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Perspectives of Iranian Secondary School Teachers towards the Application of Interactive Whiteboards Technology in Mathematics Classes

Adel Nasiri, Morteza Bakhtiarvand

Abstract – **This study explored the attitudes of teachers towards the use of interactive whiteboards (IWBs) in Mathematics teaching and learning contexts, and also sought insights into teachers' actual use of IWBs in Mathematics classes. The study also investigated possible factors affecting teachers' positive and negative attitudes towards IWB technology. Data were collected through questionnaires distributed to 82 teachers in different institutions across Andimeshk, Iran, from Secondary schools. Questionnaire results revealed that teachers have positive attitudes towards the use of IWBs in Math instruction and are aware of the potential of this technology. Responses given in interviews indicated that all Math teachers are supportive of IWB technology in their classes, and observations revealed that IWBs are used with their basic functions in Math classes. The statistical analysis revealed that the more teachers use IWBs, the more they like this technology.**

Keywords—**Interactive whiteboard (IWB), attitude, Mathematic Teachers, Math Instruction.**

I. Introduction

With the introduction of computer facilities into the education system, traditional teaching techniques are increasingly being enhanced or even replaced by techniques relying more on technology. Once concentrated in math and science classes, technology has also begun providing benefits to language teaching and learning. One recent popular computer based technology that has emerged is interactive whiteboards (IWBs). IWBs were initially developed for presentations in

office settings, but over the last decade, starting from higher education, educational institutions have begun using them. According to some studies and reports based primarily on research in science, math or other content-based classrooms, the use of IWBs makes the learning and teaching atmosphere more enjoyable, creative, and interesting. There are also numerous claims about the benefits and positive impact of IWBs on learning, but these remain largely anecdotal.

With the incorporation of IWBs in teaching and learning settings, important changes have been observed in education, such as engaging more students in the lesson, using multimedia sources flexibly, and motivating learners easily. IWBs could be useful supplementary tools for education, providing the opportunity to bring in different kinds of multimedia resources, to access Internet sources with ease, and to increase student interest; however, maximum benefit from this technology, especially in language teaching and learning settings, requires further backgroundknowledge and research. Although there are many descriptive reviews and reports about the use of IWBs, it is beneficial for teachers and students to be familiar with the actual potential of this technology through empirical studies, including gathering the opinions of students and teachers, exploring its actual use in the classroom, and providing pedagogical advice for effective use of this technology.

II. Background of the Study

In recent years, computers and computer-related technologies, such as IWBs, have increasingly begun to be used in language teaching and learning settings. Technologically developed countries such as the UK, the USA, and Australia have invested a great deal of money in such technological equipment. With respect to IWBs in particular, a national survey in England in 2005 found that nearly half (49%) of primary school teachers had used IWBs, and in secondary schools, 77% ofmath teachers, 67% of science teachers and 49% of English teachers said they had used IWBs (BECTA, 2005). In financial terms, this has meant that in a recent five year period £50 million was spent on IWBs (DfES, 2004b). There is increasing interest in the potential of this technology worldwide (Bell, 2002; Hodge & Anderson, 2007; Kent, 2004), including in countries like Iran, Andimeshk, where, though this technology is quite new, it is attracting educators' attention day by day.

Interactive whiteboards have been argued to provide certain benefits for students. Firstly, using IWBs has been claimed to increase student motivation and enjoyment (BECTA, 2003a).

Secondly, they have been shown to enable greater opportunities for participation and collaboration, thus developing students' personal and social skills (Levy, 2002). Thirdly, they may eliminate the need for students to take notes, through the capacity to save and print what appears on the board (BECTA, 2003b). Another benefit is arguably that, with the help of an IWB, teachers can make clearer and more dynamic presentations and in turn the students can manage to deal with more complex concepts (Smith, 2001). It has also been argued that IWBs allow teachers to accommodate different learning styles and to choose materials according to the particular needs of students (Bell, 2002). Moreover, IWBs seem to enable students to be more creative and self-confident in presentations to their classmates (Levy, 2002). Finally, Bell suggests using IWBs for a variety of reasons. Since IWBs are colorful tools, they attract the attention of students and they may be useful not only for visual intelligent students, but also for kinesthetic learners because they allow touching and marking on the board.

IWBs may provide benefits for teachers as well. First of all, IWBs have been shown to provide teachers with a way to integrate Information and Communication Technology (ICT) into their lessons while teaching from the front of the class (Smith, 2001). Secondly, they may allow for spontaneity and flexibility, and for teachers to benefit from a wide range of web-based resources (Kennewell, 2001).

Thirdly, they permit teachers to save and print the notes they or their students write on the board (Walker, 2002). Furthermore, IWBs allow teachers to share materials with their colleagues via intranet at schools and use them again later, which saves time in preparing materials (Glover & Miller, 2001). Finally, interactive whiteboards have been argued to serve as encouraging devices for teachers to change their pedagogical approaches and use more ICT, which in turn can facilitate professional development (Smith, 1999).

Even though there are many reports claiming to show the advantages of IWBs, there are also a few studies pointing out the drawbacks of this technology. In a study conducted by Gray, Hagger Vaughan, Pilkington and Tomkins (2005), researchers found that some teachers complained that IWB-based lesson preparation and planning is time-consuming. Other teachers stated that too much PowerPoint use could lead to a "show and tell" style of teaching that may result in changing the role of the teacher into one of just a presenter of the topic in the classroom.

In this case, the teacher may be seen as more passive and as less involved in the teaching process.

Smith, Higgins, Wall and Miller (2005) revealed that in order to use IWBs to their full potential and avoid such problems, there is a tremendous need for training and technical support for teachers. Teachers should be confident in using this technology, which can only be achieved by special training. Without training, the claimed benefits may not be experienced by the learners and teachers. Glover and Miller (2001) conducted another study that supports this idea, emphasizing many teachers' lack of overall ICT competence. Yet another problem that may arise with the introduction of IWB technology is a financial one. Schools have to spend a considerable amount of money in order to equip classrooms with this technology.

Yet, if there are only one or two classrooms equipped with IWBs, students and teachers may suffer from inadequate access to IWB technology (Smith, 1999). With all these claimed benefits and possible disadvantages of IWBs, what do those who use them think about them? To explore the attitudes of students and teachers towards the use of IWBs, a few studies in different content classes have been conducted, such as Glover and Miller (2001), Lee and Boyle (2004), Hall and Higgins (2005), and Kennewell and Morgan (2003). Aside from generally reporting positive attitudes on the parts of students and teachers alike towards IWBs, these attitude studies have provided important information to help educators form informed and scientifically supported opinions about this new technology - a crucial first step with any new innovation in educational settings.

III. Statement of the Problem

Since the late 1990s there has been an increasing use of technology in educational settings worldwide. Computer facilities such as wireless net, interactive white boards, and multimedia devices have started to enhance teaching and learning processes. Interactive whiteboards (IWBs) are a relatively recent technology, so there is not a great deal of scholarly literature relating to attitudes towards their use. The articles in the educational press and newspapers offer only anecdotal evidence and advice and the existing small-scale studies do not provide a full picture – particularly with respect to IWB use in the area of language instruction.

