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Impact of Kinect Game on Primary School Students' Mental Computation Speed

Ozgur Yilmaz, Istanbul University-Cerrahpasa, Turkey
Duygu Mutlu Bayraktar, Istanbul University-Cerrahpasa, Istanbul, Turkey

ABSTRACT

This article investigates the effect of kinesthetic educational game on students' mental computation speed. A Solomon four-group design was used to avoid the influence of pretest-posttest design. In order to determine which grade is appropriate for this game, a pilot study was conducted with 30 students. As for the main study, 123 students participated. First, the group was divided into two as control group and experimental group. The participants of the control group played a computer game while the members of experimental group played a kinesthetic educational game. According to Solomon, using a four-group model the study group was divided into 4 separate groups. The groups were randomly assigned and two of them were applied a pre-test. After the pre-test, in order to measure the attention level of students, a d2 test of attention was applied. The study lasted for 8 weeks in total. At the end of the study, a significant difference was found between the mental computation speeds of the experimental and the control groups. The second significant finding in this study was that there was a difference between the mental computation speeds of students depending on their cognitive characteristics. In other words, students with a low attention level finished the games in a longer period of time in comparison with students who have middle and high attention levels. It was concluded that students with a low attention level have lower mental computation speed. The results suggest that within primary school, Kinect-based exergames can be exploited as effective and motivational learning environments.

KEYWORDS

Educational Games, Exergaming, Game-Based Learning, Mental Computation Speed

INTRODUCTION

Today's children have grown up within digital technology. The digital world such as computer games, social media and internet has an important effect on children, who were introduced to technology at early ages, in terms of studying, playing games and even socializing. Games, which have served to humankind as the biggest part of entertainment for hundreds of years, now meet us in a digital form that people prefer just to spend their free time. Surveys on young people among many countries have shown that children spend a large proportion of their time with media (Blumberg, Blades, & Oates, 2013). Rideout, Foehr and Roberts (2010) reported that American youngsters between 8 to 18-year-olds play video games approximately for 1.15 hour on average and time spent on playing games is increasing day by day. In 1999, the average time that was spent for games was 24 minutes; in 2004 it was 49 minutes and in 2009 it turned out to 73 minutes. Vandercammen and Vandenbrande (2011) noted that teenagers in Belgium play game for 1.20 hour per day and the ones in Netherland play game for 1.61 hour per day. It is reported that at least 83% of children and adolescents in Singapore

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play games in 2011 (Gentile et al., 2011). Moreover, more than half of junior high school students have played online games in Taiwan (Tarng & Tsai, 2010). In Turkey, however, a rapidly increasing digital player profile has been reported. For this reason, educators are conducting numerous studies on whether digital games can be used as a supporting tool in education or not. If we can't benefit from the advantages that digital world encompasses children and adolescents, we will not be able to catch the spirit of the digital age in respect of revealing students' potential (Judson, 2010). Dr. Kawashima's Brain Training Game comprises a variety of puzzles that primarily involve mental calculations and memorisation. At regular intervals players complete a 'brain-age check', which provides feedback to the individual about his or her speed and accuracy in tasks. In this study the smaller and bigger (< – >) comparison game was selected to investigate the impact of Kinect game on students' mental computation speed.

REVIEW OF LITERATURE

Game-Based Learning

All types of games have been a way of entertainment for people for hundreds of years. All of the games from the simplest one to the most difficult one become entertaining, incentive and succeed to attract our attention. While playing a game, we are not only impressed but the games are the platforms which have their rules and restrictions, and require such skills as problem solving, critical thinking, time management and some other educational skills to be used (Gee, 2008; Prensky, 2007). Therefore, James Gee (2003) puts forward that students actually have these skills; thus, such kinds of skills need to be placed in a game platform. Although it is known that students have these skills, we cannot see these skills much in face to face educational model applied in a traditional classroom environment at schools. The students who are uninterested in the classroom and are not enthusiastic to participate the learning environment are able to play the games which are cognitively challenging and tiring for hours outside school (Gee, 2003; Prensky, 2007).

Well then, while students can be ambitiously preoccupied with high level cognitive processes during playing games why can't they do the same in a classroom environment? Marc Prensky (2007) explains this situation as such; games bewitch users because they are entertaining, different and interactive. Besides, they provide open targets, support learning via feedbacks and results, make users join their magical stories; and finally, they combine difficulty with contest and struggle in one place. In addition, it is supposed that games trigger cognitive and affective activity through gathering internal motivation sources such as struggle, control, wonder and imagination as a requirement of its nature (Malone, 1980; Malone & Lepper, 1987). While they are playing games, players actively experience the knowledge instead of getting it passively (Squire, 2005; Barab et al., 2012). When learning content is integrated into a game; learning is enhanced by interaction, meaningful experiments and learning principles inherent in games (Prensky, 2007; Gee, 2008).

Researcher Marino et al. (2012) in the study they performed with the participation of secondary school students (N = 876), notes that all of the participants prefer learning science course from a computer game instead of learning from schoolbooks, laboratory-based applications or internet-based platforms. For this reason, researchers are conducting studies on the educational potential of game-based learning as a tool that can reveal many skills. In particular, game-based learning platforms can combine learning content and skills in a single gameplay in order to improve cognitive and affective skills created by the gameplay of the game addressing educational purposes.

Exergaming

Exergaming consisting of the combination of "Exercise" and "Gaming" words, stands for a new generation game playing structure where player plays using his/her rough motor movements replacing the classic button click game structure where the player is immobile and plays game in a sitting position

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