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Gamification: Ethicality and Efficacy

Introduction

Components of games are increasingly invading all aspects of our lives; frequent flyer points, Instagram likes, streaks on exercises apps, step counters, and corporate rewards incentives. Even activities that involve exploring remote areas of nature are succumbing to gamification with patches and clubs for hiking peaks or visiting parks. Together, this trend is known as “gamification” and is commonly defined as applying game mechanics to non-game, non-entertainment purposes (Hon, 4). Typically, this takes the forms of adding points, badges, leaderboards, levels and quests to non-game activities. At its best, gamification can increase motivation and make dull tasks more enjoyable. At its worst it can be coercive and manipulative, trying to affect behavior in individuals on a mass scale. This paper will explore both historical and contemporary examples of gamification, with special attention to how gamification is being used in educational contexts. Throughout the paper we will question if gamification is both ethical and effective.

History of Gamification

It is hard to point to the first example of gamification because of just how entrenched some aspects of games are in daily life. As early as the mid 19th century, Russian scientist Dimitri Mendeleev is believed to have used gamification in his process for understanding elements and their relationships. By placing cards on a table to facilitate his visualization of the

elements and their relationships to each other, a gamified structure endured that led to the Periodic Table of Elements (“5 Benefits of Gamification”). Companies began using reward points to encourage customer loyalty as far back as 1896 (Fitz-Walter). Merit Badges, introduced by the Boys Scouts in 1908 to confer completion of an activity (Fitz-Walter) are often cited as an early analog version of the badges that are ubiquitous in gamified experiences today. In the 1970s and 1980s, as video games were being invented and refined, researchers began exploring how games can be used to motivate workers. American Airlines introduced frequent flier miles in 1981, awarding points to encourage customer loyalty, something that is practiced by almost every company today.

The Internet and proliferation of Internet connected devices increased the breadth of activities that could be gamified. In 2007, Chore Wars turned dull, household tasks into a fantasy-based game. It was the advent of the mobile phone that led to an explosion of gamified experiences. One of the most widely noted examples of contemporary gamification is the advent of the 2009 app FourSquare which utilized a phone’s GPS to allow users to check-in to a business, awarding points and making the most frequent visitor the “Mayor,” thus gamifying the act of patronizing a business. Gamification is also reaching into the most unexpected arenas such as driving. New technological advances in electric and hybrid cars employ gamified interfaces that measure energy consumption per trip and encourage drivers to conserve more on their next trip.

Although gamification is now used across many domains, there are areas where it is more prevalent and the promises of its utility are greatly hyped. Fitness / Self Help, workplace incentives, and education are areas where gamification has become almost an industry standard and thus deserve a closer analysis.

Fitness and Self-Help

The diverse and broad self improvement domain, from fitness to goal setting to weight loss and more, has long used gamification to make these often difficult, mundane tasks more desirable, attainable and enjoyable. Step measuring machines drawn in Leonardo DaVinci's 15th century sketchbooks, and Thomas Jefferson's 1788 "Tomish Meters" show that measuring steps, thus fitness, has always been a human fascination (Guidos). Since the conception of the "App Store" in 2008, fitness apps have rapidly expanded and today include apps for any fitness activity a person might indulge in, including broader health related activities such as mental health, medical health and spiritual health. Fitness apps such as Fitocracy, Strava, Map My Run/Ride, and Peloton use gamification for setting individual goals as well as allowing members to opt in to competitive challenges between members on the platform with the idea that these features will improve the intrinsic motivation for better fitness. Goal setting apps such as Habitica and Coach.me, and weight loss apps such as MyFitnessPal and Noom use individual and group aspects of gamification that the user can opt into to support their needs. These features are marketed to people based on popular assumptions that gamification, such as badges, will enable users full control of self improvement.

While these apps certainly help build revenue for the companies creating them, research has not proven unequivocally their success and more studies are needed to determine the efficacy of gamification to change behavior (Hamari, 469). On one hand, a person opting in to gamification on a self-help app is doing so based on their individual motivation which can result in a positive experience and further motivation. However, typically the gamification aspects of self-help apps are in place not for personal motivation for the user, but rather a way to increase revenue for the company. Gamification practices such as Apple's exercise rings, or Strava's

fitness streaks can work against a user's goals by employing competitions that could cause injury, take focus off of a user's personal goal, or inspire users to continue an activity even when it is unhealthy or detrimental which raises ethical concerns across the self-help industry.

