Instructional Design Applications of Gamification in Post Secondary Courses

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This paper reviews and analyzes existing research on gamification in order to determine if a strong case can be made for its use by instructional designers developing online post secondary courses. A case study on two online graduate classes is examined to determine how gamification can be implemented in higher education and how it affects learning. These techniques are then analyzed in terms of what they could mean for instructional designers and recommendations are made for their use.

Scope of Discussion

In recent years, gamification has become a buzzword and a growing trend in education. Both digital and non-digital forms of game play have made their way into K to 8 classrooms as well as higher education. This growing popularity would seem to suggest that gamification has been proven to be effective and can therefore be applied by all educators and course designers with positive results; however, this is both a broad and hasty conclusion to make. Educators and designers must guide their practice based on existing studies and literature rather than the trend of the moment.

In order to explore the literature and make conclusions about the efficacy of gamification in a targeted way, a clear definition of the term but first be established. Gamification often gets conflated or confused with game-based learning, which refers to “serious games” that are created specifically with the intention of teaching (Keener, 2017a). An example of a serious game is Minecraft Education (Kastrenakes, 2016), which takes the popular game,

Minecraft, and adapts it for elementary and high school curriculums. Students learn by playing the game as the lessons are imbedded directly within it (Landers, 2014).

Gamification differs in that it is the application of select game-based elements to educational settings and does not necessarily require technology in face-to-face learning environments (Keener, 2017). Elements like rewards, autonomy, instant feedback, conflict/ challenge, game fiction, and rules/goals can all be used to gamify a course (Landers, 2014). Gamification also differs from game-based learning in that learning does not happen as a direct result of interacting with these elements. Instead, these elements influence learners' attitudes and behaviours, which cause them to be able to better engage with and learn from course content. Landers sums this up by stating that "although one might claim that they *learned from a game*, it would generally *not* be valid to say that they *learned from gamification*. Serious games and gamification share a common toolkit of game elements, but the processes by which these elements affect learning differ" (2014).

This paper focuses on gamification rather than game-based learning because the former is more likely to be implemented in higher education and it is more relevant to the instructional design focus of this paper. Van Eck (2015) states that "digital games may have everyone's attention, but there is not enough research to guide their use. Academia depends on experts to carefully examine products and provide evidence-based demonstrations of effectiveness…" There simply isn't enough research to justify the extensive, time consuming, and costly changes required to implement game-based learning in higher education. It makes more sense to make a case for gamification as it would be more likely to have an impact on higher education in the foreseeable future. Gamification is also more relevant to instructional design practices as

instructional designers have more say in developing a gamified course than they would an educational game.

Analysis of Case Study

Calongne's case study on gamification in graduate courses (2005a; 2005b) will be examined in order to make connections to instructional design practices. Two graduate level courses delivered through the Blackboard learning management system (one completely online and one hybrid) were used for this study. The goal of gamifying the courses was to increase participation, collaboration, and communication. It was also intended to create "opportunities to reduce anxiety, encourage early teamwork and remap the perceptions and beliefs on the value of online teamwork" (Calongne, Henderson, & Wilson, 2015). A fictional game-based metaphor was applied to the course in different ways to immerse students in a game-like experience and improve learning.

Just as with games, rules and goals were established so that learners could understand what steps they needed to take to "win" (Landers, 2014). Students were asked to choose a reward at the beginning of the course. They decided on gold and a Treasure Hunter metaphor in which students collected gold was adapted to the course. Action language (Landers, 2014) was used to reward gold to students for participating in discussions, group projects, and other course activities: "When students offered insights that were noteworthy, the instructor typed or said *Ka-ching!* in the feedback, and described the sound of coins owing into their coffers as she addressed mastery of the concepts" (Calongne et al., 2015). A "Treasure Hunter Report" that used character names ranked students from highest to lowest based on how much gold they had. This embodied

elements of conflict/challenge, rules/goals, assessment, and feedback also seen in games (Landers, 2014).

Rewards

Using extrinsic rewards (gold) increased student engagement and motivation. Students were more likely to engage in and complete course activities because they wanted to earn more gold and rank higher amongst their peers. Allowing them the opportunity to chose what type of reward they'd be receiving ensured the reward was meaningful, valued, and would consequently motivate learners to do better in the course. As students earned rewards and ranked higher, they experienced intrinsic rewards such as personal achievement, responsibility, power, fun, and mastery (Keener, 2017).

