How Gamification Rewards Shape Motivation: A Self-Determination Theory Perspective

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ABSTRACT

Gamification is a motivational technique that uses game design elements (streaks, points, leaderboards) in non-game contexts to increase user's interest. They are extensively used in fields like marketing, fashion, tourism, and education.

While gamification mechanisms (leaderboards, strikes, and XP) are known to increase user engagement and performance metrics, they might have a detrimental effect on the long-term quality of learning and levels of intrinsic motivation. This research explores the effect of reward-driven platforms on basic psychological needs, as derived from the Self-Determination Theory (SDT).

The three core elements of SDT (autonomy, competence, relatedness) foster intrinsic motivation and engagement in people's behavior.

This ongoing research examines how common reward mechanisms align with or contradict SDT principles across 7 theoretical and empirical studies.

The findings of this study contribute to the DiGRA community in terms of the understanding of gamification techniques in educational contexts, applying renowned psychological theory - Self-Determination Theory - in the context of gamification.

Keywords

gamification, engagement, intrinsic motivation, Self-Determination Theory, autonomy, competence, relatedness, rewards.

INTRODUCTION

Games are a form of entertainment for most people regardless of the age category they belong to. In essence, instructors and teachers are using gamified approaches and techniques to increase student engagement and motivation. And overall, the rise of applications like Duolingo (Duolingo, Inc. 2011) and Kahoot! (Kahoot! ASA 2013) unveiled new approaches to learning, gaining millions of users across the world and being widely used by schools and institutions.

In general, gamification is often represented as being different from entertainment games and serious games. Games are usually developed for entertainment purposes (e.g., World of Warcraft (Blizzard Entertainment 2004) or Tetris (Pajitnov 1984)), while

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serious games, also known as game-based learning, are developed to train certain skills or learn academic content. Occasionally, the term “gamification” is confused with the notion of game-based learning, and it is crucial to understand that gamification denotes the use of game elements in non-game activities. Game-based learning, on the other hand, is the learning that happens inside the game.

In contrast, gamification is a relatively new term that gained prominence in approximately 2010. It is not based on the development of a game product but rather the application of game elements to enhance participants’ motivation levels in non-gaming contexts.

There are various types of gamified systems: achievement-based (leaderboards and badges), social (team challenges), progress-based (progress bars, levels and additional challenges) and reward-based systems.

All game elements mentioned above are known to boost motivation. And while some are inherently interested in learning and studying for the sake of their own curiosity, many people gain joy by climbing leaderboards, gaining more XP, earning badges for consistency and covering levels.

However, while gamification techniques generally raise motivation, it is crucial to consider how they influence extrinsic and intrinsic motivation levels within students. Unfortunately, findings on the effects of gamification on intrinsic motivation have been inconsistent (Sailer et al. 2017), and at the moment there is a lack of conclusive evidence with regards to the influence of gamification on students’ intrinsic motivation.

The present study addressed the problem by conducting a literature review to offer insights into the effects of gamification on intrinsic motivation and how it can be used to sustain motivation. This paper adopts the dominant theory called Self-Determination Theory (SDT) as its primary analytical framework. This paper tackles this question by explaining how intrinsic motivation fuels the direction, intensity, and persistence of motivated behavior.

The SDT theory emphasizes that to satisfy basic psychological needs in one’s life, competence, relatedness, and autonomy must be present to stimulate intrinsic motivation. (Deci and Ryan 2000).

THEORETICAL FRAMEWORK: SELF-DETERMINATION THEORY

Motivation

Essentially, there are three main types of motivation: amotivation, intrinsic motivation, and extrinsic motivation. Amotivation refers to a lack of interest or competence to perform, leading to loss of intentionality. Intrinsic motivation is the type of motivation that inherently wants one to participate in activities for the sake of personal interest, values or goals. Extrinsic motivation is defined as doing something due to a separable outcome, such as pressure or “extrinsic rewards” in the form of money or verbal feedback (e.g., praise) (Deci et al. 1999)

During the learning process, both extrinsic and intrinsic motivation enhance performance, but studies found but only the latter has been associated with improved psychological well-being, enhanced creativity and learning outcomes (Ryan & Deci 2000), as well as increases in the extent and quality of effort that people put into a given task (Cerasoli et al. 2014).

