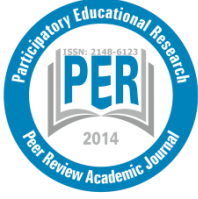TITLE: Impact Of Science Lessons Carried Out In Out-Of-School Environments On Students'

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PAGES: 108-114

ORIGINAL PDF URL: https://dergipark.org.tr/tr/download/article-file/776938

Impact Of Science Lessons Carried Out In Out-Of-School Environments On Students' Attitudes

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Abstract
This research aims to study impacts of the teaching method - supported in out-of-school environments – of the unit of "Let's Solve Puzzle of Our Body" on students' attitude towards science. The mentioned unit takes part in teaching curriculum of Fifth Grade Science Lesson of Secondary Schools. When the literature is studied, there is no research about this unit regarding to the impacts of science lessons supported with out-of-school environments on students' attitude. Therefore, this research is thought to contribute into the literature in this respect. In the research, the pre-test - post-test equalized control group model, which is one of quasi-experimental methods, has been used. The experimental group of the study includes 15 students, whereas there are 16 students in control group. The groups were determined through random sample. Before and after the research, the "Primary School Fifth Grade Science and Technology Attitude Scale" developed by Yaşar and Anagün (2008) has been used on both experimental and control groups. The students in the experimental group studied the unit with current program as well as activities in out-of-school environments. In control group, the students just studied the lessons at the current program, without having additional activities. A t-test was performed for pre-test independent samples, whereas the post-test was carried out through covariance analysis. At the end of the research, there was not a significant difference between pre-test (t29= .646, p<.05) and post-test (F(1-28)= .05 p<.05) scores. It is thought that the reasons such as the pre-test scores being high and the application being limited to just a unit had impact on failing to find a significant difference on the attitude scores. It is also thought that carrying out research on different grades from now on and out-of-school environment activities including more units might impact on students' attitude toward science.
Key words: Out of school environments, attitude, secondary school, fifth grade

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Introduction

Educational and training activities are planned to perform all over the world in the school environment. When hearing the sentence of "Learning out of school settings", informal learning which means that learning environment in unplanned way comes to mind. However, educational and training activities can be actualized in outside of the school walls as well. Organizing planned and programmed activities and trips in the direction of certain objectivities are called as out-of-school learning environments (Laçin Şimşek, Şen, Bozdoğan, Atabek Yiğit, Balkan Kıyıcı, Varnacı Uzun, Nuhoğlu, Ertaş & Keleş, 2011). In the out-of-school learning environments, learning of the students who can make observation one-to-one with life and information from the classes are more permanent and these students can develop positive attitude towards science lessons (Ramey-Gassert, 1992, Lucas & Ross, 2005).

To develop attitude towards science lessons of students, it is thought that performing out-of-class lessons are very important. Attitude; is a tendency to react positively or negatively toward individuals, environments, situations or ideas (Simpson, Koballa, Oliver & Crawley, as cited in Yaşar & Anagün, 2008). One of the vision of science curriculum is to develop positive attitudes towards science. Positive and negative attitudes are important variables on learning (Avcı, Coşkuntuncel & İnandı, 2011). Tenenbaum, Rappolt-Schlichtmann and Zanger (2004) stated that students should show positive attitude towards science lessons as well as the good content of the lessons to learn these subjects. Furthermore, attitudes are formed within the relationship process with external environment of the individual, but, they have an important role in shaping their relationship with their environment by becoming an important section of the personality structure of the individual (İnceoğlu, 2010; as cited in Kayri, Elkonca, Şevgin & Ceyhan, 2014). In this context, since students' positive attitudes toward science are related to relationship with the external environment, it is thought that positive attitudes towards science can be developed in science lessons carried out in out-of-school settings. Realization of out-of-class learning became an issue in terms of knowing how it affects students' attitudes toward science.

The purpose of this study is to investigate the effects of teaching approach supported with out-of-class environments of "Solve Puzzle of Our Bodies" unit in the 5th Grade Science Class Curriculum on attitudes of students towards science.

Method

In this section, it is included the information about research model, study group, data collection instruments and data analysis.

Research Model

The research was carried out by using equalized pre-test and post-test control group model within the scope of quasi-experimental study. In this model, determination of control and experimental groups is conducted by non-random assignment. Two groups are performed pre-test. When experimental group is intervened, control group is not interfered and both groups are applied post-test (Büyüköztürk, Kılıç Çakmak, Akgün, Karadeniz Demirel, 2010).

Table 1.*Experimental design of research.*

Groups	Pre-tests	Intervention	Post-tests
Experimental Group	5th Grade Science and Technology Attitude Scale	Teaching in the out-of-school environment with guidance material	5th Grade Science and Technology Attitude Scale
Control Group	5th Grade Science and Technology Attitude Scale	Teaching according to current schedule	5th Grade Science and Technology Attitude Scale

Experimental Group

Necessary permissions to perform an application in two schools located in Tokat city were taken from Tokat National Education Directorate. It was decided to research in these schools because of the overlapping physical possibilities of the schools, the gender, the graduation statues, the similarity of the profession of the science teachers who work at the schools, the existing numbers of the classes and socio-cultural structure of the students by considering that it may be appropriate and efficient to the method of the study. The sample of the study was determined via convenient sampling. In the first semester of the 2015-2016 academic year, a total of 31 5th grade students selected from two secondary schools in Tokat city constitute the sample of this study. All students were born in 2005. The distribution of sample in terms of schools and gender is presented in Table 2.

Table 2. The Distribution of Sample in terms of Schools and Gender

Group	Female Students	Male Students
Experimental Group	5	10
Control Group	7	9
Total	12	19

As can be seen in Table 2, the number of female students in the sample is 12, and the number of male students is 19.

