Chapter 33
Using Gamification to Engage Higher-Order Thinking Skills

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ABSTRACT

Critical thinking and other higher-order thinking skills are key objectives of higher education. Through the development of higher-order thinking skills, students are able to discern information from multiple, often competing sources, make sound judgements, draw conclusions, and enact creative solutions to complex problems. However, faculty can struggle with how to help students develop higher-order thinking skills, relying instead on transmission of knowledge, focusing on what to learn instead of how to learn. In this chapter, the author provides insights into the connections between using gamification as a pedagogical approach, and the development of higher-order thinking skills. The chapter addresses perspectives on higher-ordering thinking, approaches to gamification in college courses, and concludes with recommendations for faculty in approaching gamification.

INTRODUCTION

The development of higher-order thinking skills is a primary goal of higher education (Behar-Horenstein & Niu, 2011). Through higher-order thinking, students are better able to make judgements about competing perspectives and generate their own solutions to complex issues. However, many faculty struggle with structuring their courses in ways that help students develop such critical thinking skills. Instead, faculty structure their courses to transmit knowledge, and help students learn "what to think rather than how to think" (Daud & Husin, 2004, p. 478 as quoted in Behar-Horenstein & Niu, 2011, p. 215). There are various approaches to addressing the development of higher-order thinking skills in higher education. Gamification of learning is one such approach that has gained increased attention in recent years.

Games can serve as powerful learning tools (Kapp, 2012; Nordby, Øygardslia, Sverdrup & Sverdrup, 2016). Today's students almost expect something like gamification, due to their comfort with technology, and their expectations to be engaged beyond traditional lecture approaches (Lister, 2015). Learning

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comes about through game play because games designed around educational outcomes require players (e.g. students) to learn in order to progress in the game (Ke, Xie & Xie, 2016).

The approach of using games to promote learning is not new. Dewey (1938) emphasized the importance of experience in learning. Piaget (1953) observed children at play as he began theorizing cognitive development. Vygotsky (1978) considered play (particularly cooperative play) quintessential to children's cognitive and emotional development. Gamification in education offer a means for students to experience something they might not otherwise experience (e.g. via simulation), approach learning tasks through play, and engage with other students in novel or unique ways. It makes sense that games are used for learning. Games and courses share similar characteristics: a goal, rules/guidelines for reaching the goal, voluntary participation, and feedback systems (Kulpa, 2017).

At its base level, gamification is about taking something that is not ordinarily approached as a game, and turning it into a game (Lopez & Tucker, 2017). Gamification can function as a motivator, serving as a tool to nudge students to engage in particular activities (Tan & Hew, 2016). In the context of college-level courses, faculty work to accomplish this in a variety of ways. The desired outcome of gamification is often to increase student motivation to engage in the course (Plass, 2017). When attempting to increase student motivation, faculty are often pursuing a deeper goal: promote students' use of higher-order thinking skills. Gamification represents one possible strategy faculty can draw upon to help students progress from simplicity to complexity (Langehdahl, Cook & Mark-Herbert, 2016).

Some differentiate between gamification and game-based learning (Tan & Hew, 2016), but the author of this chapter uses gamification and game-based learning synonymously. The author uses the term in this way for two reasons. First, the author has been careful to use terminology as reflected in cited texts. Second, the author makes a point throughout the chapter that faculty borrow ideas, concepts and approaches from gamification and game-based learning in ways that suit their educational aims, teaching styles, and individual preferences and tastes. From the author's perspective, gamification and game-based play are both about turning something into a game (e.g. a lesson on economics or a full history course) that was not originally conceived as a game. They share the common goal of using gamed elements to make learning more engaging and fun (Kapp, 2012).

In order to consider the uses of gamification for any aim, we need to take a step back and consider some basics. The first basic is to provide an operational definition of what constitutes a game. At its root, a game is comprised of a goal, rules, a feedback system, and voluntary participation (Farber, 2015). Every game has a goal to reach or accomplish. Otherwise, what's the point? Rules for gameplay guide the player toward the goal of the game. Further guidance is provided through a feedback system, such as a score or progress indicator. When it comes to voluntary participation, Farber (2015) noted that even if students are required to use a game as part of a course, they ultimately make the choice to play the game, or simply work through the tasks required.

Gamification relies on the use of game elements, which include an interface, game mechanics, and clear goals for the user (Cheong, Filippou & Cheong, 2014). Other game elements would come into play depending on the modality of the game; if the game were an analog design (e.g. like a board game played in person), some elements would not be utilized compared to a digital game (e.g. like a quest-based game played on a computer or tablet). Faculty should not confuse visual elements, especially progress bars, badges displays, or even leaderboards, as central game elements (Cheong et al., 2014). What matters before making choices about game elements is to focus on learning objectives that a student would address by playing the game (Kapp, 2012).