

Chapter 40

Game-Based Learning in an Online Environment: Effects on Student Engagement

Stephen Ko

The Hong Kong Polytechnic University, China

Eric Kong

 <https://orcid.org/0000-0002-8897-5827>

University of Southern Queensland, Australia

ABSTRACT

A game-based learning team exercise was specifically designed as a teaching tool which aimed to unlock the black box of cultivating student engagement in an online learning environment. In the exercise, online distance learning students were divided into police and prisoner groups whereby they were required to use different resources for catching the prisoners or for escaping from the police on a virtual map. The team exercise helped to create an innovative online learning environment that was active, cooperative, and encouraged student engagement, these being some of the key elements to enhance the quality of student experience. To evaluate the effectiveness of this exercise, an experiment was conducted using survey data from undergraduate students in an online learning environment. Results showed that the online class with a team-based activity had significantly higher scores in students' behavioral engagement than the other online class without a team-based activity while the differences in cognitive and emotional engagements were not significant.

INTRODUCTION

As many students have grown up with technology nowadays, it is second nature for them. Higher Education must take advantage of knowledge and use it to address students' educational needs. The advancement in Internet technologies has provided new opportunities for computer-supported collaborative learning activities in online environments. The Internet and related technologies enable learning anywhere and

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anytime, and present flexible and innovative channels for interaction (Burgstahler, 2000; Chickering & Ehrmann, 1996). For instance, instructors and students can collaborate virtually via computer networks (Hwang et al., 2012; Neo, 2003; Wang, 2010; Verdu et al., 2012). A simple online learning environment usually allows the instructor to generate and share contents, and provides a platform that facilitates the learner to interact with peers and the instructor on the contents (Nguyen et al., 2016). This enables and enhances learner-content, learner-instructor, and learner-learner interactions (Tawfik et al., 2017).

In collaborative learning environments, students work in groups to achieve learning outcomes together. When such environments are made available online, students can benefit from more interaction and participation with peers (Hrastinski, 2009; Morris et al., 2005). Studies show that a well-designed online course can further make the learning environment more engaging while allowing students to acquire high-order knowledge and problem solving skills (Gee, 2003, 2009; van Eck, 2007). This is because good online learning contents will involve students in an iterative problem-based learning process, through which they have to make decisions on embedded inquiries, experiment with solutions or strategies, and reflect on those strategies so as to develop new understandings or skills (Garris et al., 2002; Kiili, 2007).

With the 21st century concept of teaching in a Digital Age, Higher Education must evolve with the new era and adapt curricula to the present market needs and it is here that teaching methodologies must ensure that students are provided with the tools required to acquire those competencies demanded by the growth of a knowledge society (Aznar et al., 2017). Despite the advantages of using technology in an online learning environment, engaging online students remains a challenge to many academics. This may seem to be even more apparent when effective teaching involves skills such as teamwork, creativity and problem-solving. Game-based learning may help to enhance the skills since gamified activities can provide particular learning experiences where students are immersed in complex tasks in which these skills can be acquired and developed. In other words, game-based learning is able to draw connections between coursework and real-life and students are able to develop better critical thinking skills and thought processes around course concepts (Williamson & Sandford, 2011).

Game-based learning is not an entirely new concept and has been growing in the last decade or so in education (See e.g., Crocco, Offenholley & Hernandez, 2016; Manuel, Wolfgang, & Johannes, 2011). In a game-based learning environment, students learn new concepts and practise skills in a risk-free setting while their progress in a gamified activity is directly related to their understanding of the subject being taught (Hamari et al., 2016; Hwang, Hsu, Lai & Hsueh, 2017; Kiili, Moeller & Ninaus, 2018). Game-based learning helps to increase student engagement by fostering enthusiasm for a topic and allowing students to gain a better understanding of course materials in an enjoyable and interactive way (Hung, 2018; Williamson & Sandford, 2011). It gives students a customised learning experience in which students are afforded the opportunity to make mistakes in a risk-free environment, correct those mistakes and revisit course content (Manuel, Wolfgang & Johannes, 2011). A well-designed game-based learning experience, along with well-implemented learning tasks, has several advantages such as students being more engaged and motivated over traditional teaching methods and thus it is likely to assist students to acquire, for example, teamwork, creativity and problem-solving skills.

Game-based learning is one of the emerging instructional technologies most likely to be adopted in online Higher Education in the coming years (Crocco, Offenholley & Hernandez, 2016). As Gagne (2013: 7) has argued, 'instructional technology includes practical techniques of instructional delivery that systematically aim for effective learning, whether or not they involve the use of media.' Thus, the decision of applying game-based learning, especially in an online learning environment, requires careful consideration as the impact of the approach in a non-traditional virtual setting remains unclear. Using a

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