WCES-2010

Which one is smarter? Teacher or Board

Fatih Gursul a,*, Gulsah Bilgic Tozmaz a

aIstanbul University, Department of Informatics, Beyazit, 34116, Istanbul – Turkey

Received November 15, 2009; revised December 3, 2009; accepted January 25, 2010

Abstract

This study investigates the advantages and disadvantages of the use of Smart-Board and offers suggestions for effective use of Smart-Boards basing on teacher opinions. Research group is comprised of 20 teachers using Smart-Board actively at a primary school in 2009-2010 academic year. A questionnaire regarding the teachers’ opinions about using Smart-Board and face-to-face interviews with 15 teachers are utilized to gather data for the study. Content analysis, a qualitative research technique, is employed to analyze the data of the study. Besides the advantages and disadvantages of using Smart-Board, the study also includes findings such as the demographic features and the frequency of Smart-Board use of the research group and the activity types that students make use of Smart-Boards.

Keywords: Smart-board; educational technology; teacher education; interactive white board; computer assisted learning.

1. Introduction

Blackboard, the first revolutionary teaching tool, came into the classrooms prior to 1800 and deeply affected the nature of teaching for the next two centuries. Blackboard came to signify traditional teaching and is still used as a symbol for traditional teaching. Interactive whiteboard (or smart-board as it is generally termed in Turkey) has the potential to prove the second revolutionary teaching tool. Betcher (2009) stated that smart-boards had the potential to be identified with new digital classrooms of the 21st century just as blackboard played a key role in 19th and 20th century.

Though the first smart-board was developed in early 1990s, it took some time to recognize its potential for use. Owing to its cost, it started to be used in business life at a earlier date compared to school environment. Once developers had realized the possibilities of using such a technology in education, it started to come into classrooms (Walker, 2005).

The smart-board is a powerful teaching tool for classrooms. It is a computer-based touch-screen and a digital projector conveys the image on a computer screen to the touch-screen. Teachers (or students) simply touch the surface of the board in order to control applications and write notes. The notes and scripts on the smart board can be recorded and printed. One can use his/her finger or a special pencil so as to write notes on the board in digital ink, to highlight any application, to give color to key points on a web site and to get ideas for brainstorm (Rief & Heimburge, 2007).
The smart board comes with a special software (Notebook, Flipchart...etc.). While this software is running, you can write on it by using the pencil or your fingers. The software also includes several extra properties which bear a resemblance to a presentation program. There are libraries consisting of figures and symbols that can be displayed on the screen. You can also write notes by using the screen keyboard rather than handwriting (Kennewell, 2004).

Stephen Brown (2003) lists the advantages and drawbacks of the smart board as the following:

- User friendly, even those teachers who are not on good terms with technology can use it easily.
- Teachers can make a presentation by obtaining materials from several spots (an image from the Internet, a graphic from a worksheet, writing from Word) and collecting them together.
- Teachers can compose easily and rapidly customized learning objects out of the existing contents and adapt them in a way that will meet their real-time requirements in a lesson.
- It enables learners to internalize any input in an easier way.
- By lifting the burden of taking notes from students’ shoulders, it enables them to freely participate in discussions.
- It enables learners to work around a common area or duty in a cooperative manner.
- Once completely integrated into visual learning environments and sources of learning objects, it enables common share.
- It provides instant feedback when interactive comprehension is tested for the whole classroom.

The drawbacks of using smart-board:

- Smart-boards are more expensive than white boards or computer-screen combinations.
- Board surface may be damaged and, in that case, it is costly to renew it.
- Front-projection boards may be found difficult for some users to figure out.
- When length-adjustable boards are placed at a high point, some users may have difficulty in reaching the upper parts of them. On the other hand, not all users may see them if they are placed at a lower point.
- It is harder to ensure the safety of mobile smart-boards (Furthermore, it is necessary to recalibrate them every time they are moved to another place.
- Should it allow for more than one entry at the same time, this may interfere with the writings on the screen, thus leading to a bad picture.
- If boards allow for long-distance access, some users may make undesired comments and drawings on them.

