, M. F. (2008). Attitudes of students and teachers towards the use of Interactive whiteboards in EFL classrooms (Doctoral dissertation), Bilkent University, Ankara.

Emre, İ., Kaya, Z., Özdemir, T. Y., & Kaya, O. N. (2011, May). 'Akıllı Tahta Kullanımının Fen ve Teknoloji Öğretmen Adaylarının Hücre Zarının Yapısı Konusundaki Başarılarına ve Bilgi Teknolojilerine Karşı Tutumlarına Karşı Etkileri'. In *6th International Advanced Technologies Symposium (IATS'11)* (pp. 16-18).

Erduran, A., & Tataroğlu, B. (2009). Eğitimde Akıllı Tahta Kullanımına İlişkin Fen ve Matematik Öğretmeni Görüşlerinin Karşılaştırılması. In *9th International Educational Technology Conference (IETC2009)* (pp. 14-21).

Gillen, J., Staarman, J. K., Littleton, K., Mercer, N., & Twiner 2, A. (2007). A 'learning revolution'? Investigating pedagogic practice around interactive whiteboards in British primary classrooms 1. *Learning, Media and Technology*, *32*(3), 243-256.

Glover, D., & Miller, D. (2002). The Introduction of Interactive Whiteboards into Schools in the United Kingdom: Leaders, Led, and the Management of Pedagogic and Technological Change. *IEJLL: International Electronic Journal for Leadership in Learning*, *6*.

Glover, D., Miller, D., Averis, D., & Door, V. (2005). The interactive whiteboard: a literature survey. *Technology, Pedagogy and Education*, *14*(2), 155-170.

Gonçalves, M. J. (2010). *Interactive whiteboards in Portuguese primary schools: the teachers' view.* 14th World Multi-Conference on Systemics, Cybernetics and Informatics.

Goodison T. (2002) Learning with ICT at primary level. *Journal of Computer Assisted Learning 18*, 282-29.

Gregory, S., & Connolly, J. (2009). Teaching the Teachers. *Education Technology Solutions*, April/May 2009 (29), 68-70.

Greiffenhagen, C. (2002). *Out of the office into the school: electronic whiteboards for education*.Retrieved from http://web.comlab.ox.ac.uk/oucl/work/christian.greiffenhagen/ pub/boards/

Guskey, T. R. (2002). Professional development and teacher change. *Teachers and Teaching: Theory and Practice*, *8*(3), 381-391.

Hall, I. & Higgins, S. (2005). Primary school students' perceptions of interactive whiteboards. *Journal of Computer Assisted Learning 21,* p.102-117.

Higgins, J., & Johns, T. (1984). *Computers in language learning*. Boston, MA: Addison-Wesley Longman Publishing Co., Inc.

Higgins, S., Beauchamp, G., & Miller, D. (2007). Reviewing the literature on interactive whiteboards. *Learning, Media and Technology*, *32*(3), 213-225.

Hsieh, K. J. (2011). Preservice Teachers' Attitudes and Opinions towards Interactive Whiteboards and E-Textbooks. In *Advances in Computer Science, Environment, Ecoinformatics, and Education* (pp. 362-366). Berlin, Germany: Springer .

Jang, S. J., & Tsai, M. F. (2012). Exploring the TPACK of Taiwanese elementary mathematics and science teachers with respect to use of interactive whiteboards. *Computers & Education*, *59*(2), 327-338.

John, M. (2002) Can one size fit all*? Times Educational Supplement, 13 September 2002.*

Kennewell, S. & Beauchamp, G. (2007).The features of interactive whiteboards and their influence on learning. *Learning, Media and Technology,32*(3), p.227-241.

Kennewell, S., & Morgan, A. (2003). Student Teachers' Experiences and Attitudes Towards Using Interactive Whiteboards in the Teaching and Learning of Young Children. *In IFIP Working Groups 3.5*. Presented at the Australian Computer Society, Inc, Parramatta. Retrieved from http://www.canterbury.ac.uk/education/protected/ppss/docs/kennewell-morgan.pdf.

Kirkscey, R. (2012). Secondary school instructors' perspectives on the integration of information and communication technologies (ICT) with course content. *American Secondary Education, 40* (3), 17-33.

Koenraad, A. L. M. (2008). *Interactive Whiteboards in educational practice: the research literature reviewed.*Utrecht, Holland: Utrecht University.

Lacina, J. (2009). Interactive whiteboards: Creating higher-level, technological thinkers? *Childhood Education, 85*(4), p.270.

Lai, H.-J. (2010). Secondary school teachers' perceptions of interactive whiteboard training workshops: A case study from Taiwan. *Australasian Journal of Educational Technology, 26*(4), 511-522.

Levy, P. (2002) *Interactive whiteboards in learning and teaching in two Sheffield schools: a developmental study*. Retrieved January 20, 2012 from http://www.shef.ac.uk/eirg/projects/wboards.

