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THE EFFECT OF USING ACTIVITIES IMPROVING SCIENTIFIC LITERACY ON STUDENTS' ACHIEVEMENT IN SCIENCE AND TECHNOLOGY LESSON

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ABSTRACT
The aim of this study is examining the effect of the using scientific literacy development activities on students' achievement. The study was carried out in a primary school in Buca İzmir for 2010-2011 academic years. System of our body was chosen as a study topic in our search which took 6 weeks. Pre–post test semi experimental control model was used as an experimental pattern. While activities improving scientific literacy were being applied for experiment group; science and technology curriculum was applied for control group. As a result of the study, the experimental group achievement was measured higher than the control group. Consequently it was seen that using scientific literacy development activities in science and technology lessons increases the student achievement.
Keywords: science education, scientific literacy, the unit of "system of our body" student achievement

INTRODUCTION

In our age, individuals are supposed to get the information they need, have the ability of scientific thinking by producing new information and make the technology usable in daily life (MEB, 2000). They should improve the information, understanding, attitude and value about the science, they should progress their ability of searching, solving problem, making decision. And in order to get them some basic skills in this field, individuals must start their science education in primary schools (Tatar, 2006).

The researches in this field show that scientific literacy is one of the most important facts of the science education (Laughksch, 1999 Nelson 1999, Tsabari & Yarden, 2005 and Knai, 2006). Rather than transferring the existing information, literacy of science gains to students the ability of attaining the knowledge. Citizens must have the ability to read, write and have critical thinking about science and technology subjects in order to increase the economic productivity of a society Anagün (2008).

According to the studies, scientific literacy is one of the most important elements in science education. Scientific literacy brings in skills for achieving the knowledge rather than teaching the existing knowledge to the students. The skills acquired will be important in some occasions such as problem solving and making important decisions for their life in which students would encounter in their future life. Therefore, all elementary school students must be grown as scientific literate. According to these data, basic vision of the science and technology lesson is specified as that, ***each student graduated from elementary school is a science literate*** (Talim Terbiye Kurumu, 2005).

What Is Scientific Literacy?

Understanding the nature of science have been started to be defined as one of the aims of education having priority as studies on science literacy have increase in last century (AAAS, 1989). These studies in education area emphasize the importance of science literacy and indicate that, science literacy is necessary for all pupils. Who is qualified as science literate? Abd –El-Khalcik ve Boujaoude (1997) recognized the scientific literate person who knows concepts, principles theories about science,

understands scientific process and realizes connection between science and technology, society and environment. In this definition three important points are focused.
These are:
1 - What the science is (concepts, principles and theories)
2 - Scientific process skills
3- Applications of science (science and technology, society and environment Relations)

First of all, a science literate person should have knowledge about what science is, and relevant concepts, principles and theories. Hazen and Trefil (1991) emphasized that, keeping key concepts and principles in Physics, chemistry and biology in mind is not necessary for students. These concepts, principles and words should be employed as a tool in achieving scientific information by the students.

Some of the most important problems faced by researchers on education are that, students' scientific vocabulary is limited, students do not have sufficient skills for reading papers and they cannot understand scientific papers, which are read by them at school. These problems are caused by insufficiently developed scientific literacy (Thelien, 1991). Because students' science literacy level is low, they are limited in making arrangements relevant to the texts existing in their science books (Roe et al, 1995). One of the most important problems, which elementary and high school science teachers complain about, is that, most of the students cannot properly understand the texts, which are read by them (Lloyd & Mitchell, 1989). However, according to Roe et al (1995), the reason is that, science books are not written suitable for that, students learn the words facilitating understanding science books.

Importance of the Study

The basic vision of Science and Technology curriculum implemented by the Ministry of Education is to make students literate in science and therefore students' books have been prepared for this purpose. But it can be seen that neither the student's book nor the workbook was complete to improve the science literacy during the implementation phase .The study carries weight with the inclusion of students' science literacy learning environments, activities and also carries weight with teachers can easily prepare materials for the enrichment of the teaching environment.

Purpose of the Research

The purpose of this research is to examine the effects of using the activities for the development of science literacy in the Science and Technology course in the unit of "systems of our body" on the students' achievements in science and technology lesson.

Sentence of the Problem

What is the effect of the use of science literacy developer activities on students' achievement in the unit of "Systems of our body" in Science and Technology course of Primary School?

METHOD

Research Model

A pre-tested model of the actual trial, post-test, control group half-experimental model was used in the research. "Trial Models" are the models in which the data is produced directly under the control of the researcher for the purpose of determining cause - effect relationship. Also this data requires to be observed (Karasar, 2000).

With this survey, the effectiveness of the students' success in Science and technology lesson of the implementation of the activities to improve science literacy skills in teaching students unit named"Systems of Our Body" in the field of science and technology course in primary school will be examined. Therefore, the research is a trial model study.

In this experimental study, achievement test was administered to both experimental and control groups as a pre-test and a post-test before the start of practice. Selected as the experimental group classroom activities will be taught by scientific literacy developing skills whereas the selected class as the control group will be taught by using the content and activities implemented in 2005 introduced the subject of Science and Technology Curriculum. Science and technology achievement test which will be applied at the end of the teaching subject will determine the effect of students' success of the scientific literacy developing activities.

