Chapter 20
Gamified Assessment Supported by a Dynamic 3D Collaborative Game

Apostolos Mavridis
Aristotle University of Thessaloniki, Greece

Thrasyvoulos Tsiatsos
Aristotle University of Thessaloniki, Greece

Michalis Chatzakis
Aristotle University of Thessaloniki, Greece

Konstantinos Kitsikoudis
Aristotle University of Thessaloniki, Greece

Efthymios Lazarou
Aristotle University of Thessaloniki, Greece

ABSTRACT

This study examined whether a 3D collaborative gave can be used as a midterm examination method and investigated the impact of this game on students' attitude towards collaboration. A total of 89 students and one coordinating professor participated in this study. The intervention lasted five weeks and took place in a computer science department. The game that was used as a treatment was dynamic and therefore the educator was able to customize its content for the examinations using an administration panel. A mixed method of quantitative and qualitative data collection was used. The results indicated that there was a statistically significant correlation between the performance of the students on the game and their performance on the final paper-based examination. However, there was no statistically significant difference between the attitude of the students towards collaboration before and after the use of the game.

INTRODUCTION

The use of computer games in areas beyond entertainment is continuous. This is due to the fact that games have infiltrated our daily lives, whether they are played on a computer or on a portable device or even on TV. Computer games hold a strong position in our society (Oblinger, 2004). They are particularly likeable to young people who spend considerable time playing them at home (Downes, 1999; Harris, 1999; Mumtaz, 2001). By playing games, people acquire knowledge and skills like critical thinking and problem solving abilities (McFarlane, Sparrowhawk, & Heald, 2002).

The benefits of learning through games are too many (Mann et al., 2002) and they are much closer to realistic situations than the traditional educational means (Ebner & Holzinger, 2007). Some of the advantages of games are that they are new, attractive, they create better atmosphere and they keep the learner focused on the task that needs to be done (Heinich, Molenda, Russell, & Smaldino, 2002), so they can become a good suggestion for educational purposes.

Through educational games the learner is at the center of interest making the whole process more interesting, easier and more effective (Cheng & Su, 2012). Digital educational games are the means that can cause cognitive changes to learners (Erhel & Jamet, 2013). For that reason, many researchers agree that digital educational games fulfill the requirements to be used in education (Connolly, Boyle, MacArthur, Hainey, & Boyle, 2012; Moreno & Mayer, 2007; Prensky, 2001; Rieber, 2005). Thus, through gamification the proper conditions can be created so that the student can try new things and is not afraid of losing or failing (Lee & Hammer, 2011). Moreover, the student will be engaged in the educational process (Su & Cheng, 2013b).

Nowadays 3D game-based learning comes to enrich the benefits and the advantages of game-based learning. As Freitas and Neumann (2009) stated, student engagement can therefore be much higher with virtual worlds than with other hybrid learning methods. Besides engagement, 3D game-based learning's challenge and attractiveness can lead to learners' curiosity and immersion in a learning activity (Su & Cheng, 2013a). Moreover it increases student motivation for learning achievement. As Prasolova-Førland (2008) stated, 3D game-based learning can also lead to better conceptual demonstrations on complex scientific concepts, rich content engagement for learning and higher learning autonomy for students, as well as facilitating collaborations between physically remote students. Even though many argue that males are better at 3D games than females, Ke and Grabowski (2007) proved that gender does not have an impact on the learning achievement. Last but not least, a case study on teaching human computer interaction (Perera, Allison, Nicoll, & Sturgeon, 2009) has shown that at the end of the project, most students had constructed an interactive version of the shunting algorithm that worked correctly and had novel and engaging user interfaces.

Advancements in technology increased the amount of games where players need to collaborate to achieve a common goal (Zagal, Rick, & Hsi, 2006). Collaboration is a promising mode of human engagement that has become a twenty-first-century trend. The need to think and work together on critical issues has increased (Austin, 2000; Welch, 1998), causing to stress on from individual attempts to teamwork and from autonomy to community (Leonard & Leonard, 2001). When students work together the learning process becomes interesting and fun despite the repetitive nature of the learning process (Panitz, 1999). Moreover as Webb (1982) stated, collaborative learning develops higher level thinking skills. Furthermore, the success of one learner helps other students to be successful (Gokhale, 1995). According to Vygotsky (1980), students are capable of performing at higher intellectual levels when

Related Content

Environments for VE Integration
Maria Manuela Cunhaand Goran D. Putnik (2008). *Encyclopedia of Networked and Virtual Organizations (pp. 499-507).*
www.irma-international.org/chapter/environments-integration/17652

Augmented Reality Indoor Navigation Using Handheld Devices
Angelin Gladstonand Aadharshika Duraisamy (2019). *International Journal of Virtual and Augmented Reality (pp. 1-17).*
www.irma-international.org/article/augmented-reality-indoor-navigation-using-handheld-devices/228943

Discovering Communities of Practice Through Social Network Analysis
Cindi Smattand Molly McLure Wasko (2006). *Encyclopedia of Communities of Practice in Information and Knowledge Management (pp. 129-130).*
www.irma-international.org/chapter/discovering-communities-practice-through-social/10479

A Methodological Approach for Blended Communities: Social Network Analysis and Positioning Network Analysis
Susan Anneseand Marta Traetta (2011). *Handbook of Research on Methods and Techniques for Studying Virtual Communities: Paradigms and Phenomena (pp. 103-121).*
www.irma-international.org/chapter/methodological-approach-blended-communities/50336

Introduction
Laku Chidambaramand Ilze Zigurs (2001). *Our Virtual World: The Transformation of Work, Play and Life via Technology (pp. 1-8).*
www.irma-international.org/chapter/introduction/27926