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Examining students’ attitudes and views towards usage an interactive whiteboard in mathematics lessons

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Abstract

This research done to determine the attitudes and to evaluate the views of 10th grade students towards interactive whiteboards (IWBs) in mathematics classes is a part of a quasi-experimental study. In the research, participants were 60 students from a public school. This group’s lessons were covered using an IWB for 5 weeks. Qualitative and quantitative data were collected in the research. At the end of the research, it was determined that students’ attitudes towards the use of IWB in mathematics classes is at a medium level and that students see the IWB as a tool which increases their interest and facilitates learning.

Keywords: Interactive whiteboard; technology; instructional technology; mathematics education; attitude.

1. Introduction

Developments in information and technology can be found in every field of our life at any time. Ignoring these developments is almost impossible. Education is also trying to catch up with these developments. New instructional technologies can be seen as an effort to keep up with new developments. It is known that the effectiveness of education increases as the information technology which is called the “instructional technology” is used consciously (Akkoyunlu, 1998). The information technologies used have an important role in the teaching-learning environment and offer different opportunities for the teacher and student during the teaching and learning process. Avoiding the use of these facilities means ignoring the quality and benefits of technology in education.

One of the newest examples of technological developments in the field of education is IWBs. This device which is known as the “IWB”, “electronic whiteboard”, or sometimes by brand (Smartboard, Promethean) is a device used in presentations. It is sensitive to touch and used by connecting to digital projector (Shenton & Pagett, 2007).

The projector reflects an image it took from the computer on to the IWB and the whiteboard turns into a big computer screen sensitive to touch. As a result, the whiteboard changes into an interactive surface that can be controlled by your finger or an electronic marker. It is possible to access all the documents on the computer and also connect to the Internet. When working with special software installed onto the whiteboard, a menu that shows variety according to the features of the software can be used. It is possible to add new images and animations to the
existing ones in the software. This feature offers opportunities for the teachers to reach ready-made materials or to make their own materials and resources. In addition to this, teachers can save the things that are done on the IWB during the class hour alongside the original ones. They can return to the pages covered whenever they want. The saved lessons can be forwarded to the absent students or lessons can be transferred onto the web for students to use as a tool for revision at home as well.

Studies have been conducted on the use of this technology (Kennewell & Beauchamp, 2007; Lewin, Somekh & Steadman, 2008; Wood & Ashfield, 2008). In studies related to the IWB, it is indicated that the IWB technology has the potential of supporting teaching and learning (Kennewell & Beauchamp, 2007; Smith et al., 2005; Wall, Higgins & Smith, 2005). In the study Wall, Higgins and Smith (2005) did in order to collect information about the opinions of students on the IWB and its effects on the teaching and learning process, it was found that students have positive attitudes towards the use of IWBS in mathematics and science classes. In a study, Schut (2007) found that the IWB is a valuable educational tool in class and that the IWB has several benefits such as focusing students’ attention on the topic, increasing students’ interest and their interaction, and developing visuals. Wood and Ashfield (2008) pointed out that presentation technologies like the IWB can be used to support creativity. Lewin, Somekh and Steadman (2008) stated that if the IWB is to be efficient in teaching and learning, then it should be used to its full potential. According to the researchers, new devices provide the creation of new versions of activities, but these new activities cannot emerge on their own; they are rather created by the users by developing their skills in using these devices.

The IWB has also become a device which has become more popular in our country over the few last years. However, the differences between Turkey and other countries in terms of the socio-economic situation, education programs, learning environment, and teaching approaches can affect the results of IWB usage. We believe that studies made on this issue can be useful in determining the benefits of this highly priced technology and its effectiveness and efficiency.

The problem in the research is determined to be “What are the attitudes and views of high school students towards the usage of IWBS in mathematics classes?”. The related sub-problems are:

1. What are the attitudes of high school students towards the usage of IWBS in mathematics classes?
2. What are the views of high school students on the usage of IWBS in mathematics classes?

2. Method

This study consists of a comprehensive research with a quasi-experimental design. The participants in the research were 10th grade students in the city of Izmir. When deciding on the participants for the research, layered, cluster and simple random sampling methods were used. The participant group consisted of 60 students who were studying in a public school in Izmir.

The treatment of the study was done in the 2008-2009 academic year for 5 weeks without a break. In the research, lessons were done using an IWB connected to a computer and the projector. The researcher covered 3 lessons of mathematics in a week and the mathematics teacher did 1 lesson of mathematics a week. The example topic covered in the research was “Quadratics” since the topic was appropriate for the use of visuals like graphics and pictures. The researcher prepared a PowerPoint presentation of the topic “Quadratics” using the opinions of experts.

The quantitative data were collected using an “Attitude Scale Towards Interactive Whiteboard in Mathematics Classes” (ASTIWMC) developed by the researcher. In addition, an interview form developed by the researcher was used in collecting the qualitative data.

