

WCLTA 2010

# The effect of computer aided teaching method on the students' academic achievement in the science and technology course

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## Abstract

In this study, the effect of computer aided teaching of acid-base subject on the academic achievement science and technology course is investigated. In the material developed by the researcher, it was aimed to enable students learn acid-base subject by using interactive animations and simulations.

In order to collect data, a scale consisting of 30 questions was developed by the researcher. As a result of the study, it was found out that teaching of acid-base subject supported with computer aided teaching had a positive effect on the achievements of students in science and technology course.

*Keywords: science teaching, science and technology, computer aided teaching, students' achievement, acid-base*

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## 1. Introduction

Likewise in all areas, the continuing speedy development of information technologies in education presents the required environment for development and usage of different method instruments. It is thought that effective use of information technologies will lead to an increase in teaching quality. Cartier and Stewart state that by means of computer simulations and tools, students can be enabled to think as scientists (Sodenberg, Price, 2003).

Harwood and McMahon (1997) state that development and use of multimedia aided teaching activities which stimulate students' visual and intellectual structures have a positive on their achievement in teaching concepts which are hard to understand.

In many relevant national and international studies, it is emphasized that computer aided teaching is more successful than traditional teaching methods (Özmen and Kolomuç, 2004; Yiğit and Akdeniz, 2003; Chang, 2002; Hacker and Sova, 1998; Yalçınalp, Geban and Özkan, 1995).

Collaborative learning enhances students' learning (Lonning, 1993). The use of information and communication Technologies in teaching environments enables students to work together. Students communicate with each other to discuss about the chemical cases provided by the technological tools (i.e. animation, simulation, video, etc.), or define and describe the concepts of chemistry (Laroche, Wulfsberg & Young, 2003). This situation will enable information exchange and social construction (constructing knowledge collaboratively) of the knowledge among (Solomon, 1987; Driver, Asoko, Leach, Mortimer & Scott, 1994) students.

Based on these findings of the literature, in this study, computer based instruction was employed during the instruction of acid base subject on students who were working collaboratively and the influence of this treatment on students' academic achievement was explored.

**2. Method**

In this study computer aided teaching method’s effect on students’ achievements towards science and technology course is investigated. With the help of the material developed by the researcher, it is aimed to enable students learn acid-base subject by interactive animations and simulations. In the program, students who work cooperatively had the possibility to interact with group friends, share information, and solve problems.

In the research, an experimental study that fits the pre-test post-test model is conducted.

**2.1 Study Group**

The study group of the research consists of 28 students who are enrolled in a public primary school’s 8th grades in Bahcelievler district of Istanbul.

**2.2 Data Collection Instruments**

In order to collect data, a scale consisting of 30 questions was developed by the researcher. For the reliability of the scale,  $\alpha$  Reliability Analysis was done, as a result of the analysis, 0.916 was found  $\alpha$  reliability coefficient of the test.

**2.3 Data Analysis**

To determine whether there is a significant correlation between achievement tests of the Experiment Group and of the Control Group or not, independent samples t-test and paired samples t-test analysis were used.

**3. Findings and Comment**

t-test results of pre-test achievement scores according to control- experiment groups are presented as in Table 1

Table 1. t-test results of pre-test achievement scores according to control- experiment groups

	N	X	s	sd	t	p
Control	28	11,60	5,07	54	0,800	,427
Experiment		10,46	5,59			

$t_{54} = 0,800$  ,  $p > ,05$

\* $p > ,05$  shows that the difference is not statistically significant

Table 1 reveals that there isn’t a significant difference between the control and experiment groups regarding students’ achievement towards pre-test

t-test results of post-test achievement scores according to control- experiment groups are presented as in Table 2.

Table 2. t-test results of post-test achievement scores according to control- experiment groups

	N	X	s	sd	t	p
Control	28	13,78	6,45	54	3,001	,004
Experiment		19,10	6,80			

$t_{54} = 3,001$  ,  $p < ,05$

\* $p < ,05$  shows that the difference is statistically significant.

Table 2 reveals that there is a significant difference between the control and experiment groups regarding students’ achievement towards post-test

To determine whether there is a significant correlation between achievement tests of the Control Group or not paired samples t-test analysis was used.

t-test results of pre-post achievement scores according to control group are presented as in Table 3.

Table 3. t-test results of pre-post achievement scores according to control group

	N	X	s	sd	t	p
Pre- test	28	11,60	5,07	27	2,53	,017
Post-test		13,78	6,45			

$t_{27} = 2,53$  ,  $p < ,05$

\* $p < ,05$  shows that the difference is statistically significant.

Table 3 reveals that there is a significant difference between the pre-test and post-test points regarding students’ achievement towards control group.

To determine whether there is a significant correlation between achievement tests of the Experiment Group or not paired samples t-test analysis was used.

t-test results of pre-post achievement scores according to experiment group are presented as in Table 4.

Table 4 t-test results of pre-post achievement scores according to experiment group

	N	X	s	sd	t	p
Pre- test	28	10,46	5,59	27	7,056	,000
Post- test		19,10	6,80			

$t_{27} = 7,056$  ,  $p < ,05$

\* $p < ,05$  shows that the difference is statistically significant.

Table 4 reveals that there is a significant difference between the pre-test and post-test points regarding students’ achievement towards experiment group.

#### 4. Result, Discussion, and Suggestion

In this study, it was aimed to investigate the effect of computer aided teaching method on students’ academic achievement science and technology class in teaching “acid-base” which is one of subjects in primary schools’ 8th grades that individuals experience difficulty in comprehending. The study investigates effectiveness of computer aided teaching on students’ academic achievement science and technology course by teaching acid-base subject with simulation and animation aided teaching material in computer environment. The obtained data are analyzed by using SPSS statistical program. Findings indicate that computer aided teaching method had a positive effect on students’ academic achievement science and technology course.

Many factors such as characteristics of computer aided teaching material, different approaches embraced in applications, and duration of application can be effective on student's achievement in computer aided teaching. In researches, this resulted on positive effect of computer aided teaching material on academic achievement sciences and course.

Previously, Own and Wong (2000) had used animations to teach acid base subject to students. By the use of animations in learning environment, very well progresses were observed at all of the students. Researchers reported that the use of instruction with animations on conceptual learning of acid-base chemistry, has produced good results and for this level of students the instruction with animations is the best method of instruction. It was indicated that the integration of information and communication technologies into chemistry curriculum of West Pennsylvania Deafs School had influenced student attitude and achievement positively (Bernauer, 1995). In most of the studies conducted on chemistry education, it is stressed that the use of information and communication technologies in teaching environments provides various advantages (Pekdağ, 2010).

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