"Gamified apps routinely overclaim their benefits, some otherwise well-behaved apps inadvertently lead their users to damaging behavior, and many contribute to an unhealthy culture of constant self-monitoring and competition" (Hon, 35).

Workplace

Although individuals often have a choice to use gamified apps to track their fitness or well-being, this is not always the case. Gamification has been employed in the workplace where individuals don't have the ability to opt-out. "In the absence of scrutiny, new forms of gamification have flourished. Some are harmless, aimed at helping you learn a new language or play the piano. Others are coercive and abusive, like those monitoring millions of workers in warehouses and taxis." (Hon, 30-31). Gamification is a growing trend within the gig-economy for companies such as Uber, Amazon Workplace, and DoorDash. When applied to work environments employers may claim that this practice helps to alleviate repetitive, unrewarding and boring types of employment. However, in an interview for the podcast, Cyber, Adrian Hon explains that these tactics are often implemented to distract underpaid gig workers with workplace money-making quests with complicated ways to calculate earnings, rather than simply paying workers (Gault). At best, these practices cause workers to feel like pawns rather than respected employees. These missions can make the workplace feel more like a casino in which employees are engaged in chasing a quest with only a small chance for success.

This practice establishes a workplace divide between the employees and the company managers or owners that restricts conversations about predictable compensation for work

completed. In his book, *You've Been Played: How Corporations, Governments, and Schools Use Games to Control Us All*, Hon points out that “the gamification we encounter most often doesn’t deliver the fulfillment or progress it promises. Instead, it maintains stasis. It keeps workers in line, funneling profits to those who already have capital. It encourages us to study or train or play for goals that aren’t truly our own. And it reinforces the idea that the world is a game, whose rules are to be worked around but not changed” (241). The gamification in the workplace usually falls short of its publicized reasons for implementation, and instead locks workers into a system that undermines their autonomy and deteriorates their bargaining power.

School

Education is also seeing an increase in content that is gamified in an attempt to improve student motivation and achievement. Like the workplace, schools are an arena where gamification is being imposed on students. We see content quizzes in Kahoot with leaderboards, trophies and confetti. Badges and levels abound in Khan Academy, and streaks, challenges and reminders in Duolingo. While these companies are well intentioned and well loved by educators and students alike, they are relying on a general assumption within the population that games will inherently improve student engagement, hence learning. However, this topic has yet to be widely studied and the assumption, while plausible, has not yet been proved. “There are several assumptions underlying the usefulness of gamification in educational context, such as gamification is motivating, gamification is engaging, gamification can improve attendance and participation. However, research remains inconclusive on these assumptions” as we will explore further (Dichev and Dicheva, 26). Currently, educational apps that employ simple gamification such as badges, levels, and leaderboards, among others are relying on these assumptions. And while they may spark interest and enthusiasm at the beginning within a classroom, their

repetitive approach and narrow focus will eventually lead to the same boredom that was initially attempted to thwart.

Education has always been a culture based on gamification with points being translated into grades which enables students to reach new levels, and gold stars for excellent work, attendance and jobs, new uses of gamification are often implemented into schools (Lee and Hammer, 2). Currently, there are three distinct levels of educational adoption of gamification approaches. One level is the “gamified activity” level, in which certain activities or apps may be used by a teacher within a classroom, or adopted by a district for use in a specific grade level (Oxford Analytica, 18). A broader level is through establishing gamified courses, which sounds rigorous and multifaceted, however it is usually only seen at the university level where there tends to be more resources and support to develop entirely gamified courses. The last level are gamified schools, in which there are “two cases, at Quest to Learn (Q2L) in New York City and CICS ChicagoQuest (19). The former a public school funded by the private sector and the latter a charter school funded through foundations and private funds. These schools “use game design as its organizing framework for teaching and learning. Game designers work together with teachers to develop playful curricula and incorporate game elements into the entire school day” (Lee and Hammer, 2). This level is rare and expensive while also requiring a larger collaboration between public and private sectors, however it may provide future data on the efficacy of gamified education. While the field of gamified education is rapidly expanding, and many companies are heavily marketing the use of gamification as a panacea for motivating students in learning environments, the research is simply not available yet to back up this trend, nor are there enough comparative studies done based on each type of gamification and their applications (Dichev and Dicheva, 14).

