

WCES-2010

Effect of computer aided teaching of acid-base subject on the attitude towards science and technology class

Beyza Karadeniz Bayrak^{a*}, Hale Bayram^b

^a Faculty of Education, Yıldız Technical University, Istanbul, 34220, Turkey

^b Atatürk Faculty of Education, Marmara University, Istanbul, 34722, Turkey

Received October 19, 2009; revised December 28, 2009; accepted January 11, 2010

Abstract

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

For the purpose of collecting data in the research, “Attitude towards Science and Technology Course Scale”, developed by Nuhoglu (2008), was used. In the statistical analysis of data, t-test was performed. Results indicate that, teaching of acid-base subject supported with computer aided teaching had a positive effect on the attitude of students towards science and technology course.

© 2010 Elsevier Ltd. All rights reserved.

Keywords: Acid-base; computer aided teaching; science and technology; attitude scale.

1. Introduction

In literature on teaching science, students’ attitudes towards courses and factors affecting achievement are frequently discussed. In most of the researches, the importance of teaching techniques come into prominence.

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).

In the usage of computers in teaching science and technology, factors such as supplies of school and classroom, competence of teachers, and compatibility of software are important. Besides all these, students’ attitude towards computer and their related skills on usage are other factors affecting computer aided education.

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.

* Beyza Bayrak. Tel.: +0-212-383-4846; fax: +0-212-383-4808

E-mail address: bbayrak@yildiz.edu.tr

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).

Attitudes are cognitive behaviour patterns in response to aspects that are faced in learning. According to positiveness or negativeness of attitudes which are formed by depending on a value and belief system, have direct effect on learning process and orients individuals' future (Seferoğlu, 2004). Many relevant researches exist in literature both in national and international scale (Parkinson ve diğerleri, 1998; Ussler ve Hoffmann, 2000; Jones, Howe ve Rua, 2000; Jarvis ve Pell, 2002).

Education is an important tool in both in determining attitudes and changing the negative ones (Bozdoğan, Yalçın, 2005). Some of the sensual behaviors which are targetted in education are directly related to attitudes. Thus, to obtain desired achievement in education is due to recognition of student attitudes (Hançer and Yalçın, 2007). Teaching science effectively and in awareness is crucial for enabling students attain positive attitude and behavior towards sciences.

With this in mind, the study investigates effect of computer aided teaching of acid-base subject on primary school students' attitude towards science and technology class.

2. Method

In this study computer aided teaching method's effect on students' attitudes 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 52 students who are enrolled in a public primary school's 8th grades in Bahçelievler district of Istanbul.

2.2 Data Collection Instruments

In determining students' attitudes towards science and technology course, "Science and Technology course attitude scale" which is developed by Nuhoğlu (2008) is used as the measurement material. Validity, reliability, and factor analyses are done and Cronbach's Alpha internal consistency coefficient is found as $\alpha = .8739$. The material contains 20 items (10 positive and 10 negative) possessing 3-point Likert scale Results (Findings)

2.3 Data Analysis

Data obtained from the attitude scale are analyzed by using the SPSS 13.0 statistical program where t test is applied in determining the significance of the difference between pre-test and post-test attitude points.

3. Findings and Comment

In determining whether there is a significant statistical difference between the pre-test and the post-test points regarding students' attitudes towards Science and Technology course, independent samples t test is applied.

The values obtained are given in Table 1.

Table 1: Results of the t-test

Gruplar	N	X	s	sd	t	p
Pre-test	52	54,4808	3,77	51	2,845	0,006
Post-test		56,1538	2,38			

$$t_{51} = 2,845, p < ,01$$

* $p < ,01$ shows that the difference is statistically significant.

Table 1 reveals that there is a significant difference between the pre-test and post-test points regarding students' attitudes towards Science and Technology course.

3. Result, Discussion and Suggestion

In this study, it was aimed to investigate the effect of computer aided teaching method on students' attitude towards 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' attitudes towards 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' attitudes towards 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 attitude in computer aided teaching. So far, in researches, this resulted in lack of consensus on positive effect of computer aided teaching material on attitudes towards sciences and courses (Francisa, Katzb, Susan, and Jonesc, 2000; Mitra, 1998; from Yeşilyurt and Kara, 2007). While Selwyn (1999) and Ertepinar, Demircioğlu, Geban, and Yavuz (1998) stated that computer aided teaching materials develop positive attitudes towards science teaching, Shaw and Marlow (1999) noted that there is not such an effect (Yeşilyurt and Kara, 2007).

Another research (Yenice, 2007) in primary schools' 8th grade levels, states that computer aided science education method had a positive effect on students' attitudes towards science and computer.

