The Eurasia Proceedings of
Educational & Social Sciences (EPESS)
ISSN: 2587-1730

The Eurasia Proceedings of Educational & Social Sciences (EPESS), 2018

Volume 9, Pages 143-150

ICEMST 2018: International Conference on Education in Mathematics, Science and Technology

The Effect of Using SMART Board to the 7th Grade Students' Achievement and Recognition Level in Human and Environment Unit

Samet KAYNAK
Aşağıhadim Ahmet Yavuz Ortaokulu

Ayvaz UNAL
Necmettin Erbakan University

Abstract: In this study, the effect of SMART Board usage in the 7th grade Human and Environmental unit was investigated on the academic achievement of the students and their recall levels. For research; two middle schools were used in Konya province Hadim District. One of the schools was chosen as the control group and the other was chosen as the experimental group. The Unit Achievement Test was used as data collection tools. For 4 weeks, the students in the control group processed the Human and Environmental unit according to the traditional methods while the students in the experimental group were processed using the same unit smart board activities. The obtained data were analyzed with SPSS 22 statistical package program and t-test was used in the evaluation of the obtained data. In this study comprised of quantitative data on the results of the analysis of the data obtained in academic achievement between the experimental group and the control group, the experimental group in favor of the students it was identified as statistically significant difference. Furthermore, according to the results of the application recall test, the recall rate of the students in the experimental group is higher than the students in the control group. In the data obtained in this study; to the 7th grade students of the junior high school, the use of SMART Board in the teaching of the Human and Environmental unit has achieved academic success and easier to remember learned information.

Keywords: Human and environment, Smart board, Level of recall, Science teaching

Introduction

Today, societies need individuals who have lifelong learning skills, in other words they can continuously renew their knowledge, adapt to change, follow developments, become informed conscious consumers, and produce information. What is expected from educational institutions that are responsible for educating individuals in accordance with the human motives needed by society is to educate individuals who are equipped with knowledge skills (who can access, use, transmit and produce information), who can use technology and learn to learn to oneself (who has learned to learn) (Akkoyunlu and Kurbanoğlu, 2003).

It can be said that the developments of the countries we are in can be measured by education level and knowledge, not by material situation. Because the knowledge gained by education to individuals is expected to turn into economic gain and progress in a very short time (Danaoğlu, 2009). Human beings are entering the race to develop technologies and use the technologies they have developed since the moment they came into the world. Countries that follow technology closely and are open to technological developments have a more advantageous position than other countries. As a result, many countries try to integrate the technologies they develop into education, which is the architect of the future. During this integration, some technologies were found to be efficient and others were not (Wood and Ashfield, 2008).

There is a direct relationship between progress in the field of Science and the development of a country. Therefore, science education is of great importance for the country's future. It is thought that success will be improved with education and training that takes the student to the center. One of the best ways to improve success is to plan educational systems that will bring the student to the centre of the process (İnal, 2014).

One of the efficient ways to achieve the gains in science course is to give the necessary importance to experiments and projects in the courses (Karaduman, 2008). As some of the experiments at secondary school level can be done in a laboratory environment, students do not know laboratory rules and tools to use and teachers do not allow students to perform the experiment during the experiment, students do not fully establish the connections between concepts and the realization of the order of the results is low (Başdaş, Kirişçioğlu and Oluk, 2006). It is thought that computer-aided education is an efficient and impressive way for students to create links between the subjects and concepts they have difficulty understanding (Çömek, 2003). One of the most foremost of these educational technologies is the so-called interactive whiteboard, smart board or electronic board, which has increased its use in recent years (Becta, 2004; Kennewell, 2006).