Various studies have investigated the attitudes of students and teachers towards CALL (Arkın, 2003; Bebell, O'Conner, O'Dwyer, & Russell, 2003; Lin, 2001; Passey & Rogers, 2004; Pekel, 1997; Tuzcuoğlu, 2000) and several studies have looked at the student and teachers attitudes towards the use of interactive whiteboards in particular (Glover & Miller, 2001; Gray et al., 2005; Hall & Higgins, 2005; Kennewell & Morgan, 2003; Lee & Boyle, 2004; Levy, 2002; Moss, Jewitt, Levaãiç, Armstrong, Cardini, Castle, 2007; Schmid, 2006; Wall, Higgins, Smith, 2005). Of the latter studies only two looked specifically at IWB use in language learning contexts (Gray et al., 2005; Schmid, 2006), and of these, both were small-scale qualitative studies looking at specific groups of ESL learners and teachers.

The literature lacks therefore large-scale studies surveying specifically language teachers', learners', and administrators' views about the use of IWBs in EFL contexts and exploring the possible factors affecting these stakeholders' positive or negative attitudes towards IWB technology.

In Iran, Andimeshk, IWB technology is fairly new and there are not many institutions that use it currently for language teaching purposes. Since research studies may be helpful to educators deciding whether or not to invest in this new technology, this study will be a starting point to show the overall picture of IWB use in Iran, Andimeshk, student and teacher openness to their use, and their overall potential for language instruction. This study will include all of the stakeholders in language instruction settings by exploring teachers', students', and administrators' attitudes both qualitatively and quantitatively, so that educators may decide whether they should incorporate this technology into their teaching process or not.

IV. Research Questions

1) What are the attitudes of Iranian EFL teachers towards interactive whiteboards?
4) How are IWBs used in EFL classrooms in Iran, Andimeshk?
5) What factors may influence Iranian students' and teachers' attitudes towards the use of IWBs in EFL classrooms?

V. Significance of the Study

IWB technology is becoming more and more widespread day by day since it appears to offer teachers and students opportunities to facilitate teaching and learning. Although there are many claimed benefits of IWB technology, it is the teachers who will have to exploit the features of IWBs and integrate them with their current teaching methodologies, and students who will be expected to be ready for such changes. Effective integration can be achieved once it is understood how much training is needed, how open teachers and students are to the idea of IWB use, and how much support can be expected from administrators. Since the literature lacks broad empirical studies investigating students' and teachers' attitudes towards IWB technology in language instruction, this study might provide more empirical results, including both qualitative and quantitative data, showing how language teachers and EFL students perceive IWB technology, and ultimately may help both teachers and students maximize the benefits of IWB technology.

This is the first study that will investigate the attitudes of students, teachers, and administrators towards the use of IWBs in language instruction settings in Iran, Andimeshk. Before deciding on whether to invest in any new technology, educators need to understand how much this technology may contribute to their particular teaching and learning process, and need to be aware of opinions of the people who are using this technology currently. This study will enable Iranian educational institutions in the language teaching field to make informed decisions about whether to invest in this technology, and to better understand what they need to do if they decide to make this commitment.

Benefits of IWBs for Teachers

Research has also noted benefits that IWBs provide for teachers. Using IWB based resources may reduce time spent in writing and leave more time for teaching (Levy, 2002), and materials generated in the classroom can be saved, printed, and reused later (Levy, 2002; Walker, 2002). In addition, teachers have pointed out that they are more inventive, creative, and effective in their explanations when they use IWBs (Levy, 2002; Wall et al., 2005). Furthermore, since teachers can provide immediate feedback to the learners and incorporate more samples (Cuthell, 2005), IWBs may increase the pace of teaching and give an opportunity to the teachers to be more flexible (Kennewell, 2001; Moss et al., 2007). IWBs have also been argued to make it easier for teachers to keep the class together, keep the students' attention longer, and motivate students (Kennewell & Beauchamp, 2007; Smith, 1999).

Levy (2002) states that when the teachers use materials prepared before class, they save time for other teaching activities. With IWBs, teachers can allocate more time for the students, focusing on individual problems, extra challenging tasks, and communicative activities, because they do not spend a lot of time writing on the board. Normally, when the teacher is writing on the board, he/she is facing the board not the class, so the teacher might not keep control over the class.

In Wall et al.'s (2005) study, which was conducted with 80 students at 12 English primary schools, pupils commented that they felt their teacher was more inventive and active during the IWB-based class. The teacher seemed better able to find original ideas or interesting ways to teach the subjects in a fun way. Because of this, the students were no longer bored. Levy (2002) also mentions reports of teachers' being considered more effective with their explanations because IWBs have many visual materials and vivid illustrations. Her participants felt IWBs made the teaching process more interesting, interactive, and exciting.

Another benefit of IWBs noted in some studies is that they increase the pace of teaching and give the opportunity to teachers to be more flexible (Kennewell, 2001; Moss et al., 2007). According to Kennewell (2001), a wide range of internet resources made accessible by the IWB allows the teacher to choose materials flexibly in order to cover the diverse needs and consider the different characteristics of the students in a classroom. In addition, Moss et al. (2007) point out that the pace of teaching can be increased by bringing in and moving between the texts or materials quickly. When learner characteristics are taken into consideration, it was shown that for students who are quick and good at learning new items, the pace of the lesson can be increased and the lesson can be made more challenging with extra materials.

Drawbacks and Difficulties of Interactive Whiteboards

Although the benefits of IWBs in the literature outnumber the drawbacks, studies have also shown that there are some important difficulties and drawbacks which may hinder the expansion of this technology. The lack of teachers' confidence and competence in using IWBs (Glover & Miller, 2001; Hall & Higgins, 2005; Levy, 2002; Wall et al., 2005), extra time needed for the planning and preparation of the materials (Gray et al., 2005; Levy, 2002), the need for special training (Gray et al., 2005; Hall & Higgins, 2005; Levy, 2002; Moss et al., 2007), and technical issues such as the possibility of breaking down, the need for recalibration, and position of the board (Hall & Higgins, 2005; Levy, 2002; Wall et al., 2005) are the main problems or difficulties that both students and teachers face while using this technology.

In Levy's (2002), Hall and Higgins's (2005), and Wall et al.'s (2005) studies, some pupils reported that the lack of teachers' competence in using IWBs causes problems during the lessons. For instance, if the teacher is not comfortable with finding necessary files, the students get bored and the real value of this technology is not understood. This kind of competence includes both technical and pedagogical aspects of IWB use. In other words, the teacher should know how to benefit from IWBs both in terms of teaching techniques and flexibility of using the resources for the different needs of students. According to Levy (2002), teachers who have confidence in ICT are more comfortable with the use of IWBs. This finding demonstrates that teachers should receive training to integrate ICT and IWB technology into classroom settings.

In line with this, many studies indicate that there is a need for training in order to take advantage of IWB technology fully. Levy (2002) states that teachers who have no or little knowledge of ICT should receive special training in the use of IWBs individually, in particular, because some teachers may have barriers regarding the use of technology and need more time and practice to be confident in using the technology in class. Hall and Higgins (2005) point out that teachers should be trained to learn not only technical but also pedagogical aspects of IWB technology and this training should be continuous. In addition, Moss et al. (2007) and Gray et al. (2005) stress the importance of training to help teachers understand the real value of IWBs for teaching and learning and the role of training for personal development in order to be more effective and creative teachers.

