Understanding Gamification and Its Benefits

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Abstract

This paper focuses on gamification and its application in modern education and information technology. The main question is how effective gamification is, as a strategy for engagement and motivation. A multitude of formal studies and publications are available to help answer this question. The findings conclude that no gamification solution fits all and each solution must be tailored to meet the goals of both the 'player' and the 'game-maker'. This conclusion is significant and crucial to understanding why gamification often fails and involves more work than simply implementing badges. The future of gamification will be more intuitive and personal with the rise of technologies like the Internet of Things (IoT) and Augmented Reality (AR).

Keywords

Gamification; learning technology; e-learning

1. Introduction

Gamification has risen in popularity since 2009 with many successes and downfalls. The engagement strategy has now matured and moved past the hype, especially in education. As the novelty has worn off, it is possible to more realistically evaluate how effective gamification is.

Whether gamification works as a method of engagement and motivation has been tested over recent years, spawning books on how best to implement and how not to implement. More and more studies are published each year that delve into motivation theory and psychology, attempting to find the ideal mix of game design elements for their given contexts.

Most known for its use in education, gamification has also been effective in health, marketing and the workplace to motivate employees and increase sales. Looking to the future, technologies such as Augmented Reality and the Internet of Things can enable gamification to be even more effective.

The presumption for this paper is that 'play' is essential to every stage of human development, even adulthood. The concept of gamification is a manifestation of a natural human desire to work towards and achieve a goal.

2. Methodology

It is important to also look at formal psychology and health studies along with industry expert opinions such as Gartner Inc. and Jane McGonigal. In addition, literature from the last several years were preferably picked and reviewed. Furthermore, there seems to be a peak of interest in gamification between 2010 and 2014; therefore, general opinions and online sources blogs from those years were also consulted.

3. Literature

What is gamification, and how is it being used in modern society?

Adding game elements to activities is not a new concept and is often used as an effective motivator for children in education. How digital technology enhances and extends the possibilities that gamification can offer has been the new frontier. Technology can increase the audience, transcend real-time constraints and distance, incorporate social networking, and reduce costs. (Burke, 2014). Broadly speaking, gamification is the application of game-like features to traditionally non-game activities. A more current description of gamification is "the use of game mechanics and experience design to digitally engage and motivate people to achieve their goals" (Burke, 2014, p. 6). Gartner has changed its categorization of gamification over the years. The American research company originally placed Gamification on its Hype Cycle for Emerging Technologies between 2011-2014, moving it in 2015 to place on the Hype Cycle for Digital Marketing instead (Chaffey, 2015; Gartner Inc, 2014; Gartner Inc, 2013; Murphy, 2012; Zichermann, 2011).

Although there is a conception that gamifying an activity means adding badges and a leader board, that is not always the case. Gamification is defined by various characteristics, such as reward systems for achieving objectives and overcoming challenges. This may take the form of levelling systems, prizes, and badges (Glover, 2013). Swarm and Fitbit are well known for this feature. In the health sector, gamification has soared in success with apps such as Fitbit and Fitocracy that allow users to measure and track steps, weight and health goals. Competition is also noted to be a strong motivational aspect of gamification (Nicholson, 2012). Well-known gamified apps include a social element where users can 'friend' other users, see their achievements, and compete for the top spot in social rankings. Another notable example in fitness was the Volkswagen initiative Rolighetsteorin (The Fun Theory), which introduced a piano staircase that played musical notes as it was stepped on. The store in which the staircase was installed saw an increase of 66% choosing to take the stairs (Rolighetsteorin, 2009). This is a good example of intrinsic motivation.

Technology has helped education immensely since its emergence. Students journey through the process of winning badges at Khan Academy for learning about different topics and contributing to the community. Online Travel Training does something similar, allowing students to track their progress towards completing courses, and rewards them with physical prizes such as vouchers and overseas trips. Even video games have been further gamified, allowing gamers to earn gamer-points, achievements, trophies and collectable trading cards.

