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Gamification: Fad or Future

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# Introduction

Gamification is the addition of game elements or mechanics to an experience to increase engagement or enjoyment with the goal of changing human behaviour. In an educational context, gamification aims to either generate learning through the gamified activity itself or to increase motivation which moderates behaviour leading to learning.

Gamification started gaining popularity around 10 years ago and has since infiltrated various industries such as marketing, media and finance. The education field is one of the most prolific users of gamification with the claims around gamification ranging from mildly exaggerated to downright miraculous. Enthusiasts tout its potential to boost student engagement while sceptics question whether it aligns with research on how people learn. This report will delve into the motivational principles that underpin the success of gamification, integrating these insights with established frameworks around how people learn. Additionally, it will address how individual characteristics affect how teachers should design gamified learning to best suit a broad range of students. On my study tour, I spoke to researchers as well as practitioners of gamification across Finland, Canada and the US. I hope that through examining both the existing research and investigating real-world examples of gamification in practice, I am able to provide a more balanced perspective in exploring the factors which underpin its success or lack thereof.

# Focus of Study

This study on gamification looked at the potential of gamification of learning to motivate, engage and transform learning. However, it aimed to delve deeper beneath the “smokescreen” of fun to determine if it has the potential to help students to actually learn beyond the appearance of engagement.

Research questions:

* What are the ways in which gamification can benefit student learning?
* What are the ways in which gamification can hinder student learning?
* What are some unexpected implications of gamification for the classroom?
* Which elements of gamifications work best?
* Which contexts do they work best within?
* How do learner characteristics impact the success of gamification?

# Significant Learning

### Game-based Learning Vs Gamified Learning

It is important that we are clear about what we mean when we talk about gamification. Using a video game such as Mario Kart to make an educational point or as a motivational tool is not gamification. Instead, gamification is an intentional design process where learning is augmented in a way that makes it more game-like. At the most basic level, adding a points system to your classroom for good behaviour can be considered gamification. At the more immersive end of the spectrum, Scott Hebert’s Scientia Terra classroom incorporates storytelling, points, boss battles, random events, quests and rewards.



Figure 1: One of many game boards in Scientia Terra (Photo by Stella Ding)

Generally speaking the learning tasks themselves are not altered in gamification. It is the behaviours and attitudes around learning that are affected which in turn provides a moderating effect between the learning activity and the learning outcomes (Sailer & Homner, 2020). For example, if you reward students with points and badges for completing their homework each day, the homework tasks are not necessarily altered but students’ motivational state can be changed which leads to altered behaviour and hopefully achievement of outcomes. It’s crucial to recognise that if the instructional content itself is ineffective, gamification is not likely to bring any benefit. In other words, instructional content is the limiting reagent of the learning process regardless of gamification. Analogously, increased motivation to engage in an ineffective health fad is not likely to produce the health effects desired. The same principle applies to gamified learning.

Game-based learning is another term often used around gamification. Game-based learning alters the actual learning task so that through playing the game, learning happens. A good example of this is Assassin’s Creed Discovery Tour where players learn about different ancient civilisations through exploring the game worlds.

Gamification and game-based learning lie on a spectrum and are at times inseparable. During my study tour, I was able to explore both methods and I will seek to specify within the report whether it is gamification or game-based learning that is being discussed.

### The Double-Edged Sword of Motivation

In an era where attention is one of our most valuable commodities, exploring the potential of gamification to enhance engagement to drive learning is increasingly compelling. Existing research supports the notion that gamification can increase student motivation (Hamari et al. 2014; Sailer & Homner, 2020). Within the classrooms I observed, there was certainly a palpable energy and excitement when gamification was in practice. Within Mr Hebert’s gamified science classroom, called Scientia Terra, students eagerly showed me the different quests they had tackled. Quests, in this world, refer to themed learning activities in which students can take on additional tasks to earn points or rewards. The majority of students I interviewed significantly enjoyed the gamified classroom as compared to a traditional classroom. Similarly, in an elementary school classroom in Vantaa, Helsinki, students excitedly played the mini-games in Miika Anundi’s Loru Games suite.

But a question lurks beneath the surface of the visceral excitement and energy. What is it that students are actually motivated to do?

Are students motivated to:

* Learn more about the subject matter?
* Uncover more of the game fiction?
* Beat other students on the leaderboard?
* Earn rewards and prizes?