Both Gray et al. (2005) and Levy (2002) reveal that teachers need more time to prepare resources and plan IWB-based lessons. Teachers cannot use their traditionally prepared materials for IWB-installed classrooms. They have to plan when to display extra materials, how to design the activities so that more interaction can take place in the class with the help of the IWB, and determine what kind of activities to use to enhance the learning process. They also have to plan the amount of time they will allocate for the actual use of the IWB during the class time, because some students may find it boring when IWBs are overused (Levy, 2002).

Since this technology is more complicated compared to traditional blackboards or overhead projectors (OHP), technical problems may occur more often. In Levy (2002), students reported that half of the time IWBs do not work properly and sometimes if they break down, the teacher may not have anything to use for rest of the class time. Some students also complained about the difficulty of using the electronic pen and noted problems related to the manipulation of the images on the board. In Hall and Higgins (2005), some students reported the problem of freezing, which means the teacher, has to switch the IWB off and on again. In this case, the teacher has to reload everything, which wastes time. In addition, if the IWB does not display the images and texts properly, it needs recalibration and this process has to be repeated each time if the place of the whiteboard is changed. Lastly, the positioning of the IWB is also very important (Smith, 2001). Especially for young students it is easier to touch and write on the board if the IWB is mounted at a suitable height.

According to Gray et al. (2005), use of the IWB in conjunction with PowerPoint can lead teachers to a “show and tell” style of teaching, which pushes students to be more passive. In their study, one of the teachers stated that the IWB changed the teachers’ role, making them less involved in the teaching process because they only deliver the material for the students with the help of the IWB. This in turn may cause a decline in the authority of the teacher in the classroom. Another point about the use of IWBs is that there are different types of interactivity when IWBs are used in the lessons. The interaction can be between pupils and pupils, teachers and pupils, and IWBs and pupils (Birmingham, Davies & Greiffenhagen, 2002). If IWBs are not used as tools for enhancing the interaction between pupils and IWBs in a proper way, the teacher’s role in the classroom can be questioned by the students.

Another study (Gray et al., 2007) indicates that due to the increase in the pace of the lesson through the quick manipulation of images, the result may be limited interaction between the teacher and the students. Furthermore, according to Goodison (2003), teachers are cautious that their lessons may become more teacher-centered if too much focus is given to the IWB technology. They caution that there must be a balance between the use of IWBs and traditional teaching activities and techniques, which give more opportunity to the teachers to take responsibility for the teaching process.

As it is expensive to invest in computer technology, educators have to reconsider their priorities and budgets. Harris (2005) points out that IWB technology is not cheap, for instance, the least expensive IWB costs approximately £1500 (3750 YTL). Not all schools can afford this technology investment without a government policy and some kind of funding. However, infrared kits are the cheapest kind of IWB technology, providing many basic functions of IWBs, so for a start these kits may be a short-term solution to access this technology.

Attitudes of Students and Teachers towards the Use of Interactive Whiteboards

In the literature on IWBs, some studies have focused particularly on the attitudes and views of students (Hall & Higgins, 2005; Kennewell & Morgan, 2003; Wall et al., 2005). Other studies have investigated the perceptions of both teachers and students (Beeland, 2002; Glover & Miller, 2001; Levy, 2002; Moss et al., 2007; Schmid, 2006), and one study examined the opinions of only teachers (Lee & Boyle, 2004). Overall, both students and teachers are positive about the use of IWBs in their lessons and appreciate the benefits of IWBs.

The studies conducted by Moss et al. (2007), Wall et al. (2005), and Hall and Higgins (2005) revealed students’ perceptions of the use of IWBs in different subject areas (e.g. math, science). The findings in those studies showed that the majority of the students have positive opinions about IWB use in the lessons. The findings also indicated that the students appreciated the versatility of IWB technology, and its ability to incorporate a wide variety of resources, and they pointed out that IWBs added some value to the lessons.

Moss et al. (2007) and Glover and Miller (2001) also found that students were positive about the contributions of IWBs to learning in terms of making difficult things easier to understand and increasing motivation. With regard to teachers’ attitudes, Smith (1999), Moss et al. (2007), Glover

and Miller (2001), and Lee and Boyle (2004) contributed to the literature on IWBs reporting the attitudes of teachers about IWBs. In general, the teachers reported their positive attitudes in these studies and were impressed by the functions of IWBs.

According to the teachers’ comments in these studies, IWBs are effective tools in enhancing student learning and

help their lessons to be more enjoyable, interesting, and motivating.

Although these various studies have investigated the attitudes of students or teachers, only Schmid (2006) and Gray et al. (2005) focused on students' and/or teachers' attitudes in language learning settings. Schmid (2006) conducted a small-scale qualitative study, in which he collected data from a small group of students who were taking an English for Academic Purposes course in Lancaster University.

The aim of the study was to obtain an understanding of the processes and analyze the use of IWBs from the perspective of a critical theory of technology. The findings showed that several elements, such as the inherent characteristics of the technology, pedagogical beliefs, and students' own understanding affect technology use in a certain context. Gray et al. (2005) is a case study of twelve English teachers in Britain. While it provides information about the language teachers' positive opinions about the potential of IWB technology, giving some suggestions for the effective use of this technology as well, it fails to provide a broad and comprehensive understanding of language teachers' views about the use of IWBs in language teaching. In short, there remains a need for a larger-scale study, focusing on language instruction contexts, and including all stakeholders.

VI. Participants and Setting

Since this study was limited by the number of educational institutions in Iran, Andimeshk that use IWB technology, there could not be equal distribution of the types of institutions. This study was conducted, therefore, in thirteen different educational institutions where IWB technology is used in Iran, Andimeshk.

Some of the students who participated in the study were preparatory class students in universities and high schools, others were in language schools taking English courses at different levels, and others were primary school students taking English classes at least two days a week. In any one institution, not all classrooms using IWBs in English classes were necessarily surveyed. In any institution, if there were more than three classrooms where IWBs were installed, the three classes in which IWB had been used most often were surveyed.

If the students' IWB exposure was the same, one sample from each grade and level was chosen at random. The age of students ranged from 6 to mid-40s since there were educational institutions ranging from primary school to language school. The highest student population in this survey belongs to university students (45%).

The teachers surveyed also came from these thirteen different educational institutions, and therefore ranged from primary school teachers to university instructors. They had varying degrees of experience in teaching English, with the majority (83%) having between 1-10 years' experience. Among all English teachers in any institution, only the ones with actual experience using this technology were involved in the survey. In order to see the actual use of IWBs in English classes, three hours of English lessons were observed. Two of these classes were observed in one university, and the other was observed in a secondary school. The criterion for choosing the lesson to be observed was the amount of the teacher's experience in using this technology.

Lastly, three administrators were interviewed to investigate their attitudes towards the use of IWBs. All administrators were from universities and they were chosen because they had either had enough knowledge about IWB technology or had participated in the decision-making process to purchase the IWB technology.

VII. Instruments

Survey techniques and instruments were used in order to collect data in this study. Two questionnaires were employed in this study in order to collect data about the attitudes of students and teachers towards IWBs in language teaching and learning settings. Both the student and teacher questionnaires included five point Likert-scale items, open-ended and multiple-choice items, and apart from primary and secondary school students, the rest of the participants signed a consent form.