Foursquare's Swarm is a social discovery app that allows its users to earn points for visiting shops, attractions and cities. Users can earn expertise stickers for venue categories they visit often and compete for the chance to become 'mayor' of any given location (Swarm, 2017).

Businesses are also starting to incorporate gamification to improve productivity. FreshDesk, a customer support service, has a reward system for employees who complete various tasks and complete challenges (FreshDesk, 2017a).

Environmentally, companies such as Recyclebank use gamification to encourage citizens to recycle their garbage, offering points for sustainable lifestyles, recycling and environmental learning. These points can be redeemed for rewards such as gift vouchers and magazine subscriptions (Recyclebank, 2017). At a broader scale, Jane McGonigal's (2011) book Reality is Broken: Why Games Make us Better and How They can Change the World proposes the idea the games can change the whole world for good.

Is Gamification an Effective Methodology for Increasing Motivation?

Since 2009, scientific experiments have been conducted on gamification with some exceptional results. For example, Nextjump saw an increase in their employees attending gym classes by 80% after implementing a gamified competition in the workplace (Vasudevan & Stark, 2012). The Piano Stairs, mentioned earlier, saw a 66% increase in people using the stairs over the escalator (Rolighetsteorin, 2009). Autodesk increased its revenue by 29% after updating its trial program to gamify the learning process of its product (Lane, 2013).

Several studies have also been conducted to attempt to understand why and how gamification motivates individuals. A randomised clinical trial to incentivise families' physical activity found that over the duration of 12-weeks, the study group supplied with gamification achieved their daily step goal consistently more than the control group, even after the experiment concluded (Patel, et al., 2017).

Another formal study conducted in November 2015 concluded that for gamified learning to work in higher education effectively, the activity must be tailored directly to the demographic. In other words, a 'one-size-fits-all' methodology does not help students learn better (Buckley, Doyle & Doyle, 2017). It was also noted in this study that males responded more positively to the competitive aspects of the gamified learning than females.

There are hundreds more examples of gamification working to improve people's lives, however, most of them involve extrinsic rewards which studies show, could have a negative long-term effect on learning and motivation (Bain, 2004, p. 32-33). Very few studies have shown what happens when the novelty of the gamified solution wears off. The goal is to create something players want to participate in, such as a solution that aligns with the player's goals and the game-maker's goals. In 2012, Gartner predicted "by 2014 80% of current gamified applications will fail to meet business objectives

primarily due to poor design", noting that the biggest mistakes companies make is their heavy focus on points, badges and leader boards, instead of creating a meaningful game environment (Stamford, 2012).

Intrinsic vs Extrinsic Motivation

It is important to understand the difference between the two kinds of incentive theory: intrinsic and extrinsic motivation. Intrinsic motivation stems from a person's interest in the subject or activity itself and includes a want to achieve a certain goal, such as a student who wants to learn Math because they want to become more efficient. Extrinsic motivation comes from the need to reach a certain standard or goal, like a student who needs to earn a certain grade to pass their class (DeLong&Winter, 2014, p. 163). Brian Burke (2014, p.16) refers to them as emotional engagement (intrinsic) and transaction engagement (extrinsic). When a user is emotionally invested in their goal, they are more likely to persist. When a user sees their goal as transactional, participation tends to drop and the novelty wears off. This is because people will build up a tolerance to their favourite things. (McGonigal, 2014). When player's intrinsic motivation is triggered, they receive positive emotions instead. "The very act of what we're doing, the enjoyment of being full engaged, is enough" (McGonigal, 2014, p. 45). Jane McGonigal provides a rough idea of what intrinsic rewards look like. Even though something may be hard work, people choose to take it on and are interested in the impact they are making to the given situation. Furthermore, games can make people feel like they are achieving things and help them show off to others what they are good at. This also includes the impression that people are getting better at something over time. Moreover, humans are naturally social, even introverts. They want to share experiences with others and build bonds over matters that they care about. Finally, people seek meaning in life, i.e. the feeling of being part of something bigger.