The students in the experimental group consisting 15 students are selected from a single class whereas the control group students are from the same class as well, and consists of 16 students. The 5th grade students in these schools constitute the sample of the research.

The science teacher of the experimental group; is 29 years old and a female, she has a master's degree in Gaziosmanpaşa University Science Education Department. The teacher has 5 years of professional experience. She has been working for the Ministry of National Education for 5 years.

The science teacher of the control group; is 29 years old and a female, she has a master's degree in Gaziosmanpaşa University Science Education Department. She has been working under the Ministry of National Education for 4 years. When comparing the both teachers, it was thought that they have relevant characteristics to conduct a research because their professional experience was close in recent years, the schools they graduated were the same, both are science teachers.

Data Collection Instrument

Elementary 5th Grade Science and Technology Course Attitude Scale

In the study, the "Elementary 5th Grade Science and Technology Course Attitude Scale" developed by Yaşar and Anagün (2008) was used to measure students' attitudes towards science classes. This attitude scale was deemed appropriate to select especially because it was a scale prepared for the attitudes of students in the 5th grade. The scale with 5 Likert measure has 19 items and three dimensions. The three dimensions are "Enjoyment, Request for Learning and Individual Opinions for Science".

The validity and reliability studies of the scale were conducted by applying to 849 secondary school 5th grade students. In the scale, positive attitude expressions were assessed based on 5 points for "totally agree", 4 points for "agree", 3 points for "undecided", 2 points for "disagree" and 1 point for "totally disagree". Scoring of the negative statements in the scale was done in the opposite way to the above scoring. The internal consistency coefficient of Cronbach Alpha was found to be 0.89 as a result of the analysis for the reliability of the scale. The scale consisting of 19 items accounts for 51.490% of the total variance.

Data Analysis

Elementary 5th Grade Science and Technology Course Attitude Scale was applied to students to measure experimental and control group students' attitude towards science before and after the discussing "Solve Puzzle of Our Bodies" unit in out-of-school environments as pre-test and post-test, and the data was analyzed with using SPSS 15.0 packaged software.

Findings

T-test for independent samples was conducted to determine whether there is a significant difference between attitude scores obtained from the application of Elementary 5th Grade Science and Technology Course Attitude Scale as pre-test. Findings obtained from the difference between pre-test total scores of Elementary 5th Grade Science and Technology Course Attitude Scale are presented in Table 3.

Table 3. Difference between Pre-Test Total Scores of Elementary 5th Grade Science and Technology Course Attitude Scale

Measurement	N	X	SS	Sd	T	P
Experimental Group	15	81.13	.85	29	.646	.730
Control Group	16	78.88	9.60			

When the total attitude pre-test scores of the experimental and control group were compared, there was no difference between the mean scores (t (.05: 29) = 646).

By accepting the pre-test as a dependent variable among scores obtained from the students for the application of the Elementary 5th Grade Science and Technology Course Attitude Scale as the post-test, single-factor covariance analysis (ANCOVA) was performed to test whether the experimental procedure was effective. The applied Elementary 5th Grade Science and Technology Course Attitude Scale as post-test ANCOVA results of the students in the experimental group and the students in the control group were presented in Table 4.

Table 4. Descriptive Statistics of Elementary 5th Grade Science and Technology Course Attitude Scale according to Attitude Post-Test Groups

Groups	N	Mean	Adjusted Mean
Experimental Group	15	81.13	80.36
Control Group	16	78.88	79.60

When examined in Table 4, the mean score of the experimental group was 81.13 and the mean score of the control group was 78.88. The adjusted scores of attitudes scale post-test were 80.36 for the experimental group and 79.60 for the control group. The ANCOVA values for the significance of the difference between the adjusted post test scores of the groups are given in Table 5.

Table 5. ANCOVA Values of Elementary 5th Grade Science and Technology Course Attitude Scale science attitude post-test scores for groups

Source of Variance	Sum of Squares	sd	Mean Squares	F	Significance Level
Science attitude post-test	570.55	1	570.55	7.36	.011
Group	4.27	1	4.27	.05	.816
Error	2170.93	28	77.53		
Total	2780.97	30			

According to the findings in Table 5, there was no significant difference between the groups when the experimental and control group scores were compared [F (1-28) = .05 p <.05].

Discussion, Conclusions and Recommendations

T-test for independent samples was for pre-test, post-test was performed by single-factor covariance analysis (ANCOVA) in the research. As a result of the research, there was no significant correlation between experimental and control groups; pre-test (t29= .646, p<.05) and post-test (F(1-28)= .05 p<.05) scores. When the literature was examined, similar

results were not obtained as a result of the research. De White and Jacobson (1994), Rapp (2005), Lucas and Ross (2005), Jarvis and Pell (2005), Tenenbaumet al., (2004), Keleş, Uzunand Uzun (2010) reached the conclusion in their studies that out-of-school activities affect the attitudes of students in a positive way. The research differs from the literature in this respect. As a reason for not having a significant difference in student attitudes, some reasons such as the high pre-test scores of both groups, are the results of the applications limited with one unit (Altınışık & Orhan, 2002). More time is needed to change student attitudes (Güven & Sülün, 2012). It is thought that more time is needed to improve student attitudes in this direction.

Based on the results of the research it can be presented in the following recommendations: Long duration studies in out-of-school environments with more than one unit can be organized to improve attitudes of students towards science. Different variables can be observed by carrying out out-of-school activities for different units. By designing researches in out-of-school settings with different grades, examinations can be made in terms of different variables. A similar research can be conducted with different attitude scales.

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