Teaching Case of Gamification and Visual Technologies for Education

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ABSTRACT

This paper describes the use of gamification and visual technologies in a classroom for higher education, specifically for university students. The goal is to achieve a major increase in student motivation and engagement through the use of various technologies and learning methodologies based on game mechanics called gamification. Gamification is used to engage students in the learning process. This study adds learning methodologies like Learning by Doing to students’ collaborative work, and mixes teacher support with new, accessible technology, such as virtual reality and visualization 3D on the web thanks to WebGL. This creates a new management tool, called GLABS, to assist in the gamification of the classroom. Understanding the role of gamification and the technology in education means understanding under what circumstances game elements can drive a student’s learning behavior so that he or she may achieve better results in the learning process.

Keywords: 3D Education, Engaging, Gamification, Learning Management System, Mixed-Methods Evaluation, Oculus Rift, Problem Based Learning, Quest Based Learning, Virtual Reality, WebGL

1. INTRODUCTION

Engagement is the main objective in applying gamification (Kapp, 2012; Huotari & Hamari, 2012; Dixon, 2011). Gamification isn’t about turning the classes into a game; although the gamification technique is not truly an academic methodology, it may improve the performance of students in the learning process (Pozo, 1993; Trilla, 2011; Xu, 2012; Carr, 1998). Gamification is about applying game mechanics to any project, idea or situation (Zimmerman, 2003). In our case, we want to implement some game mechanics to make learning (Prieto, 2008) and instruction more fun (Sheldon, 2011; Hamari, 2014); consequently, this will allow longer
retention of the material among the students. To apply game mechanics and achieve a level of fun, we must first follow some rules. In gamification, rewards can be delivered through the creation of leaderboards, badges, and loyalty programs that encourage students to have fun and perform a learning activity as desired by the teacher. The gamification for learning purposes, we think, is not only about badges, rewards and points themselves; it is about measuring qualification and achieving motivation. Students need motivation when learning; they need the feeling of accomplishment and success of striving against a challenge. They need to feel that they have overcome a difficulty, to push them forward to the next level.

In this paper, a mixed-methods study evaluating the motivation, satisfaction and academic performance of degree students is presented. The methodology is both quantitative (through a structured test) and qualitative (using the Bipolar Laddering, BLA (Pifarré, 2007)), and it is based in the use gamification and the use of technology for 3D arts creation for multimedia purposes such videogames or films.

The working hypothesis to be confirmed is whether students who learn 3D with gamification techniques will obtain better academic results because they are more motivated and satisfied than they are under the classic working system. Our secondary objective is to ascertain through a mixed-methods analysis of quantitative and qualitative data the most positive and negative aspects of the experience, with the aim of adapting the implementation method in future iterations and for other subjects. Our final objective is to solve some needs for gamification creating a new tool for gamifying education. This new platform, called GLABS has the objective to use Schoology (Friedman, Hwang, Trinidad & Kindler, 2007) as an Learning Management System (LMS) and change its interface to produce a G-LMS (Gami-fied Learning Management System). GLABS allows users implement quick game mechanics for their courses, such as badges, analytics, progress bars, lives, portfolio 3D, adventure map, avatars, and such like. These elements are essential to produce a good classroom game mechanics. Understanding the role of gamification in education means understanding under what circumstances game elements can drive a student’s learning behavior so that he or she can achieve better results in the learning process.

For the last objective, we solve some needs for gamification creating a new tool for gamifying education. This new platform, called GLABS has the objective to use Schoology (Friedman, Hwang, Trinidad & Kindler, 2007) as an Learning Management System (LMS) and change its interface to produce a G-LMS (Gami-fied Learning Management System). GLABS allows users implement quick game mechanics for their courses, such as badges, analytics, progress bars, lives, portfolio 3D, adventure map, avatars, and such like. These elements are essential to produce a good classroom game mechanics. Understanding the role of gamification in education means understanding under what circumstances game elements can drive a student’s learning behavior so that he or she can achieve better results in the learning process.

The first section of this paper, includes an overview of good practices in education. The study of gamification for education and the
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