In a psychological experiment, two groups of students were given puzzles to solve, one with a monetary reward, and one without. The experiment found that those that got paid for completing puzzles, stopped when the experiment ended, while the non-paid group continued solving puzzles after the experiment was over. This suggests that extrinsic rewards can have a negative effect on intrinsic motivation in the long-run (Bain, 2004, p. 32-33). It is possibly for this reason that Gartner predicted a 'badge fatigue' (Burke, 2014, p. 7).

Competition and the Social Aspect

Gentle competition amongst friends and co-workers is common in gamified activities. However, a recent study among postgraduate and undergraduate students suggested that competition is not always effective. The undergraduate group of 13 students enjoyed the individualistic competition and were motivated to do better over time. However, the postgraduate group of 9 felt uncomfortable competing against each other, as they saw themselves as close-knit. This study by Buckley, Doyle, and Doyle (2017) concluded that competition may not be an effective motivator in smaller group sizes, but made particular mention of motivation dropping off in the larger class when students started ranking lower than their peers.

Considering this, an educational gamified activity could affect participants negatively if their peers are well known to them. This does not apply to applications like Khan Academy where participants are not known to each other and achievements hold more personal value than status. The area of health and fitness does not seem to have this setback; gamified applications, such as FitBit, thrive on comparing stats with friends, competing, and cheering each other on.

<u>The Fun Element</u>

One criticism of gamification may be its heavy reliance on using scoring mechanisms as a foundation, instead of tailoring the game to the subject or making the activity fun. Dutch researcher Koen van Turnhout (2012) proposed the idea of Playification, as an alternative method of engaging a wider demographic of participants. This implies designing tools that make activities fun, with fewer rules, and letting players play the way they want (vanTurnhourt, 2012). His argument is that 'play' people tend to drive change whereas 'game' people tend to improve quality and work efficiently by the rules.

Using LinkedIn's profile completion as an example, van Turnhourt (2012) explains that the emphasis is on reaching the "All-Star" badge at the end through various activities based on creating a LinkedIn profile, regardless of the means to achieve this goal. Creating a profile can be a creative and personal activity. However, LinkedIn has simplified the process with a set of tick boxes. "It takes away some of the original meaning, freedom and pleasure of the task. Suddenly, what counts is whether the profile is 'complete', nothing else." (van Turnhourt, 2012).

4. How Can Gamifying Aspects of Life Improve Well-being?

E-democracy, of which its applications extend beyond this research paper, is the idea of a technology-facilitated democracy. Gamification strategies could prove useful in this future vision of democracy as mentioned in Nika Mahnič's (2004) journal article, Gamification of Politics: Start a New Game. Here it is theorised that allowing citizens to monitor their representatives carries transparency and integrity into the political space. Instead of the typical dystopian view of Big Brother government monitoring citizens, citizens then become the moderators of government. 20 years ago, Grossman predicted in his book The Electronic Republic, "the twenty-first century's defining image is more likely to have ordinary citizens using their personal telecommunication devices to keep Big Brother under continuing surveillance" (Grossman, 1996. P.12).

In the same vein of politics, China is in the process of planning a Social Credit System, designed to increase awareness for honesty and credibility of citizens, specifically due to the lack of trust on the Chinese market. (中华人民共和国国务院 [State Council of the People's Republic of China], 2014). Strictly speaking, this is not planned to be gamified, but it poses an interesting idea as to whether obeying the law can be made more appealing to citizens, perhaps even on a competitive level. A An interesting European experiment implemented a speed lottery, rewarding drivers with draws to win money if they obey the speed limit. The experiment saw a drastic drop in speeding tickets since the implementation (Rolighetsteorin, 2010).

4.1 Education

While gamification is most well-known in primary and secondary education, there are many examples of success stories where people in higher education have motivated themselves to learn new skills or uncover scientific breakthroughs. A good example is Foldit.

