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The Effect of Using SMART Board to the 7th Grade Students' Attitudes toward the Environment in Human and Environment Unit

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Abstract: In this study, the effect of SMART Board usage in the 7th grade Human and Environmental unit was investigated on students' attitudes toward the environment. 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 Environmental Attitude Scale 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 Environmental Attitude Scale was applied as a pre-test to determine the students' attitudes toward the environment before the application started. After the application was completed, the same test was applied as a post-test to determine the students' attitudes towards the environment. The obtained data were analyzed with SPSS 22 statistical package program and t-test was used in the evaluation of the obtained data. As a result of the analysis of the post-test data of the Environmental Attitude Scale, although the score of the experimental group was higher than that of the control group, there was no statistically significant difference between the experimental group and the control group. Therefore, it has been found that the use of SMART Board has not been effective in improving students' attitudes towards the environment.

Keywords: Human and environment, Smart board, Environmental attitude, Science teaching

Introduction

In parallel with the information, the development of technology is advancing at a great rate and technological developments in every aspect of life are shown in a very clear way by everyone today. A newly emerging technology is constantly evolving and the new ones are emerging in a very short time. Competition among societies is determined by the level of use of these technologies with the new technologies that are produced today. Industry, agriculture, health, transportation, defense, education, etc. countries that use the most effective technologies in all areas of life, such as those of today, have the power. Therefore, it is very important to follow and use Information and Communication Technologies (ICT) in order to adapt the innovations brought by technology to life and to keep pace with the age.

Technological developments show its impact on all aspects of society. One of the areas where technological developments influence is undoubtedly the education sector. Education is an effective factor in the social, political and economic development of countries. At the same time, education is one of the most effective methods in directing, changing, formatting and developing people. Education and technology is one of the most important factors in determining individuals ' lives, political, social, economic and cultural levels among countries. In particular, the rapid development and change of technology in todays affect education; education naturally affects society (Özkul and Girginer, 2001).

It has been observed that the understanding of the impact of education on individuals and societies ' lifestyles and values, and the effect of rapidly developing technology on education in all nations, has started a movement towards developing a new educational system by integrating education with technology (Kaya, 2002, p.6).

Within the framework of this vision, education, which is open to development and innovation, can produce new information, combined with advances in IT technologies, has started to design a rich educational environment. In this respect, the use of IT technologies, which is an element that we can no longer give up in our age, is becoming widespread in many places in our daily lives (Birişçi and Karal, 2010).

Today, education systems need to educate individuals who are free, creative, scientific thinking, questioning events, who are aware of the problems, who have the ability to make decisions, who have the ability to produce information and who have the confidence of self-confidence instead of transferring information instead of educating individuals who are loaded with knowledge based on memorization using traditional teaching methods (Yavuz and Coşkun, 2008). In order to do this, the educational systems that have this duty must be able to renew, change and transform themselves. In order to realize this, innovations in Information and Communication Technologies need to be integrated into educational systems. Today, SMART Boards are one of the most important tools in the context of effective integration of education technologies into classroom environment.

The fact that the board screen has an interactive touch sensitive structure allows the student and teacher to intervene on the screen, make changes to what is done and record what is done. Audio clips, video and animation shows, colors, images, screen and magnification reduction, such as highlighting opportunities makes it possible to make lessons more visual and more vivid (Erduran and Tataroğlu, 2009). With SMART Board, teachers can enrich their teaching with a variety of teaching strategies and techniques, thereby increasing student involvement, motivation, participation and collaboration. Türel and Johnson (2012) stated that the real success of the SMART Board depends on the use of the teacher in learning environments.

Students will have an advanced thinking ability in effective use of technology. The course should be careful and prepared and should have a good technical support system for the efficiency of the learning process. For this, national research and development support should be. Software should be developed about the most effective and necessary use of technology. The state should create at least one center for these researches and allocate an appropriate budget (Hamdan, Al-Qirim and Asmar, 2012).

SMART Board used in the world since 1997 have been widely used in recent years in the scope of FATİH Project in our country. Studies on this subject have been conducted mostly for the success and attitude of the students in science class. In addition to this research, the effect of using SMART Board on students ' attitudes towards the environment will be investigated. Therefore, the research is the basis for subsequent studies.

Research Problem

What is the impact of SMART Board applications on students ' attitude towards the environment in science lesson?

Sub-problems

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

1. Do the environmental attitude scores of the experimental and control groups differ in the pre-test?
2. Do the environmental attitude scores of the control group differ from pre-test and post-test?
3. Do the environmental attitude scores of the experimental group differ from pre-test and post-test?
4. Do the environmental attitude scores of the experiment and control groups differ in the post-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 environmental attitude scores of the experimental and control groups in the pre-test.
2. There is no significant correlation between the environmental attitude scores of the control group in pre-test and post-test.
3. There is a significant correlation between the environmental attitude scores of the experimental group in the pre-test and the end-test.

