Teachers' Perceptions of the Use of the Interactive Whiteboard and Its Impact on Their Self-Perceptions as ICT Literate

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Abstract: The purpose of the present research is to examine the perceptions of teachers regarding use of the interactive whiteboard (IWB) in classroom teaching, and the impact of these perceptions on their self-image as ICT literate. The research was conducted with a sample of sixteen teachers in an elementary school in Israel. The research design combined quantitative and qualitative methods. The data was collected by means of a questionnaire and teachers' reflective summaries of the process of their training in use of the IWB in teaching. The findings indicated advantages of the IWB in diversifying the means available to the classroom teacher to generate curiosity and interests, demonstrate the subject matter, and document the class lesson. The weaknesses of the IWB were associated with the extensive training required its use, the long preparation time for lessons using the IWB, and technical problems. The findings also suggested that the use of the IWB contributed to the respondents' self-esteem as ICT-literate teachers, including a sense of empowerment and confidence in their ICT skills, which contributed to their increased use of the IWB in classroom instruction.

Key words: interactive whiteboard, computer-assisted instruction, teachers' perceptions

1. Introduction

The interactive whiteboard (IWB) is a new teaching aid that over the last decade has rapidly become a widely used technology for instructors throughout the world (Smith, 2005; Türel, 2010). The IWB is a touch panel that is connected to a computer that can be connected to the Internet. One can write on it with a special stylus. The IWB enables manipulation of digital text or any other object projected on it. It enables presentation of multimedia and/or spontaneous content (such as the outcome of a class discussion) on the board. At the end of the lesson, its contents can be saved in a digital file and uploaded to a course website or sent to the students for further study and/or revision (Kurtz & Chen, 2012).

IWBs offer a number of pedagogical benefits in terms of learning from experts, active learning, and enriching the learning process (BECTA, 2004; Smith, 2005; Lopez, 2010). Moreover, the fact that the IWB is an integral part of the traditional classroom teaching environment might be considered an advantage (Kochavi, 2010). Teachers have access to innovative ICT teaching aids that they can project onto the screen together with familiar instructional methods, such as writing on a board. Teachers customarily write main points, students' answers, interim summaries, and the like on the board. This teaching aid is maintained in the IWB environment, and the

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teachers' previous acquaintance may facilitate their transition to the advanced IWB and digital environment, which may be threatening to some teachers who lack ICT literacy.

One virtue of the features supported by IWB software, IWBs allow users to design and use their own course materials in various file format, such as IWB software files, PowerPoint presentations, and Flash animations. By touching the board with a finger or an IWB stylus, teachers or students can control any application running on the computer. Thus, users can manipulate and interact with the course content on the computer from the board, using different functions, such as highlighting, annotating, drag-and-drop activities, screen shade, zooming, screen sharing over the Internet, and connection to web-based applications (Türel & Demirli, 2010).

Studies of teachers and students have revealed positive attitudes toward IWB use in classroom teaching, because of the potential of IWBs for greater interactivity between teachers and students, and increased student engagement, motivation, and enjoyment (Hall & Higgins, 2005; Digregorio & Sobel-Lojeski, 2010; Hennessy, 2011; Moss et al, 2008; Sad & Özhan, 2012).

Schwimmer and Gutman (2011) studied the attitudes of Israeli students toward the introduction of IWBs in elementary school classrooms, and their perceived contribution of this device to the learning process. The research indicated that the students perceived the use of the IWB as contributing to their understanding of the content of the lesson and to the interaction between students and teachers, between students and the study matter, and among the students themselves. In addition, the research participants gave high ratings to the contribution of the IWB and the audiovisual aids to raising the level of concentration, active participations in lessons, and increased curiosity. The explanation of this finding lies in the view that the colorfulness, motion, esthetics, and precision of the study matter projected on the IWB promote concentration and arouse curiosity and interest. Sad and Özhan (2012) found similar results: elementary-school students liked the instruction with IWB because of the better visual presentation, multimedia use, and better learning.

Betcher and Lee (2009) reviewed articles that examined the contribution of the IWB to classroom instruction. They interpreted their findings as clearly indicating a positive contribution when the aid was used properly. Moreover, there was no reason to expect any benefit from using the IWB unless the style of instruction took advantage of the potential of the device. In other words, the IWB is an aid and the human factor — that is, the teacher operating it — is responsible for its positive impact on the teaching process. Furthermore, in their meta-analysis of 210 evidence-based cases of innovation in learning, Luckin et al. (2012) concluded: "What is clear is that no technology has an impact on learning in its own right; rather, its impact depends upon the way in which it is used." (p. 9).

Another meta-analytical review suggests a consensus that the teacher bears the main responsibility for the success of the educational process (Hattie, 2008), including the process of using the IWB (Avniet et al., 2010). In other words, the road to success is via the teacher as the leader who navigates the instruction and manages the class and the lesson in the most intelligent, beneficial way. The main challenge in this task is to design a different way to teach, in which the role of technology not only diversifies and enriches instruction and learning, but also includes promotion, support, creation, and provision of an opportunity for a different learning paradigm. Blau (2011) added the claim that success in assimilating the IWB as a teaching aid depends largely on appropriate training of the teacher. Her research showed that in lessons using the IWB that are managed by teachers who were not adequately trained, the device is perceived as a hindrance to the flow of instruction and one that reduces progress in the learning process.