Foldit is an online puzzle application tag-lined 'Solve Puzzles for Science'. The objective is to conduct protein folding as perfectly as possible. High scores are then analysed by scientists and researchers who determine whether the solutions can be applied to proteins in the real world, which are then used to eradicate diseases and make scientific breakthroughs. Foldit has seen many accomplishments, most notably in 2011, where players assisted in understanding the crystal structure of the Mason-Pfizer monkey virus retroviral protease, which causes HIV/AIDS, that had remained unsolved by scientists for 15 years. Within 10 days, participants produced an accurate 3D model of the enzyme allowing scientists to use this information in their studies (Cooper, et al., 2011).

In March 2017, at Murray's Bay Intermediate School in Auckland, the company Banqer released an upgrade to their game which teaches children about credit scores and credit reporting. Within the education application, students will be credit-scored depending on their financial gaming choices e.g. they may hit virtual bankruptcy if they do not do well (Stock,2017). This teaches children about real-world issues they will face as adults in the future. "We project Banqer will be used by 50,000 kids by the end of the year across more than 30 per cent of all primary and intermediate schools, but with support from the commission and government funding we could reach that scale a lot faster," says Kendall Flutey, Banqer co-founder (Clayton, 2017).

In Jane McGonigal's book Reality is Broken (2011), she challenges the current 'way of life and work' we live in today, presenting a theory that individuals will be more motivated to better themselves and their work-lives by implementing game-like features into everyday tasks. While her approach does not necessarily fit into the definition of gamification, she acknowledges the need to make work something people want to do, through her strategy of applying game design theory to everyday life.

4.2 Workplace Environment

Gamification in the workplace is very responsive to the goals of the company and industry sector. For example, technical support companies such as FreshDesk have created an application based on gamification principles that allows support teams to receive recognition completing challenges and meeting performance KPI. (FreshDesk, 2017b). This may not work for a law firm or a trade industry. Each sector would require a tailored gamification solution to work effectively. Since modeling large organizational processes takes a long time, this modification would require considerable planning.

Interest in the OKR (Objectives and Key Results) framework has risen over the last couple of years and is now being used by Twitter, Zynga and Google (Wagner, 2015; Klau, 2013; Pincus, 2010). The goal behind this framework is to define company objectives and corresponding key results. In some instances, the individual employees

set their own objectives, while in others, the company has set the objectives. Some have both, with the idea that this will help motivate employees. Companies that have implemented this framework can easily incorporate gamification elements to assist and motivate employees to reach their set objectives. Software companies such as BetterWorks and Weekdone have already created applications that provide goal-setting and progress planning features, designed very similarly to gamified solutions.

4.3 Health

The characteristics that video games possess force us to become mentally stronger, achievement-oriented, social and successful (McGonigal, 2014). "Quality computer games have been shown to enhance concentration, improve retention of information, facilitate deep learning, and bring about behaviour change." (Fleming, et al., 2017).

A recent survey indicated that 64% of health patients use a digital device of some sort to help manage their health (Transcend Insights, 2017). Wearables have contributed to the success of health gamification with devices such as Nike+ and FitBit. Companies and start-ups have also taken advantage of Microsoft's Kinect technology to assist with rehabilitation. There are also further potential capabilities for gamified rehabilitation exercises, diagnosing brain disorders, and identifying Alzheimer's and multiple sclerosis (Schwiderski-Grosche, Tansley, Sellen, & O'Hara, 2014).

Telerehabilitation is a new term used to define rehabilitation services over the internet. This has opened the way for gamified technologies to benefit patients in more ways. Reflexion Health has created the VERA Solution (Virtual Exercise Rehabilitation Assistant) to help people recover from surgery and prevent muscle loss and falling in seniors. Users get to see their goal progress in real time and ensure they are keeping up with their prescribed exercises. The information is presented graphically to the user and sent back to clinicians to monitor their patient's progress without the requirement for unnecessary follow-ups (Reflexion Health, n.d.).