A number of studies have been conducted on the use of smart-boards. These studies (López, 2009; Lewin, Somekh and Steadman, 2008; Hennesy and others, 2007; Schmid, 2007, 2008; Sevindik, 2009; Martin, 2007; Marzano, 2009; Hwang, Chen & Hsu, 2006) are generally into effectiveness of smart-boards and the effect of smart-boards on students’ academic performances.

Troff and Tirotta (2009) studied the effects of smart-boards on students’ motivation for math and academic performances. A study, in which 773 upper elementary students took part, observed that the effect of smart-boards on students is minimal.

In their studies, Winzenried & Lee chose various schools from several countries and made sure that smart-boards were included in curriculum and a particular subject was presented through the use of smart-boards every day. The study concluded that using smart-boards significantly affected the lesson and learning and had a number of advantages. Some of them were listed as follows: important points can be highlighted with a special pencil; it ensures the same convenience as in traditional black boards; and it can make use of many sources (Internet, DVD/CD, video...etc.)

In a pilot scheme conducted in South Africa, Slay, Sieborger and Hodgkinson-Williams (2007) received teachers’ and students’ opinions regarding the cost of smart-boards and the materials to be used. Judging from what teachers and students stated concerning the advantages of smart-boards, they noted that smart-boards could not go beyond computers or projectors.

In their studies, Smith, Hardman and Higgins (2006) examined the potential of smart-boards in classrooms. They studied the lessons which included or excluded smart-boards and concluded that those lessons carried out with the help of smart-boards were smoother and subjects could be comprehended in a quicker way. They also observed that the duration of group-works experienced a decrease when smart-boards were used. Similarly, Latane (2002) stated that student-student interaction was lower and teacher-student interaction was higher in classrooms which made use of smart-boards.

Even though there are a lot of studies (López, 2009; Lewin, Somekh and Steadman, 2008; Hennesy and others, 2007; Schmid, 2007, 2008; Sevindik, 2009; Martin, 2007; Marzano, 2009; Hwang, Chen & Hsu, 2006), these studies...
have mainly focused on effective use of smart-boards and their effects on students’ academic achievement. There is hardly any emphasis on teachers’ opinions concerning the use of smart-boards. The present study has included teacher opinions in the form of observation and not made a detailed study into them.

This study examined the advantages and disadvantages of the use of smart-boards from teachers’ point of view, analyzed what kind of activities they conducted and included their opinions regarding the use of smart-boards.

2. Method

2.1 The Study Group

The study group is comprised of 20 teachers who actively used smart-boards in a private teaching institution during the school year 2009-2010.

2.2 The Scale

The scale consists of 9 questions, three of them being multiple-choice and the others being open-ended questions, as to the users’ demographic characteristics; the frequency at which they used smart-boards; the advantages of using smart-boards; the disadvantages of using smart-boards; suggestions towards more efficient use of smart-boards; whether students used smart-boards or not; and, if yes, for what kind of activities they used smart-boards.

2.3 The Interview

Following the analysis of the data on scale, face-to-face interviews were conducted with fifteen of the teachers. These interviews were recorded by means of a sound recording device.

2.4 Analysis of Data

Content analysis, a qualitative research method, was used in order to analyze the teacher opinions.

3. Finding

3.1 Demographic Findings

The relationship between teachers’ age and their weekly smart-board using hour is illustrated below in table 1.

