The Benefits of Gamification in Learning

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ABSTRACT

The gamification of learning has significantly impacted instructional designers, educators and students in a collective desire to enhance and improve the educational landscape. Gamification has been defined as the inclusion of game elements in non-game settings. This study scrutinizes the psychological foundations and development of gamification in learning. The need for a focused state of mind, the Flow, and satisfying prominent psychological needs such as autonomy, relatedness, and competence are discussed as crucial elements in successful gamification of learning. Based on current trends and aligned with the psychological needs of humans, significant benefits of gamification in learning are introduced. The study finds five key benefits to the inclusion of gamification in learning. An increase in student engagement and student motivation are noted. Moreover, the cooperative element of games is found to enhance cooperation and communication among peers. Gamification has also been linked to increased knowledge retention and the fostering of more personalized learning environments. The examination concludes that gamification is an effective method for instruction and further application in learning is highly suggested.

Keyword: *Gamification, Education, Learning benefits, Motivation, Engagement,*

1. Introduction

Rapid technological advances, highly connected social networks and a mindset of speed and involvement are some of the prime characteristics of human existence today. Educational specialists such as instructional designers and teachers face new challenges on how to engage, educate and guide students exposed to an everchanging realm of technology and internet advancements. Critical issues include students' lack of engagement, students' lack of motivation as well as their inefficiency in problem-solving. Teaching students who are now absorbed by graphic designing aesthetics and the speed and sounds of digital games has proven a daunting task. Some educators now include game elements within their teaching- learning process to increase student engagement and motivation. This inclusion has been term gamification: "the use of game mechanics and virtual achievements in non-game contexts to engage users, are being added to the virtual environment to increase task engagement and decrease attrition." [1]

2. Background

The application of gamification in various domains can be linked back to psychologist Jean Piaget who advocated the inclusion of games as a way for meaningful learning and interaction among children. Since Piaget's early advocacy for gamification, much has changed as video games and virtual reality have changed the child, adolescent and adult learning landscape. However, gamification is still closely related on the psychology of how humans are motivated. The Theory of Flow was introduced by psychologist Mihaly Csíkszentmihályi in 1990; in his theory, the Flow is defined as "an experience that is at once demanding and rewarding. Flow is furthermore a singularly productive and desirable state of mind." [2] The existence of Flow has three prerequisites. Firstly, a clear goal that adds structure and direction to the task. Secondly, clear and immediate feedback which helps people adjust their performance to meet demands. The third essential condition is a balance between challenge and skill. [3] The amalgamation of these elements results in engaged users. Applied to gamification this could mean that a user should be in a state of Flow to be fully immersed in an activity. [4]

Another key psychological theory impacting gamification is the Self-Determination theory developed by psychologists Edward Deci and Richard Ryan. The Self-Determination Theory is based on "the hypothesis that there is a set of universal psychological needs that must be satisfied for effective functioning and psychological health" [5] Deci and Ryan (2008) define the core needs as autonomy, relatedness, and competence. (p.235) Thus, users, or

learners, benefits from gamification when these core needs are experienced. The freedom to select an avatar, succeeding through various game levels and connecting with groups within the game are prime examples of the Self-Determination theory's application in gamification.

Taking both the Theory of Flow and the Self-Determination Theory into consideration will aid instructional designers and educators in understanding the innate features and potential benefits of gamified learning. Evidently, the experience must include all three Flow elements. A learning objective, equivalent to a game goal, must be set and determine "what educational content and activities [are] to be included in learning process". [6] Moreover, the educational game platform must offer "immediate feedback so that users perceive feelings of high individual performance." [7] Excelling in each step is what arises a sense of achievement and consequently increases motivation. Educational games must then be designed with "tasks of increasing difficulty [and] cognitive structures for the internalization of learning contents may be systematically created." [8] From the Self-Determination perspective, different types of feedback and reward mechanisms are central to effective game design. Game mechanisms such as the accumulation of points and badges trigger "motivating mechanisms as positive reinforcement that is achieved by immediate recognition and obtaining rewards." [9] Similarly, the selection of avatars generates a "feeling of autonomy and personal implication in achieving the objective." [9] Such gamification elements solidify the notions of autonomy, competence and relatedness within a focused state of mind, as set forth by the psychological theories of Csíkszentmihályi, Ryan and Deci thus, resulting in "an improvement of knowledge and skills." [10]

3. Benefits of Gamification

3.1 Student Engagement

The education sector has witnessed various changes and trends over the years. The notion of gamification is a fairly new trend which still requires study however, gamification has already offered solutions to some educator dilemmas. "One of the main problems in modern education is related to the lack of engagement and motivation of students to participate actively in the learning process." [6] Thus, most primitively, the introduction of gamification into the classroom stems from the premise that the nature of games and what makes them fun increases students' intrinsic motivation to engage in learning activities. [11]

The effectiveness of gamification in engaging learners can been related to the inclusion of game elements that trigger intense focus. These intriguing elements have been categorized into mechanical, personal and emotional elements. The use of avatars, leaderboards and quests as well as "high customization levels and the possibility to develop eye-catching graphics" are key features in attracting students' engagement. [12] Gamified learning also presents new reward mechanisms such as trophies, stars and score charts which create a sense of achievement. Kaufmann (2011) notes how gamified learning settings have rewards which are "visual and trackable, which give additional levels of gratification to the player when correct actions are taken." (p.128) Furthermore, the autonomy that gamification offers learners will also "result in greater student engagement as individuals are free to select a preferred mode of learning." [12]