Lewin, C., Somekh, B. & Steadman, S. (2008). Embedding interactive whiteboards in teaching and learning: The process of change in pedagogic practices*. Educational Informational Technology, 13*, p. 291-303.

McKnight, P. E., & Najab, J. (2010). Mann-Whitney U Test. *Corsini Encyclopedia of Psychology*. Retrieved January 10, 2013 from http://onlinelibrary.wiley.com/doi/10.1002/9780470479216.corpsy0524/full

McLoughlin, C., & Oliver, R. (1995). Who is in control? Defining interactive learning environments. *Learning with technology: Proceedings of ASCILITE'95*.

Miller, D. & Glover, D. (2007). Into the unknown: The professional development induction experience of secondary mathematics teachers using interactive whiteboards technology. *Learning, Media and Technology* 32(3), p.319-331.

Miller, D. J., Glover, D., & Keele, U. K. (2006). Evolution for a revolution: professional development for mathematics teachers using interactive whiteboard technology. *The Seventeenth ICMI Study: Technology Revisited*.

Miller, F. (2003). SmartBoards and Art: Uses of Technology in the Art Classroom. In C. Crawford et al. (Eds.), *Proceedings of Society for Information Technology & Teacher Education International Conference* 2003 (pp. 2594-2595). Chesapeake, VA: AACE. Retrieved from http://www.editlib.org/p/18510.

Mills, M. E. H.& Schmertzing, L. C.,(2005) Impact of Training on Teachers' Use of Interactive Whiteboards*.* Retrieved October 7, 2012 from *http://teach.valdosta.edu/are/vol4no2/PDF/MillsE-AM-ARE.pdf*

Moss, G., Jewitt, C., Levačić, R., Armstrong, V., Cardini, A., & Castle, F. (2007). *Interactive Whiteboards, Pedagogy, and Pupil Performance: An Evaluation of the Schools Whiteboard Expansion Project (London Challenge)*. Department for Education and Skills/Institute of Education, University of London.

Robinson, M. C. (2004). The impact of the interactive electronic whiteboard on student achievement in middle school mathematics *(Doctoral dissertation).*Florida State University, Tallahassee.

Schroeder, R. (2008). Active learning with interactive whiteboards: A literature review and a case study for college freshmen. *Communications in Information Literacy*, *1*(2), 64-73.

Sheskin, D. J. (2003). *Handbook of parametric and nonparametric statistical procedures*. Boca Raton, Florida: Chapman and Hall/CRC.

Slay, H., Siebörger, I., & Hodgkinson-Williams, C. (2008). Interactive whiteboards: Real beauty or just "lipstick"?. *Computers & Education, 51*(3), 1321-1341.

Smith, F., Hardman, F. & Higgins, S. (2006). The impact of interactive whiteboards on teacher-pupil interaction in the National Literacy and Numeracy Strategies. *British Educational Research Journal,32*(3), p.443-457.

Smith, H.(2001) *SmartBoard evaluation: final report*. Kent NgfL. Retrieved, September 3, 2012 from, http://www.kented.org.uk/ngfl/ict/IWB/whiteboards/report.html#11

Smith, H. J., Higgins, S., Wall, K. & Miller, J. (2005). Interactive whiteboards: boon or bandwagon? A critical review of the literature, *Journal of Computer Assisted Learning, 21*, 91-101.

Stefik, M., Foster, G., Bobrow, D.G., Kahn, K., Lanning, S. & Suchman, L. (1987). Beyond the chalkboard: Computer support for collaboration and problem solving in meetings, *Communications of the ACM*, *3*(1), 32-47.

Türel, Y. (2010, March). Developing teachers' utilization of interactive whiteboards. In *Society for Information Technology & Teacher Education International Conference* (Vol. 2010, No. 1, pp. 3049-3054).

Türel, Y. K., & Johnson, T. E. (2012). Teachers' Belief and Use of Interactive Whiteboards for Teaching and Learning. *Educational Technology & Society*,*15*(1), 381-394.

Veeranna, S. R., & ElShheibia, T. A. (2010, November). Integrating the role of information technology in educational institutions. *In 2nd International Conference on Computer Technology and Development , (*pp. 226-229), IEEE.

Walker, D. (2002,September 13). Meet Whiteboard Wendy*, Times Educational Supplement*.

Winkler, R. L. (2011). *Investigating the impact of interactive whiteboard professional development on lesson planning and student math achievement* (Doctoral dissertation, Liberty University).

APPENDIX A

INVITATION LETTER TO PARTICIPANTS

Dear Mr/Mrs……..,
My name is Erkan Taskin. I am a doctoral student at the University of Northern Iowa, Cedar Falls, Iowa, USA. As part of my dissertation study I am conducting a survey on teachers'/principals' perceptions of professional development provided on Interactive White Boards used at schools. The purpose of this research is to contribute in improving the various uses of IWBs at schools through providing insights on professional development. Once you agree to participate in this study, it will take 15 minutes to fill out the survey. Then you will send the filled out survey in the enclosed self-addressed and stamped envelope provided by the researcher. If you prefer to fill out the online survey version, you will click "submit" after filling it out.
I will collect the data and once I complete my study, I will publish the results with absolute confidentiality without any reference to participants and part of the school district. Your confidentiality will be maintained to the degree permitted by the technology used. Participation is completely voluntary. You do not have to participate in this study if you do not want to. You can withdraw from the study anytime you choose without penalty. There are no foreseeable risks and no foreseeable benefits to you for participating in this study. As an indirect benefit, this survey may potentially help you revise your evaluation of IWBs and their uses in your classroom.