The “Science” of Gamification in Education

A simplistic glance at gamification compels us to also look at the impacts of behaviorist approaches to a gamified society and its impact on schools. B.F. Skinner’s 20th century’s work on behavioralism is widely known yet presents an overly simplified version of human behavior based on simple reward and punishment. His theories, which still invade common beliefs around motivation and behavior, especially in schools, are narrow and flawed when considering the depth and range of rationale that motivate a person (Gault). Human motivation is multifaceted; it is more than a Skinner Box, or a Teaching Machine, two gamified devices conceived by Skinner. “Motivation as a psychological process that gives behavior purpose and direction is contextual. Not only are individuals motivated in multiple ways, but also their motivation varies according to the situation or context of the task” (Dichev and Dicheva, 5). Tools used to control, coerce or manipulate can backfire. “Self-determination theory, one of the most popular frameworks for understanding motivation, sees three factors as key to the very best forms of motivation: autonomy (ability to determine one’s own path), competence (experiencing mastery), and relatedness (interacting with, and caring for, others)” (Hon, 18), which is the opposite of behaviorism in which subjects are controlled through reward or discipline.

Games are fun in general, and people feel intrinsically motivated to play games. Unfortunately this leads many, including schools, to make a correlation between people’s affinity for games and assumptions about the efficacy of a gamified education. “Making the case for gamification, however, requires more than intuition. We must clearly define what is meant by gamification, evaluate it for its benefits and drawbacks, explore current implementations and future possibilities, and better understand the theoretical rationale behind gamification” (Lee and Hammer, 1). Currently, most of the research conducted around the gamification of education is

happening at the university level with many applications focusing on online learning environments (Dichev and Dicheva, 6). The few that are looking specifically at K-12 education are lacking in a systematic approach that could provide comparative data (6). Most studies to date are too small, lack structure such as control groups and haven't employed the rigor necessary to produce reliable information on the efficacy of gamified education (Oxford Analytica, 14). Marketing of gamified elements within educational content relies on the assumption that games are inherently motivational for students. Adding visually appealing gamified elements, which are cheap and easy to overlay with traditional content is a quick marketing scheme not based on research but rather "exploitationware" (Bogost, 4). The use of badges is an immediate way to add gamified elements to education, however further rigorous studies are needed to isolate the results and impact of each gamified element within each context, which is difficult and currently not done (Hamari, 476).

The study of gamification on education quickly becomes murky due to the multiple ways gamification can manifest itself. The simple use of badges can be applied and activated in many ways based on game elements, and in the most basic ways lack depth. While studies have shown increases in student interest and outcomes, it is unclear if these initial outcomes are due to authentic improvement or largely due to the novelty of a specific element, which may wane over time (476). There are limitations to the benefits of gamification of education in that students may actually lose intrinsic motivation when using certain elements for repetitive or monotonous tasks, as is seen in the workplace (Kennette and Beechler, 5). Additional limitations require attention given to the diverse needs of a group of students, individualized motivation for students, appropriateness for specific learners, and resources available for engaging with gamification in the classroom (5). Contrary to the idea that gamification will inevitably improve

education, as more research is conducted, there is growing concern against the efficacy of gamification in schools. “The increased social comparison, competition, and reward systems might have detrimental effects over the long term for students' motivation, satisfaction, enjoyment, and engagement with class material” (Hanus and Fox, 155).

Gamification of Education

While research of gamification in education is still developing and inconclusive, there are considerations for implementing gamification into the classroom. The approach to gamification is more successful if implemented with a carefully thought out and thorough approach; simple badges and gimmicks do not produce the types of results touted by most gamified educational apps. A well-designed gamification system can help players take on meaningful roles that are fruitful for learning (Lee and Hammer 4). Looking at the components of gamification carefully is essential to authentic and effective implementation within the classroom. Lee and Hammer outline three considerations of gamification: *cognitive*, in which students can follow rules to achieve success in challenging tasks that allow for mastery and growth; *emotional*, in which engage through a range of emotional approaches with a range of positive and negative experiences, failure and perseverance; and, *social* in which students engage through relationships and identities (3 - 4). When choosing to engage in a game, people often are self-motivated to choose to play, as well as have freedom within the game structure. This is equally important in gamified experiences as outlined by Scot Osterweil, MIT's Education Arcade creative director (Oxford Analytica, 4). The “freedoms of play” are outlined as essential aspects which include “the freedom to fail, the freedom to experiment, the freedom to assume different identities, and the freedom of effort (4; Osterweil, 11:31-13:36). When we compare the “freedoms of play” with the structure of how the K-12 educational system operates, it is evident that gamification,

based on these concepts, could surely benefit student motivation and achievement (18:49-21:23). Gamification lends itself to places in the classroom where students need practice without fear of failure, as well as exposure to tasks that can be broken down and where "performance is measurable," an area of research that is still lacking (Dichev and Dicheva, 8).