The social dynamics of gamification also constructively impact student engagement. Karimi and Nickpayam (2018) discuss the psychological aspect of playing as a team and note that in social comparison settings "people seek to evaluate their beliefs, attitudes and abilities by comparing their reaction with others." [7] They note that the existence of others engages learners hence they start to "invest personal resources of effort and time for an activity [depending on] personal incentives, beliefs regarding oneself, and comprehended alternatives." (p.38) Kiryakova, Angelova and Yordanova (2014) assert that witnessing group results "adds to the competitive nature of the learning." [6] Hattie and Timperley (2007) mention the presence of groups as a frame of reference, a yardstick of comparison by which learners examine themselves. [14] This sense of competition can cause social pressure which thus increases "learners' level of engagement and can have a constructive effect on participation and learning." [15]

3.2 Student Motivation

The potential of gamification does not stop with the engagement of learners rather it deepens as students become more and more motivated to excel. Rigby and Ryan (2011) assert that the constructive competition of games "has the potential to foster feelings of relatedness, thereby enhancing intrinsic motivation." [16] Karimi and Nickpayam (2017) state that gamification combines the two types of motivations by "using extrinsic rewards such as levels, points, badges to improve engagement while striving to raise feelings of achieving mastery, autonomy, sense of belonging." [7] It is the innate feature of gamification, to use game elements, that captivates learners. As students become more engrossed in the realm of playing, continuing quests, discovering secrets or solving puzzles, their determination and competence increases. Students are stimulated by the mechanics of the game to continue; thus, they become driven and motivated to complete the task at hand. The captivating nature of the Flow, the optimal focus state, stimulates learners and increases their intrinsic motivation which "can become more powerful than the external goal." [17] This engagement is so vivid that students perceive gamified courses to be "more motivating, interesting, and conducive to learning than other courses." [18] Several studies have also found gamification increase engagement, motivation and productivity in solving problems and task engagement in a variety of non-game contexts including learning. [1][19][20]

3.3 Collaboration Skills

The increased engagement and motivation that gamification brings to learners enhances other key skills as well. A popular form of gamifications is designed for groups. These experiences involve groups, leagues, clans or teams that work together to achieve a common goal. Such gamified learning experiences focus on the concept of teamwork and cooperation. This sense of community gives students social responsibility and emotional investment. Instructional designers and educators must utilize game elements to achieve predetermined learning objectives; as students work together, they develop social skills whilst reaching the objective. Hsin-Yuan Huang and Soman (2013) affirm that "activities requiring interaction with other learners are the social element of training, they make students a part of a big learning community and their results are public and visible." [10] Gamification of learning environments can also enhance important skills such as problem-solving, collaboration, and communication by making participation effective and meaningful. [18]

3.4 Knowledge Retention

The application of gamifications has also been noted to reinforce learnt knowledge and aid with knowledge retention. Sitzmann et al (2011) note that "gamification in education also helps self-efficacy and boosts knowledge retention." [21] The potential of gamification to enhance learning can be traced to its appealing graphics, engage nature and its ability to actively involve learners. In gamified learning settings students are stimulated thus they grasp, recycle and use more knowledge. Tennyson and Jorczak (2008) define this interaction as an interactive cognitive complexity which "maximize learning because they simultaneously engage the affective and cognitive processes of trainees." [22] Randel et al (1992) reviewed the effectiveness of simulation games on knowledge retention and found that "retention was greater for trainees taught with simulation games than classroom instruction." [23] The correlation between gamification and knowledge retention further proves that by enriching learning environments with game design elements modifies these environments. Immediate feedback, a crucial element of gamification that feeds the learners need for relatedness has shown to be "among the most powerful factors in the relationship between educational interventions and learning in general." [14]

3.5 Personalized Learning Environment

Gamified learning environments provide learners with options regarding their presence, level, task and speed of completion. This potential to personalize and tailor learning to the needs of each students is a prime benefit of gamification. Giving students a choice in their learning increases their sense of autonomy and such personalized options have been found to be particularly beneficial to student engagement. [12] Taking students' levels of motivation, personalities, and game preferences into consideration also enable instructional designers to create formats that better align with particular student demographics. Such adaptability is hard to come by in traditional teaching environments as teachers are limited by time and resources on how much they can differentiate. The gamified learning environment enriches students' learning experience by offering them options and a realm with opportunities to take risks and strengthen their understanding without fear of failure. Unsurprisingly, a 2014 study

found that "personalized virtual online learning environments improved students' exam performance, satisfaction and self-efficacy compared to non-personalized virtual learning environment." [23]

4. Conclusion

As instructional designers and educators face new struggles on how to make learning more meaningful and students more motivated, gamification can be a valuable tool. Gamification in learning alleviates some of the modern educational difficulties including decreased student engagement, motivation and a lack of cooperation among students. The benefits of gamification lie in its congruence with two psychology theories; the Theory of Flow and the Self-Determination Theory. Moreover, game elements, such as scoreboards, rewards, quests, teams and leadership roles, all foster essential psychological needs. As a result, gamification can prove beneficial in enhancing students' engagement, increasing their motivation towards learning, promoting collaboration among peers, aiding with knowledge retention and establishing a positive personalized learning environment.

5. Acknowledgment

6. References

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