Please do not put your name on the survey document.

Thank you very much for your participation.

If you have any questions concerning the study, please feel free to contact the principal investigator or the faculty advisor:

Principal Investigator
Erkan Taskin
Doctoral Student
Technology Department
UNI, Cedar Falls, Iowa
(319) 830 0270
taskine@uni.edu

Faculty Advisor
Dr. Mohammed F. Fahmy
ITC 8, (319) 273-2758
mohammed.fahmy@uni.edu

If you have any questions on participant's rights, please contact Anita Gordon, UNI IRB Administrator on 319-273-6148 or anita.gordon@uni.edu.
Please return the survey if you agree to participate in this study.
Thank you for agreeing to work with me and I look forward to your participation!

APPENDIX B

TURKISH TRANSLATION OF INVITATION LETTER TO PARTICIPANTS

Katılımcı Daveti (kagit uzerinde)
Sayın .....,
Ben Erkan Taşkın. University of Northern Iowa, Cedar Falls, Iowa, ABD'de doktora yapmaktayım. Tez çalışmamın gereği olarak öğretmen ve okul müdürlerinin İnteraktif Akıllı Tahta'nın okulda kullanımı konusunda mesleki eğitime ilişkin algıları üzerine bir anket çalışması yapmaktayım. Bu araştırmanın amacı, mesleki eğitim konusunda daha derinlikli görüşler kazandırarak İAT'ların okullarda çeşitli şekillerde kullanımının geliştirilmesine katkıda bulunmaktır. Eğer bu çalışmaya katılmayı onaylarsanız, anketi doldurmak 15 dakikanızı alacak ve sonra doldurulan anketi araştırmacı tarafından sağlanan pullu, mühürlü ve adresli zarfın içinde gönderebilirsiniz. Eğer anketi çevrimiçi doldurmayı tercih ederseniz, tamamladıktan sonra 'teslim et'i tıklayınız.
Verileri toplayacağım ve çalışmam tamamlandıktan sonra sonuçları, son derece güvenli bir tarzda, katılımcıların ya da okulun bilgilerini açıklamaksızın yayınlayacağım. Gizliliğiniz kullanılan teknolojinin izin verdiği ölçüde saklı kalacaktır. Katılım tamamen gönüllüdür. İstemezseniz bu çalışmaya katılmak zorunda değilsiniz. istediğiniz herhangi bir aşamada bu çalışmayı mazeretsiz bırakabilirsiniz.
Bu çalışmaya katılmanızdan ötürü üstleneceğiniz herhangi bir görünen risk ve kazanacağınız herhangi bir görünen doğrudan yarar yoktur. Ancak dolaylı olarak bu anket sınıfınızdaki İAT kullanımını ve değerlendirmesini gözden geçirmenize yardımcı olabilir.

Lütfen adınızı anket belgelerine yazmayınız.
Katılımınız için teşekkür ederiz.
Bu çalışmayla ilgili herhangi bir sorunuz olursa lütfen ana araştırmacı ya da fakülte danışmanını aramaktan çekinmeyin:

Ana Araştırmacı
Erkan Taskin
Doktora Öğrencisi
Teknoloji Bölümü
UNI, Cedar Falls, Iowa ,(319) 830 0270
taskine@uni.edu

Fakülte Danışmanı
Dr. Mohammed F. Fahmy
ITC 8, (319) 273-2758
mohammed.fahmy@uni.edu

Katılımcı haklarıyla ilgili herhangi bir sorunuz olursa lütfen +1319-273-6148 numaralı telefondan ya da anita.gordon@uni.edu eposta adresinden Anita Gordon, UNI IRB Yöneticisi ile iletişime geçin.
Benimle çalışmayı kabul ettiğiniz için teşekkür ediyor ve katılımınızı bekliyorum.

APPENDIX C

PRINCIPAL SURVEY

TEACHERS' PERCEPTIONS OF PROFESSIONAL DEVELOPMENT FOR THE USE OF INTERACTIVE WHITE BOARDS IN TURKEY

Interactive White Board (IWB) Survey for Principals

Part 1: Questions

To the right of each of the following item, a 6-point Likert scale columns will appear where

"SA" stands for Strongly Agree,

"A" for Agree,

"N" for Neutral (Neither agree/nor Disagree),

"D" for Disagree,

"SD" for Strongly Disagree and

"N/A" Not Applicable.