Table 1: The Symbolic Presentation of Research Design. T1= "Systems of our body " Unit Achievement Test

GROUPS	PRE- TEST	PROCESS	POST- TEST
EXPERİMENTAL GROUP	*T1*	Scientific literacy developing activities.	*T1*
CONTROL GROUP	*T1*	Science and Technology Curriculum	*T1*

Study Group

The dependent variable of the research is the students' academic achievements. It was found that the independent variable of the research is the science developer literacy skills. According to Sönmez (2005)', in experimental researches universe and sample selection must not be selected. For this reason global generalization of these research and study groups have been ignored and a study group has been selected. As a study group, the seventh grade students of Hüseyin Avni Ateşoğlu primary school in the Buca district of Izmir have been selected.

"Systems of Our Body" Unit Achievement Test Preparation

In this research the academic achievement test of the unit "Systems of Our Body" has been developed to determine the level of understanding of the seventh grade student's knowledge about the following units: Digestive System, Urinary System, Supervisory and Regulatory Systems. The reliability of the questions in the test process in the last grant, and the KR-20 value was calculated in this process. We observe that the KR-20 reliability of the scale was found to be 0.82. For this reason, the academic achievement test which was developed to measure the students' success is a reliable measuring tool.

Reliability from 0.70 to 0.80 from the high number of sources state that, it is a sufficient measuring tool which can be used in research studies (Özgüven, 1998). For this reason, the academic achievement test developed to measure the students' success of the unit of "systems of our body" can be said to be a reliable measuring tool.

Table 2: The Unit of "Systems of Our Body" Achievement Test Reliability Results

Test	Number of items	KR–20
"Systems of our body " Unit Achievement Test	30	0.82

Process

This study was conducted in Hüseyin Avni Ateşoğlu Primary School in the city of Izmir during the second semester of 2010-2011 education years. Before the application, the pre-test was applied to both classes and it was shown that there is no significant difference between control and experiment groups.

"Teaching of the unit of "Systems of our body" started in both of the groups at the same time. The duration of the teaching time was determined as 30 hours and it has been finished in both groups at the same time. Systems of our body" unit has been taught to the students of experiment group by using scientific literacy improving activities (worksheets, homework, illustrated dictionary prepared by the researcher) on the other hand; the students of control groups have been taught the way which has been suggested by the textbooks advised by Minister of Education.

DATA ANALYSIS AND RESULTS

The data analysis was made by using independent t-test and the statistical results were obtained by using SPSS packet program. At the beginning of the study a pre-test was applied to determine if there is a difference between control and experiment groups student's knowledge level about the unit of "Systems of Our Body". The t-test analysis results which obtained by using the pre-test scores were given the Table 3.1 below.

Table 3.1: The T-Test Results of Experiment and Control Group Student's Pre-Test Scores

Group	N	X	SS	t	p
Control	35	5,74	1,09	1,23	.22
Experiment	35	5,4	1,21		

Table 3.1 shows there is no meaningful difference between control and experiment groups' student's pre-test results before application. It is shown that the knowledge level of control and experiment group student's about subject are similar before the experimental study.

The results of t-test score which was taken by post-test to determine if there is meaningful difference between control group students who were taught the subject by traditional methods and experiment students who were taught the subject by scientific literacy development activities are shown at table 3.2

Table 3.2: The t-Test Results of Experiment and Control Group Student's Post-Test Scores

Group	N	X	SS	t	p
Control	35	21,82	4,68	7,50	.00
Experiment	35	13,68	4,36		

Table 3.2 shows that there is a meaningful difference between control and experiment group student's post-test results. In addition there is an 8.14 score difference between control and experiment groups post-test scores. According to this result the experiment groups' student's achievement increased at meaningful level than the control group students' achievement.

RESULTS AND CONCLUSIONS

It was found that at the end of the study, a meaningful variation occurred between post-test scores of the students of the test group in which the activities developing students' scientific literacy were employed in teaching "digestion system" and the students of the test group were taught according to Science and Technology. This variation was in favor of the test group in which the activities developing students' scientific literacy were employed.
According to this result, using activities developing students' scientific literacy in scientific teaching is a more effective method in increasing lesson successes of students compared with the activities recommended by science and technology program. Armstrong, (2000) investigated the integration of reading vocabulary techniques effects on achievement in 6th grade students and he determined students' achievement whose scientific literacy skills has been development are higher than the other students' achievement Mongollio (2006) studied the effect of developing scientific literacy by games on students achievement. The result of his search shows that the achievement of the students whose scientific literacy level developed by games were more successful than the others. Kristina (1992) studied on the effects of using scientific reading texts in science teaching on students' understanding scientific concepts and concluded that, such texts are useful for students' understanding scientific concepts more effectively. These results also may prove the result of this study.

According to the results, which were obtained in the study applied on 7th grade test group students by using activities developing students' scientific vocabulary in science teaching, the followings may be recommended:

The essential objective of the existing science and technology program is to make the students scientific literate. Science and technology teachers should have been trained on their job about what scientific literacy is and how it can be developed:

- Teachers practicing education program should be informed about studies on developing scientific literacy levels of students.

- It should be observed during education process whether students learn reading, writing and using scientific terms properly or not which are taught according to the existing science and technology program.

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