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Short Communication

The effect of the technology supported science education on achievement and attitudes of students

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The aim of this study is to investigate the effect of the technology supported science education on the academic achievement and attitudes toward science of students. It was an experimental study with pre-test and post-test control group. The participants for this study consisted of 44 (Experimental, n=25 and Control, n=19) middle 6th grade students in Turkey. The data of the research was collected by the science academic achievement test (SAAT) and the attitude toward science test (ATST). The data was analyzed by statistical package for the social sciences (SPSS) program. "Technology Supported Learning Method" was applied to the experimental group and "Traditional Teaching Method" was used for control group. The results indicated that there was a significant difference between experimental and control group. SAAT and ATST levels of average in experimental and control groups provided better results for the experimental group. As a result of applying both methods, not only experimental groups of students but also the ones in control group could learn the science knowledge. However technology supported learning had a positive impact on students' attitudes toward science and increased science academic achievement.

Key words: Technology supported science education, academic achievement, attitudes toward science.

INTRODUCTION

The use of technology teaching materials in education opens a new area of knowledge and offers a tool that has the potential to change some of the existing educational methods. The teacher is the key to the effective exploitation of this resource in the educational system. As technology teaching materials use continues to increase in society, educators must also prepare for the use of computers within the classroom. This involves all levels of education, including elementary schools (McCannon and Crews, 2000). The role of the elementary school teacher is evolving from that of a giver of information to that of a facilitator of student learning. New Technologies already exist to help teachers complete that evolution (Downs and Bennett, 1995). Nowadays; the usage of technology is not a privilege but an obligation. Technological developments influence structures and functions of educational institutions. It is also expected from the order to educate the individuals of information society. With globalization, many technological developments and changes occurred all around the world. Today's educational system adapts these changes with new methods and techniques. One of these is Technology Supported Learning approach. In Technology Supported Learning, students are responsible for their own learning, they make connections with their daily lives and they work in groups. There are two research questions of this study:

Research questions

(i) Is there any significant difference between experimental and control groups' SAAT post-test levels?
(ii) Is there any significant difference between experimental and control groups' ATST post-test levels?

MATERIALS AND METHODS

This research was designed pre and post-test with control group

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Table 1. SAAT pre-test average of experimental and control group students' results of t-test for independent groups.

Group	n	X	ss	df	t	p
Experimental	25	4.64	1.82	42	-0.34	0.73
Control	19	4.84	2.06			

Table 2. ATST pre-test average of experimental and control group students' results of t-test for independent groups.

Group	n	X	ss	df	t	p
Experimental	25	45.44	9.30	42	-2.02	0.051
Control	19	50.63	7.12			

Table 3. SAAT post-test average of experimental and control group students' results of t-test for independent groups.

Group	n	X	ss	df	t	p
Experimental	25	9.08	3.24	42	3.64	.001
Control	19	5.26	3.61			

and performed in the fall term of 2010 to 2011 academic year with the department of middle 6th grade students in Turkey (Experimental, n=25 and Control, n=19). In the study, "Technology Supported Teaching Method" was applied to the experimental group and "Traditional Teaching Method" was used for control group. Independent variables in both groups were the instruction method. The dependent variables in the groups were the same and they are the Science Academic Achievement Test (SAAT) and the Attitude toward Science Test (ATST). Gathering the pre- test and post-test documents related to this variable, comparisons were made between groups and within groups. The context of the SAAT which was used in this study were determined in accordance with the purpose of the study; the learning setting was organized in accordance with the topics and course; and the application was implemented taking the pre-knowledge and preparedness levels of the students. The implementation lasted for about 10 weeks. The dependent and independent variables in the study were examined with the data obtained from the experimental and control groups throughout the study.

Sample and instrument

The universe of this study was composed of the students enrolled in the second level of primary school in the Kaynarca district of Sakarya province in 2010 to 2011 educational year. The sample which was determined by means of random sampling method was composed of 44 students who were 6th year students at a primary school in aforementioned district in 2010 to 2011 educational year (Experimental, n=25 and Control, n=19).