Interactive White Board (IWB) Survey Questions

1- I received professional development training on IWB use.

SA	A	N	D	SD	N/A
☐	☐	☐	☐	☐	☐

2- The professional development training I received on IWB use was enough.

SA	A	N	D	SD	N/A
☐	☐	☐	☐	☐	☐

3- The professional development training I received on IWB use was well organized.

SA	A	N	D	SD	N/A
☐	☐	☐	☐	☐	☐

4- I think teachers need to have adequate professional development before they use IWB in the classroom.

SA	A	N	D	SD	N/A
☐	☐	☐	☐	☐	☐

5- I think teachers need to have ongoing professional development on IWB use in the classroom.

SA	A	N	D	SD	N/A
☐	☐	☐	☐	☐	☐

6- The professional development training I received on IWB use increased my confidence in using the IWB comfortably.

SA	A	N	D	SD	N/A
☐	☐	☐	☐	☐	☐

7- Teachers in my school are able to use IWB in their classrooms more effectively after the training.

SA	A	N	D	SD	N/A
☐	☐	☐	☐	☐	☐

8- The first training my teachers received on IWB use allowed them to instruct more effectively.

SA	A	N	D	SD	N/A
☐	☐	☐	☐	☐	☐

9- The use of IWB in my teachers' classrooms was good for their students.

SA	A	N	D	SD	N/A
☐	☐	☐	☐	☐	☐

10- Use of IWB in my teachers' classrooms encouraged their students to use it when available.

SA	A	N	D	SD	N/A
☐	☐	☐	☐	☐	☐

11- My teachers received full training before the installation of IWB in their classrooms.

SA	A	N	D	SD	N/A
☐	☐	☐	☐	☐	☐

12- My teachers received full training after the installation of IWB in their classrooms.

SA	A	N	D	SD	N/A
☐	☐	☐	☐	☐	☐

13- My teachers received continuous training after the installation of IWB in their classrooms.

SA	A	N	D	SD	N/A
☐	☐	☐	☐	☐	☐

14- Initial training I received was very beneficial.

SA	A	N	D	SD	N/A
☐	☐	☐	☐	☐	☐

15- All teachers in my school received initial training before they started using IWB.

SA	A	N	D	SD	N/A
☐	☐	☐	☐	☐	☐

16- All teachers in my school received ongoing training after they started using IWB.

SA	A	N	D	SD	N/A
☐	☐	☐	☐	☐	☐

17- The experiences of my teachers have made them better users of IWB in their classrooms.

SA	A	N	D	SD	N/A
☐	☐	☐	☐	☐	☐

18- I don’t use IWB very often, because I am a new user.

SA	A	N	D	SD	N/A
☐	☐	☐	☐	☐	☐

19- The older teachers in my school are happy with the quantity and quality of professional development.

SA	A	N	D	SD	N/A
☐	☐	☐	☐	☐	☐

20- Experienced teachers feel more comfortable with IWB.

SA	A	N	D	SD	N/A
☐	☐	☐	☐	☐	☐

21- Teachers in my school who know technology feel more comfortable with IWB.

SA	A	N	D	SD	N/A
☐	☐	☐	☐	☐	☐

22- Teachers in my school use IWB only as a projector in their instruction.

SA	A	N	D	SD	N/A
☐	☐	☐	☐	☐	☐

23- My teachers use IWB extensively in their instruction.

SA	A	N	D	SD	N/A
☐	☐	☐	☐	☐	☐

24- Teachers in my school use IWB to attract their students' attention.

SA	A	N	D	SD	N/A
☐	☐	☐	☐	☐	☐

25- Students in my school use IWB directly during instruction.

SA	A	N	D	SD	N/A
☐	☐	☐	☐	☐	☐

26- Teachers in my school use IWB as the main technology in the classroom.

SA	A	N	D	SD	N/A
☐	☐	☐	☐	☐	☐

27- Teachers in my school do not use IWB in the classroom very often.

SA	A	N	D	SD	N/A
☐	☐	☐	☐	☐	☐

Part II: Demographics

Please check one: I am ☐ A principal ☐ A teacher

Gender: ☐ Female ☐ Male

School Name: ……

Type of School: ☐ Elementary ☐ Secondary

Of Years as a principal in this school:

……..

School Address:

……..

Years you have been using Interactive White Board, please check one of the following:

☐ 1-5 years ☐ 6-10 years

Have you received IWB training: ☐ Yes ☐ No

IWB training program title:

APPENDIX D

TURKISH TRANSLATION OF PRINCIPAL SURVEY

Ek-A

ÖĞRETMENLERİN TÜRKİYEDE'Kİ İNTERAKTİF AKILLI TAHTA KULLANIMINA İLİŞKİN MESLEKİ EĞİTİM KONUSUNDA ALGILARI

Müdürler için İnteraktif Akıllı Tahta (İAT) Anketi

Bölüm 1: Sorular

Her bir şıkkın sağında 6 puanlık Likert Scale satırı bulunacaktır. Burada "KAF" Kesinlikle Aynı Fikirdeyim, "AF" Aynı Fikirdeyim, "Ç" Çekimserim, "AFD" Aynı Fikirde Değilim, "KAFD" Kesinlikle Aynı Fikirde Değilim, "U" Uygulanamaz anlamına gelmektedir.