SMART Board helps students discover new information by enabling interactive activities, and it increases students ' attention, interest and motivation to lesson and topic, as it allows students to create different activities according to their age, learning styles and other characteristics (Kennewel, 2006; Shenton and Pagett, 2007). Using SMART Board makes it easier for students to learn abstract concepts; by recording all the activities during the lesson, it enables them to be reused in the future, to share these activities with others and thus to allow the teacher to easily access the work of the teacher at any time (Adıgüzel, Gürbulak and Sarıçayır, 2011). In addition, the use of SMART Board allows teachers to move the course more smoothly by giving them the chance to intervene quickly and in time during the course and allows teachers to easily and diversify measurement and evaluation activities at the beginning, within, and at the end of the course (Adıgüzel et al., 2011).

Wall, Higgins, Smith and Miller (2005) evaluated the potential impact of smart boards in their assessment of the literature is positive and very strongly about, but asserts that as their priority are based on teacher and student feedback. When we look at the studies in this field in Turkey (Öztan, 2012), the use of SMART Board has shown the effect of the students ' academic achievements. In addition, (Özenç and Özmen, 2014) showed the effect of SMART Board use on students ' success and attitudes in their study.

SMART Board is a useful presentation tool that teachers can access at one touch of resources that can be used to replace traditional and modern classroom resources (such as blackboard, whiteboard, overhead, maps, pictures, number validations, books, calculators and cassette and video players), which will take years to accumulate and will have a huge wardrobe to store them (Becta, 2006).

SMART Board should be used with all potential if it is desired to be effective in teaching and learning. The teacher must adapt this tool to the approach he uses, and learn how to use the possibilities offered by the SMART Board in the learning interaction. New tools provide the opportunity to create new types of activities, but these new types are created by users as users develop skills to use new tools, not by themselves (Lewin, Somekh and Steadman, 2008).

Research Problem

What is the impact of SMART Board applications on students ' achievement and recall levels in science lesson?

Sub-Problems

Answer to the following sub-problems related to the problem sentence of the research:

1. Do the success scores of the experimental and control groups in the human and environment unit differ in the pre-test?
2. Does the success scores of the control group in the human and environment unit differ in the pre-test and post-test?
3. Does the success scores of the experimental group in the human and environment unit differ in the pre-test and post-test?
4. Do the success scores of the experimental and control groups in the human and environment unit differ in the post-test?
5. Do the success scores of the experimental and control groups in the human and environmental unit differ in the recall test?

Hypotheses

The hypotheses used in this research are expressed for the answer of the research problem and its sub-problems.

1. There is no significant correlation between the pre-test scores of the experimental and control groups in the human and environment unit.
2. There is a significant correlation between pre-test and post-test scores in the control group in human and environmental units.
3. There is a significant correlation between the pre-test and post-test scores of the experimental group in the human and environment unit.
4. There is a significant correlation between the post-test scores of the experimental and control groups in the human and environment unit.
5. There is a significant correlation between the recall test scores of the experimental and control groups in the human and environment unit.

Method

In this study, the effect of SMART Board use on students ' success and recall levels in human and environmental units was investigated. Quasi-experimental design was used in the study. The research consists of 42 students studying in the seventh grade of two secondary schools affiliated to MEB in Hadim District of Konya Province.

Table 1. Number of students in groups

Group	Male	Female	N
Experimental	12	9	21
Control	10	11	21
Total	22	20	42

In the research, The Unit Achievement Test developed by Yücel (2013) was used. The average item discrimination factor (rjx) is approximately 0.49; the average item difficulty (Pj) is approximately 0.59, KR 20 reliability coefficient is 0.82.

“Human and Environment” unit topics were lectured in both groups for 4 weeks. The subjects were explained to both groups by the researcher. In this way, individual differences in teaching skills of the teacher were eliminated and the teaching was made more effective. The subjects were explained to the experimental group using SMART Board. The control group was told by using the experiments and activities in the textbook according to the Science Curriculum.

The Unit Achievement Test was applied to the experiment and control group as both pre-test and post-test. For the analysis of The Unit Achievement Test consisting of 27 questions, the correct number of students was determined. Then, each correct answer is evaluated as 3.7 points and each student's score is calculated. The lowest score is 0 and the highest score is 100. In addition to the evaluation of the total scores of students, the correct answer numbers on the subjects of ecosystem, biodiversity and environmental problems which constitute the contents of The Unit Achievement Test were also evaluated. Data obtained from the study were analyzed by SPSS 22 statistical program. The level of significance was determined as 0.05.

