Application of Gamification to Blended Learning in Higher Education

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INTRODUCTION

Digital games have been identified as a teaching strategy that goes beyond conventional notions of pedagogy to create learning environments that feel "new, meaningful, and 21st century" (Johnson, Adams, Becker, Estrada, & Freeman, 2015, p. 34). The motivational aspects of games make them highly applicable in higher education to foster student engagement in learning (Connolly, E.A. Boyle, MacArthur, Hainey, & J.M. Boyle, 2012). However, a recent review shows that digital games are not being utilised to their potential in educational settings (Boyle et al., 2016). Research shows that the inclusion of digital game-based learning (DGBL) is often challenging for educators to implement in formal education learning environments (Faria & Wellington, 2004; Ritzhaupt, Gunter, & Jones, 2010; Van Eck, 2015). This chapter proposes the use of gamification in a blended learning environment as a low-risk strategy to promote more widespread use of DGBL in higher education courses. While gamification is an emerging strategy with many definitions associated with it, there is consensus that it involves "the integration of game elements, mechanics, and frameworks into non-game situations and scenarios" (Johnson, Adams, Becker, Estrada, & Freeman, 2013, p. 20). In this chapter, the relevant literature on blended learning, gaming, and gamification are reviewed, and an empirical case is presented, to illustrate the application of gamification to blended learning in higher educa-

tion. The design and implementation of a gamified blended course are discussed and future research directions are proposed.

BACKGROUND

Blended Learning

A current trend in higher education is the implementation of blended learning (Halverson, Graham, Spring, Drysdale, & Henrie, 2014; Johnson et al., 2015). According to Graham (2013, p. 334), blended learning is commonly used to "denote a combination of traditional face-to-face and online instruction." Blended learning evolved from the research into effective teaching practices in higher education which indicated that teacher-directed, lecture-style instruction prominent in higher education learning environments often resulted in "surface-learning" of content (Marton & Saljo, 1976). Deep and meaningful learning promotes metacognitive and higher order thinking skills which are supported by learning strategies such as collaborative tasks, engagement in discourse, reflection, and self-regulated learning (Garrison & Vaughan, 2008). Nonetheless, it has been found that some learning strategies tend to be more effective in one learning environment compared to the other. For example, collaborative tasks in face-to-face learning environments provide emotional support through opportunities "to create a sense of community and connectedness more quickly,"

which is lacking in the online environment (Garrison & Vaughan, 2008, p. 28). On the other hand, reflection and discourse through self-regulation of learning is not as strongly supported by face-to-face learning interactions. It is the asynchronous nature of online learning activities that encourages collaborative discourse, reflection, and self-regulation of learning outside of class (Vaughan, Cleveland-Innis, & Garrison, 2013). Blended learning environments are therefore beneficial for mitigating emotional distance (Vaughan et al., 2013) and developing metacognition and higher order learning skills (e.g., S. K. Taradi, M. Taradi, Radic, & Pokrajac, 2005; Tsai, 2014).

Various frameworks have been proposed for designing blended learning. For example, Wu, Tennyson, and Hsia (2010) found that a combination of the following factors: cognitive (e.g., computer self-efficacy), technological (e.g., flexible access to online activities) and social interactions, contributed to learner satisfaction. Another framework that has been most prevalent for informing blended learning design is Garrison and Vaughan's (2008) community of inquiry (Halverson et al., 2014) where social and cognitive presence is addressed in the face-to-face and online environment. According to this framework, social presence is best promoted through learning activities (e.g., wikis, blogs) that engage students in small group discussions, collaborative research, and cooperative group work (Vaughan, Cleveland-Innis, & Garrison, 2013). Cognitive presence in the online environment is developed through inquiry with the community of learners, using ongoing reflection and critical discourse. Many online learning activities, such as WebQuests, videos, simulations, and games provide learners with opportunities to gain knowledge and participate in a community of online inquiry (Figg & Jaipal-Jamani, 2015).

Digital Games

Generally, digital games are identified by a set of common characteristics that include explicit rule systems and players, visual and auditory components, action and conflict, players competing against each other, or the game system, and the attainment of an outcome or a clear and quantifiable goal (Gee, 2013; Salen & Zimmerman, 2004). Additionally, it is the interactions among the technology, player thinking, and social interaction that create the gaming experience for players (Shaffer, Squire, Halverson, & Gee, 2005). Three corresponding constructs, rules, play, and culture, as described by Salen and Zimmerman (2004), provide educators with a simple framework to understand how games are designed to promote the gaming experience. Rules refer to the features used to organise the game such as the structure, elements, and mechanics. These design features determine player input and output, what choices players make, and what the outcomes or rewards of the game are. Play describes players' immersion experiences with the game and includes motivation to play and the tactics and strategies used while playing. Culture encompasses the larger context of the game which could be fictional or nonfictional and includes values, narrative, and community building. It is the use of a combination of these game features (rules, play, and culture) that capture the player's attention and enable the player to experience emotional well-being (e.g., happiness, pleasure) and satisfaction of psychological needs such as autonomy, competence, and relatedness (Ryan, Rigby, & Przybyiski, 2006; Weber & Shaw, 2009).

Digital Games in Educational Settings

The use of digital games in educational settings has gained momentum because of the many benefits for the workplace and learning attributed to playing games. For example, many of the workplace skills employees are expected to have are similar to the skills that lead to success in gaming, such as strategic thinking, problem solving, and adapting to change (Federation of American Scientists, 2006). Many characteristics of the gaming environment are also purported to support development

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