None of these motivations are in and of themselves good or bad. Further, it is likely that students will have a mixture of these motivations. More importantly we must consider whether these motivations leave room for learning. Self-determination theory suggests that extrinsic rewards can serve the negative effect of lowering intrinsic motivation or creating reward dependency (Sailer & Homner, 2019). Undoubtedly, one of the goals in gamified learning should be to instil an authentic love for learning within learners. In other words, we want to inspire intrinsic motivation for the subject matter and learning itself. Thus, when a learning activity or sequence is gamified, it is important that we interrogate the different aspects of motivation and how they interact with learning (Wosnitza et al., 2009).

Gamification can be used to generate:

* Motivation as a source of ignition for students such that the initial boost is hopefully able to produce more sustained interest in the learning content
* Motivation as a means to access attention during learning tasks
* Motivation to persist with learning tasks both within and outside of the classroom

Gamification expert Yu-kai Chou suggests we avoid labelling extrinsic and intrinsic motivation as inherently positive or negative. Instead we should evaluate what uses they serve for individuals in different contexts. For example, incorporating game elements such as narrative, points, badges and leaderboards can provide enough extrinsic motivation which later generates more sustained interest in the subject matter. Chou recommends that extrinsic rewards such as points and prizes be used as an initial boost before transitioning into mechanisms that support more intrinsic forms of motivation such as mastery. Furthermore, for mundane tasks that have little potential to generate interest but which may serve as building blocks to more complex and rewarding tasks, the extrinsic motivation that gamification provides can be extremely powerful.

Topi Perala’s Year 6 classroom in Helsinki provides a great example of the three types of motivation discussed above: initial, attention and persistence. Students in his class engaged in group activities to plan an imaginary global trip as part of the Amazing Race game. This four-week-long learning sequence took students around three to four different cities where students each team was allocated a budget of €3000 to €4000 to plan their trip, using online resources to plan flights and assess details such as flight duration and stopovers. Upon reaching each city, students were assigned specific tasks to complete, with their progress and task completion monitored and checked by the teacher.

While the trip was imaginary, the skills gained through the game were very much real. The Amazing Race game taught students skills in money management, geography, numeracy, and literacy. Additionally, students wrote blogs detailing their imaginary travels around the world. Throughout the Amazing Race game, students were spending a lot more time writing and getting practice than they may otherwise have done. Quantity may not always be better than quality, but in this case quantity serves to build the confidence which precedes quality. The increased time spent writing and practising demonstrates the capacity of gamification to motivate students to extend themselves. This shows one example of how gamification elements can produce an initial boost that eventually turns into more sustained motivation. In this case, the initial motivational boost was the Amazing Race narrative of the game but persistence and sustained motivation in learning can be generated from the mastery and competence that results from the extended practice.

### The Question of Cognitive Load

In investigating gamification, the question of cognitive load is one that often surfaces. While gamifying learning content can provide the motivation for students to learn complex subject matter, the complexity of the game mechanic itself may serve as a barrier to learning.

Sweller, van Merrienboer, and Paas defined three different cognitive loads (Sweller et al., 2019). Intrinsic cognitive load is defined as the inherent difficulty of the content matter which is unalterable by design. Extraneous cognitive load refers to the complexity in which the content is presented. For example, using PowerPoint presentations overloaded with conflicting text and graphics may cause extraneous load which is independent of the content matter. Germane cognitive load doesn’t contribute to the overall cognitive load and instead modulates cognitive resources so that extraneous activities can be turned into activities relevant to the learning task. The basic assumption is that lowering the amount of extraneous load is important so that learners’ working memory capacity is not overloaded. This has significant ramifications for gamified learning.

Gamification by its nature is an add-on to learning. Rules, points systems, characters and storylines are all additional features which may introduce extraneous load to the learning process. Where intrinsic cognitive load is low, this may not be an issue. However, when the subject matter is already difficult, introducing additional extraneous load in the form of difficult game mechanics can easily overwhelm learners’ cognitive capacity.

In interviews with the learners of Scientia Terra, there were indeed some students who were initially confused about the game mechanics and preferred a more traditional classroom experience with straightforward instructional activities. However, a large number of students expressed that they could easily understand the rules and different features of the gamified classroom and much preferred learning through Scientia Terra. Nevertheless, it is important that all students are able to access learning. To remedy this, Mr Hebert suggests introducing game mechanics gradually. Mirroring the progressive way in which video games introduce complexity can be helpful in managing students’ cognitive load. On the other hand, research also suggests that lowering extraneous load so much that it strips back any details that may have made the task interesting is also disadvantageous to motivation. Thus, it is clear that it is imperative for teachers to balance the components of a gamified activity or lesson sequence that make it fun and the need to manage cognitive load to ensure students are also reaching learning outcomes.