Attitudes and Behaviours

Integrating these aspects into course tasks ultimately improved learning by changing learners' attitudes and behaviours towards their work. Students in Calongne's study initially lacked engagement and motivation when it came to group work. This was likely due to a lack of interest and boredom with the overall course content and design. Gamifying the course changed these perceptions by turning the traditional format of the course into a more engaging game-like one. Immersing students in a playful learning environment (a treasure hunt) with character names added a fun and novel twist to the course, which sparked interest amongst learners.

Changes that occurred to students' attitudes and perceptions altered how they approached their coursework. In addition to lower grades, students were given additional consequences for not completing tasks as they would also receive less gold and not rank as high amongst their peers. This led students to think and act more on decisions they had to make in the

course (Keener, 2017), which ultimately led to students spending more time working on projects and overall better performance (Landers, 2014). In the fully online class, 71% of students made earlier and more substantive posts as compared to past classes. The volume of posts also increased by 29 to 45% in both classes and the majority of students completed their final projects a week earlier than past classes (Calongne et al., 2015).

These changes in attitudes and behaviours towards course goals and content are what lead to learning. As Landers states, "gamification practitioners do not generally seek to influence learning directly; instead, the goal of gamification is to alter a contextual learner behavior or attitude (e.g., engagement), which is intended to improve pre-existing instruction as a consequence of that behavioral or attitudinal change" (2014). Gamification did not directly cause learning to happen. Instead, it caused changes to student attitudes and behaviours and learning happened as a result of these changes. A testament to these changed perceptions and behaviours was the fact that students did not want to stop "playing the game" even after the course ended (Calongne et al., 2015).

Autonomy

Gamifying the course gave learners a sense of control and autonomy in the learning process. Students were able to choose what reward would be used. They were also able to work ahead and perform additional tasks such as mentoring their peers or demonstrating leadership skills in order to receive additional gold (Calongne et al., 2015). Giving students these options allowed them to more actively engage in the learning process and construct their own knowledge. It also satisfied a psychological need for motivation and allowed students to work at their own pace to a certain extent (Keener, 2017). Rewarding this behaviour encouraged students

to continue making active choices about their learning, which lead to more tasks being completed. Students in the fully online class completed 85% of additional activities (Calongne et al., 2015). This made mastery of the course material much more likely.

Stress/Anxiety

Gamifying the course reduced stress and anxiety levels, which also improved learning. Increased engagement and motivation led to increased and earlier instances of course work, which meant students were completing their work more efficiently and did not feel as overwhelmed at the end of the term (Calongne et al., 2015). Having a Treasure Hunter Report that provided feedback on students' progress also ensured they wouldn't fall behind. Character names were used in place of real names to ensure anonymity, which prevented anxiety amongst learners who felt they weren't doing as well. Providing this form of ungraded feedback reduced stress by ensuring students did not feel punished for not doing as well. It also allowed opportunities to identify and address areas of improvement (Keener, 2017).

Instructional Design Implications

Calongne's case study offered multiple examples of gamification that could be useful for instructional designers developing courses for higher education; however, a few considerations must be made before even considering implementing them. First, in order for these techniques to be useful, the course content itself must be well written and designed based on established instructional design and pedagogical techniques (Landers, 2014). As previously mentioned, gamification itself does not directly cause learning. It causes increased engagement with course content. The lessons embedded within the course content are what cause learning to

occur; therefore, even the most well developed and implemented gamification techniques may be pointless if the course content itself does not teach learners anything (Landers, 2014).

Another important consideration for instructional designers is whether a course should even be gamified to begin with and how to go about doing this. The techniques used in Calongne's case study show promising results. Calongne et al. (2015) also identify at a seemingly great opportunity for instructional designers to streamline the gamification process. "Motivating the learners, getting everyone energized and hosting a great game requires a great implementation and hard work, at least initially. Once the learners assume ownership of the game, the burden on the instructor shifts and the game feels like an organic part of the class and quite natural" (Calongne et al., 2015). Instructional designers may be able to reduce a lot of the initial work and burden instructors face by embedding gamification directly into the architecture of courses.

Depending on the capabilities and restrictions of the learning management system being used (Blackboard, Moodle, Canvas, etc. [Riddell, 2013]), gamified course templates could be created in order to embed gamification techniques directly into courses in different ways. Each template could use a specific combination of a theme, characters, and rewards in order to create a immersive game-like environment. An automated leaderboard could be built directly into the course so that instructors do not need to manually add and track scores (Calongne et al., 2015).