Before starting the study, “independent t-test” was used to compare two independent groups, whether there was a significant correlation between the experimental group and control group’s test results of the unit achievement test applied to both group. The Control and Experimental Group's Unit Achievement Test was determined by applying the "dependent t-test" used to compare two measurements from a single group to determine whether there is a significant relationship between pre-test and post-test results. The "independent t-test" was used to compare two independent groups to determine whether there was a significant correlation between the post-test results applied to the experimental and control groups.

Findings

Hypothesis 1: There is no significant correlation between the pre-test scores of the experimental and control groups in the human and environment unit.

After the analysis of the pre-test results applied to the control and experimental groups, pre-test scores, standard deviations (SD), degree of freedom (df) and p values were given in Table 2. In the multiple-choice unit achievement test of 27 questions applied as a pre-test, the average score of each group is close to each other ($\overline{X}_{control}$=22, 72; $\overline{X}_{experimental}$=25, 19).

Table 2. Unit achievement test control and experimental groups pre-test data

Group	N	$\overline{X}$	SD	df	t	p
Experimental group pre-test	21	25,19	8,64	40	1,01	,314
Control group pre-test	21	22,72	6,95			

There was no significant difference between groups (t=1.01, p=.314; p>0.05). This result shows that pre-application human and environmental units are close to each other between SMART Board usage and the experimental group and the control group where the same subject is handled with the Science Curriculum. As a result, it is observed that academic achievements in both groups are close to each other and their knowledge and experience are similar. According to this, the scores of both groups ($\overline{X}_{control}$=22, 72; $\overline{X}_{experimental}$=25, 19) are close to each other and it can be said that the aim of the study is appropriate because there is no significant difference between them. Hypothesis 1 accepted.

Hypothesis 2: There is a significant correlation between pre-test and post-test scores in the control group in human and environmental units.

After the analysis of pre-test and post-test scores applied to the control group, the mean scores, standard deviations (SD), degree of freedom (df) and p value were given in Table 3. The mean of pre-test scores of the control group students was $\overline{X}_{control}$=25, 19; the post-test scores were $\overline{X}_{control}$=39, 81.

Table 3: Unit Achievement Test Control Group Pre-test and Post-test Data

Group	N	$\overline{X}$	SD	df	t	p
Control group pre-test	21	25,19	8,64	20	4,80	,000
Control group post-test	21	39,81	17,11			

There was a significant difference between the control group pre-test and the post-test (t=4, 80, p=, 000; p<, 05). According to these results, there is a significant difference in the control group after the application compared to the application before the application. As a result, we can say that learning takes place in any environment. It can be said that the implementation of the Science Curriculum in the teaching of the "Human and Environment" unit has a positive impact on academic success. Hypothesis 2 accepted.

Hypothesis 3: There is a significant correlation between the pre-test and post-test scores of the experimental group in the human and environment unit.

After the analysis of pre-test and post-test scores applied to the control group, the mean scores, standard deviations (SD), degree of freedom (df) and p value values were given in Table 4. Students in the experimental group pre-test average score on the $\overline{X}_{experimental}$=25, 19; post-test average score on the $\overline{X}_{experimental}$=56, 25 as were found.

Table 4. Unit achievement test experimental group pre-test and post-test data

Group	N	$\overline{X}$	SD	df	t	p
Experimental group pre-test	21	25,19	6,95	20	7,25	,000
Experimental group post-test	21	56,25	17,11			

Unit achievement test in the experimental group pre-test and post-test dependent groups t-test" according to the results there was a significant difference (t=7.25, p=, 000; p<, 05). According to these results, there is a significant difference in the experimental group after the application compared to the application. Based on this result, it can be said that the use of SMART Board in the teaching of the "Human and Environment" unit increases the academic success of the students in the experimental group. Hypothesis 3 accepted.