İnteraktif Akıllı Tahta (İAT) Anketi Soruları

1- İAT kullanımı üzerine mesleki eğitim aldım.

KAF	AF	Ç	AFD	KAFD	U
☐	☐	☐	☐	☐	☐

2- İAT üzerine aldığım mesleki eğitim yeterliydi.

KAF	AF	Ç	AFD	KAFD	U
☐	☐	☐	☐	☐	☐

3- İAT üzerine aldığım mesleki eğitim iyi organize edilmişti.

KAF	AF	Ç	AFD	KAFD	U
☐	☐	☐	☐	☐	☐

4- İAT'yı sınıfta kullanmadan önce öğretmenlerin yeterli mesleki eğitim almaları gerektiğini düşünüyorum.

KAF	AF	Ç	AFD	KAFD	U
☐	☐	☐	☐	☐	☐

5- İAT'nın sınıfta kullanımı üzerine öğretmenlerin sürekli mesleki eğitim almaları gerektiğini düşünüyorum.

KAF	AF	Ç	AFD	KAFD	U
☐	☐	☐	☐	☐	☐

6- İAT üzerine aldığım mesleki eğitim İAT'yı rahatça kullanmam konusunda benim güvenimi artırdı.

KAF	AF	Ç	AFD	KAFD	U
☐	☐	☐	☐	☐	☐

7- Okulumuzdaki öğretmenler eğitimden sonra İAT'yı sınıflarında daha etkili kullanabiliyorlar.

KAF	AF	Ç	AFD	KAFD	U
☐	☐	☐	☐	☐	☐

8- Öğretmenlerimin aldığı ilk eğitim daha etkili ders vermelerini sağladı.

KAF	AF	Ç	AFD	KAFD	U
☐	☐	☐	☐	☐	☐

9- Öğretmenlerimin sınıflarında İAT kullanmaları öğrencileri için iyi oldu.

KAF	AF	Ç	AFD	KAFD	U
☐	☐	☐	☐	☐	☐

10- Öğretmenlerimin sınıflarında İAT kullanımı, müsait olduğunda öğrencilerini de onu kullanmaya teşvik etti.

KAF	AF	Ç	AFD	KAFD	U
☐	☐	☐	☐	☐	☐

11- Öğretmenlerim, İAT 'nın sınıflarına kurulmasından önce tam eğitim aldılar.

KAF	AF	Ç	AFD	KAFD	U
☐	☐	☐	☐	☐	☐

12- Öğretmenlerim, İAT 'nın sınıflarına kurulmasından sonra tam eğitim aldılar.

KAF	AF	Ç	AFD	KAFD	U
☐	☐	☐	☐	☐	☐

13- Öğretmenlerim, İAT ’nın sınıflarına kurulmasından sonra sürekli eğitim aldılar.

KAF	AF	Ç	AFD	KAFD	U
☐	☐	☐	☐	☐	☐

14- İlk aldığım eğitim çok yararlıydı.

KAF	AF	Ç	AFD	KAFD	U
☐	☐	☐	☐	☐	☐

15- Okulumuzdaki tüm öğretmenler İAT kullanmaya başlamadan önce başlangıç eğitimi aldılar.

KAF	AF	Ç	AFD	KAFD	U
☐	☐	☐	☐	☐	☐

16- Okulumuzdaki tüm öğretmenler İAT kullanmaya başladıktan sonra sürekli eğitim aldılar.

KAF	AF	Ç	AFD	KAFD	U
☐	☐	☐	☐	☐	☐

17- Öğretmenlerimin deneyimleri, onları sınıflarında daha iyi İAT kullanıcıları haline getiriyor.

KAF	AF	Ç	AFD	KAFD	U
☐	☐	☐	☐	☐	☐

18- Yeni kullanıcı olduğum için İAT ’yı pek sık kullanmıyorum.

KAF	AF	Ç	AFD	KAFD	U
☐	☐	☐	☐	☐	☐

19- Okulumuzdaki yaşlı öğretmenler mesleki eğitimin nitelik ve niceliğinden memnun.

KAF	AF	Ç	AFD	KAFD	U
☐	☐	☐	☐	☐	☐

20- Deneyimli öğretmenler İAT konusunda daha rahatlar.

KAF	AF	Ç	AFD	KAFD	U
☐	☐	☐	☐	☐	☐

21- Okulumuzda teknoloji bilen öğretmenler İAT konusunda daha rahatlar.

KAF	AF	Ç	AFD	KAFD	U
☐	☐	☐	☐	☐	☐

22- Okulumuzdaki öğretmenler İAT'yı derste sadece bir projektör olarak kullanırlar.