The first questionnaire elicited information about the attitudes of students towards IWB use in English lessons (see Appendix B). The other questionnaire explored the attitudes of EFL teachers towards IWB use in the classroom settings (see Appendix C). While writing the questions in the questionnaire, the researcher was inspired by Moss et al (2007) questionnaire on teacher and student perceptions of IWBs in core subjects (e.g. math and science).

Some teacher and student responses in Levy's (2000) study were also used to prepare the questionnaire items for this study. After the writing of the final version of the student's questionnaire in English, the questions in the student's questionnaire were translated into Iranian by the researcher and checked by a fellow English teacher, in case student participants would not understand some of the statements in English.

However, the teacher's questionnaire was written in English because it was felt that EFL teachers would easily understand the questionnaire items. In order to improve the questionnaires, a pilot study was conducted in Middle East Technical University's Foreign Languages Department. Forty students and five teachers participated in the study in total. After the study, two vague items in the teacher's questionnaire were changed in order to be clearer.

The reliability check with Cronbach Alpha resulted in the score of 0.79 for student's questionnaire and 0.78 for teacher's questionnaire. In the teacher's questionnaire, three opposite items were excluded before the reliability check.

In order to explore the attitudes of administrators towards the use of IWBs, an interview protocol was used (see Appendix D). I conducted these interviews with the heads of the Foreign Languages Departments in three different universities. They were the administrators of the preparatory programs. The reason for including

administrators in this study is that their attitudes are also important while deciding to purchase this technology and provide additional support for teachers. There were six questions in total, exploring the factors influencing their institutions' decision to purchase IWBs, their opinions about the benefits of IWBs, the most common problems stated by the EFL teachers, and general background information about the institution.

The interviews were held in Iranian, and after the recording of the participants' speeches on a voice recorder, the researcher transcribed those speeches and translated them into English. The data were analyzed in terms of positive or negative attitudes towards the use of IWBs in language instruction.

For the last research question, a video recording procedure was conducted. The purpose of this procedure was to observe the actual ways in which of EFL teachers used or benefited from IWBs in language classes. In this way, there could be an opportunity to compare the use of IWBs as stated in the literature and in other countries with EFL teachers' use of IWBs in Iran, Andimeshk.

VIII. Procedure

In January 2008, with the help of publishers and IWB technology marketing firms, the Iranian educational institutions that possess IWB technology were identified. It was learned that approximately seventy different institutions possess this technology, but only about twenty of them use it in language classes. I phoned the administrations of the institutions that use IWB in language classes to learn whether they actually use this technology or not. I found out that even though some of these institutions had purchased IWBs, they were not using them actively, maybe due to the need for training.

Some of the institutions requested official permission from the director of education in different cities, so I excluded those institutions from my list since it would take a long time to get that permission. At the end of this initial searching step, I made a list of fifteen institutions that use IWBs in EFL classrooms, and which consented to take part in this study. Two of the institutions ultimately did not send back the questionnaires, leaving a total of thirteen institutions surveyed. The return rate, in this case, is approximately 80% with student's questionnaire and 19% with teacher's questionnaire.

In order to conduct this study, an official letter requesting the necessary permission for data collection was sent in February to the administration of the four institutions that requested an official letter. The head of the Foreign Languages department or the committee in one of the universities sent back letters that indicated their approval of the request. The other institutions consented to participate in this study without requesting an official letter. The pilot study was held in the METU preparatory school. Forty students and five teachers participated in the piloting procedure.

A preparatory classroom was selected randomly, taking into consideration that they had some degree of IWB use experience. Two teachers who had been using this technology for one year were selected for the piloting. The student questionnaires were distributed to the EFL students in the preparatory class and all the students completed the questionnaires.

The other questionnaire, which was designed for the teachers who use IWBs in English classes, was distributed to the teachers and five teachers completed this questionnaire. The researcher requested the students and the teachers to comment on unclear statements and to express their thoughts about the questions and the survey itself. The time spent for each questionnaire was also recorded. After the piloting, minor changes to improve the questionnaires were made with the help of the teachers' oral and written comments and the students' feedback.

After the minor changes in the questionnaires were made, the questionnaires were distributed to fifteen institutions by post. Three interviews were then held with the heads of three institutions. Six questions were asked to learn their beliefs about this technology. Three hours of English classes were recorded in different institutions, using a digital video camera. After the recording, the tapes were analyzed using a checklist to define the ways in which English teachers used this technology. The checklist, which was compiled on the basis of uses mentioned in the literature on IWBs, consisted of different activities and ways of IWB use, such as bringing in materials from the Internet.

The study was conducted during the first three weeks of March by distributing the questionnaires to the institutions. The researcher visited most of the institutions and collected the data himself. Four of the institutions were far from Ankara and Istanbul, thus the questionnaires were sent to these institutions and returned by post. The interviews were conducted in the second week of April 2008 and the observations of the English classes were completed the following week.

IX. Data Analysis

All the items in the questionnaires were analyzed using the Statistical Package for Social Sciences (SPSS), with the exception of the two open-ended questions at the end of both the teachers' questionnaire and students' questionnaire.

In the interview with the administrators, there were six questions and they were analyzed through categorization of the responses in terms of positive and negative opinions. For every item statistically analyzed, frequencies and percentages were calculated. In terms of mean scores and standard deviations, the researcher excluded the option "No idea" from the variables in order to see only the degree of actual agreement and disagreement among the participants expressing a clear opinion.

Therefore, the calculation of mean scores ranged from 1.00 to 4.00. In this case, the scores between 1.00 and 1.75 meant that the participants showed their strong disagreement with a certain statement, 1.76-2.50 indicated disagreement, 2.51-3.25 showed agreement, and 3.26-4.00 corresponded to strong agreement.

In order to find whether there was a significant relation between different variables such as age, hours of IWB use/exposure and students' and teachers' having positive or negative attitudes towards IWBs, one-way ANOVA tests were performed. Interviews with the administrators were taped and transcribed by the researcher.

The transcript data were categorized according to administrators' positive or negative attitudes towards the use of IWB technology. The video records were analyzed and categorized according to the ways that teachers use IWBs in the literature. In addition, the open-ended responses from the students were first translated into English, and then categorized according to the sections in the analysis of the questionnaire data gathered from the students. Later, after each section of the analysis of the student questionnaire results, the related responses were added to the relevant sections in order to support or contradict with the students' or teachers' Likert-scale responses.

Data Analysis Procedure

With the exception of section three, in which there were two open-ended response items, all sections in the questionnaires were analyzed statistically. The Statistical Packages for Social Sciences (SPSS) Version 11.5 was used to compute frequencies and percentages of each Likert-scale question.

All the Likert-scale items consisted of a 5-point format: strongly agree, agree, no idea, disagree, and strongly disagree. While calculating means and standard deviations, the option "No idea" was excluded from the variables in order to see only the degree of actual agreement and disagreement among the participants. ANOVA tests were also calculated to see whether there was a significant relationship between attitudes and various participant factors, including age, years of teaching experience, hours of IWB exposure, and type of the institution worked in. In addition, responses from the two open-ended questions were grouped according to the similar questions in the second section of the questionnaire and were discussed after each statistical analysis.