Table 1. The relationship between teachers’ age and their weekly smart-board using hour

<table>
<thead>
<tr>
<th>Age Interval</th>
<th>1-3 hours</th>
<th>3-5 hours</th>
<th>5-7 hours</th>
<th>7 + hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-30</td>
<td>4 teachers</td>
<td>1 teacher</td>
<td>none</td>
<td>1 teacher</td>
</tr>
<tr>
<td>30-40</td>
<td>10 teachers</td>
<td>2 teachers</td>
<td>none</td>
<td>1 teacher</td>
</tr>
<tr>
<td>40-50</td>
<td>none</td>
<td>1 teacher</td>
<td>none</td>
<td>none</td>
</tr>
</tbody>
</table>

The participants of this study aged between 20 – 50. The teachers whose ages range from 20 to 30 participated in this research, while four of them stated that they used the smart-board 1-3 hours per week, it is found that there is one teacher who uses the board 3-5 hours and one teacher using it 7 hours or above. There are also 13 teachers whose ages range from 30 to 40. Ten of these teachers stated that they used the smart-board 1-3 hours per week; two of them used 3 to 5 hours and one of them used it 7 hours or more a week. Only one teacher, aged between 40-50, took part in this research stated that he used the board 3-5 hours.

In the light of the interviewed teachers’ demographic findings in table 1, the following tables below are presented.

3.2 Findings about the Advantages brought about by Smart-Boards into classrooms

Table 2 presents the advantages brought about by the use of smart-boards on the basis of teacher opinions.
Table 3. The Advantages of Using Smart-Boards

<table>
<thead>
<tr>
<th>Answer</th>
<th>Percentages(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>It can draw the attention of students by increasing the visuality</td>
<td>%40</td>
</tr>
<tr>
<td>It provides the students with the opportunity for active participation.</td>
<td>%22</td>
</tr>
<tr>
<td>Retention of Learning</td>
<td>%12</td>
</tr>
<tr>
<td>It enables what is explained in a lesson to be recorded and to be continued in the next one.</td>
<td>%10</td>
</tr>
<tr>
<td>It makes lessons enjoyable</td>
<td>%10</td>
</tr>
<tr>
<td>It makes it easy to give a lesson</td>
<td>%7</td>
</tr>
</tbody>
</table>

Out of the answers, the most obvious one is that using smart-boards can draw the attention of students by increasing the visual quality. As for the face-to-face interviews, the teachers stated that using smart-boards prevented the students from being indifferent to abstract subjects and enabled them to give their attention to a subject for a longer time. 22 percent of the answers indicated that smart-boards provided the students with an opportunity for active participation. In this way, students play an active role in a lesson all the time. Another advantage expressed by the teachers is that smart-boards ensure enduring learning. Since students pay more attention to a lesson and play an active role in it when smart-boards are used, what they learn endures for a longer time. Another advantage of smart-boards is that things explained in a lesson can be recorded. Therefore, what they have been explained in the former lesson can be retrieved more easily; the illustrations can be repeated and students are able to start the new lesson with their former learning being fresh and revived. Using smart-boards can make it enjoyable to give a lesson. One of the primary reasons for this is that it can draw the attention of students. In this way, students volunteer to go to the blackboard and compete with each other. No doubt, a lesson in which students are active with a clear attention and volunteer to participate can be carried out in an easier manner.

3.3 The findings about the Disadvantages in Classrooms Caused by Using Smart-Boards

The disadvantages of using smart-boards on the basis of the teacher opinions are presented in Table 3.

<table>
<thead>
<tr>
<th>Answers</th>
<th>Percentage(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical problems</td>
<td>%69</td>
</tr>
<tr>
<td>It is time-consuming to prepare them</td>
<td>%26</td>
</tr>
<tr>
<td>It requires ready-to-use materials</td>
<td>%5</td>
</tr>
</tbody>
</table>

The greatest problem of using smart-boards on the part of teachers is technical problems and lack of qualified staff to deal with them. A great loss of time results from especially their calibration settings and the fact that such settings need to be adjusted again when they are moved to another place or a slight displacement takes place. In addition, required preparation prior to using smart-boards, especially portable ones, consumes the time which would otherwise be allocated by teachers to focus on the lesson. If they are planning to use a smart-board for their lesson, teachers need to find ready-to-use materials or prepare their own materials before the lesson.

