Gamification and Manipulation

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Gamification is the application typical elements of game playing to other areas of activity, typically as an online marketing technique or another form of business (Hamari & Lehdonvirta, 2010; Vinichenko, Melnichuk, Kirillov, Makushkin, & Melnichuk, 2016) or education (Hanus & Fox, 2015). While the techniques are certainly not new, the rise of the video game industry in the 1970s and 1980s fostered a new wave of research into gamification. In recent years, technology and understanding have helped to bring gamification of classrooms, technical learning, and computer science. Some of the implementations are moderated via technology, using software, video games, specialized learning management systems, and other digital tools. Others are more analog in their implementation, like Dungeons and Dragons, but still actively apply techniques of play and competition directly onto the pedagogical experience.

In game studies, the terms "games" and "play" are usually built from Caillois' notion that paidia and ludus are the two opposites of play (Caillois, 1958). Paidia means spontaneous play (Vader, 2012), a "free-form recombination of behaviors and meanings" (Deterding, Dixon, Khaled, & Nacke, 2011). Ludus, on the other hand, means controlled play; "games with rules, manuals, limits, and instructions are part of this context" (Vader, 2012). With this definition, it is fair to say that games are characterized by a well-defined and known set of rules that encourage players to accomplish specific goals (Juul, 2011). Since gamification is applying the principles of gaming to non-gaming contexts, the principles need to be defined. Dicheva, Dichev, Agre, and Angelova (2015) reviewed many studies across educational disciplines and distilled these general elements of gamification: storylines, feedback, levels or stages, points, progress bars, leaderboards, prizes or rewards, and badges. It should be noted that a gamified experience may not contain all these principles.

Benefits of Gamification

Games are adaptive, which gives us flow (Prensky, 2001). Gamification has been shown to increase a player's intrinsic motivation (Banfield & Wilkerson, 2014; Sailer, Hense, Mandl, & Klevers, 2013; Su & Cheng, 2015), which has a dramatic effect on learning outcomes (Deterding et al., 2011). Extrinsic motivation drives a student to progress because of their grades, possible suspension, or some external motivation (Ryan & Deci, 2000). Intrinsic motivation, however, drives a student to attend classes because "they hunger for more information, they want to be there, they are involved and their self-efficacy soars" (Fotaris, Mastoras, Leinfellner, & Rosunally, 2016). For a classroom to transition from extrinsic to intrinsic motivation, it must focus on the needs of the student (Fotaris et al., 2016). Applying gamification to pedagogy is a method of invoking this change and getting students to want to engage regularly (Hickman, 2010) which can lead to improved learning outcomes (Shin, 2006; Song, Kim, Tenzek, & Lee, 2013).

Some higher-level concepts that can be applied to an activity are progression, goal-focused activities, and rewards. This allows the student to take a more active role in their learning experience. The concepts can help motivate a learner to continue progress, provide the student with a clear understanding of progress, and provide clear instructions on how to continue progress. This progress, like leveling up a character, engrains the learning with positive reinforcement and drives the student to work harder to progress more. In most cases, the use of collaboration and competition will compound the motivational, intrinsic factors (Chou, 2015). In their study, Morillas Barrio, Muñoz-Organero, and Sanchez Soriano showed "that the impact of variables such as learner motivation, attention, and learning performance is significantly higher

in those learners exposed to gamification techniques." (Morillas Barrio, Muñoz-Organero, & Sanchez Soriano, 2016).

Gamification Hype

Gamification, has been seen as a cashcow due to the concept beign over-hyped. While its use was most notable in marketing via mobile app, usage was often seen with a company seeking to attain greater productivity from employees. What started out as scaffolding to build interactive experiences for customers, ended up being another trend that has, thankfully, died down considerably. There are many gamification can be rendered ineffective in an specific setting.

Just like there are dozens of video game generes, there will not be a single gamification design that is appealing to all students. Knowing your audience is crucial for gamification; really, that can be said for any design process. While not all students are motivated by badges, some students are "driven to be the first to get a badge" (Kocadere & Çağlar, 2018). In the last decade, there have been several case studies specifically concerning gamification as part of formal pedagogy. Sanchez, Young, and Jouneau-Sion implemented a gamification platform called Classcraft for classroom management and reported positive feedback from both students and teachers (Sanchez, Young, & Jouneau-Sion, 2017). Classroom gamification has been either proposed or implemented in pedagogical environments in many disciplines, including literacy education (Kingsley & Grabner-Hagen, 2015) and pharmaceutical training (Sera & Wheeler, 2017). Despite the wide adoption of Classcraft, there has been consistent concern, albeit actual research, about the platform's punishment system. The simple truth is, you cannot apply binary or randomized punishments to human situations; the variables are simply to great to be one size fits all.

While there have been many instances of gamification applied to formal educational settings, there are relatively few instances of the gamification of computer science education, either in formal classrooms or informal learning contexts. Morrison and DiSalvo (2014) detailed Khan Academy's use of gamification techniques; which is possibly the largest use of gamification in math and computer education. It is very likely that Khan Academy's ability to achieve a user base of more than 12 million active users every month in 2017 is accredited to these techniques (Khan Academy, 2017). Aside from purely being more attractive to students, studies have shown that those who use Khan Academy regularly report higher scores on standardized tests (Murphy, Gallagher, Krumm, Mislevy, & Hafter, 2014). The data on whether gamification played a role in student success is unknown.

Landers and Landers developed a theory of gamified learning and implemented competition techniques in a classroom (Landers, 2014; Landers & Landers, 2014). They used leaderboards, progress charts, and ranking (competition) with "time on task" performance and found "leaderboards supported a causal effect. Students with leaderboards interacted with their project 29.61 more times, on average, than those in a control condition." (Landers & Landers, 2014). Cooperation and competition need not be mutually exclusive and often work well together (Tauer & Harackiewicz, 2004).

Ethics

There's a very real and strong debate about the ethics behind gamification. The best way to ensure that participants do not feel manipulated is to ensure there is full transparency on the game's intended purpose, and allow participants to opt-in, or as the case may be opt-out, of the system (Chou, 2015). This is a staple around education on gamification nowadays. Warren and Lin (Warren & Lin, 2011) suggest thinking about whether the underlying values of the game or

simulation are something that the system should be teaching. There are a few questions that should be asked as part of the analysis component that can lead the discussion about ethics down a fruitful path: "does [the] design have any inherent values that may contrast with what is best for the audience?" (Warren & Lin, 2011) and "could there be unintended consequences of [the] design?" (Warren & Lin, 2011).

While gamification is a form of manipulation (Chou, 2015), one must understand what manipulation really is. "Saying 'please' is a form of manipulation" (Chou, 2015). If a person had decided to not do something for a friend, but that friend said "please" in a sincere manner and offered nothing tangible in addition to the statement, then manipulation has occurred (Chou, 2015). The follow-up reward of a "thank you" is an intrinsic emotional reward that makes the person feel that the action was worth the effort to do.

Conclusion

Design and communication are tools. As with any tool, they can be used to help or to harm. While a hammer is intended to drive a nail into wood, it can certainly be used as a weapon. While gamification may appear to be pure manipulation on the surface, gamification offers informed choices. Information and the ability for participants to choose if they will continue playing ensure that the negative connotations of manipulation are never a factor. Only with honesty, respect, and integrity, can a fruitful educational gamification design be implemented. While there is a lot of research available, it was difficult to find empirical data that directly tied improvements in grades to the gamification. Future research should be focused on this correlation, and more specifically, on the correlating which gamification elements are the most beneficial to student outcome.

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