The interview transcript data were analyzed according to the responses of interviewees for each of the six questions. The researcher examined all the responses for each question in order to find similarities and differences between the attitudes of the administrators.

Finally, the observation data were analyzed in order to reflect the actual use of IWBs in English lessons and to what extent the potential of IWBs is exploited.

The results obtained from the analysis of the questionnaires are presented in four parts below. In the first part, the analysis of questions in the student questionnaire is presented according to six categories: learning, technical issues, affective factors, motivation, time/organization, and differences between IWBs and traditional whiteboards. In the second part, the responses given to the questions in the teacher's questionnaire are shown according to four categories: teaching, attitudes, motivation, and training. In the third part, the data gathered from the interviews are presented according to the six questions asked, and the similarities and differences between the interviewees' responses for each question addressing attitudes towards the use of IWBs are analyzed. The final part of this chapter is devoted to a presentation of the various ways of actual IWB use in English classes as seen during the class observations.

Part 2: Teachers' Attitudes towards the Use of Interactive Whiteboards

Section 1: Teachers' Attitudes Related to IWBs as Teaching Tools

The nine questions in this section of the teacher's questionnaire investigated teachers' attitudes towards the use of IWBs as teaching tools. Generally, the proclaimed benefits of IWBs such as saving time, enabling teachers to reach different sources, saving and printing students' work or examples, easing review, and allowing the opportunity to interact with the class face to face were included in the questionnaire statements to learn the teachers' feelings about these features of IWBs. The researcher also wanted to learn whether the teachers feel that they are more effective, efficient, and better managers of their classes when using IWBs.

Q1: Using the IWB resources reduces the time I spend writing on the board.

Q2: When using IWBs in the classroom, I spend more time for the preparation of the lesson.

Q3: I think using IWBs makes it easier to reach different sources and display them to the whole class immediately.

Q4: IWBs are beneficial for saving and printing the materials generated during the lesson.

Q5: I can give explanations more effectively with the use of IWBs.

Q6: With the help of using the IWB, I can easily control the whole class.

Q7: I think IWBs can be a good supplement to support teaching.

Q8: Using IWBs makes me a more efficient teacher.

Q9: Using IWBs makes it easier for a teacher to review, re-explain, and summarize the subject.

According to the mean scores in this table, except for the statement that using IWBs requires more preparation time, the teachers agreed with all statements in this category. The highest mean score belongs to question seven, which indicates that nearly all of the teachers (90%) agree or strongly agree that IWBs can be a good supplement for the language teaching process.

The questions in this section can be categorized into two subcategories:

questions related to the benefits of IWBs and questions related directly to the opinions of teachers. Q7 and Q8 can be included in the category of teachers' opinions about IWBs and the rest could be mentioned in the category of benefits and drawbacks of IWBs. Of the second group, the results of the third item show that a majority of the teachers responded positively that IWBs make it easier for them to reach different sources and show them to the whole class at the same time.

Regarding the responses related to the ninth question in this section, it can be seen that a majority of the teachers believe that IWBs enable them to review, summarize, and reexplain a subject in an easy way. If we look at the results

of the fourth question, we see that 73% of the teachers agreed that IWBs are useful for saving and printing out their students' work. Nearly two thirds of the teachers believe that they can give explanations more effectively by using IWBs. The results of the first question reveal that 78% of the teachers agreed or strongly agreed that using IWB-based resources reduces time spent in writing on the board during the lessons. Looking at the responses given for the sixth question, 72% of the teachers agreed that they could easily control the whole class from the front of the class.

For the second question, which has the lowest mean score in this category, 59% of the teachers disagreed with the idea that preparing for IWB-based lessons takes more time than for a regular lesson. This may indicate that these teachers use special software programs designed for certain textbooks because these programs provide a lot of different activities, exercises, and tests for the teachers, which eases the teachers' job in preparing extra materials. On the other hand, the results also reveal that 32% of the teachers agree with this idea, which suggests that these teachers try to prepare their materials by themselves, so they have to look for special materials and create appropriate materials for IWBs.

In terms of the results of the two questions related to teachers' opinions, nearly two thirds of the teachers agreed with the notion that using IWBs makes them more efficient teachers in the classroom. It is also seen that 90% of the respondents believe that IWBs can be used for supplementing the lessons, resulting in the highest mean score for any question.

Taking the open-ended responses into consideration, three teachers stated that using IWBs saves time for the teacher. Two teachers also reported their feelings that IWB-based lessons are more interesting for the students and therefore the teacher can teach more effectively. In the words of one of these teachers:

I think this technology is a great opportunity for the students and the teachers because my lessons become more interesting by using IWBs and I can include a great variety of sources (Teacher 7).

On the other hand, one teacher complained that the IWB software that was designed for the course book does not contain anything different from the units of the textbook, so he suggested generally that these supplementary materials should be improved.

Section 2: Teachers' General Attitudes toward the Use of IWBs

These seven questions aimed to investigate teachers' general attitudes towards the use of IWBs. The questions can be divided into subcategories of positive attitudes/feelings and negative attitudes/feelings. Q10 and Q12 may be thought of as positive attitudes because they directly looked at whether the teachers like using this technology and whether they have positive attitudes towards it. On the other hand, Q11, Q13, Q14, and Q16 can be considered as negative attitudes since they explored the negative feelings of the teachers while using IWBs, their negative attitudes towards this technology, their concerns about their students' readiness to use this technology, and doubts about their own readiness to use IWBs. Q15 is directly related to the preference of a traditional way of teaching over IWB technology, so it can be included in the negative category as well.

Q10: I like using IWB technology in my lessons.

Q11: I feel uncomfortable using IWBs in front of my students.

Q12: I have positive attitudes towards the use of IWBs in language instruction.

Q13: I have negative attitudes towards the use of IWBs in language instruction.

Q14: I do not think my students are ready for this technology.

Q15: What I do in class with traditional methods is sufficient for teaching English.

Q16: I am not the type to do well with IWB-based applications.

In terms of mean scores calculated, the teachers strongly agreed with questions ten and twelve, whereas they disagreed or strongly disagreed with the rest of the questions in this category. As is seen in Table 11, these remaining questions were actually expressing negative opinions, so the teachers' disagreement with them shows an overall positive attitude, and thus a consistency among the participants' responses is evident.

The results show that the majority of the teachers agreed that they like using IWBs in their lessons, and that they have positive attitudes towards them. Supporting this finding, only 6% of the teachers responded that they have negative attitudes.

There is a more mixed response when it comes to the question of whether there is a need for IWBs. Although 61% disagree that their traditional methods are sufficient to teach English, 25% agreed with this statement, which indicates that some teachers do not see the necessity of introducing this new technology into the teaching process. By disagreeing with question 11, the majority of teachers made it clear that using IWBs does not make them uncomfortable in front of their students, and most teachers (72 of the 82 surveyed) were confident that they themselves were suited to using this new technology.

Finally, in terms of what the teachers' attitudes towards their students' readiness for IWB use, more than two thirds of the teachers (79%) agreed that their students are 'ready' for this kind of technology.