3.4 The findings regarding for what activities teachers use smart-boards

The activities, teachers use smart boards, are presented Table 4.

<table>
<thead>
<tr>
<th>Answers</th>
<th>Percentage(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Using it as a combination of computer and projection</td>
<td>%23</td>
</tr>
<tr>
<td>Carrying out such interactive activities as matching, dragging and painting</td>
<td>%23</td>
</tr>
<tr>
<td>Using it for normal board activities (Solving questions, writing...etc.)</td>
<td>%23</td>
</tr>
<tr>
<td>Explaining things which would otherwise be impossible to do so in classrooms through animation</td>
<td>%13</td>
</tr>
<tr>
<td>Making children play games related to the subject of a lesson</td>
<td>%9</td>
</tr>
</tbody>
</table>
Using ready symbols and drawings found in the Internet and smart-board program  

When percentages of the answers provided by the teachers are analyzed, it can be observed that the first three items have the same value. Two of these activities are general ones, rather than special, which can be carried out also on a blackboard. Such interactive activities as matching, dragging and painting are related to the real use of smart-boards. These answers are followed by the one “I explain things which would otherwise be impossible to do so in classrooms through animation” with a percentage value of 13. Similarly, this is an activity which needs to be carried out by the nature of smart-boards. 7 percent of the answers suggest that teachers make students play games related to the lesson. It was English Language teachers who gave this answer most. The remaining 9 percent of the answers show that teachers made use of library programs downloaded into computer as well as the smart-board.

3.5 The findings regarding for what activities students use smart-boards

According to analysis of the scale and face to face interviews with teachers, the teachers encourage their students to use smart-board in the activities presented in table 5.

Table 5. The activities carried out by students on smart boards

<table>
<thead>
<tr>
<th>Answers</th>
<th>Percentage(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Using smart boards for normal board activities (Solving questions, writing…etc.)</td>
<td>%29</td>
</tr>
<tr>
<td>Explaining things which would otherwise be impossible to do so in classrooms through animation</td>
<td>%23</td>
</tr>
<tr>
<td>Carrying out such interactive activities as matching, draging and painting</td>
<td>%19</td>
</tr>
<tr>
<td>Permission to control the computer</td>
<td>%16</td>
</tr>
<tr>
<td>Making children play games related to the subject of a lesson</td>
<td>%13</td>
</tr>
</tbody>
</table>

As can be concluded from Table 5, activities conducted by teachers and students are not different from each other. Similarly, the activity carried out students at the highest percentage is using smart-boards as if they were a blackboard, namely solving questions and writing. It can also be inferred from the table that students are given an active role in the explanation of events which would otherwise be impossible to put into practice in classrooms, an activity commonly used by teachers. By making use of interactive properties of smart boards, students are also made to carry out such activities as draging, matching, painting. These activities are followed by students being able to control the computer. Another activity in which students are made to participate is to have them play games related to the subject of a lesson.

3.6 The findings about for what kind of activities teachers use smart-boards

Table 6 presents suggestions put forward by the teachers towards a more efficient use of smart-boards.

Table 6. Suggestions towards a more efficient use of smart boards

<table>
<thead>
<tr>
<th>Answers</th>
<th>Percentage(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical staff should be available in order to overcome technical problems</td>
<td>%33</td>
</tr>
<tr>
<td>There should be ready-to-use lesson presentations</td>
<td>%33</td>
</tr>
<tr>
<td>They should be placed in every classroom</td>
<td>%28</td>
</tr>
<tr>
<td>They should be employed frequently</td>
<td>%6</td>
</tr>
</tbody>
</table>

Table 6 presents the answers provided by the teachers for the question “What can you suggest towards a more efficient use of smart boards”. Two important ones among these suggestions are that technical staff should be available in order to overcome technical problems and there should be ready-to-use lesson presentations. These suggestions are followed by the one which refers to the need for smart-boards in every classroom. Another suggestion is that they should be employed more frequently.
4. Discussion, Conclusion and Recommendation