When done thoughtfully, gamification can support what schools are already doing and add joy and curiosity to learning experiences. However, when the application and approach are untethered from research, gamification can create the same type of rule-heavy, autonomy-scarce experiences for students (Lee and Hammer, 4). It is essential, therefore, to spend time considering the types of gamification and their uses prior to adoption. It is clear that some mechanics of gamification are simpler than others and will have different impacts on how they are employed within the classroom. Dichev and Dicheva outline three levels of gamification and their uses from complex to basic with "dynamics, mechanics and components":

Dynamics represents the highest conceptual level in a gamified system. It includes constraints, emotions, narrative, progression and relationships. Mechanics are a set of rules that dictate the outcome of interactions within the system, while dynamics are users' responses to collections of those mechanics. The game mechanics refer to the elements that move the action forward. They include challenges, chance, competition, cooperation, feedback, resource acquisition, rewards. Components are at the basic level of the gamification process and encompass the specific instances of mechanics and dynamics. They include: achievements, avatars, badges, collections, content unlocking, gifting, leaderboards, levels, points, virtual goods, etc. (9).

Early research has been good at defining and establishing aspects of gamification that can be helpful within the K-12 classroom, however there is more that needs to be evaluated. Due to the vast aspects of gamification, when studies are conducted, they are often not comparing similar or identical data points (Nacke and Detering, 7). This leaves overburdened teachers who already have little time to explore scant research, weigh its efficacy and thoughtfully implement gamification into their classrooms. It renders teachers beholden to educational content distributors to package gamified content for the classroom that may not be grounded in substance. "...For gamification proponents, the idea that adding points and incentives to things fails to engage the power of games as interactive systems is likewise nonsensical. Doing that would be hard. It would require changing the practices of entire industries. It would take time and effort. That's not what marketers and educators and politicians and executives want. They want easy answers and fast results" (Bogost, 5). For those educators who are committed to finding complex and rigorous applications for gamification in the classroom, it is possible yet daunting. "Gamification is not easy and should not be used as a bandage to fix an already broken system or cover up and make a problematic program attractive to users" (Gerber, 52).

Conclusion

Gamification is a growing concept across all aspects of life. With the rise of the Internet and smart technologies, there's an app to gamify everything. We may be aware of its reach, or completely oblivious to it since the concept has not been defined long. The practice of gamification is embedded into our society, first as analog examples, and now with digital technologies. It is no surprise that with a rapidly growing trend, companies are looking to profit off of the gamification of education. "Does gamification work? Its sheer diversity makes this hard to answer. The novelty effect means that some generic gamification may work for a while,

but also that as players become accustomed, its effectiveness may wear off over time” (Hon, 228). There is still not enough research yet to prove the efficacy of gamification in the K-12 educational system. Specific types of gamified learning, such as simulations, can increase "learning outcomes and motivation levels when compared with traditional teaching" (Dichev and Dicheva, 7), however the research has not been conducted to every educational situation, nor does it consider the myriad gamification components, applications and audiences.

Our code experiment helps to highlight the flaws of casually adopting gamification into the classroom without consideration for the psychological and ethical ramifications, nor the pedagogy to do so thoughtfully. Seeking simply to increase short time motivation by adding points and badges, so students can identify how gamified experiences are used to change behavior.

Gamification should not be imposed on any population. “Most importantly, before any form of mandatory gamification is put into place in schools or in society, it must be debated openly, with rigorous testing, informed support, and the ability to opt out without penalty” (Hon, 239). It is essential to empower teachers to apply gamification with expertise and intentionality “because the reasons for knowing —why, when, where and how to use gamification in education needs to be as clear as possible and requires some scientific planning” (Çeker and Özdamlı, 223). When designed thoughtfully and ethically, gamification has the potential to make experiences more playful and meaningful. Educators should look beyond simply adding points, badges, and leaderboards to when designing gamified experiences.