Section 3: Teachers' Attitudes in terms of Motivational Issues

The questions in this section intended to investigate teachers' attitudes in terms of motivational issues. This section consisted of four questions in total. The questions aimed to gather information about teachers' opinions whether they think that using of IWBs makes lessons more enjoyable and interesting, helps keep the students' attention longer, and increases interaction, motivation, and participation of the students during the lessons.

Q17: I think IWBs make learning more enjoyable and more interesting.

Q20: I can keep my students' attention longer with the help of IWB technology.

Q21: I think IWBs increase the interaction and participation of the students.

Q22: I think my students are more motivated when I use an IWB in my lessons.

The mean scores and low standard deviations calculated show that the teachers agreed or strongly agreed with all the statements in this category. The mean score of question seventeen is the highest (M=3.46), which indicates that nearly all of the teachers (almost 88%) agreed that IWBs make lessons more enjoyable and interesting. Nearly 80% of the participating teachers agreed that the use of IWBs increases the interaction and participation of the students, and nearly two thirds of the teachers believe that their students are more motivated when an IWB is used in the classroom.

The responses given for the 22nd question in this category show that 78% of the EFL teachers agreed that they can keep their students' attention longer when they use IWBs during the lessons.

Two of the participants wrote in positive extra comments, stating that IWBs attract the students' attention and increase student participation.

On the other hand, two other teachers observed that when the classroom lights are dimmed, some of the students lose attention:

When the classroom is a bit dark, my students start to sleep and lose their concentration. I think only the curtains near the IWB should be closed and the back of the classroom might get light from outside so that students do not tend to sleep (Teacher 19).

In order to avoid loss of attention when the lights are dimmed, the curtains at the back of the classroom can be opened or the lights could be switched on at the back of the classroom so that darkness of the classroom does not affect the students negatively.

Section 4: Teachers' Attitudes Related to the Issue of Training

The last category of the teacher's questionnaire contained two questions addressing the specific issue of training for the use of IWBs: whether it is necessary and whether without it, they still feel comfortable using IWBs (see Table 12).

Q18: I believe that training is required to teach with IWB technology.

Q19: If I do not get sufficient training, I do not feel comfortable with using IWBs in the classroom.

The mean scores reveal that the teachers believe in the need for training, but are much more divided over whether such training is absolutely necessary in order for them to feel comfortable using IWBs.

According to the responses given for the 18th question, 63% of the participants agreed that training is necessary for the use of this technology. For question 19 however, there is a more mixed response. Although 34% of the EFL teachers report that they feel comfortable without any training while using an IWB, 51% of the respondents agreed that they do feel uncomfortable, if they do not get sufficient training.

Since the agreement score is higher than the disagreement rate, it can be said that the need for training is accepted as an important issue.

One of the teachers made the point that teachers themselves have a role to play in getting ready to use IWBs:

I agreed with the training requirement, but this is a skill that teachers must develop themselves, make time to explore this technology and it's potential. If they do not make time, they will not use it effectively (Teacher 16).

This opinion indicates that it is the teachers' responsibility in part to learn to use this technology, but the administrators should also encourage teachers and plan training sessions for them. The comment may suggest that if a teacher does not have positive attitudes towards this technology or believe in its benefits, it might be difficult for him/her to become accustomed to using it.

Section 5: Factors Affecting Teacher Attitudes towards IWB Use

In this section, one-way ANOVA tests were performed to explore the relation between teacher attitudes and different variables such as age, experience, and hours of IWB use. The researcher wanted to check whether hours of IWB use, age differences, and experience of teachers can be connected to positive attitudes or negative attitudes. Correlations were sought between hours of IWB use, age, and experience variables and questions 10 (I like using IWB technology in my lessons), Q12 (I have positive attitudes towards the use of IWBs in language instruction), Q13 (I have negative attitudes towards the use of IWBs in language instruction), and Q15

(What I do in class with traditional methods is sufficient in teaching English). After ANOVA tests were performed, none of the relations were found to be significant except for that between hours of IWB use and liking the use of IWB technology.

The result in Table 13 shows that there is a significant relationship between the hours of the teachers' IWB use and the degree of liking the use of IWBs. Specifically, post hoc tests reveal a significant difference between the group with the lowest exposure (1-2 hours) and the group with the highest exposure (11+ hours).

In general, what this suggests is that as the number of hours of using IWBs increases, teachers' rating of how much they like using this technology increases as well. This is an important finding because as the teachers explore this technology day by day, its potential and difference from traditional whiteboards are seen by the teachers and they want to use it more often. It is also related to the feedback coming from the students because when the teachers hear positive feedback, they want to use this technology more enthusiastically, as one of the administrators noted in the interview.

X. Discussion of the Results

Attitudes of Students and Teachers towards the Use of IWBs in Language Learning Settings

The items in the second part of the student and teacher questionnaires were designed to investigate the attitudes of both groups towards the use of IWBs in English lessons. The questionnaire items were categorized according to

particular concepts in order to ease reporting and analysis. The six categories were: learning and teaching; affective factors and attitudes; motivational issues; technical issues; differences between IWBs and traditional whiteboards; and training.

Section 1: Student and Teacher Attitudes Related to Learning and Teaching

In this section, the results indicate that both students and teachers think that IWBs are useful devices for enhancing teaching and learning processes and both groups expressed their positive opinions about the contribution of this technology, and its use of audio and visual materials in particular, to language teaching. These generally positive reports are in line with the results of previous attitude studies about IWBs.

In Wall et al.'s (2005) study, the majority of the pupils surveyed also expressed their positive opinions about the IWBs' contribution to effective learning.

In the same study, more than half of the pupils mentioned how the IWB assisted their understanding with the help of visuals, different software programs, and games. Most of the student comments in Glover and Miller's (2001) study also supported this idea that IWB-based lessons are easier to follow and may help the students who have difficulty in understanding the lessons. The responses in the current study that gained the highest mean scores were question 4 (Using audio and visual materials with IWBs helps me understand the lesson better.) and question 14 (IWBs make learning more interesting and exciting.), which reveals that both having the opportunity of using audio and visual materials and creating interesting and exciting lessons are two characteristics of IWBs which are appreciated by the students.

The results in this study revealed that a majority of the students agreed that when audio and visual materials are used with IWBs, they can understand lessons better and feel that they learn more.

Regarding the teachers' responses related to teaching, the teachers strongly agreed that IWBs are a good supplement for teaching and that IWBs make it easier to show different kinds of materials to the class. In Levy (2002) and Lee and Boyle (2004), the teachers reported that IWBs make it easier to draw on a greater number and wider variety of information and learning sources and these sources can be used flexibly and spontaneously in response to different pedagogical needs. The findings in the current study agree with this notion that it is easier to reach different sources with IWBs and that the whole class can benefit from these sources at the same time.

Teachers in the current study also strongly agreed with the idea that the use of IWBs makes it possible to review, re-explain, and summarize a topic easily and effectively, since the saved or ready examples from the previous lessons and a great variety of other sources make it easier for the teacher to re-present the subject. This is similar to points raised in earlier studies. Most of the students in Glover and Miller's (2001) study, for example, reported that with the help of IWBs, their teachers were able to review things if they needed to study them again. More than two thirds of the teachers in that study also agreed with the idea that the opportunity to save and print out the students' work and other materials is a very useful facility of IWBs, and is in fact a feature unique to IWBs, a point noted in both Walker (2002) and Lee and Boyle (2004).