Once smart-boards are included in curriculum in accordance with purposes for using them and employed regularly, they prove a revolutionary invention for schools. Even so, it is necessary to overcome the deficiencies and to develop skills to make use of them. The results of the study conclude that the greatest advantage of smart boards on the part of teachers is that it can increase the level of attention paid by students. In their studies on the effect of using smart boards on students’ interest in and motivation for math, Troff and Tirotta (2009) discovered that not only did they increase the level of attention paid by students but also teachers were eager to employ them. During face-to-face interviews conducted for the present study, teachers stated that using smart boards made their lessons more enjoyable. The increase in students’ level of attention suggests the significance of the variable “teacher” in both studies. Another factor in increased attention on the part of students is that they are provided with the opportunity to actively participate in a lesson. Discussing the advantages of using smart boards, Stephen Brown (2003) noted that they enabled students to internalize the input in an easier way. Enduring learning, thought by the teachers in the present study to be one of the advantages of smart boards, requires that learners internalize inputs in a proper manner.

Out of the disadvantages of smart-boards, the greatest problem expressed by the teachers is technical problems (69%). Face-to-face interviews with teachers concluded that teachers, especially those who are rather bad at technology, abstain from smart boards due to the fact that calibration settings need to be redone for them, particularly for portable ones. Technical problems and constant need for calibration are other disadvantages in that it is time-consuming to prepare them. Since teachers, especially those who have to give lessons one after another, avoid reinstalling and calibrating them, the number of lessons in which they employ them is low. In his paper, Stephen Brown listed constant disorders in calibration as one of the disadvantages of using smart boards. This is in consistent with the finding of the present study that it is time-consuming to prepare smart boards (26%). In their studies on the use of smart boards in Turkey, Somyurek, Atasoy and Ozdemir (2009) studied whether the investments made by the Ministry of National Education proved efficient or not. The study also received teacher opinions regarding the use of smart boards and concluded that technical problems lowered the level of efficiency of smart boards. Another point widely expressed by the teachers during face-to-face interviews despite having the lowest percentage among other findings is that smart boards require ready-to-use materials. Similarly, in the study carried out by Somyurek, Atasoy and Ozdemir (2009) teachers noted that neither the Ministry of National Education nor their own schools provided them with materials which they could use on smart boards.

It is interesting that neither teachers nor students carry out a great variety of activities on smart boards. The activities they conduct can also be carried out by the students through a combination of computer and projection and on blackboards found in every classroom. Especially in classrooms where they are used as a combination of computer and projection, neither teachers nor students can touch even the board. The activity which is in greatest harmony with actual purpose of smart boards is to make use of animations on them for activities which cannot be carried out in classrooms or laboratories owing to impossibilities or being dangerous for students. During face-to-face interviews, especially Science and Technology teachers stated that they benefit a lot from smart boards used in laboratories in this respect. Another activity commonly employed by Science and Technology and English Language Teachers is to make students play games related to the subject of a lesson. Face-to-face interviews discovered that particularly younger students can learn via games in a quicker way and their learning is more enduring.

Even though using a smart-board may be regarded as a burden by teachers, it can be observed from their own opinions that advantages outweigh disadvantages. Firstly, when used properly smart boards make lessons easier and more enjoyable both for students and teachers.

On the basis of teacher suggestions specified under the section “Findings”, the present study makes the following suggestions:

- Technical staff should be available in order to deal with technical problems, the greatest problem of using smart boards.
- The Ministry of National Education and schools should provide digital educational materials that can be used on smart-boards and qualified staff to help teachers with this.
- Every classroom should have a smart-board and it should be integrated into teachers’ lesson plans in order for smart-boards to be used in a more efficient manner.
• How often teachers use smart-boards should absolutely be monitored and an attempt should be made to increase the frequency at which they are used.

References


Winzenried, A. & Lee, M. Implementing interactive whiteboards: What can we learn?. *Teach Journal*, 1, 6-8.