KAF	AF	Ç	AFD	KAFD	U
☐	☐	☐	☐	☐	☐

23- Öğretmenlerim İAT'yı ders sırasında oldukça fazla kullanır.

KAF	AF	Ç	AFD	KAFD	U
☐	☐	☐	☐	☐	☐

24- Okulumuzdaki öğretmenler öğrencilerin dikkatini çekmek için İAT kullanır.

KAF	AF	Ç	AFD	KAFD	U
☐	☐	☐	☐	☐	☐

25- Okulumuzdaki öğrenciler ders sırasında İAT'yı doğrudan kullanırlar.

KAF	AF	Ç	AFD	KAFD	U
☐	☐	☐	☐	☐	☐

26- Okulumuzdaki öğretmenler sınıfta ana teknoloji öğesi olarak İAT kullanırlar.

KAF	AF	Ç	AFD	KAFD	U
☐	☐	☐	☐	☐	☐

27- Okulumuzdaki öğretmenler İAT'yı sınıfta pek sık kullanmazlar.

KAF	AF	Ç	AFD	KAFD	U
☐	☐	☐	☐	☐	☐

Bölüm 2: Demografi Bilgileri

Lütfen birini seçin : ☐Müdür ☐Öğretmen

Cinsiyet : ☐Bayan ☐Bay

Okul adı :.....

Okul Türü : ☐İlköğretim ☐Lise

Bu okulda yıl olarak müdürlük süreniz :.....

Okulun Adresi :.....

İAT kullanım süreniz : ☐1-5 yıl ☐6-10 yıl

İAT eğitimi aldınız mı? ☐Evet ☐Hayır

İAT eğitim proğramının adı :

APPENDIX E

TEACHER SURVEY

TEACHERS' PERCEPTIONS OF PROFESSIONAL DEVELOPMENT FOR THE USE OF INTERACTIVE WHITE BOARDS IN TURKEY

Interactive White Board (IWB) Survey for Teacher

Part 1: Questions

To the right of each of the following item, a 6-point Likert scale columns will appear where

"SA" stands for Strongly Agree,

"A" for Agree,

"N" for Neutral (Neither agree/nor Disagree),

"D" for Disagree,

"SD" for Strongly Disagree and

"N/A" Not Applicable.

Interactive White Board (IWB) Survey Questions

1- I received professional development training on IWB use.

SA	A	N	D	SD	N/A
☐	☐	☐	☐	☐	☐

2- The professional development training I received on IWB use was enough.

SA	A	N	D	SD	N/A
☐	☐	☐	☐	☐	☐

3- The professional development training I received on IWB use was well organized.

SA	A	N	D	SD	N/A
☐	☐	☐	☐	☐	

4- I think teachers need to have adequate professional development before they use IWB in the classroom.

SA	A	N	D	SD	N/A
☐	☐	☐	☐	☐	☐

5- I think teachers need to have ongoing professional development on IWB use in the classroom.

SA	A	N	D	SD	N/A
☐	☐	☐	☐	☐	☐

6- The professional development training I received on IWB use increased my confidence in using the IWB comfortably.

SA	A	N	D	SD	N/A
☐	☐	☐	☐	☐	☐

7- I was able to use IWB in my classroom more effectively after the training.

SA	A	N	D	SD	N/A
☐	☐	☐	☐	☐	☐

8- The first training I received on IWB use allowed me to instruct more effectively.

SA	A	N	D	SD	N/A
☐	☐	☐	☐	☐	☐

9- My use of IWB in the classroom was good for my students.

SA	A	N	D	SD	N/A
☐	☐	☐	☐	☐	☐

10- My use of IWB in the classroom encouraged my students to use it when available.

SA	A	N	D	SD	N/A
☐	☐	☐	☐	☐	☐

11- I received full training before the installation of IWB in my classroom.

SA	A	N	D	SD	N/A
☐	☐	☐	☐	☐	☐

12- I received full training after the installation of IWB in my classroom.

SA	A	N	D	SD	N/A
☐	☐	☐	☐	☐	☐

13- I received continuous training after the installation of my IWB in my classroom.

SA	A	N	D	SD	N/A
☐	☐	☐	☐	☐	☐

14- Initial training I received was very beneficial.

SA	A	N	D	SD	N/A
☐	☐	☐	☐	☐	☐

15- All teachers received initial training before they started using IWB.

SA	A	N	D	SD	N/A
☐	☐	☐	☐	☐	☐

16- All teachers received initial training after they started using IWB.

SA	A	N	D	SD	N/A
☐	☐	☐	☐	☐	☐

17- My experiences make me a better user of IWB in the classroom.

SA	A	N	D	SD	N/A
☐	☐	☐	☐	☐	☐

18- I don't use IWB very often, because I am a new user.

SA	A	N	D	SD	N/A
☐	☐	☐	☐	☐	☐

19- My older colleagues are happy with the quantity and quality of professional development.

SA	A	N	D	SD	N/A
☐	☐	☐	☐	☐	☐

20- Experienced teachers feel more comfortable with IWB.