In light of the above, it can be concluded that teachers' perceptions of IWBs are a critical dimension of the

effective implementation of the IWB in teaching and as a catalyst of their ICT-literacy.

1.1 The Purpose of the Study

The purpose of the present research was to examine the attitudes of teachers towards using an interactive whiteboard (IWB) in classroom teaching, and its impact on their self-image as ICT literate teachers.

2. Method

2.1 Participants

The sample for this research consisted of sixteen teachers in an elementary public school (grades 1–6) in Israel that has used IWBs for about three years (2009–2012).

2.2 Instrument, Data Collection and Analysis Procedures

The instrument selected for our research was an online questionnaire that included open questions, which allowed the teachers to answer freely, in their own language and personal imagery, and numerous multiple-choice questions, which enabled comparative statistical analysis (see: Appendix 1-Topics for teacher's questionnaire).

Another means of data collections was teachers' reflective summaries of the process of their training in use of the IWB in teaching.

Collection of the questionnaire data and the reflective summaries were carried out during May and June 2012.

3. Results

3.1 The Advantages of Using the IWB in Teaching

The analysis of the responses of the teachers indicated four main advantages of using the IWB. The first, most prominent advantage was the diversification of ways of teaching in the classroom. The teachers testified that using interactive lesson plans on the IWB helped enrich the lesson content and provide a more varied and deeper learning experience. "The IWB enables diversification, enrichment of learning, and in-depth conceptualization of subject matter." Another advantage, which is associated with the first, emphasized the generation of interest, curiosity, and heightened motivation to learn. The teachers estimated that the diversification enabled by the IWB heightened the children's interest and curiosity. As one teacher put it: "It seems that the greatest advantage of the digital board is the stimulation of interest and maintenance of concentration." The teachers saw the IWB as a means to increase participation and a desire to come up to the board in class. Moreover, several teachers noted the willingness of the children who previously avoided involvement to make a greater effort to understand, because of the diverse ways of teaching using the IWB. In other words, the first two advantages were interrelated and in practice, the second advantage (interest, curiosity, and motivation) could not have existed without the contribution of the first (diversification of ways of teaching).

A third advantage was demonstration, which helped deepen the understanding of concepts and processes. The IWB provides teachers with a variety of instruments that can be used to demonstrate and clarify abstract concepts that in the former world of instruction were very difficult to explain. According to one of the teachers, "Even students who have difficulty in comprehensive and differentiation could take an active part in the lesson, thanks to the extensive visual representations." The fourth advantage was documentation and access to the lesson content

after it ended. As noted, the lesson can be saved in a file, including the content that was written on the IWB, for later use, providing a visual reminder, more of a continuous flow, and detailed documentation of what the students said. As one of the teachers testified: "Saving a whole lesson and sending it to everyone or, alternatively, using it to open the next lesson from the place we stopped, provides a reminder of who said what. This is not possible with other means."

The support of the teachers for using IWB was expressed in their widespread agreement with the statements that examined the advantages of the IWB (the responses ranged from 1, indicating disagreement, to 5, indicating strong agreement): The statement "Use of the IWB improves teaching processes in class" received an average rating of 4.56 (SD = 0.63) and similarly, the statement "It is possible to explain the subject matter better using the IWB" received an average rating of 4.50 (SD = 0.63). A slightly lower rate (average 4.30, SD = 0.70) was obtained for the statement "All teachers should know how to use the IWB" and the list ended with "The IWB helps increase the students' interest and attention" with an average rate of 4.01 (SD – 0.44).

3.2 The Disadvantages of Using the IWB in Teaching

The testimony of the teachers suggested three prominent disadvantages of using the IWB in teaching. The first disadvantage was associated with the need for individual prior training and extensive practice in teaching with the IWB technological instruments and software. As one of the teachers said: "The use of the IWB requires very good technological skill — you need to study it for a long time." The second disadvantage referred to the extensive amount of hours/required of the teachers to prepare the computerized lesson plans: "Of course, the work didn't stop there; we sat for hours to create this unit. It should be noted that we used existing units quite a lot, but it still took us a lot of time to implement our plans." This was supported by the medium-high agreement of the teachers with the statement: "The IWB adds to the teacher's work" (average 3.30, SD = 1.19). Finally, the third disadvantage involved technical problems that arose when use technology in teaching. The teachers mentioned difficulties such as files that crashed and different technical problems that they encountered occasionally, which made it difficult to teach lessons and encumbered the teaching process: "The planning was perfect but unfortunately everything depended on the wonders of technology."