The only statement in this category that the teachers disagreed with was one suggesting that preparation of IWB-based lessons takes more time than for a regular lesson.

This finding contradicts with a participant's comment in Glover and Miller's (2001) study that IWBs require earlier and better preparation from teachers. Levy's (2002) study also revealed that most of the teachers felt that initial lesson planning and materials preparation such as nice flipcharts take a long time to prepare.

According to the findings in Moss et al. (2007), teachers reported preparing their own resources 78% of the time, and 42% of the time using commercial software. Although the findings in that study indicate that the teachers mostly spend a long time to prepare their own materials, this study may indicate that Iranian EFL teachers are either using commercial software or are finding prepared IWB materials on the Internet since they report that it is not time consuming to prepare IWB-based materials. Although in the observations I conducted, there were not any teachers who used a software program, but the researcher knows that some teachers use software programs specially designed for certain course books, such as Face2Face. Since the number of observations is limited to three, it was not possible to verify the use of software programs in English classes.

Section 2: Teachers' General Attitudes towards IWBs

Section 6: Attitudes of Teachers towards the Training Issues

One of the frequent issues raised by many teachers is the need for adequate training in order to benefit from all of the IWBs' potential. According to the results of this study, 63% of the teachers agreed that they need training to use this technology. This finding is not surprising since it is similar to that in Glover and Miller (2001). In their study, one third of the teachers found it difficult to figure out the techniques of IWB use and to plan the lessons. If we refer to one student's statement in Levy's (2002) study, we get an interesting insight into how teachers should use this technology appropriately and effectively:

I prefer normal boards because the teachers do not act clever using IWBs. In other words, teachers should be confident and "clever" in using IWB functions and they should not use IWBs just for presentations or similar to the ways of using traditional boards.

Although 36% of the teachers in this study report that they feel comfortable in using an IWB without any training, 48% of the respondents said that lack of training makes them feel uncomfortable. All in all, these results indicate that a fairly large group of the participating teachers seems to have found IWBs not difficult to use, and feel that without special training they can still use it and in a sense train themselves, but training is still an important service to be offered. Dexter, Anderson, and Becker's (1999) study revealed that provision of efficient

and effective training support is important for the systematic incorporation of any new technology into education settings. In Levy (2002), it was stated that the teachers with less confidence about IT may not be able to train themselves and they may need more sustained and individual support in terms of training before using IWB technology.

One of the respondents in that study pointed out that it is not "training" when someone simply gives someone else a booklet about the technology. It is advisable that teachers who want to use this technology, regardless of whether or not they feel that they have enough knowledge about computers, should be given the opportunity to take focused training to learn how to exploit all of the functions of IWBs during the teaching process.

Factors Affecting Teacher and Student Attitudes towards IWB Use

In this section of the study, one-way ANOVA tests were performed to explore the relations between respondent attitudes and different variables such as age, experience, and hours of IWB use. In terms of the teachers, it was speculated that hours of IWB use, age differences, and work experience may affect their attitudes towards the use of IWBs. These factors were therefore correlated with questions about liking IWB technology, having certain attitudes towards the use of IWBs, and finding traditional methods sufficient for teaching English. Statistically, only the relationship between hours of actual IWB use and liking the use of IWB technology was found to be significant. This finding indicates that as the number of hours of using IWBs increases, teachers' rating of how much they like using this technology increases as well.

This finding reveals that as the teachers experience the unique features of IWBs, they like this technology more and feel more positive about it. The literature on IWBs has not yet given us a similar result to this, so this is a new and previously unnoted finding in the literature and it is one that IWB manufacturers will no doubt be happy to hear about. With regard to the factors affecting the students' attitudes, correlations were sought between their attitudes and different variables such as age, type of school, and hours of IWB exposure. Again only one significant relation was found, this time between hours of exposure and awareness of the distinctiveness of IWBs. The result showed that as the hours of student exposure to IWB-based lessons increases, the degree of recognizing a difference between IWBs and traditional whiteboards rises as well.

This finding is not mentioned in the existing IWB literature and is significant to the extent that it shows students' growing awareness of the distinctiveness of this technology and it's potential.

The results of question 8 (I like going to the front of the class to use an IWB) in the student questionnaire might be included in this section since its results may be related to age.

The finding revealed that though slightly more than half of the participants agreed that they like using IWBs in front of the class, 10% of the students declared that they did not like using IWBs in front of the class. It seems possible that these mixed comments might be related to age. Young learners may like using this technology by touching on the screen and writing with the special pen as some of the primary schools students' commented in Hall and Higgins (2005).

However, adult learners may find it more unusual and therefore difficult to use this technology and may fear losing face in front of their peers if they cannot use IWBs appropriately. When checked with ANOVA tests, the results showed that for this specific question there is a weak significant relation between liking to use IWBs and age except the group of the oldest students (25+). Younger learners, who were between 6 and 14 years old, strongly agreed that they like using IWBs, whereas adult learners disagreed with this idea.

EFL Teachers' Actual Use of IWB Technology

Three hours of observation in different institutions revealed that the teachers and the students are easily able to use the basic functions of IWBs, such as highlighting, writing with the special pen, saving the generated materials, searching on the Internet, and playing audio and visual files. IWBs' benefit of reducing time spent in teacher's writing in the classroom (Levy, 2002) was observed in one class, where the teacher was presenting ready-made sample paragraphs and letting the students work on them. If she had been using a traditional whiteboard, the teacher would have had to take the time to write a paragraph on the board, or else distribute a worksheet, which would not have provided an opportunity to look at and highlight the text for everyone to see.

Another important benefit of IWBs observed was changing the pages (screens) without erasing the previously written materials. When a page was full of examples and answers, the teacher was able to simply open new pages. This feature, also unique to IWBs, saves time and allows teachers to turn back to previous examples as well since all the pages are saved.

Although some of these functions can be seen with OHPs, it takes more time to back and forth between different kinds of resources and highlighting function is very easy and flexible with IWB technology. It was also observed in at least one instance how students can search using the IWB for unknown words and present not only Iranian and English meanings of the word, but also allow the whole class to listen to the pronunciation of the word. Although there are other features such as using flipcharts, overwriting or editing a student's written work on the IWB screen, some of which can be experienced with the help of subject specific software programs designed for course books, the researcher did not witness use of these in the observed lessons. These software programs, for example, allow the students to see all the pages of the book on the IWB screen so that they can follow the lesson from the IWB screen and the teacher can involve all the students at the same time easily. These programs also provide a variety of exercises and activities that can be exploited by the teachers. The literature on IWBs in the area of language instruction does not provide empirical information about specially designed software programs since they are fairly new and only two publishers prepare

these kinds of software programs. However, in Moss et al.(2007), it was found that many English teachers have difficulty in finding resources, whereas math and science teachers can easily access resources since they are using subject specific software.

XI. Pedagogical Implications of the Study

The results of this study suggest that simply providing IWBs in some or all classrooms does not guarantee their use in language instruction as it was found out during the research. The students in the institutions where there is only one IWB equipped classroom complain that they have experienced this technology only once or twice a semester.

This lack of exposure may come from concrete problems such as lack of time or inability to schedule access to the IWB classroom, or it may come from the teachers' unwillingness to try this new technology and therefore reluctance to bring his/her students to the IWB classroom.

