

Chapter 13

Educational Computer Games in Math Teaching: A Learning Culture

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ABSTRACT

In this study, the effect of educational computer games on students' academic success and their attitudes towards mathematics were investigated. The study was designed as a mixed method. The results revealed that after the implementation, no significant variation was observed between both groups in terms of academic test scores and attitude points. However, qualitative findings indicated that students in the experimental group got more pleasure from the lessons and their attitudes towards mathematics were positively affected. Also, educational computer games are effective learning tools and create a positive affirmation on students. Although this study was conducted in the face to face classrooms, the findings would be transferred to other learning settings such as distance and online education. Therefore, the experience obtained from such technologically enriched learning environments is discussed in the context of distance and online learning.

INTRODUCTION

Being one of the oldest sciences of the history of humanity; mathematics has been evaluated from different aspects throughout history and is defined by scientists as; the science of numbers and shapes, a special language deciphering the nature and an intellectual game (Ülger, 2005). Mathematics that is a bag of abstract concepts is not an art that could be understood and liked by everyone. Redundancy and obscurity of abstract concepts have made mathematics a nightmare for people. Majority of children

DOI: 10.4018/978-1-5225-3076-3.ch013

who are born into this prejudice that has continued from past to present obviously have anxieties about understanding mathematics when they start school. Being defined as the state of fearing an expected peril; anxiety causes students to abstain from and fear mathematics and consequently believe that they would fail in the mathematics class (Cited from Baykul, 1999 by Yiğit, 2007). It could be suggested that mathematics education is complicated by not only the abstractness of math, but also the prejudices and anxieties of students concerning mathematics. In order to remove this problem and provide a success in mathematics education, it is primarily required to remove the prejudices and anxieties of students concerning mathematics and then concretize mathematical concepts. All these conditions might make it unavoidable to try new methods in mathematics education.

Technological developments and changes have enabled the reconstruction of the mathematics curriculum and the development of new methods for mathematics education (NCTM, 2000; Zbiek, Heid, Blume, & Dick, 2007). The studies suggest that technology will also affect mathematics education in a significant way (NCTM, 2000; Verschaffel, Greer & De Corte, 2007; Zbiek et al., 2007). While education and technology used to be defined as irrelevant concepts in the past; they have been united under the same roof and involved in the science world with the name “education technologies” today. Main material of education technology is computer. Education method that is developed by combining education with computer technology is defined as computer-aided education (Çankaya & Karamete, 2008). Uşun (2000) suggests that computer-aided education increases the motivation of students and enables them to learn by themselves and according to their own learning speed. It is seen that computer-aided education also comprises computer games. Majority of students consider computer games an up-to-date leisure time activity (Bunchman & Funk, 1996; Cesarone, 1998; Durkin & Barber, 2002; Subrahmanyam, Greenfield, Kraut & Gross, 2001). As a result of studies, it was determined that while primary and secondary school female students spent 5,5 hours a week playing games, male students spent 13 hours (Christakis, Ebel, Rivara & Zimmerman, 2004). Today, children spend the large part of their days playing computer games at every opportunity, which makes many researchers consider using computer games as an educational tool in classes (Prensky, 2001).

Educational games could make mathematics, which is a complement of abstract concepts, more interesting (Yiğit, 2007). Concretizing mathematical concepts with the help of diagrams and figures; educational games enable students to learn by practicing and experiencing, and have fun while learning. Students could directly reach the knowledge by trying and exemplifying with the help of educational computer games. Besides, educational computer games motivate students and enable their participation in classes. For all these reasons, educational computer games could be used as an alternative, a subsidiary and an enricher of other educational methods (Çankaya & Karamete, 2008). It could be suggested that the use of educational computer games in classes will make mathematics classes more entertaining.

Learning environments enriched with technology (virtual laboratories, computer laboratories, computer games etc.) also can be used in distance learning easily and they can contribute to learning process through distance education. In following parts of this chapter; game based learning, educational computer games in math teaching and learning, information on learning through distance education, method of the research, findings, conclusion and recommendations will be discussed.

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