SA	A	N	D	SD	N/A
☐	☐	☐	☐	☐	☐

21- Teachers who know technology feel more comfortable with IWB.

SA	A	N	D	SD	N/A
☐	☐	☐	☐	☐	☐

22- I used IWB only as a projector in my instruction.

SA	A	N	D	SD	N/A
☐	☐	☐	☐	☐	☐

23- I used IWB extensively in my instruction.

SA	A	N	D	SD	N/A
☐	☐	☐	☐	☐	☐

24- I use IWB to attract students' attention.

SA	A	N	D	SD	N/A
☐	☐	☐	☐	☐	☐

25- My students use IWB directly during instruction.

SA	A	N	D	SD	N/A
☐	☐	☐	☐	☐	☐

26- Teachers use IWB as the main technology in the classroom.

SA	A	N	D	SD	N/A
☐	☐	☐	☐	☐	☐

27- Teachers do not use IWB in the classroom very often.

SA	A	N	D	SD	N/A
☐	☐	☐	☐	☐	☐

Part II: Demographics

Please check one: I am ☐ A principal ☐ A teacher

Gender: ☐ Female ☐ Male

Grade you Teach:

……

School Name:

……

Type of School: ☐ Elementary ☐ Secondary

School Address:

……

Years you have been using Interactive White Board, please check one of the following:

☐ 1-5 years ☐ 6-10 years

Have you received IWB training: ☐ Yes ☐ No

IWB training program title:

APPENDIX F

TURKISH TRANSLATION OF TEACHER SURVEY

Ek-B

ÖĞRETMENLERİN TÜRKİYEDE'Kİ İNTERAKTİF AKILLI TAHTA KULLANIMINA İLİŞKİN MESLEKİ EĞİTİM KONUSUNDA ALGILARI

Öğretmenler için İnteraktif Akıllı Tahta (İAT) Anketi

Bölüm 1: Sorular

Her bir şıkkın sağında 6 puanlık Likert Scale satırı bulunacaktır. Burada "KAF" Kesinlikle Aynı Fikirdeyim, "AF" Aynı Fikirdeyim, "Ç" Çekimserim, "AFD" Aynı Fikirde Değilim, "KAFD" Kesinlikle Aynı Fikirde Değilim, "U" Uygulanamaz anlamına gelmektedir.

İnteraktif Akıllı Tahta (İAT) Anketi Soruları

1- İAT kullanımı üzerine mesleki eğitim aldım.

KAF	AF	Ç	AFD	KAFD	U
☐	☐	☐	☐	☐	☐

2- İAT üzerine aldığım mesleki eğitim yeterliydi.

KAF	AF	Ç	AFD	KAFD	U
☐	☐	☐	☐	☐	☐

3- İAT üzerine aldığım mesleki eğitim iyi organize edilmişti.

KAF	AF	Ç	AFD	KAFD	U
☐	☐	☐	☐	☐	☐

4- İAT'yı sınıfta kullanmadan önce öğretmenlerin yeterli mesleki eğitim almaları gerektiğini düşünüyorum.

KAF	AF	Ç	AFD	KAFD	U
☐	☐	☐	☐	☐	☐

5- İAT'nın sınıfta kullanımı üzerine öğretmenlerin sürekli mesleki eğitim almaları gerektiğini düşünüyorum.

KAF	AF	Ç	AFD	KAFD	U
☐	☐	☐	☐	☐	☐

6- İAT üzerine aldığım mesleki eğitim İAT'yı rahatça kullanmam konusunda benim güvenimi artırdı.

KAF	AF	Ç	AFD	KAFD	U
☐	☐	☐	☐	☐	☐

7- Eğitimden sonra İAT'yı sınıfımda daha etkin kullanabildim.

KAF	AF	Ç	AFD	KAFD	U
☐	☐	☐	☐	☐	☐

8- İAT üzerine ilk aldığım eğitim daha etkili ders vermemi sağladı.

KAF	AF	Ç	AFD	KAFD	U
☐	☐	☐	☐	☐	☐

9- Sınıfda İAT kullanmam öğrencilerim için iyi oldu.

KAF	AF	Ç	AFD	KAFD	U
☐	☐	☐	☐	☐	☐

10- Sınıfda İAT kullanmam öğrencilerimi de müsait olduğunda onu kullanmaya teşvik etti.

KAF	AF	Ç	AFD	KAFD	U
☐	☐	☐	☐	☐	☐

11- İAT 'nın sınıfa kurulmasından önce tam eğitim aldım.

KAF	AF	Ç	AFD	KAFD	U
☐	☐	☐	☐	☐	☐

12- İAT 'nın sınıfa kurulmasından sonra tam eğitim aldım.

KAF	AF	Ç	AFD	KAFD	U
☐	☐	☐	☐	☐	☐

13- İAT ’nın sınıfıma kurulmasından sonra sürekli eğitim aldım.