3.3 The Contribution of IWB to the Teacher's Self-image as ICT Literate

Based on the reports of the teachers and the reflective documents, it appears that use of the IWB contributed to a sense of empowerment and confidence in ICT skills. The IWB helped them acquire skills for teaching in an advanced technology environment, connecting them to the students' world. With the help of the IWB, the teachers, who planned and developed the lesson plans themselves, were able to create new opportunities for innovative learning and plan rich lessons using multimedia; this contributed to a positive and empowering learning experience for the teachers: "I was exposed to a device that allows the teacher autonomy and personal creativity in creating diverse study assignments for the students."

The sense of empowerment combined with a sense of self-efficacy in operating technology contributed, in turn, to increasing the teachers' involvement in using the IWB in the educational process. As one of the teachers said: "In the end, I am pleased with the process that enabled us to reexamine the unit and upgrade it using interactive instruments." Another teacher noted that: "When we become familiar with all this we'll be able to diversity our means of instruction and adapt them to the needs of the students and, most important, we will learn to use technology intelligently for pedagogical benefit."

All these together contributed to promoting the ICT self-image of the teachers, which is essential for the

process of assimilating technology such as the IWB. This conclusion is further reinforced by the widespread agreement of the teachers (75%) that "using the IWB makes it possible to be an ICT teacher," and another 60% agreed strongly with the statement: "the IWB contributes to a friendly relationship with the computer."

4. Conclusions

When using technology such as the IWB in classroom teaching, the teacher remains the leader of the learning process. The transition from a blackboard and chalk to an interactive screen enables teachers to maintain their traditional position in the classroom while integrating technological applications that did not exist previously, which help diversify and enrich the learning process. The similarity between the IWB and the blackboard and chalk constitute a bridge, providing a sense of confidence and serving as firm, safe ground for the transition to the world of technology in teaching of the 21st century.

It should be emphasized that as sophisticated as they might be, technology and technological means do not generate learning. The teachers and the students who use the technology to create a space that invites learning are responsible for that. In other words, the human factor is responsible for the success of the ICT-integrated educational process. The IWB is a means, and the teacher operating it is responsible for the success of its inclusion in the teaching process. The findings of the present research indicate the willingness and active involvement of teachers in the optimal integration of the IWB in the teaching process. These are essential preconditions for success in integrating any technology in teaching, which instill teachers with a sense that they derive enrichment and benefit from using the IWB in teaching.

The use of the IWB in classroom teaching is not considered an agent of paradigmatic change in the education process. Moreover, some claim that the white color of the IWB is the new black (the color of the traditional board), implying that the IWB is replacing the traditional blackboard without utilizing the new possibilities it offers (Clark, 2012). However, it is important to remember that teachers in the education systems throughout the world, including Israel, are subject to the policies of the education system and those who supervise it. The IWB may be considered a catalyst of a quiet revolution (Blau, 2011), which could serve as a first step in a fundamental and deep change, fitting the era of the society of knowledge. Moreover, true ICT learning does not require one specific environment (such as the virtual environment)for learning. Rather, it requires change in the nature of learning as a result of the introduction of technology, whether within or outside the physical classroom (Haythornthwaite & Andrews, 2011). We believe that the IWB can help bring about this change.

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Appendix

Appendix 1　Topics for Teacher's Questionnaire

In this survey we would like to study your perceptions toward the integration of classroom interactive whiteboard (IWB). Your participation will contribute significantly to our research. Therefore we thank you for your cooperation.

Your responses are anonymous and will be used for research purposes only.

Part I - This section is aimed to learn about the experience of integrating IWB in the teaching process

(1)　Name three advantages of integrating IWB in teaching.

(2)   Give an example of a strategy of teaching which you use combined with IWB.

(3)   Can you give an example of a teaching strategy via IWB that did not succeed?

(4)   What do your students think of using IWB in class?

(5)   If the IWBs were to be removed, would you feel sorry? For what reasons?

Studies have shown that integrating IWB affects several aspects. We ask you to give your opinion on them and describe the change that happened in each of the following areas:

(1)   Teaching environment

(2)   Teacher job description

(3)   Channels of communication with students

Part II – In this section we would like to learn about your attitude towards the adoption of classroom interactive whiteboard in classroom teaching by using the following scale: 1. Totally disagree; 2. Disagree; 3. Indifferent; 4. Agree; 5. Totally agree.

Statements
1.   Use of the IWB improves teaching processes in class
2.   It is possible to explain the subject matter better using the IWB
3.   If I could, I would not put an interactive whiteboard in my classroom
4.   All teachers should know how to use the IWB
5.   The IWB adds to the teacher's work
6.   Using the IWB makes it possible to be an ICT teacher
7.   The IWB contributes to a friendly relationship with the computer
8.   The IWB helps increase the students' interest and attention

In conclusion, give a score from 1 to 10 to represent the overall satisfaction with the integration of the interactive whiteboard in the classroom teaching _____

Part C - Background Data:

(1)   What is your age?

(2)   What is your teaching area?

(3)   Which classes?

How many years of teaching seniority do you have?