Intrinsic motivation fuels inner interests and naturally makes one achieve goals, strive for consistency and maintain progress. On the other hand, extrinsic motivation provides external achievements, additional practices that help sustain interest when intrinsic motivation alone is not enough.

Competence

(1) Competence denotes a feeling that one is succeeding or even excelling when partaking in an activity. To support competence, social-contextual events (e.g., feedback, communications, rewards) that contribute toward feelings of competence during action can boost intrinsic motivation for that action. Moreover, early studies showed that positive performance feedback raised levels of intrinsic motivation, whereas feedback about low performance diminished it (Deci 1975).

In addition, the gamification approach should not focus on supporting just one of the psychological needs in isolation but all three needs cohesively. Studies have shown (Fisher 1978; Ryan 1982), that feelings of competence will not enhance intrinsic motivation unless accompanied by a sense of autonomy. Thus, people must not only experience competence or efficacy, they must also experience their behavior as self-determined for intrinsic motivation to be in evidence.

Autonomy

2) Autonomy is a person's ability to independently make decisions and act however they choose to do so, yet it is a less-studied aspect in gamification. In fact, most of the research on the effects of intrinsic motivation have focused on the comparison of autonomy versus control rather than that of competence. Research on this issue has been more controversial. lt began with the repeated demonstration that extrinsic rewards can undermine intrinsic motivation. Early experimental findings proposed that external rewards can weaken intrinsic motivation. Deci (1975) interpreted this effect as a shift toward more external perceived locus of causality, leading to reduced autonomy. Although other scholars questioned the robustness of this undermining effect, a comprehensive meta-analysis by Deci, Koestner, and Ryan (1999) reaffirmed that expected tangible rewards contingent on task performance truly decrease intrinsic motivation.

Relatedness

3) Relatedness is a feeling of belonging and interconnectedness with others for a sense of security, safety, support. Because extrinsically motivated behaviors are not typically interesting, the primary reason people initially perform such actions is because the behaviors are prompted, modeled, or valued by significant others to whom they feel (or want to feel) attached or related. This suggests that relatedness, the need to feel belonging and connectedness with others, is important for internalization.

METHODOLOGY

This study applies a qualitative literature review approach to observe the relationship between reward-based mechanisms and intrinsic motivation. The methodology follows both empirical and theoretical review on gamification.

Relevant peer-reviewed articles were selected based on examining the level of intrinsic motivation and psychological need satisfaction through the lens of Self-Determination Theory in gamified learning. Foundational works by Deci & Ryan were used to establish the theoretical framework, along with Cognitive Evaluation Theory (CET) and Organismic Integration Theory (OIT) as sub theories of SDT.

Reward-based mechanisms such as leaderboards, badges, and XP were evaluated in terms of their potential to support or undermine these psychological needs. Patterns across empirical findings were synthesized to estimate whether intrinsic motivation levels increased or dropped.

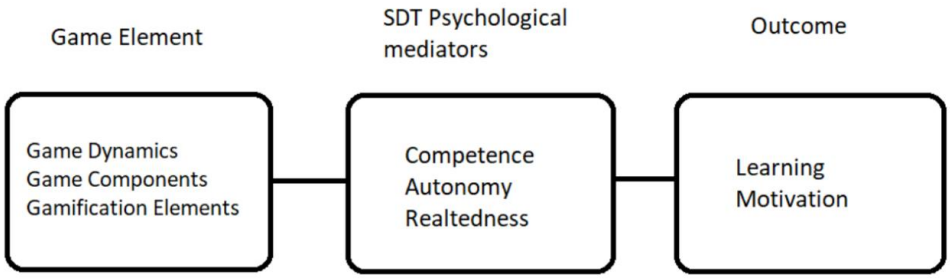

Figure 1: SDT Based Gamification Framework.