4. There is a significant correlation between the environmental attitude scores of the experimental and control groups in the end-test.

Method

In this study, the effect of SMART Board use on students ' attitude toward the environment 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

The Environmental Attitude Scale developed by Yücel and Özkan (2014) was used in the study. The scale is of five point likert type and consists of two sub-dimensions. The first subscale includes 14 items and the attitude includes the "Behavior" dimension. “Never”, “rarely”, “occasionally”, “mostly” and “always” are scaled and scored as 1, 2, 3, 4, and 5 respectively. The second sub-scale includes the dimensions of the attitude “Idea”, “Feeling”, “Willingness to Proceed in Action” and consists of 21 items. The average of the responses to the environmental attitude scale was calculated for both the whole scale and for each dimension.

“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 Environmental Attitude Scale was applied to the experiment and control group as both pre-test and post-test. 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 Environmental Attitude Scale applied to both group. The Control and Experimental Group's Environmental Attitude Scale 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 environmental attitude scores of the experimental and control groups in the pre-test.

In the analysis of Environmental Attitude Scale (EAS) scores, the different parts of the test were analyzed among themselves because of the fact that the test consisted of two parts. Finally, the test was analyzed in general and the results were obtained. In the analysis of the tests, the average scores of the substances were used to facilitate analysis rather than the total scores of the substances.

Environmental Attitude Scale Behavior Dimension applied to control and experiment groups after analysis of pre-test results, pre-test score averages, standard deviations (SD), degree of freedom (df) and p values were given in Table 2. The environmental attitude test applied as a pre-test is close to each other in the behavior dimension ($\overline{X}_{control}$=3, 02; $\overline{X}_{experimental}$=2, 67).

Table 2. Environmental attitude scale behavior dimension control and experimental groups pre-test data

Group	N	$\overline{X}$	SD	df	t	p
Control group pre-test	21	3,02	0,54	40	1,83	,075
Experimental group pre-test	21	2,67	0,67			

As shown in Table 2, there is no significant difference between the groups (t = 1.83, p = .075, p>, 05). This result shows that the attitudes towards the environment before the study are close to each other in the behavioral dimension of the experiment group and the control group where the same subject is handled with Science Curriculum. According to this, the scores of both groups ($\overline{X}_{control}$=3, 02; $\overline{X}_{experimental}$=2, 67) are close to each other and since there is no significant difference between them, it can be said that the purpose of the research is appropriate.

Environmental Attitude Scale Idea, Feeling and Willingness to Proceed in Action Dimension applied to control and experiment groups after analysis of pre-test results, pre-test score averages, standard deviations (SD), degree of freedom (df) and p values were given in Table 3. The environmental attitude test applied as a pre-test is close to each other in the behavior dimension ($\overline{X}_{control}$=3, 60; $\overline{X}_{experimental}$=3, 57).

Table 3. Environmental attitude scale idea, feeling and willingness to proceed in action dimension control and experimental groups pre-test data

Group	N	$\overline{X}$	SD	df	t	p
Control group pre-test	21	3,60	0,53	40	,171	,865
Experimental group pre-test	21	3,57	0,60			

As shown in Table 3, there is no significant difference between the groups (t=, 171, p=, 865; p>, 05). This result shows that the attitudes towards the environment before the study are close to each other in the idea, feeling and willingness to proceed dimension of the experiment group and the control group where the same subject is handled with Science Curriculum. According to this, the scores of both groups ($\overline{X}_{control}$=3, 57; $\overline{X}_{experimental}$=3, 60) are close to each other and since there is no significant difference between them, it can be said that the purpose of the research is appropriate.

Environmental Attitude Scale applied to control and experiment groups after analysis of pre-test results, pre-test score averages, standard deviations (SD), degree of freedom (df) and p values were given in Table 4. The environmental attitude test applied as a pre-test is close to each other ($\overline{X}_{control}$=3, 36; $\overline{X}_{experimental}$=3, 21).

Table 4. Environmental attitude scale control and experimental groups pre-test data

Group	N	$\overline{X}$	SD	df	t	p
Control group pre-test	21	3,36	0,36	40	1,11	,273
Experimental group pre-test	21	3,21	0,50			

As shown in Table 4, there is no significant difference between the groups (t=1, 11, p=, 273; p>, 05). This result shows that the pre-study environmental attitudes between the experimental group and the control group are close to each other. According to this, the scores of both groups ($\overline{X}_{control}$=3, 36; $\overline{X}_{experimental}$=3, 21) are close to each other and since there is no significant difference between them, it can be said that the purpose of the research is appropriate.

