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ELEMENTARY SCHOOL 6TH GRADE STUDENTS' ATTITUDES TOWARDS TECHNOLOGY AND THEIR OPINIONS ABOUT TEACHING SCIENCE AND TECHNOLOGY COURSE THROUGH INTERACTIVE WHITEBOARD

Ramazan Demir
Gazi University, Gazi Faculty of Education
Department of Science Education, Ankara
ramazandemir70@hotmail.com

Nurhan Öztürk
Gazi University, Gazi Faculty of Education
Department of Science Education, Ankara
nurhanozturk41@hotmail.com

İlbilge Dökme
Gazi University
Gazi Faculty of Education
Department of Science Education, Ankara
ilbilgedokme@gazi.edu.tr

Abstract

The purpose of the present study is to determine elementary school 6th grade students' attitudes towards technology and their opinions about teaching science and technology course through interactive whiteboard (IWB). Technology attitude scale developed by Yurdugül and Aşkar was used to determine students' attitudes towards technology and an interview protocol including one open-ended question was used to elicit students' opinions about teaching science and technology course through IWB. According to findings of the study, while there is no significant relationship between the gender variable and their attitudes towards technology, there is a significant difference favoring the male students in relation to tendency towards technology and technology for everyone, and a significant difference favoring the female students in relation to negative aspects of technology. Moreover, the students stated that they learn the topics better when IWB is used in teaching science and technology course, they feel more motivated and visualizations help them to understand better.

Key Words: Attitude towards technology, Interactive Whiteboard, Science and technology course.

INTRODUCTION

In today's world, education and technology have become subjects that can not be considered separately from each other (Simon, 1983; McCannon & Crews, 2000; Komis, Ergazakia & Zogzaa, 2007). The scope of technology embraces all the societal and economic activities and organizations which are necessary to adapt technical information to daily life. By its broad definition, technology means implementing scientific principles and innovations to find solutions to the problems and to make life easier. At the same time, it changes the relationships among the areas of information and contributes to the increase of information (Goetsch, 1984; Middlehurst, 1999; Williams & Kingham, 2003).

Educational technology deals with the provision of relevant equipment and materials for teachers to make appropriate use of as part of their teaching methods (Ertürk, 1972). According to Collier, Paula & Goff (1971), educational technology is employed in the processes of education administration; it also encompasses environmental organization or the design of the teaching environment for detecting student behaviors the determining of certain educational situations and gaining in experiences (Alkan, 1998). Of late, educational

technologies have been defined as the recent developments in educational instruments (Baek, Jung & Kim, 2006) and other new electronic technologies (Nilson & Purao, 2005; Roblyer, 2006).

IWBs, occasionally called as electronic whiteboards or smart-boards, have taken researchers and instructional institutes' attention, especially for the last decade. There are a variety of IWBs that are utilized in instructional settings, most of which are small apparatuses mounted to a traditional whiteboard with the connection of a computer and a projector. IWBs with the support of the IWB software enable following features: Highlighting, screen-shade, spotlight, annotation, capturing, record, handwriting recognition (OCR), zooming, screen sharing over network, and so on. IWBs have been performed in several disciplines and regarded as having potential to facilitate instruction owing to numerous advantages including easy-to-use, interactivity, adaptability to various environments, and usability with most of instructional methods and techniques successfully (Cuthell, 2003; Smith, Higgins, Wall & Miller, 2005; Moss, Jewitt, Levaãiç, Armstrong, Cardini, Castle, Allen, Jenkins, Hancock & High, 2007). By virtue of all those benefits of IWBs, it enhances various crucial indicators including learners' interaction, achievement, active participation, attention, and motivation in a positive manner (Beauchamp & Parkinson, 2005; Becta, 2006; Glover, Miller, Averis, & Door, 2007).

As a consequence, most countries have paid special attention to generalize the IWB use in school settings (Ashfield & Wood, 2008; Türel, 2010). In this respect, it is of great importance to determine the students' attitudes towards technology and their opinions about the use of IWBs in teaching science and technology course. As there is a paucity of research on the use of IWBs in Turkey, the present study is believed to make a great contribution to the effectiveness of IWBs on teaching science and technology course.

METHOD

Study Model

In the present study, mixed method was used to collect data. In this way, the method diversification was realized; this made it possible to use more than one method and technique to seek an answer to the research question (Yıldırım & Şimşek, 2005). Hence, qualitative and quantitative methods were used together in the present study.