LITERATURE REVIEW

Even though gamification is often associated with increased user engagement and improved performance, recent research has begun to question its long-term effects on intrinsic motivation. Empirical findings remain mixed, with some studies reporting positive short-term engagement results and others indicating unintended and even detrimental consequences of reward-heavy applications.

A recent qualitative case study by Mogavi et al. (2022) examined a language learning app Duolingo and how users experience reward-based systems. Whilst analyzing more than 30,000 forum posts and in-depth interviews with Duolingo users, the authors recognized patterns of “gamification misuse,” where users prioritized streak maintenance and leaderboard status over meaningful and intentional learning. Moreover, users reported poor well-being, disappointment, and withdrawal from learning or dropping out.

Some users shared their comments on the consequences of gamified learning, some of them reported that they experienced loss of confidence during the studying process, and without cheating, climbing the leaderboard felt impossible. Other people mentioned they felt enslaved to the gaming aspects of Duolingo and ignorance of daily life tasks such as cleaning, bedmaking and fixing vacuum cleaners.

Some extreme comments were reported by users, mentioning how the game teaches kids to cheat, be manipulative and greedy: “Duolingo turns many people into worse versions of themselves, and it’s a very irresponsible thing, especially on a learning platform like this one. Many kids are here, and Duolingo is teaching them how to get greedy, how to manipulate, how to cheat, how to fight for meaningless and utterly useless virtual gems.

Different reasons for gamification misuse were investigated. For instance, active reasons included competitiveness, overindulgence in playfulness, and challenging the system, whereas passive reasons involved dark nudges of gamification and compulsion.

Competitiveness is not always an undesirable quality since the desire to compete with other people can be linked to people’s internet tendency to progress, excel, or survive in life. However, our findings propose the idea that users who are obsessed with it (especially in a learning environment) can become aggressive and stray from learning.

Users who indicated indulgence as one of the reasons confuse Duolingo with entertainment games such as Candy Crush Saga (King 2012) or Angry Birds (Rovio Entertainment 2009) and expect the same “entertaining” effect. But as we have mentioned before, it is crucial to distinguish typical games for the sake of entertainment and gamified learning. Finally, several users mention their desire to challenge the learning system. According to our findings, this could be due to previous negative experience with the learning app, finding bugs and errors, or simply gaining popularity or monetary gain.

As for passive reasons, people mentioned present dark patterns and compulsion.

In general, nudges are psychologically informed techniques used to steer the user’s decisions in welfare-enhancing directions. Dark nudges are also nudges, but with harmful, unhealthy, or unproductive purposes (Newall 2018). The term is relatively new and comes originally from the literature on gambling, where people are enticed to play more games and spend more money on them (Newall 2018). We find that some users charge Duolingo for using dark nudges to drive traffic to their platform without caring much about the users’ learning experience.

Compulsion. Another passive reason for gamification misuse is compulsion, which can be defined as a strong feeling of wanting to do something that is difficult to control. Research has shown that all people generally experience some degree of compulsion in their daily lives, however, for some people, compulsion might cause more severe detrimental effects. For instance, in the context of Duolingo, some users reported that their compulsive feeling for reward collection has completely undermined their full learning experience.

DESIGN IMPROVEMENTS

Users also mentioned a few design improvements to adapt and personalize the learning process. Personalization refers to the process by which a system (e.g., a learning platform) adapts itself (automatically) to the needs and interests of its users. Customization is the process that puts the control in the hands of the users, allowing them to modify the system themselves.

First, level compatibility should be considered when placing students in a leaderboard. For example, one user mentioned that it is unfair practice to put users with different levels (e.g. Level 23 and Level 5) to compete together.