Additional elements could be beneficial for instructional designers to implement into gamified course templates (again, this will depend on the capabilities of the software used). A course could be designed to keep track of students' "levels". Students could start the course at

level zero and then achieve higher levels as they complete assignments and discussion posts (Landers, 2014). The higher the level the students achieve, the more difficult or conceptually complex the course content and/or assignments could get and the more rewards they would receive. This scaffolding is reflective of how players progress through games as they experience increased difficulty, higher stakes, and more significant rewards.

In theory, integrating the aforementioned gaming techniques directly into courses would be the least time consuming and most cost effective way to approach gamifying a large number of courses; however, it would ultimately prove to be ineffective because gamification can not be implemented in such a one-size-fits-all manner. In post secondary courses, learners and course content can vary significantly from one course to the next. Consequently, learners will vary in regards to what rewards they value and gaming experiences they relate to. Certain gamification techniques may be effective and/or appropriate for one set of learners and courses and may be entirely ineffective for others. Some courses may benefit from different combinations and varying degrees of game elements while others may not benefit from gamification at all (Keener, 2017).

Every learning situation is different and, therefore, requires an individualistic approach to gamification that takes into account course content and goals as well as learner attitudes and values. The only way that instructional designers can implement gamification in an effective way is if it were done on a course by course basis. Instructional designers would need to ensure that they make careful decisions regarding what game-based elements to include as improperly designed gamification ultimately fails to engage learners, alter attitudes and behaviours, and meet learning goals (Landers, 2014). “Future successes in this area will come from careful

planning and design; from selecting game mechanics and rewards that map to the beliefs and values of the participants, and for selecting metaphors and game characteristics that support how the players feel about the tasks and their importance" (Calongne et al., 2015).

Limitations and Future Considerations

One limitation of this discussion is that it does not explore the capabilities of individual learning management systems used in higher education in great detail. A very general application of gamification is proposed in the absence of knowing the specific capabilities and limitations of different softwares used. Future research should focus on specific learning management systems in order to further explore opportunities for gamification and the feasibility of these techniques.

Another limitation is that there is little research to justify how "careful decisions" in regards to implementing gamification can be made. Gamification is still very new to education in general and much of the existing literature pertains to game-based learning rather than gamification. Furthermore, existing research makes broad conclusions about gamification and does not isolate and analyze specific aspects of gamification techniques as they pertain to learning or instructional design (Landers, 2014). This makes it very difficult to study specific gamification techniques and make conclusions about which ones would work best with specific courses and students. Determining what game mechanics, characteristics, rewards, and metaphors best suit specific learners in online classes will be difficult to do until more research is conducted on gamification in high education.

Gamification is a growing trend that appears to offer many opportunities for improved learning in post secondary learning environments; however, the lack of research that exists

means that colleges and universities are wary to begin using it more. More research must be done to evaluate connections between gamification practices and learning outcomes as this may lead to gamification being welcomed more readily into post secondary settings. If this happens, instructional designers must ensure they implement gamification into courses on a case by case basis rather than using the same techniques across courses.

References

Calongne, C. (2005a). Let's Play: Using Game Design in Our Online Course Rubrics, TCC 2005 Worldwide Online Conference.

Calongne, C. (2005b). Playing to Enhance Learning: Using Game Design in Our Online Course Rubrics, TCC 2005 Worldwide Online Conference.

Calongne, C., Henderson, S. B., & Wilson, D. (2015). Gamification Challenges and a Case Study in Online Learning, *Internet Learning*, *4*(2), 84-102.

Kastrenakes, J. (2016). Microsoft launches Minecraft: Education Edition for schools, *The Verge*. Retrieved from https://www.theverge.com/2016/11/1/13489340/minecraft-education-edition-launches.

Keener, C. P. (2017a). Game-based learning considerations for instructional designers, *On the Horizon*, *25*(4), 235-241.

Keener, C. P. (2017b). Instructional design talks to game design, *On the Horizon*, *25*(4), 253-259.

Landers, R. N. (2014). Developing a Theory of Gamified Learning: Linking Serious Games and Gamification of Learning, *Simulation & Gamin*g, *45*(6), 752-768.

Riddell, R. (2013). 12 learning management system providers and what they bring to classrooms, *Education Dive*. Retrieved from https://www.educationdive.com/news/12-learning-management-system-providers-and-what-they-bring-to-classrooms/97613/.

Van Eck, R.V. (2015). Digital game-based learning: still restless, after all these years, Educause Review. Retrieved from https://www.researchgate.net/publication/284178854_Digital_game-based_learning_Still_restless_after_all_these_years.