KAF	AF	Ç	AFD	KAFD	U
☐	☐	☐	☐	☐	☐

14- İlk aldığım eğitim çok yararlıydı.

KAF	AF	Ç	AFD	KAFD	U
☐	☐	☐	☐	☐	☐

15- İAT kullanmaya başlamadan önce tüm öğretmenler başlangıç eğitimi aldılar.

KAF	AF	Ç	AFD	KAFD	U
☐	☐	☐	☐	☐	☐

16- İAT kullanmaya başladıktan sonra tüm öğretmenler başlangıç eğitimi aldılar.

KAF	AF	Ç	AFD	KAFD	U
☐	☐	☐	☐	☐	☐

17- Deneyimlerim, beni daha iyi İAT kullanıcısı haline getiriyor.

KAF	AF	Ç	AFD	KAFD	U
☐	☐	☐	☐	☐	☐

18- Yeni kullanıcı olduğum için İAT ’yı pek sık kullanmıyorum.

KAF	AF	Ç	AFD	KAFD	U
☐	☐	☐	☐	☐	☐

19- Yaşı ilerlemiş öğretmen arkadaşlarım mesleki eğitimin nitelik ve niceliğinden memnun.

KAF	AF	Ç	AFD	KAFD	U
☐	☐	☐	☐	☐	☐

20- Deneyimli öğretmenler İAT konusunda daha rahatlar.

KAF	AF	Ç	AFD	KAFD	U
☐	☐	☐	☐	☐	☐

21- Okulumuzda teknoloji bilen öğretmenler İAT konusunda daha rahatlar.

KAF	AF	Ç	AFD	KAFD	U
☐	☐	☐	☐	☐	☐

22- Ders sırasında İAT ’yı sadece bir projektör olarak kullandım.

KAF	AF	Ç	AFD	KAFD	U
☐	☐	☐	☐	☐	☐

23- Ders sırasında İAT’yı oldukça fazla kullandım.

KAF	AF	Ç	AFD	KAFD	U
☐	☐	☐	☐	☐	☐

24- Öğrencilerin dikkatini çekmek için İAT kullanırım.

KAF	AF	Ç	AFD	KAFD	U
☐	☐	☐	☐	☐	☐

25- Öğrencilerim ders sırasında İAT’yı doğrudan kullanırlar.

KAF	AF	Ç	AFD	KAFD	U
☐	☐	☐	☐	☐	☐

26- Öğretmenler sınıfta ana teknoloji öğesi olarak İAT kullanırlar.

KAF	AF	Ç	AFD	KAFD	U
☐	☐	☐	☐	☐	☐

27- Öğretmenler İAT’yı sınıfta pek sık kullanmazlar.

KAF	AF	Ç	AFD	KAFD	U
☐	☐	☐	☐	☐	☐

Bölüm 2: Demografi Bilgileri

Lütfen birini seçin : ☐Müdür ☐Öğretmen

Cinsiyet : ☐Bayan ☐Bay

Ders verdiğiz sınıf (lar) : .....

Okul adı :.....

Okul Türü : ☐İlköğretim ☐Lise

Okulun Adresi :.....

İAT kullanım süreniz : Lütfen birini işaretleyiniz

☐1-5 yıl ☐6-10 yıl

İAT Eğitimi aldınız mı? ☐Evet ☐Hayır

İAT Eğitim programının adı :

APPENDIX G

APPROVAL BY THE DIRECTORATE OF NATIONAL EDUCATION OF BEYLİKDÜZÜ

Dear Erkan Taşkın,

We are grateful for your offer for doing your research in our region. It made us proud to choose our region for your thesis and we let you to start your research in 2011-2012 education year.

We are ready to support anything for your thesis. We believe that your research will be useful not only for our region but also for all around the Turkiye.

Thank you again for choosing our region for your research.

With my best regards,

Ahmet HACIOGLU
National Education Director of Beylikduzu

Ahmet HACIOĞLU
İlçe Milli Eğitim Müdürü

APPENDIX H

BEYLİKDÜZÜ İLÇE MİLLİ EĞİTİM MÜDÜRLÜĞÜNÜN ONAYI

Sayın Erkan Taşkın,

Araştırmanızı bizim okul bölgemizde yapma talebinize teşşekkür ederiz. Tez çalışmanız için bizi seçmiş olmanız bizi çok memnun etti ve 2011-2012 öğretim yılı zarfında herhangi bir zamanda çalışmanıza başlamak için size izin veriyoruz.

Çalışmanızı tamamlamak için ihtiyacınız olan yardımı sağlamaya hazırız. Çalışmanızın okul bölgemiz yanında Türkiye'nin diğer okul bölgelerine da yararlı olacağına inanıyoruz.

Araştırma alanı olarak okul bölgemizi seçtiğiniz için yine teşekkür ederiz.

Saygılarımla

Ahmet HACIOĞLU
Beylikdüzü İlçe Milli Eğitim Müdürü

Ahmet HACIOĞLU
İlçe Milli Eğitim Müdürü