Given that learning does not happen in isolation, in considering cognition, it is important to also consider the myriad of other processes that affect learning. The previously discussed motivational processes are one example. Social, emotional and motivational processes all factor into how cognitive processes occur. Thus reducing cognitive load may not be the be all end all of learning strategies. If increasing cognitive load through gamification also increases motivation, as we saw in Hebert’s Scientia Terra classroom, a compromise may need to be reached between these two aspects of learning. After all, the success of teaching is measured not only by what happens in the classroom but also the impact on the student beyond the classroom walls. Student persistence, for instance, is an important consideration (Wosnitza et al., 2009). This was on display in various classes in Scientia Terra. Students demonstrated sustained interest by engaging with non-compulsory tasks during their own time. While the initial draw may have been to win points, the final product and the learning achieved through the tasks was something they were truly proud of. This emphasises the capacity of gamification to breed the mastery required which leads to more sustained forms of motivation despite an increased cognitive load initially.

### The Student as the Player

A universal struggle for teachers is the paradox of having to use strategies that cater to all students while simultaneously treating students as individuals with unique needs. Gamified learning faces the same difficulty as games need to engage different types of players who have different motivations for playing. Marczewski’s (2015) player types provide a framework in which to think about the ways we can design games to cater to different types of learners/players.

Marczewski (2015) classifies six types of players each with different core drivers. Achievers are those students who prioritise improvement, progress and mastery. Free spirits hope to create and explore. Socialisers focus on people and the interactions between other players, including collaboration and competition. Philanthropists seek meaning and purpose and wish to do good for the sake of doing good. Players are motivated by rewards and points. Disruptors cause change or may not want to play. This can include looking for loopholes in the system or influencing others to “break” the game. While not an exact science, the player types provide a blueprint for teachers when designing educational games that aim to be engaging for different types of students.

At the core, designing a successful gamified system for learning involves catering to the intrinsic motivators of relatedness, autonomy, mastery and purpose. According to Marczewski (2015), prioritising a balanced game design that accounts for these motivators first before incorporating a reward system is more conducive to creating a self-sufficient game which doesn’t rely on external rewards.

# Conclusion

Just like education itself, gamification is a complex field that extends beyond a sum of its parts where individual game elements collectively create the overall experience. While beyond the scope of this report, individual elements of gamification and how they affect different learners in varying contexts are important consideration when designing gamified learning systems. To further complicate things, interactions among elements can also produce both amplifying and detrimental effects. This report addresses only a portion of the questions related to gamification, focusing primarily on motivational and cognitive processes and briefly examining the impact of individual differences.

Research and observations from the study tour indicate that gamification can generate substantial motivation as touted by enthusiasts. However, it must be noted that observations were made over relatively short spans of time, making it challenging to evaluate long-term engagement. Despite this, anecdotal evidence suggests persistent motivation is present in many classrooms visited. Echoing the sentiment of Dr. Kathrin Gerlig who keynoted at GamiFIN, when considering gamification, engagement is an assumption. Not all games are fun. It takes effective design considering motivational, social and cognitive factors to drive engagement.

Regarding cognitive processes, while cognitive load is a crucial factor, the motivational benefits of gamification may counterbalance the increase in extraneous load caused by complex game elements. Finding a balance between minimising cognitive load and maintaining engaging gamification features is essential. Once again, the design of gamified learning is critical, and both motivational and cognitive aspects must be considered in designing effective game-based learning or gamification systems which prioritise student learning.

Ultimately our role as teachers is to support our students in gaining the knowledge and skills to succeed in their future endeavours. The students are our core business. Thus, when we simultaneously step into the role of game designer, we must ensure we cater to our students as individuals. Just as we would differentiate learning for learner abilities or adjust lessons to engage different students, considering player types allows us to tailor our approaches to better meet individual motivations and enhance overall engagement.

Whether you use gamification or game-based learning in the classroom, the principles behind games can empower us to better understand the underlying motivations that drive students’ behaviour. While this report only scratches the surface of gamified learning, I hope that it can serve as a catalyst for more educators to delve deeper and contribute to the growing body of knowledge on gamified learning, particularly in NSW and Australia. As learning itself is so context-dependent, it takes a network of brave explorers to dabble and experiment in order for us to build more practice-based evidence on gamification that is relevant to Australian educators. By embarking on this adventure, we can collectively enhance our educational practices and better support our students' growth and engagement.

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