As a result; it is considered that enabling students learn by discovering and making experimental observations with enriching science courses with materials.

References

- Akçay, H., Tüysüz, C., Feyzioğlu, B., Oğuz, B.(2008) "Bilgisayar Tabanlı ve Bilgisayar Destekli Kimya Öğretiminin Öğrenci Tutum ve Başarısına Etkisi". Mersin Üniversitesi Eğitim Fakültesi Dergisi, 4 (2), 169-181.
- Bozdoğan, A.E. ve Yalçın, N. (2005). "İlköğretim 6., 7. Ve 8. Sınıf Öğrencilerinin Fen Bilgisi Derslerindeki Fizik Konularına Karşı Tutumları" Gazi Üniversitesi Kırşehir Eğitim Fakültesi Dergisi, 6 (1), 241-247.
- Chang, C. Y., (2002). Does -Computer-Assisted Instruction + Problem Solving = Improved Science Outcomes? A Pioneer Study. *Journal of Educational Research*, 95 (3), 143-150.
- Hacker, R. G. & Sova, B., (1998). Initial teacher Education: A Study of the Efficacy of Computer Mediated Courseware Delivery in a Partnership Concept. *British Journal of Education Technology*, 29 (4), 333-341.
- Hançer, A.H. ve Yalçın, N.(2007). "Fen Eğitiminde Yapılandırıcı Yaklaşımın Dayalı Bilgisayar Destekli Öğrenmenin Bilgisayara Yönelik Tutuma Etkisi" Kastamonu Eğitim Dergisi, 15 (2),549-560.
- Harwood, W. S. & McMahan, M. M. (1997). Effects of integrated video media on student achievement and attitudes in high school chemistry. *Journal of Research in Science Teaching*, 34 (6), 617-631.
- Jarvis, T. ve Pell A. (2002) "Effect Of The Challenger Experience On Elementary Children's Attitudes To Science". *Journal of Research in Science Teaching*. 39 (10) 979-1000.
- Jones, M. G., Howe A. ve Rua M. J.(2000) "Gender Differences in Students' Experiences, Interests, And Attitudes Toward Science And Scientists". *Science Education* 84, 180-192.
- Nuhoğlu, H. (2008) "İlköğretim Fen ve Teknoloji Dersine Yönelik Bir Tutum Ölçeğinin Geliştirilmesi" İlköğretim Online, 7 (3), 627-639.
- Özmen, H. & Kolomuç, A., (2004). Bilgisayarlı öğretimin çözümler konusundaki öğrenci başarısına etkisi. *Gazi Üniversitesi Kastamonu Eğitim Dergisi*, 12 (1), 57-68.
- Parkinson, J., Hendley, D., Tanner, H., Stables, A.(1998) *Pupils' Attitudes To Science in Key Stage 3 Of The National Curriculum: A Study of Pupils in South Wales*, Research In Science & Technological Education. 16, 2.
- Seferoğlu, S. S.(2004) Öğretmen Adaylarının Öğretmenliğe Yönelik Tutumları. XII. Ulusal Eğitim Bilimleri Kongresi Bildirileri. Ankara: 413-425.
- Sodenberg, P., Price, F. (2003) "An examination of problem-based teaching and learning in population genetics and evolution using evolve, Acomputer simulation". *International Journal of Science Education*, 25 (1), 35-55.
- Ussler, P. ve Hoffmann L.(2000) *A Curricular Frame for Physics Education: Development, Comparison with Students' Interests, and Impact on Students' Achievement and Self-Concept*. *Science Education*. 84, 689–705.
- Yalçınalp, S., Geban, Ö., & Özkan, Ö., (1995). Effectiveness of using computer-assisted supplementary instruction for teaching the mole concept. *Journal of Research in Science Teaching*, 32, 1083-1095.
- Yenice, N. (2003) " Bilgisayar Destekli Fen Bilgisi Öğretiminin Öğrencilerin Fen ve Bilgisayar Tutumlarına Etkisi" TOJET,4 (12). ISSN: 1303-6521.
- Yeşilyurt, S. ve Kara, Y. (2007). "Ders Yazılımlarının Öğrenci Başarısına, Kavram Yanılgılarına ve Biyolojiye Karşı Tutumlara Etkisinin Araştırılması" Ondokuz Mayıs Üniversitesi Eğitim Fakültesi Dergisi, 23, 75-84.
- Yiğit, N. & Akdeniz, A. R., (2003). "Fizik öğretiminde bilgisayar destekli etkinliklerin öğrenci kazanımları üzerine etkisi: Elektrik devreleri örneği." *GÜ Gazi Eğitim Fakültesi Dergisi*, 23 (3), 99-113.