4.4 Marketing

Gamification has seen many successes in the marketing industry as well. In 2011, Yahoo!7 launched a mobile app that allowed TV viewers to interact with shows by checking-in and earning badges. Within 3 months, the app had received over 200,000 downloads (ImpulseGamer, 2012).

The well-known discovery application, Foursquare, opened-up their badge system to Starbucks to create their own franchise-related badges, along with discounts for frequent customers (Kleinberg, 2011). Burgerfuel also offered Foursquare promotions in 2011 such as a free L&P per Foursquare check-in (Monk, 2011). In America, Marsh Café offered a free drink to whoever was crowned the current Mayor in an online competition at the time (Fisher, 2009). This is effective in two ways. Mayorships are earned by players who have the most check-ins to a venue than any other player. Not only is there an incentive to become the mayor, but once the status is achieved, players are also more likely to meet there with their friends in the future.

Another example of a revenue increase is American outdoor retail company, Moosejaw, who created a retail game that enticed players to purchase discounted $10 gift cards for $1-5. Customers would then opt-in on upcoming deals before they went live. Moosejaw also incorporated higher incentives for those who invited their friends. Within two days, Moosejaw saw an increase in site registration of 2,000. Within 15 minutes of the announcement of the game, five hundred gift cards were purchased. On average, consumers made purchase of $66, a 560% return on investment (Geller, 2013).

5. What are the Future Possibilities of Gamification?

Technology is evolving to become more personal, aware, engaging and intelligent. Mixed, augmented and virtual reality have risen in popularity in the last few years, with doctors already using VR for risky surgical procedures (Holley, 2017). However, Augmented Reality (AR) really has the potential to take gamification to a new level. Augmented Reality is a live direct or indirect view of a physical, real-world environment whose elements are "augmented" by computer-generated or extracted real-world sensory input such as sound, video, graphics, haptics or GPS data (Schueffel, 2017). Technologies such as AR could teach us how to cook, read, or fix a broken electrical circuit (Microsoft HoloLens, 2017). An applied example can be to award points to students who are learning how to drive, rewarding the learner with a goal such as earning their licence and seeing their progress bar fill as they become more experienced. Of course, with autonomous self-driving vehicles entering the market, we could instead be rewarded by monitoring and limiting our energy uses. Should the government participate, we could see tax cuts for low carbon footprint households thanks to the use of home automation, for example.

Computers can monitor the effectiveness of a gamified solution, in the workplace for example, and send that data back to moderators, allowing them to make changes and find better ways of motivating individual employees. Eventually, the 'game' can change itself based off the employee's mood or engagement levels without the need for a manual reconfiguration.

Already we are seeing smart fridges that are aware of their own contents (Shanker, 2016). Should this software also reward people for eating healthily and learning how to cook, people's natural competitiveness could see them competing with their neighbours on who can earn the most health points or rack up cooking skills. Coupled with Artificial Intelligence, Virtual Assistants, and the Internet of Things, the future of gamification is looking brighter, more personal and much more engaging.

6. Conclusion

Gamification is an engagement strategy, not a technology. The buzzword has risen to fame in the last decade, promising to be the ultimate solution to employee and student engagement. Sectors such as health, marketing, politics and education have seen many successes through trial and error. Several formal studies appear to support the fact that gamification works effectively for most people.

Badges and achievements are a common characteristic in most gamification applications, although careful consideration is required to ensure these badges hold significance to people. This usually requires the incorporation of a social aspect. Extrinsic motivation, such as badges or a status, can be rewarding for certain players, but they risk the chance of players losing interest in the long-term. More experiments are required to learn when the novelty of extrinsic motivation wears off. In contrast, intrinsic motivation is a far more effective and long-lasting game factor, i.e. when people participate because they want to, or they are interested in the topic at hand. Offering extrinsic rewards to intrinsically motivated people could have a strong negative affect on engagement. Poorly-implemented gamification may be those examples that put emphasis on mechanics over fun.

Augmented Reality could completely change the way the world works in terms of providing users with the instant gratification they crave for learning and trying new things. The possibilities are endless.

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