The data of the research has been collected by the Science Academic Achievement Test (SAAT) and the Attitude toward Science Test (ATST) developed by researcher. "SAAT" was used in order to determine whether the technology supported science education affects students' Science Academic Achievement or not. The reliability of this scale is $\alpha = 0.81$. The data has been analyzed by SPSS package program. The hypotheses were tested with by t-test for the independent groups.

RESULTS

Research question 1

Is there any significant difference between experimental and control groups' SAAT pre-test levels?
Table 1 presents the findings obtained from control and experimental groups SAAT pre-test as a result of the data analysis.

When SAAT pre-test scores of the experimental group and control group students were examined, it was found that the arithmetic mean of the SAAT pre-test scores taken by the experimental group students was 4.64 and the respected figure of the control group students was 4.84. It was observed that p value ($t_{42} = -0.34$, $p = 0.73 > 0.05$) is more than 0.05. This indicates that there isn't any significant difference between experimental and control groups' SAAT pre-test levels.

Research question 2

Is there any significant difference between experimental and control groups' ATST pre-test levels?
Table 2 presents the findings obtained from control and experimental groups ATST pre-test as a result of the data analysis.

When ATST pre-test scores of the experimental group and control group students were examined, it was found that the arithmetic mean of the ATST pre-test scores taken by the experimental group students was 45.44 and the respected figure of the control group students was 50.63. It was observed that p value ($t_{42} = -2.02$, $p = 0.051 > 0.05$) is more than 0.05. This indicates that there isn't any significant difference between experimental and control groups' ATST pre-test levels.

Research question 3

Is there any significant difference between experimental and control groups' SAAT post-test levels?
Table 3 presents the findings obtained from control and experimental groups SAAT post-test as a result of the data analysis.

When SAAT post-test scores of the experimental group and control group students were examined, it was found that the arithmetic mean of the SAAT post-test scores taken by the experimental group students was 9.08 and the respected figure of the control group students was 5.26. It was observed that p value ($t_{42} = 3.64$, $p = 0.001 < 0.05$) is less than 0.05. This indicates that there is a significant difference between experimental and control groups' SAAT post-test levels in favor of the experimental group.

Research question 4

Is there any significant difference between experimental

Table 4. ATST post-test average of experimental and control group students' results of t-test for independent groups'

Group	n	X	ss	df	t	p
Experimental	25	54.00	4.76	42	2.21	.032
Control	19	50.68	5.00			

and control groups' ATST post-test levels?
Table 4 presents the findings obtained from control and experimental groups ATST post-test as a result of the data analysis.

When ATST post-test scores of the experimental group and control group students were examined, it was found that the arithmetic mean of the ATST post-test scores taken by the experimental group students was 54.00 and the respected figure of the control group students was 50.68. It was observed that p value ($t_{42} = 2.21$, $p = 0.032 < 0.05$) is less than 0.05. This indicates that there is a significant difference between experimental and control groups' ATST post-test levels in favor of the experimental group.

DISCUSSION

This paper presents the effect of the technology supported science education to the academic achievement and attitudes toward science of students were examined empirically. It was found that there was a significant difference in favor of the experimental group between the academic achievement of the control group and the experimental group in which traditional teaching and technology supported learning have been performed respectively. It can be claimed that there is a significant difference between the level of the attitude toward science in favor of the experimental group. That is, results showed that technology supported learning method had a positive impact on students' attitudes toward science and increased science academic achievement.

As can be seen from the literature, the findings of this study which receives direct support from research technology supported learning had a positive impact on students' attitudes toward science as well as increased science academic achievement (Ateş et al., 2006; Nakhleh and Kjarcik, 1993; Geban et al., 1994). According to Padrón and Waxman (1996), student learning must be connected to the home in addition to focusing on knowledge learned in the classroom. In addition, this, according to the International Society for Technology in Education (ISTE) (2000: 6), "technology should become an integral part of how the classroom functions – as accessible as all other classroom tools."

SUGGESTIONS

In summary, the technology supported learning approach can be used to improve students' achievement related to science and other lessons. Starting from the first grade of primary education, it should be included in education programs at all levels of formal education. Students should be technology literates and they should learn to use technology teaching materials. In the education process, in addition to teach pre service teachers knowledge related to the study field, it should be aimed to develop their skills and some activities should be planned to develop these skills.

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