2.1. Attitude scale towards interactive whiteboard in mathematics classes (ASTIWMC)

The draft form of a 5-point Likert-type scale with 29 items was given to 141 students of high school level. The collected data were analyzed using SPSS 15.0 packet program. For the construct validity of the scale, factor analysis was done, and for the reliability of the scale, Cronbach alpha coefficient was calculated. The 22 itemed ASTIWMC obtained after factor analysis had four factors. The first one of the factors explained 19,335 % of the total variance, the second one 18,656 %, the third one 12,437 %, and the fourth one 6,852 %. The common factor variance of the
items in the scale can change between 0.254 and 0.773. The Cronbach Alpha coefficient of the scale was calculated as 0.898.

2.2. The interview forms

A student interview form was prepared in order to determine the views of the students in the experimental group towards the use of an IWB in mathematics classes. While preparing the interview questions, the literature on IWBs was examined and the interview form was presented to experts. The final draft of the form was prepared according to the feedback given by experts.

There were 12 questions in the interview form. However, in this study, analysis of only 5 interview questions were conducted. The evaluation of the student interviews was done by the researcher. In order to do this, the recorded interviews of the participants were transcribed. The raw data taken from each student were ordered, and the unnecessary parts were taken out and organized.

3. Findings

3.1. The findings of attitude scale towards interactive whiteboard in mathematics classes (ASTIWMC)

ASTIWMC was employed in order to determine students’ attitudes towards the IWB. The mean and the standard deviation of each item of the scale were calculated. The mean of the answers students gave to the items in the ASTIWMC was 3.04 (see Table 1).

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<th>X</th>
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</table>

Frequency and percentage distribution of four items in the ASTIWMC which had the maximum and the minimum mean were examined in the table. 16.6 % of the students do not agree on the opinion which states that IWB can be beneficial for students when they are absent or when they revise after class from the Internet or memory; on the other hand, 56.6 % of the students agree on this item. 25 % of the students in the group do not agree that using the IWB in mathematics class brings action to the lesson. 51.7 % of the students agree on the opinion that they have difficulty in following the lesson because the pace of math classes done using the IWB is very fast. While 35 % of the students are undecided whether the use of IWB affects their success in the lesson or not, 36.7 % agrees with this statement, and 28.3 % do not agree. 11.7 % of the students stated that they are anxious in math classes which are done using the IWB, 43.3 % are undecided about this issue, and 45 % do not agree with this statement. 55.5 % of the students do not agree that the use of the IWB increases self-confidence. While 16.7 % of the students state that they do not take lessons done by using IWB seriously, 50 % do not agree with this statement. 68.3 % of the students do not think that it will be sufficient to use only the projector instead of the IWB.
3.2. Findings on student interviews

In the research, at the end of treatment, 16 students in the experimental group were interviewed face to face. The purpose of the interview was to find out the opinions and the impressions of students about the use of the IWB in mathematics classes. Students were informed about the purpose and the importance of the study at the beginning of the interview in order for them to take the questions seriously and answer them sincerely. Those 16 students were chosen according to their sex and pass degrees from the 1st term mathematics class. Students were coded from 1 to 16 during the interview (e.g. Student 1).

With the question asked at the beginning of the interview, it was found out that except for two of the students, the rest of the students had never done a lesson using an IWB before.

When answers to the next question “Did your interest towards mathematics change after using the IWB?” were examined, it was determined that the interests of 9 students towards mathematics increased after the lessons with the IWB. Students who think that their interest increased stated that it was because of their curiosity about the board, the simplicity of drawing, its ability to save time, the enjoyment of the lessons and visuals. 7 students stated that there was no change in their interest because they were already interested in this lesson or because there was too much noise in the class.

When the 1st term mathematics lesson pass grades of the students were examined, it was seen that the pass grades of 4 of the 9 students who think that their interest towards mathematics increased was 1. There were no students who had a pass grade of 1 among the other 7 students. As a result of this finding, it can be said that the use of IWB is effective in increasing the interest of students who had low success rates in mathematics.

One of the questions in the interview was: “Would you like to do all your mathematics lessons using the IWB? Can you explain why?”

While 2 of the students answered this question as no, 9 said yes. 5 students stated that they may do some of the lessons, some parts of the lessons, or other lessons (e.g. geometry, geography) using the IWB. Those students think that: “Not in all the mathematics lessons but in lessons like geometry where drawings are necessary. It can be used in mathematics where drawings are used.” (Student 12, Male)

When the answers to the question “What was the thing you liked most about the IWB? Why?” were grouped, features of the IWB like its speed, ease of opening an empty page, lack of chalk dust, ease of returning to the subject, the properties of the marker, increase in visuals, the use of animations on the board interactively, the properties of the eraser, the ability to save the things done and the simplicity of drawing were identified. Students liked the feature of being able to go back to the subject whenever they wanted most.

Another question asked in the interview was that “What effects does the IWB have on the lesson and the students? Can you explain?”