Hypothesis 4: There is a significant correlation between the post-test scores of the experimental and control groups in the human and environment unit.

Unit Achievement Test are applied to the experimental and control groups post-test scores of "independent groups t-test after analysis, the mean score, standard deviations (SD), degree of freedom (df), and p value are given in Table 5.

Table 5. Unit achievement test control and experimental groups post-test data

Group	N	$\overline{X}$	SD	df	t	p
Control group post-test	21	39,81	17,11	40	3,23	,002
Experimental group post-test	21	56,25	15,76			

The Unit Achievement Test, which was applied as a pre-test before the students learned the subject, was applied as a post-test to both the control group and the experimental group after the application. Students in the control group post-test average score of $\overline{X}_{control}$ =39, 81; students in the experimental group post-test average score on the $\overline{X}_{experimental}$ =56,25as were found. There was a statistically significant difference between the scores of the two groups (t=3.23, p=0.012; p<0.05).

After the application, the lowest score of the test group students obtained from the unit success test was 33.2 out of 100 and the control group students were 14.8 out of 100. The highest score was 96.2 in the experimental group and 74 in the control group. The majority of test group students (90.3%), 41 and above, while the number of students in the control group (42.7%) remained around (Table 6).

Table 6. Unit achievement test control and experimental groups post-test score distributions

Control Group (N=21)					Experimental Group (N=21)				
X min	X max.	Points Ranges	N	Percent	X min	X max.	Points Ranges	N	Percent
14,8	74	0–20	2	9,5	33,3	96,2	0–20	0	0
		21–40	10	47,6			21–40	2	9,5
		41–60	6	28,5			41–60	14	66,6
		61–80	3	14,2			61–80	3	14,2
		81–100	0	0			81–100	2	9,5

Approximately 39% of students in the control group answered these questions correctly, while 56% of the students in the experimental group answered correctly the questions in the Unit Achievement Test post-test. Questions about the ecosystem in the experimental group of students, approximately 64%, of the students in the control group, approximately 41%; questions about the biological diversity of the students in the experimental group, approximately 53%, control group students approximately 36% in the experimental group and the environmental issues questions about students with approximately 50% of control group students and nearly

40% gave the correct answer. Accordingly, it is seen that the students in the experimental group showed better results in the Unit Achievement Test.

Hypothesis 5: There is a significant correlation between the recall test scores of the experimental and control groups in the human and environment unit.

After the analysis of "independent groups t-test", the mean scores, standard deviations (SD), degree of freedom (df) and the p value were given in Table 7.

Table 7. Unit achievement test control and experimental groups recall test data

Group	N	$\overline{X}$	SD	df	t	p
Control group recall test	21	37,35	16,41	40	3,43	,001
Experimental group recall test	21	54,09	15,09			

The mean of the recall test scores of the students in the control group is $\overline{X}_{\text{recall test}}$ =37, 35; the average of the recall test scores of the students in the experimental group was found to be $\overline{X}_{\text{recall test}}$ =54, 09. There is a statistically significant difference between the two groups' average scores (t = 3, 43, p =, 001; p <, 05). It is understood from this that learning the information in the experimental group using SMART Board has become more permanent compared to the science and Technology teaching program applied to the control group. According to this data, hypothesis 5 was accepted.

The mean of pre-test, post-test and recall tests of both groups are shown in Table 8 and Figure 1.