Works Cited

- Bogost, Ian. "Persuasive Games: Exploitationware." *Informa*, 3 May 2011,
<https://www.gamedeveloper.com/design/persuasive-games-exploitationware>. Accessed 18
Nov. 2022.
- Çeker, Eser, and Fezile Özdamlı. "What 'Gamification' Is and What It's Not." *European Journal
of Contemporary Education*, vol. 6, no. 2, 2017, pp. 221–228.,
<https://doi.org/10.13187/ejced.2017.2.221>.
- Dichev, Christo, and Darina Dicheva. "Gamifying Education: What Is Known, What Is Believed
and What Remains Uncertain: A Critical Review." *International Journal of Educational
Technology in Higher Education*, vol. 14, no. 1, Springer Science and Business Media
LLC, Feb. 2017, <https://doi.org/10.1186/s41239-017-0042-5>.
- Fitz-Walter, Dr Zachary. "What Is Gamification? Education, Business & Marketing." *What Is
Gamification? Education, Business & Marketing (2021 Examples)*, Gamify, 2021,
<https://www.gamify.com/what-is-gamification?hsLang=en-au>.
- "5 Benefits of Gamification." *STEMvisions Blog*, Smithsonian Science Education Center, 8 Jan.
2014, <https://ssec.si.edu/stemvisions-blog/5-benefits-gamification>. Accessed 23 Oct. 2022.
- Gault, Matthew. *How Corporations and Governments Use Games to Control Us*. 5 Oct. 2022.
- Gerber, Hannah R. "Problems and Possibilities of Gamifying Learning: A Conceptual Review."
Internet Learning, vol. 3, no. 1, 2014, pp. 46–54., <https://doi.org/10.18278/il.3.2.4>.
- Guidos, Emily. "The Evolution of the Pedometer." *Walker Tracker*, 13 Aug. 2014,
<https://walkertracker.com/the-evolution-of-the-pedometer/>. Accessed 23 Nov. 2022.

- Hamari, Juho. “Do Badges Increase User Activity? A Field Experiment on the Effects of Gamification.” *Computers in Human Behavior*, vol. 71, Elsevier BV, June 2017, pp. 469–78. <https://doi.org/10.1016/j.chb.2015.03.036>.
- Hanus, Michael D., and Jesse Fox. “Assessing the Effects of Gamification in the Classroom: A Longitudinal Study on Intrinsic Motivation, Social Comparison, Satisfaction, Effort, and Academic Performance.” *Computers & Education*, vol. 80, Elsevier BV, Jan. 2015, pp. 152–61. <https://doi.org/10.1016/j.compedu.2014.08.019>.
- Hon, Adrian. *You’ve Been Played: How Corporations, Governments, and Schools Use Games to Control Us All*. Basic Books, 2022.
- Kennette, Lynne N., and Michelle P. Beechler. “Critical Success Factors: Tips from the Trenches.” *Transformative Dialogues: Teaching & Learning Journal*, vol. 12, no. 2, July 2019, <https://doi.org/10.1002/9781119199984.part3>.
- Lee, Joey J., and Jessica Hammer. “Gamification in Education: What, How, Why Bother?” *Academic Exchange Quarterly*, vol. 15, no. 2, Dec. 2010.
- Nacke, Lennart E., and Sebastian Deterding. “The Maturing of Gamification Research.” *Computers in Human Behavior*, vol. 71, 11 Jan. 2017, pp. 450–454., <https://doi.org/10.1016/j.chb.2016.11.062>.
- Osterweil, Scot, and Richard Eberhardt . “Freedoms of Play by Scot Osterweil (MIT Game Lab).” MIT Open Courseware. <https://ocw.mit.edu/courses/cms-611j-creating-video-games-fall-2014/resources/lecture-15-guest-lecture-scot-osterweil-mit-game-lab/>. Accessed 26 Nov. 2022.

Oxford Analytica. “Gamification and the Future of Education.”

<https://www.worldgovernmentsummit.org>,

www.worldgovernmentsummit.org/api/publications/document?id=2b0d6ac4-e97c-6578-b2f8-ff0000a7ddb6#:~:text=Gamification%20and%20the%20Future%20of%20Education%20is%20a%20forward%2Dlooking,context%20to%20improve%20educational%20outcome.