Universe and Sampling

The universe of the study consists of 6th grade students in Turkey in 2010-2011 school year. The sampling of the study, on the other hand, consists of 110 6th grade students attending Private Diltaş Elementary School in the city of Konya. 46.36% of the students are female and %53.64 are male.

Data Collection Tools

The data in the study were collected in two stages. In the first stage; "attitude towards technology scale" developed by Yurdugül and Aşkar (2008) was used to collect data about the students' attitudes towards technology. The factor analysis of the scale revealed that the students' attitudes towards technology consist of four sub-dimensions. For the whole scale, cronbach-alfa coefficient was found to be 0.79. In the second stage, an interview protocol including one-open ended question was used to elicit the students' opinions about the science and technology course taught by means of IWB.

Data Analysis

In the analysis of the quantitative data, SPSS 15 program package was used. The data obtained from the attitude scale were entered into SPSS package program. Then, means for the students' general attitudes towards technology and means for the sub-dimensions were calculated and independent-samples t-test was used to investigate whether the students' attitudes vary depending on the gender variable.

In the analysis of the qualitative data, descriptive analysis technique was used. While using descriptive analysis technique, the students opinions elicited through interviews were directly used. NVivo 8 program was used to analyze the data obtained from the students' responses to the interview question. Based on the question, the students responses were classified under certain headings and students' sentences/words concerning the use

of IWB in science and technology course were coded in relation to relevant themes. The findings obtained are presented together with direct quotations from the students' statements.

RESULT AND DISCUSSION

1. The students' attitudes towards technology in relation to gender variable;

Table 1. There are independent-sample t-test results for the students' gender-related attitude scores.

Table 1: The students' attitudes towards technology

Gender	N	$\overline{X}$	s.s.	t	p
Female	51	3.213	0.288	1.124	.264
Male	59	3.279	0.325		

As can be seen in Table 1, there is no gender-based significant difference between the attitude scores of the students (P>.05). This result shows that the students' attitudes towards technology do not vary significantly depending on the gender variable. The female students' attitude mean score is $\overline{X}$=3.213, and the male students' attitude mean score is $\overline{X}$=3.279. This finding concurs with that of Volman, Eck, Heemskerk & Kuiper (2005).

However, Frantom, Green & Hoffman (2002) reported that there is a gender-based significant difference between the elementary and secondary school students' attitudes towards technology.

2. The students' attitudes towards technological tendencies in relation to gender variable;

Table 2. There are independent-samples t-test results for the students' attitudes towards technological tendencies in relation to gender variable.

Table 2: The students' attitudes towards technological tendencies

Gender	N	$\overline{X}$	s.s.	t	p
Female	51	3.524	0,0845	2,290	.024
Male	59	3,798	0,0839		

As can be seen in Table 2, according to the results of independent-samples t-test analysis, the students tendencies towards technology vary significantly depending on the gender variable (p<.05). This difference favors the male students.

However, when the means of male and female students were examined, it was seen that their means are close to each other. Hence, the students' tendencies towards technology were deeply investigated and they were asked the question "Why technology?" Some of the students stated that the professions they want to have are related to technology, others stated that many jobs in today's world require technological information. Some of the students' excerpts are given below:

"I want to be a good civil engineer in the future. I think it is necessary to know how to use technology in order to be a good career in this filed."

"Though I do not view the penetration of technology into every field of life positively, I believe it is necessary to have a good job. Hence, I think I have to master technology."

3. The students' gender-based attitudes towards the negative sides of technology;

In Table 3, the independent-samples t-test results obtained from the comparison of students' scores for the negative sides of technology in relation to gender variable are presented.

Table 3: The students' attitudes towards the negative sides of technology

Gender	N	$\overline{X}$	s.s.	t	p
Female	51	2.036	0,0891	3,531	.001
Male	59	1,639	0,0696		

As can be seen in Table 3, there is a significant gender-based difference between the students' attitudes towards the negative sides of technology (p<.05). This difference favors the female students.

Though the female students' scores for tendencies towards technology were found to be higher, their mean score for the negative sides of technology was found to be lower. In order to find out the cause of this, the female students were asked this question "Why do you think technology leads to negative results?" The students stated that the professions they want to have are not much related to technology, but technology is necessary in every part of the life. Some of the students' excerpts are given below:

"I want to be a teacher. But I do not want to be a teacher who just reads the subjects from the textbooks rather I want to be a teacher who is good at using technology when necessary. On the other hand, relaying on only technology for teaching can be really boring because I think the teacher is someone who loves his/her students and shows his/her compassion to students."

"In my opinion, excessive use of technology results in many unemployed people because only one person can do the work which should be done by two or three people with the help of technology so one or two people become redundant."