Moreover, there should be an option to disable gamification schemes. Users should be able to choose whether they need gamified learning, or it is redundant. Users reported that gamification can hinder one's progress, distract, or just simply become unnecessary overtime.

The diversity and circumstances of different scenarios should be considered. One of the participants mentioned that daily streak is not a relevant gamification element for them since they mostly log into the app on weekends and maybe weekly streaks could be adapted into the system.

Interestingly, users have noted that learning apps like Duolingo assume that learners dislike the learning process and they use the app to compete in leaderboards and engage in gamified learning. This assumption destroys motivation and inner passion in students.

Most importantly, designers and software engineers should keep in mind that not all users know what gamification is. Apps that incorporate gamification should inform users in advance about the difference between games and gamification Last but not least, it is important to keep in mind that not all users know what gamifications. Designers and practitioners should have this in their minds that some users do not know what gamification is. Three respondents to our interviews are of the view that the learning apps

should inform users in advance about the difference between games and gamification.

ANALYSIS AND PRELIMINARY FINDINGS

Overall, there are a few findings worth mentioning. First, rewards and achievements primarily enhance competence since feedback-oriented mechanisms consistently increase competence levels and short-term engagement in users. However, according to Deci et al. (1999), tangible rewards risk undermining intrinsic motivation when perceived as controlling.

Moreover, when examined through the lens of SDT, reward-based gamification mechanisms do not always align with relatedness, autonomy, and competence. In the long run, the user's focus shifts from language learning to rewards and streak maintenance.

Apart from that, social elements support relatedness more sustainably. Avatars, teams, and collaborative elements tend to form a sense of relatedness without enforcing shift of focus on external rewards.

With regards to measurement of intrinsic motivation, it is difficult to sustain intrinsic motivation using gamification in the long run. Therefore, gamification is not motivational per se. It is psychologically neutral - specific gamification elements produce specific need-based effects.

Regarding the consequences of gamification implications, some gamification designs carry dark patterns (or also called “sludges”), which encourage continued engagement through manipulative mechanisms rather than genuine inner motivation (Newall 2018). For example, features like streaks may create a sense of obligation, pressure, or even anxiety, leading users to potentially lose interest in learning. Similarly, empirical studies propose the idea that overreliance on reward-driven mechanisms can shift user behavior toward compulsive engagement (Mogavi et al. 2022).

These observations shape the importance of carefully designing the gamification platforms: while gamified elements are crucial for external motivation and user engagement, sustaining and not undermining inner interest in the long spectrum is also equally essential.

CONCLUSION

In this theoretical study, we looked at gamification and assessed its techniques through the lens of SDT. Three key elements of SDT: competence, relatedness, and autonomy can be both enhanced and diminished during the learning process, and the outcome is affected by a person's motivation, behavior and personal preferences.

This paper examined reward-based gamification in language learning applications such as Duolingo through the lens of Self-Determination Theory (SDT). While gamification mechanisms such as XP, streaks, and badges are associated with increased involvement and raised motivation levels, the findings suggest that constant engagement alone does not necessarily reflect sustainable levels of inner interest.

While interpreting through SDT, at first glance, the reward-driven approach creates a sense of motivational tension. Even though elements like XP may reinforce competence in the short run, autonomy remains inconclusive in terms of competitive pressure and mechanisms. Leaderboards and streak systems may shift learners’ focus from studying the language to gamification elements and external pressure. Moreover, competitive features introduce social visibility, but they do not stimulate genuine relatedness and may instead exacerbate levels of pressure.

The contribution of this study is to demonstrate that gamification is not always inherently motivational. Instead, its motivational factors depend on various factors, including extrinsic and intrinsic motivation, exposure to gamification techniques, and psychological needs. For researchers, designers, and software developers, these findings suggest that balancing competence feedback with autonomy-oriented and socially meaningful mechanics might be essential for maintaining intrinsic motivation in the long term.

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