In especially crowded schools with one IWB classroom, it will be very difficult to schedule who will use it when. The solution to this problem can be installing IWBs into more classrooms or administrators' planning equal schedules to make it possible for every class to benefit from this technology. In addition, teachers may not only face some first-order barriers such as lack of equipment and time, but also second-order barriers such as lack of confidence (Ertmer, Addison, Lane, Ross and Woods, 1999).

Through professional guidance and assistance, these second-order barriers can be overcome and teachers may feel more confident and eager to benefit from this technology. Thus, administrators should arrange focus meetings with experienced teachers in using IWBs, establish a kind of sharing network among teachers in terms of materials, resources, and advice on IWB use, and encourage teachers to exploit this technology on their own with the help of experienced colleagues.

Another important and related issue is the need for training. As Hall and Higgins (2005) stated in their study, training sessions should be regular and should be viewed as a continuous process so that teachers can improve their ICT skills in order to use IWBs efficiently. This issue is also mentioned in Smith et al. (2005), where they note that in order to use IWBs to their full potential, there is a need for adequate training because inexperienced manipulations of IWB features decrease the value of this technology. Additional coaching personnel and time could be beneficial on a one to one basis and administrators can arrange training sessions that could be helpful for teachers to overcome their barriers and be more confident in using IWB technology. However, my research findings indicate that more than one third of the teachers responded that they can teach with IWBs without special training.

This may show that the teachers who are interested and good at ICT skills can easily adapt themselves to IWB technology. Therefore, training could be provided by administrators according to the individuals' technological knowledge, experience, and their individual needs to exploit this technology in education. Since most of the teachers in this study agreed that IWB technology is a good supplement for teaching, and both students and teachers have positive attitudes towards this technology, it can be argued that IWBs should be involved in the teaching process as much as possible. Although it depends on the institutions' budgets, once the decision is made to use IWBs, ideally it is advisable to install them in every classroom so that students do not have to change classrooms for IWB-based lessons. If this is not financially possible, there can be at least two or three classrooms that are equipped with IWBs.

In this case, it should be ensured that students be able to find the opportunity to go to those classrooms as much as possible. Students in this study complained that they can only rarely go to the "smart class", which prevents them from experiencing and benefiting from this technology. It should also be reminded that some publishers prepare IWB-based materials and there are a wide variety of free resources on the Internet suitable for IWB use.

Teachers and administrators may wish to contact the publishers for IWB-based materials, on the condition that they choose certain course books whose materials are ready for IWB use, or search the Internet to find extra materials. On a cautionary note, since in most cases a committee, not individual teachers, decides on the books to be used in an institution, a teacher who wants to use this technology with readymade materials may not find this opportunity. Another potential problem with using ready-made materials is that not many books are prepared with software programs, which would limit the teachers' choice if they want to benefit from these software programs. If they find the opportunity to choose course books provided with IWB software programs, teachers may get help in the exhausting process of preparing extra materials for the class and save time by using these materials.

As a last point, educators and administrators should not simply rush to buy IWBs before purchasing one. They should search for and be informed about the different features of each IWB. Although most IWBs share similar features, some of them have distinctive functions and allow more interactive opportunities during the lessons, a particularly important aspect for language teaching. After the comparison of different trademarks, the cost of this technology should also be considered. If more classrooms are intended to be equipped with IWBs, low cost IWBs could be appropriate, whereas if this technology is going to be installed in just a few classrooms, more functionally active IWBs can be chosen. It should also be noted that the size of the IWBs is also important, for instance, in large classrooms, bigger sizes would be more appropriate.

XII. Limitations of the Study

In this study, thirteen educational institutions were surveyed, ranging from primary schools to universities. Although there are several more institutions currently using IWB technology in Iran, Andimeshk, time, travel

constraints, and willingness to take part in this study reduced the number of institutions involved. In addition, in some institutions, there were IWBs, but they had not been installed yet, so those institutions were not included in this study.

In one of the institutions surveyed, IWBs have been used for more than four years, but the rest of the institutions have been using this technology for only one year on average. This meant that in some cases students and teachers were basing their opinions on only limited exposure – a fact which no doubt led to the high "no idea" response rate for some questions. It should also be taken into consideration that in many institutions in Iran, Andimeshk, IWBs are used more in subject classes such as math, science, and geography. Restricting the study to institutions in which IWBs are used in language classrooms also meant that the number of institutions included in this study is far fewer than the total number of institutions currently using IWBs.

Apart from one private primary school and one high school surveyed, all the institutions in this study have this technology installed in just one or two classrooms.

This limited accessibility again may have negatively influenced the extent to which IWBs are used since teachers find it difficult to share the same classroom among them. As noted above, this also meant that students and teachers in many cases did not have a great deal of exposure to lessons with IWBs, and at times could not comment on this technology appropriately. If all the participants in this study had had more experience with IWBs, they might have agreed or disagreed with the statements more easily.

The number of lessons observed in different institutions to see the actual use of IWBs in English classes was also limited. Again, time and travel constraints did not make it possible to include more observations in this study. In addition, some institutions did not consent to having their teachers observed during the lessons and did not allow video recording. Similarly, the study is limited by the few interviews with administrators, but time constraints did not allow for more.

XIII. Suggestions for Further Research

This study investigated the attitudes of students, administrators, and teachers towards the use of IWBs, factors affecting their attitudes, and the ways that EFL teachers use IWBs. Although this study includes some qualitative data, more classroom observations can be carried out to investigate to what extent teachers' benefit from the potential of this technology as claimed in the literature. Such a study, if conducted in a longitudinal manner, could attempt to confirm the finding in this study that greater use correlates to more positive attitudes.

As one administrator in this study pointed out, IWBs may help improve classroom interaction because the teachers do not need to turn their backs on the class. Given the importance of interaction in language learning settings, it could be the particular focus of a classroom-based research study to look at whether or how IWB use contributes to classroom interaction specifically.

The effectiveness of this technology in language instruction settings should also be examined. Although IWBs are claimed to have an impact on learning in the short term, this has not yet been confirmed. It should be checked and seen what are exactly the real contributions of this technology through experimental studies in language learning settings. If not much contribution to learning is found, investment in this technology could be questioned and investors might rethink before purchasing this expensive technology.

XIV. Conclusion

The findings of this study revealed that both students and teachers have positive attitudes towards IWB use in English language classes. IWB-based lessons are perceived as more interesting and enjoyable by both the students and teachers.

In IWB-based lessons, students are more motivated and participate in the activities more. These reported contributions of IWBs may be significant for the increase of the quality of education. Although there can occur technical problems and IWBs have some drawbacks, this technology seems to be welcomed and appreciated by both students and teachers. What must be done for the effective use of this technology is that the teachers should have access to adequate training and should be provided with technical and material-based support?

Since the students are already eager to use and benefit from this technology, Iranian educational institutions should be encouraged to try and provide at least a few classrooms installed with this technology if we do not want to fall behind technologically developed countries, where education goes hand in hand with technology. It should also be noted that once the teachers and students have felt the difference and benefits of this technology, they are likely to become more enthusiastic about using it. Since technology eases our lives in many areas, education may also benefit from its potential, and in this way, teaching and learning environments can be enhanced.

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