The Effects of Computer-Enhanced Teaching on Academic Achievement in 8th Grade Science and Technology Course and Students’ Attitudes towards the Course

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SYNOPSIS

INTRODUCTION

Defined as a means of enhancing the motivation of students and enabling them to learn in line with their knowledge level and as a combination of self-learning principles with computer technology, computer-enhanced teaching (Uşun, 2000) has recently become a focus of great research interest. In science teaching, computer-enhanced teaching (CET) can instill the sense of wonder about scientific and technological developments in students, make abstract concepts concrete with the help of simulation and modeling, enable students to learn according to their own knowledge speed, help to carry out some dangerous experiments in the classroom setting, make learning more fun and interesting by means of multi-media techniques such as pictures, videos, sounds and animations and can meet students’ needs stemming from individual learning differences. Hence, the present study investigates the effects of computer-enhanced teaching on students’ academic achievement and their attitudes towards science and technology course.

PURPOSE OF THE STUDY

The purpose of the present study is to investigate the effects of computer-enhanced teaching of unit “the structure and properties of matter” in 8th grade science and technology course on students’ academic achievement and attitudes towards the course. The subject of “the structure and properties of matter” is consisted of abstract concepts such as periodical table, chemical bonding, and chemical reactions. Students have difficulties for understanding these concepts so CET which enhancing students’ visual and thinking structures could be
used for developing their understanding of these concepts. The results of this study demonstrated that buy using CET students’ Science and Technology achievement were promoted; however, their attitudes were not be affected.

METHODOLOGY

The present study was carried out as a semi-experimental study in line with a pretest-posttest control group design. In the present study, a computer-enhanced teaching method and traditional teaching methods were taken as independent variables. The dependent variables were taken as science and technology course achievement and student attitudes towards the science and technology course. The population of the study consists of 8th grade students attending elementary schools in Ankara in the 2009-2010 school year, and the sample consists of 63 eighth grade elementary school students attending Hacı Bektas-ı Veli elementary school in the Sincan district of Ankara. As data collection tools, for the instrument of “Science and Technology Achievement Test”, experts and science teachers looked at the items and according to their views, items were arranged. Then the test was applied as a pilot study to 50 students at 1st grade in high school. After pilot study the final form of the instrument was developed. The instrument of “Scale of Attitudes towards Science and Technology Course” were developed by Gezer, Köse ve Bilen (2006) and, the validity and the reliability were established by them. Science and Technology Achievement test was developed to measure students’ prior-knowledge level about the unit “Structure and Properties of Matter” and their achievement level after the application. There were multiple-choice questions in the test covering the issues of “Classification of elements”, “Chemical links”, “Chemical reactions”, “Acids and bases” and “Water purification”. The content and structure validity of the test were established by seeking the opinions of experts, and its reliability was established by including the questions with about 0.50 item difficulty index and 0.3 and more item discrimination power index from pilot study. The Scale of Attitudes towards Science and Technology was used to determine the elementary school students’ attitudes towards science and technology course. The Spearman Brown reliability coefficient of the scale was found to be 0.93. The scale is made up of love (2 items), fear (3 items, interest (5 items), pleasure (7 items) and profession (3 items) dimensions. Within the context of the present study, the experimental group was taught through computer-enhanced teaching method and the control group through some traditional teaching methods such as lecturing, question-answer and discussion over a two-month period. At the beginning of the study, the “Science and Technology Achievement Test” and “The Scale of Attitudes towards Science and Technology Course” were administered to both groups, and the data obtained were analyzed using the SPSS 18 program package. While analyzing the data, a one-way ANCOVA, which is recommended for determining whether there are any statistically significant differences between the groups including one independent variable, a dependent variable and one or more co-variables (Kalaycı, 2006), was used.

FINDINGS

In the analyses, while there was no significant difference between the achievement test scores of the groups (F(1, 60) = .080; p = .778 r = .001), the post-test means revealed a statistically significant difference between the groups (F(1,60) = 48.41, p = .0005 r = .447). This difference favors the experimental group. Moreover, while there is no significant difference between the groups’ pre-test attitude scores, (F(1, 60) = .042; p = .839 r = .001), post-test attitude scores revealed a significant difference between the groups (F(1,60) = 3.274, p = .075 r = .052).
DISCUSSION and CONCLUSION

The present study revealed that there is a significant difference between the achievement test mean scores of the experimental group students who were taught with the computer-enhanced teaching method and that of the control group students who were taught with traditional teaching methods. Hence, it can be argued that computer-enhanced teaching has positive impact on students’ academic achievement. This may be because the teacher can make proper use of computer to make abstract concepts more concrete and in this way teaching is enhanced by the use of computer. In addition, after teaching the subject, giving opportunities to do related exercises and applications on computer and also making use of appropriate software programs while teaching the subjects may have had a positive impact on students’ academic achievement. The reason why there is no significant difference between the students’ attitudes towards science and technology course as a result of computer-enhanced instruction may be that the students were encountering such an application for the first time (Altınışık & Orhan, 2002). Based on the idea that there is too much time needed to change attitudes, it is thought that longer term studies are needed to change students’ attitudes. Moreover, the students’ having different attitudes towards school when pre-test and post-test were administered may have led to the emergence of this result.

REFERENCES