It was observed from the analyses that the attitudes of the experimental group and control group towards the environment were not statistically different in the behavioral dimension and the idea, feeling and willingness to proceed dimension. This shows that the two groups are appropriate for the study. Hypothesis 1 accepted.

Hypothesis 2: There is no significant correlation between the environmental attitude scores of the control group in pre-test and post-test.

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 5. The mean of pre-test scores of the control group students was $\overline{X}_{control}$=3, 02; the post-test scores were $\overline{X}_{control}$=3, 40.

Table 5. Environmental attitude scale behavior dimension control group pre-test and post-test data

Group	N	$\overline{X}$	SD	df	t	p
Control group pre-test	21	3,02	0,54	20	2,23	,037
Control group post-test	21	3,40	0,58			

There was a significant difference between the control group pre-test and the post-test (t=2, 23, p=, 037; p<, 05). The results show that the students ' attitudes towards the environment increased in the behavior dimension at the end of the study of the science curriculum in the control group. It can be said that the science curriculum develops students ' attitudes towards the environment in a behavior dimension.

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 6. The mean of pre-test scores of the control group students was $\overline{X}_{control}$=3, 60; the post-test scores were $\overline{X}_{control}$=3, 92.

Table 6. Environmental attitude scale idea, feeling and willingness to proceed in action dimension control group pre-test and post-test data

Group	N	$\overline{X}$	SD	df	t	p
Control group pre-test	21	3,60	0,53	20	1,79	,088
Control group post-test	21	3,92	0,52			

There was a no significant difference between the control group pre-test and the post-test (t=1, 79 p=, 088; p>, 05). It is understood from these results that at the end of the implementation of the science curriculum in the control group, the attitudes of the students towards the environment did not create a statistically significant difference in the dimension of idea, feeling and willingness to proceed.

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 7. The mean of pre-test scores of the control group students was $\overline{X}_{control}$=3, 36; the post-test scores were $\overline{X}_{control}$=3, 71.

Table7. Environmental attitude scale control group pre-test and post-test data

Group	N	$\overline{X}$	SD	df	t	p
Control group pre-test	21	3,36	0,36	20	2,63	,016
Control group post-test	21	3,71	0,46			

As shown in Table 7, there is a significant difference between the groups (t = 2, 63, p =, 016; p <, 05). It is understood from these results that the Science Curriculum produced a statistically significant difference in the students' attitudes toward the environment at the end of the control group. According to these results, hypothesis 2 was rejected.

Hypothesis 3: There is a significant correlation between the environmental attitude scores of the experimental group in the pre-test and the end-test.

After the analysis of pre-test and post-test scores applied to the experimental group, the mean scores, standard deviations (SD), degree of freedom (df) and p value values were given in Table 8. Students in the experimental group pre-test average score on the $\overline{X}_{experimental}$=2, 67; post-test average score on the $\overline{X}_{experimental}$=3, 66 as were found.

Table 8. Environmental attitude scale behavior dimension experimental group pre-test and post-test data

Group	N	$\overline{X}$	SD	df	t	p
Experimental group pre-test	21	2,67	0,67	20	4,49	,000
Experimental group post-test	21	3,66	0,88			

As shown in Table 8, there is a significant difference between the groups (t = 4.49, p = .000, p <.05). It is understood from these results that the attitudes of the students towards the environment in the experimental group applied to SMART Board applications showed an increase in the behavior of the students. It can be said that SMART Board applications have improved students' attitudes toward the environment in dimension of behavior.

After the analysis of pre-test and post-test scores applied to the experimental group, the mean scores, standard deviations (SD), degree of freedom (df) and p value values were given in Table 9. Students in the experimental group pre-test average score on the $\overline{X}_{experimental}$=3, 57; post-test average score on the $\overline{X}_{experimental}$=4, 04 as were found.

Table 9. Environmental attitude scale idea, feeling and willingness to proceed in action dimension experimental group pre-test and post-test data

Group	N	$\overline{X}$	SD	df	t	p
Experimental group pre-test	21	3,57	0,60	20	2,66	,015
Experimental group post-test	21	4,04	0,62			

As shown in Table 9, there is a significant difference between the groups (t = 2, 66, p =, 015; p <, 05). It is understood from these results that there was a statistically significant difference in the dimension of the students ' attitudes towards the environment idea, feeling and willingness to proceed in action in the experimental group applied to SMART Board applications. It can be said that SMART Board applications have improved students' attitudes toward the environment in dimension of idea, feeling and willingness to proceed in action.