4. The students' attitudes towards the importance and contribution of technology in relation to gender variable;

In Table 4, the independent-samples t-test results obtained from the comparison of the students' attitudes towards the importance and contribution of technology in relation to gender variable are presented.

Table 4: The students' attitudes towards the importance and contribution of technology

Gender	N	$\overline{X}$	s.s.	t	p
Female	51	4,039	0,1027	1,105	.272
Male	59	4,178	0,0780		

As can be seen in Table 4, no gender-based significant difference was found between the students' attitudes towards the importance and contribution of technology (P>.05). This indicates that gender does not significant affect the students' attitudes towards the importance and contribution of technology. The mean score of the female students for the importance and contribution of technology is $\overline{X}$=4,039, and for male students, it is $\overline{X}$=4.178.

5. The students' gender-based attitudes towards technology for everyone;

In Table 5, the independent-samples t-test results obtained from the comparison of attitude scores for technology for everyone in relation to gender are presented.

Table 5: The students' attitudes towards technology for everyone

Gender	N	$\overline{X}$	s.s.	t	p
Female	51	3,483	0,138	2,518	.013
Male	59	3,926	0,111		

As can be seen in Table 5, a gender-based significant difference was found between the students attitudes towards technology for everyone (p<.05). This difference favors the male students.

6. The students' opinions about the use of IWB in teaching science and technology course;
In Table 6, the students' opinions about the use of IWB in science and technology course are presented.

Table 6: The students' positive opinions about the use of IWB in science and technology course

	Female		Male		Total	
	f	%	f	%	f	%
It enables students to solve more problems	2	4.65	5	11.63	7	8.14
It motivates us more	10	23.26	9	20.93	19	22.09
It makes learning fun	4	9.3	3	6.98	7	8.14
It facilitates going back to the previous topics	4	9.3	5	11.63	9	10.47
It allows us to do the activities more easily	4	9.3	3	6.98	7	8.14
It enables us to learn the topics better	10	23.26	10	23.26	20	23.26
It enables us to learn in a shorter time	3	6.98	2	4.65	5	5.81
It helps us to visualize the subjects	6	13.95	6	13.95	12	13.95

When the students' opinions about the use of IWB in science and technology course were examined in relation to gender variable, it was found that 23.26% of the female students think that it is more motivating and facilitates the learning of topics, 13.95% think that it helps them visualize the topics. On the other hand, 23.26% of the male students reported that they learn the topics better, 20.93% found it more motivating and 13.95% think that it helps them to visualize the topics. Tataroğlu & Erdoğan (2010) investigated the students' attitudes towards the use of IWB in mathematics courses and found that at first the students have positive attitudes. The 16 students selected among the students were taught how to use IWB and then they were interviewed again and this subsequent interview revealed that 9 of the students reported positive opinions and their motivation increased. Similar finding was reported by Kennewell & Beauchamp (2008).

When the students responses were generally examined, it was found that 23.26% of the students think that it helped them to learn the subjects better, 22.09% think it enhanced their motivation, 13.95% it helped them to visualize the subjects. From the statements of the students it seems to be clear that the use of IWB helped them to understand the subjects better, motivated them better and visualized the subjects. Some students' excerpts are given below:

"Using IWB to teach biological subjects in science and technology course helped to feel more motivated for the lesson, to understand the topics better and to enhance my interest because the teachers teach the topics by using pictures and videos. If there is any point which has not been understood, they explain it on pictures easily".

Türel & Demirci (2010) investigated the use of IWB in general and concluded that it is important for teaching methods and techniques. Coyle, Yañez & Verdú, (2010) reported that IWB increases students' interests in lessons. The findings of the present study concur with the findings of these studies.

CONCLUSION AND SUGGESTION

Together with the rapid advancement of technology, the need for technology increases. As a result of wider use of technological tools and devices in the field of education, it seems to be important to determine the students' opinions about and attitudes towards technological devices (Akpınar, Aktamış & Ergin, 2005; Frantom, Green & Hoffman, 2002; Becker & Maunsaiyat, 2002; Tsai, Lin & Tsai, 2001; McCoy, Heafner, Burdick & Nagle, 2001; Gunter, Gunter & Wiens, 1998). In this respect, educational technologies have an important place in improving the quality of teaching-learning. Hence, it is important to know students' attitudes towards

educational technologies. The present study revealed that the students have positive attitudes towards technology and the use of IWBs in science and technology course.

Hence, it can be suggested that teaching science and technology course and other courses should be performed through IWB.

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