Table 8: Pre-test, post-test and recall test data of experimental and control groups

Group	Pre-test	Post-test	Recall Test
Control Group	22,72	39,81	37,35
Experimental Group	25,19	56,25	54,09

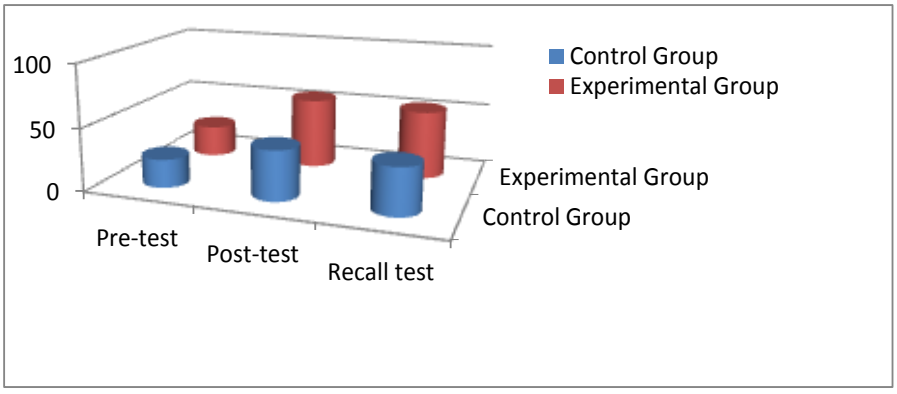

Figure 1. Pre-test, post-test and recall test data of experimental and control groups

Table 8 and Figure 1 shows that learning takes place in every environment, but the average scores in both the final-test and the recall test are much higher than the control group. This clearly demonstrates the purpose of our research. Because SMART Board applications were applied to the experimental group. These activities have increased students ' academic achievement in the "human and environment" unit and have made it easier to remember and remain informed.

Conclusion and Discussion

The unit achievement test was applied to measure students ' academic achievement. The courses were carried out by the researcher in both groups. Before starting the study, a pre-test was applied to measure the pre-test

results of both groups, and after the end of the application, the same test was applied as a final test and 3 weeks after the test was applied as a recall test.

In order to determine the cognitive development of the students, firstly the difference between the pre-test scores and the post-test scores of the students of the control group and the pre-test scores and the post-test scores of the students of the experimental group were evaluated. As expected from every student within a specific teaching process, there was a significant difference between the pre-test and post-test scores of the students in the control group, both using SMART Board and the experimental group, as well as in the current program, and the cognitive development of the students.

In the analysis performed, it was determined that both experimental and control group students had an increase in unit success scores, but the increase in the scores in the experimental group students was higher. It was determined that the scores of the students in the experimental group were significantly higher when The Unit Achievement Test post-test scores of the students in the experimental and control groups were compared. This situation is also evident in the scores distribution of the students of the experimental and control group. The highest score in the experimental group was 96.2 out of 100 and 81.4 out of the control group. While the students in the experimental group score between 61-80 (14.2%) and 81-100 (9.5%), the majority of the students in the control group score between 21-40 (47.6%) and 41-60 (28.5%). These results show that supporting teaching with SMART Board activities increases students ' academic achievement.

When the recall test results were examined, it was found that the information learned in both groups was not forgotten. However, the fact that the scores were higher in the experimental group compared to the control group shows that SMART Board use contributes to learning in science lesson and makes it easier to remember information.

According to the results obtained from the research, SMART Board in science teaching has a positive impact on students ' academic achievement. This is consistent with the literature data. Aktaş (2015) found the academic success of the teaching supported by SMART Board and the permanency of the information in the science lesson of the students. In addition, in the studies conducted in the country Önder (2015), Dikmen (2015), Türkoğlu (2014), Tercan (2012) and Öztan (2012), SMART Board has determined the positive impact of academic success.

Another of the objectives of this research is that the use of SMART Board has an effect on students' recall level of knowledge. When the results were examined at the end of the study, the level of recalling the students in the experimental group was higher than the other group. As a result, the use of SMART Board in the lecture of the lessons makes the learned information more permanent and easy to remember.

Notes

This study was produced from the master's thesis prepared by the first author under the guidance of the second author.

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Author Information

Samet Kaynak
Necmettin Erbakan University
Contact e-mail: *sametkaynak42@hotmail.com*

Ayvaz Unal
Necmettin Erbakan University