After the analysis of pre-test and post-test scores applied to the experimental group, the mean scores, standard deviations (SD), degree of freedom (df) and p value values were given in Table 10. Students in the experimental group pre-test average score on the $\overline{X}_{experimental}$=3, 21; post-test average score on the $\overline{X}_{experimental}$=3, 89 as were found.

Table 10. Environmental attitude scale experimental group pre-test and post-test data

Group	N	$\overline{X}$	SD	df	t	p
Experimental group pre-test	21	3,21	0,50	20	4,31	,000
Experimental group post-test	21	3,89	0,60			

As shown in Table 10, there is a significant difference between the groups (t = 4.31, p = .000; p <. 05). It is understood from these results that there was a statistically significant difference in the attitudes of the students towards the environment in the experimental group in which SMART Board applications were applied. According to these results, hypothesis 3 was accepted.

Hypothesis 4: There is a significant correlation between the environmental attitude scores of the experimental and control groups in the end-test.

Environmental Attitude Scale Behavior Dimension 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 11.

Table 11. Environmental attitude scale behavior dimension control and experimental groups post-test data

Group	N	$\overline{X}$	SD	df	t	p
Control group post-test	21	3,40	0,58	40	1,13	,265
Experimental group post-test	21	3,66	0,88			

Students in the control group post-test average score of $\overline{X}_{control}$ =3, 40; students in the experimental group post-test average score on the $\overline{X}_{experimental}$ =3, 66 as were found. There was no statistically significant difference between the scores of the two groups (t=1, 13, p=, 265; p>, 05).

Environmental Attitude Scale Idea, Feeling and Willingness to Proceed in Action Dimension 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 12.

Table 12. Environmental attitude scale idea, feeling and willingness to proceed in action dimension control and experimental groups post-test data

Group	N	$\overline{X}$	SD	df	t	p
Control group post-test	21	3,92	0,52	40	,67	,502
Experimental group post-test	21	4,04	0,62			

Students in the control group post-test average score of $\overline{X}_{control}$ =3, 92; students in the experimental group post-test average score on the $\overline{X}_{experimental}$ =4, 04 as were found. There was no statistically significant difference between the scores of the two groups (t=, 67, p=, 502; p>, 05).

Environmental Attitude Scale 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 13.

Table 13. Environmental attitude scale control and experimental groups post-test data

Group	N	$\overline{X}$	SD	df	t	p
Control group post-test	21	3,71	0,46	40	1,05	,296
Experimental group post-test	21	3,89	0,60			

Students in the control group post-test average score of $\overline{X}_{control}$ =3, 71; students in the experimental group post-test average score on the $\overline{X}_{experimental}$ =3, 89 as were found. There was no statistically significant difference between the scores of the two groups (t=1, 05, p=, 296; p>, 05).

Conclusion

In this study, it was investigated how SMART Board usage affects students ' attitudes towards the environment. Environmental Attitudes Scale was used to examine students ' attitudes towards the environment. Before starting the research, this test was applied to measure the environmental attitudes in both groups. In this test, the attitude toward a general environment was measured, as well as the dimension of behavior, idea, feeling and willingness to proceed in action. After the application, the same test was applied to both groups as the post-test.

The Environmental Attitude Scale scores of the students in the experiment and control groups have shown progress. There was a significant difference between the pre-test and post-test scores of the Environmental Attitude Scale in both the experimental group and the control group. It was understood that there was no significant difference when the scores of the Environmental Attitude Scale pos-tests of the experimental and control group students were compared. The results of the study revealed that students ' attitudes and behaviors were more difficult to achieve than cognitive success. In addition, the activities on the SMART Board were not as effective as expected in developing their attitudes towards the environment as they were not sincere to the students.

Recommendations

1. This study was conducted with a limited number of students. Researchers can study the results by applying this study to wider student communities.
2. This study lasted four weeks and 4 hours per week. Researchers can explore the effects of using SMART Board by spreading it over a wider period of time.
3. Researchers develop themselves on the use of SMART Board and reach or plan more activities will affect the results of the research.
4. Researchers can study students ' attitudes towards the environment by planning different SMART Board activities.
5. The use of SMART Board can be compared to other student-centered methods and techniques.
6. SMART Board students ' attitude towards the environment by repeating other research innovations can be gained in the literature.
7. They can explore the difference between using SMART Board and other technology-based methods.
8. Teachers can plan or design their own SMART Board applications and events.
9. Teachers can participate in in-service training to make SMART Board use more effective.
10. Teachers can meet students with more resources and questions through their z-books. In this way, they can save both paper and time.

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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