It was seen that students have the opinion that the use of the IWB speeded up the lesson and made it more fluid. From the findings of the interviews, it was determined that students’ curiosity about the board made them more interested in the lesson. It was also found that the IWB helped students focus and learn easily. Besides these, when student interviews were examined, it was identified that the IWB was seen as a device which increased students’ attention. This finding is in harmony with Shenton and Pagett’s (2007) study where students commented on the IWB as ‘exciting, entertaining, like magic’.

In order to find results that teachers who will use the IWB can pay attention while doing their lesson, we wanted to determine the features of the board students don’t like or are not comfortable with. To achieve this, students were asked “Are there any features of the IWB that you don’t like? If yes, what are they?”. 8 students stated that there weren’t any features they didn’t like about the board. On the other hand, the other 8 students ordered the features they didn’t like about the board as the screen’s freezing, difficulty in writing and seeing the writing on the board late, the writing being very big, the untidiness of the lesson, the fast pace of the lesson and the shadow of the person on the board.

4. Discussion

When the answers students gave to ASTIWMC were examined, it was remarkable to see that at least 23,3 % of the students were undecided in each item of the scale. Because students were not familiar with the use of the IWB, they were non-committal about the questions in the interview. Students had never used the IWB in any of their
lessons. On the other hand, in the research, the IWB was used in 3 of the 4 mathematics lessons in 5 weeks. Because students were introduced to the IWB for the first time, they had difficulty in adapting to this new technology and might have found the usage quite intensive during these weeks. For this reason, it is thought that students might have had difficulty in comparing the classic board and the IWB and that this might have prevented them from having clear ideas about this technology.

The impression we got from the interviews in the research was that most of the time students couldn’t differentiate between the features of the IWB and the materials the researcher prepared. Students thought that the visuals and animations in the material were the advantages of the IWB. This situation made us think that students hadn’t been exposed to similar presentations in their math lessons before. In addition to this, it was understood that projector was rarely used in the lessons and when it was used, different materials like animations were not applied.

Another interesting finding is that 4 students whose 1st term math lesson pass grades were 1 stated that their interest towards mathematics increased with the use of the IWB. There were 7 students who thought that their interest towards math didn’t raise and among them there weren’t any students whose pass grades were 1. As Wall, Higgins and Smith (2005) mentioned in their study, it can be said that the IWB is effective in increasing students’ interests whose success rates in mathematics were low. Other studies also indicate that the IWB increased students’ interest and motivation (Schut, 2007; Shenton & Pagett, 2007; Reaume, 2006; Glover & Miller, 2001).

More than half of the students stated that they would like to do all their math lessons using the IWB. The reason for this was that the IWB provided the advantage of solving more questions, saving time and providing visuals. In the study, students liked going back to the subject when they wanted most. Another thing they liked about the board was the use of different colors. This opinion was also in harmony with 12 % of the students’ opinions Wall and others (2005) interviewed.

Students generally think that the use of the IWB speeded up the pace of the lesson and made it fluid. The curiosity about the board increased students’ interest in the lesson. Moreover, students stated that the teacher could use the time she/he spent on cleaning the board or writing on the board for carrying out teaching more effectively.

In the face to face interviews, writing was found to be the first feature students didn’t like about the IWB. Students said that it was difficult to write on the IWB, the writing appeared late after it had been written, and big letters made them uncomfortable. According to some students the fast pace of the lesson where the IWB was used created a negative situation. A few students articulated that the lesson was not going in a logical order and the person on the board couldn’t see the board because of his/her shadow. When the relevant literature was examined, similar problems were indicated in the studies related to this field (Glover &Miller, 2001; Schut, 2007; Wall et al., 2005).

Doing the study in the school’s laboratory caused the students to be located in an unfamiliar class atmosphere. It is thought that the U-type sitting plan might be the reason for some of the problems. Lessons’ being covered by someone that students met for the first time, in this case the reasearcher, might have also affected the study.

5. Conclusion and Recommendation

The result we reached through our findings are parallel with the results in Beauchamp and Kennewell’s (2008) study. The use of the IWB increased students’ interest and motivation and drew their attention. Students’ attitudes towards the use of the IWB were at a medium level and this can be interpreted as positive as they were introduced with this new technology for the first time. Like the other technological devices, the IWB is not a device that should be used in the whole of the lesson or in all lessons. We think that it would be wrong not to use the classic board. For this reason, the IWB should be included in lessons where the results of its usage will be positive. The physical conditions in the schools should be appropriate for the use of the IWB. The problems in using the IWB should be taken into consideration by both the teachers and the producers and necessary precautions should be taken.

In the data collected in the interviews with the students who were introduced to the IWB for the first time in this study, the effects of so-called factor can be seen. Different results can be found out in a similar research done on students who are familiar with the use of the IWB. In future studies, we recommend that the duration for using the IWB should be longer. Analysis which will be done with the data collected after students get familiar with the use of the IWB is necessary in the field.
References


