FLOU: Evaluating the Intrinsic Motivation of Learners in Gamifying Academic Programs Through a Gamified Mobile Application

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Abstract: Learning is deeply influenced by motivational factors, and gamification has emerged as a tool to enhance student engagement by incorporating game elements into educational settings. Despite initial positive responses, sustaining long-term intrinsic motivation remains a challenge. This research investigates the relationship between intrinsic motivation and gamified learning, employing Self-Determination Theory to guide the analysis and design construct. It aims to balance intrinsic and extrinsic motivators in designing gamified educational platforms. The study evaluates the intrinsic motivation of students using a gamified platform called Flou. Findings show that user motivation did not necessarily lead to higher levels of intrinsic motivation or engagement compared to those who did not use the application. Moreover, the implored user-centric gamified design on Intrinsic Motivators had little to no interactions among the user–with which only elements from Competence have found to have most engagements from the user, mainly attaining badges. Recommendations are made for designing balanced gamified educational experiences. The study offers insights into designing gamified platforms that enhance students' intrinsic motivation and engagement while promoting meaningful educational outcomes. The findings of the study are used to formulate recommendations towards the design of a balanced gamification to be used in an educational context. This study aims to contribute to the evolving field of gamification in education by addressing the challenge of sustaining students' motivation and promoting self-directed learning within gamified platforms.

Keywords: Gamification, Gamification in Education, Intrinsic Motivation, gamified platforms, Motivators, user-centric, Self-Determination Theory

1. Introduction

Learning is a multifaceted process influenced by various motivational factors (Serin, 2018; Howard et.al, 2021; Dichev, Dicheva, Angelova, & Agre, 2014). In the pursuit of enhancing student engagement and fostering their motivation as well as the continuous progress of technological advancements in the modern world, educators have turned to different learning style approaches, which include gamification as a developing approach to enhance learning engagement and the motivational environment among the academe (Dichev & Dicheva, 2017; Licorish et.al, 2017; Manjet et.al, 2018). Gamification integrates game elements and mechanics into nongame contexts (Luo, 2021; Dichev & Dicheva, 2017; Alsawaier, 2018; Toda, Valle, & Isotani, 2018). By infusing elements and mechanics found in games into the learning environment, gamification seeks to create an enriching and immersive experience for students (Alsawaier, 2018; Crebelo, 2020). As such, in the realm of application development, gamification could hold the potential to increase the extrinsic and intrinsic motivation of learners to participate in school activities and engage them subsequently from multiple studies (Piskorz, 2016; Alsawaier, 2018; Dichev & Dicheva, 2017; Dichev, Dicheva, Angelova, & Agre, 2014).

The academic landscape witnesses a paradox: students often exhibit a positive response to gamified learning platforms, reflecting an increase in their motivation due to their engagement with them, but they would subsequently display low intrinsic motivation (Metwally, Chang, Wang, & Yousef, 2021), eventually leading to a drop in their motivation. Hence, the importance of sustaining the motivation that the learners acquire from gamified platforms poses a long-standing challenge in the avenue of gamifying education (Dichev & Dicheva, 2017). Consequently, gamification typically emphasizes extrinsic motivation more than intrinsic motivation due to the overapplication of points, badges, and leaderboard (PBL) systems in gamified platforms (Dichev, Dicheva, Agre, Angelova, 2014).

Thus, this study aims to assess the problem of gamification in education by evaluating the intrinsic motivation of students in a gamified platform whose objective is to gamify academic programs. The study looks into motivational theories and psychology of human motivation, intrinsic motivation, and gamification frameworks in efficiently conceptualizing and designing a gamified experience for students. Additionally, the use of the mentioned concepts may determining game elements and design to craft a balance between intrinsic and extrinsic motivators to enhance students' intrinsic motivation and engagement while creating profound learning experiences in the academe. This study will not only provide educators with a new perspective on designing gamified platforms centered toward gamifying academics and increasing students' intrinsic motivation on gamification, but can also offer them a strategy for balancing extrinsic and intrinsic motivators to cultivate intrinsic motivation in a gamified platform.

2. Background

2.1 Gamification

Gamification has gained significant attention in the field of education as a tool to approach the problem of enhancing student engagement, motivation, and learning outcomes. (Cosic, Krnjić, Petrušić, 2022; Dichev & Dicheva, 2017).

Gamified design principles involve game mechanics and dynamics such as challenges, role-play, progression, narratives, and rewards, which help implement gamification in various contexts (Morschheuser, Hassan, Werder, & Hamari, 2018; Dichev & Dicheva, 2017). At its thiebescore, the incorporation of game design principles aids in leveraging gamified elements to make the academic experience and learning outcomes more compelling and enjoyable (Thiebes, Lin, & Basten, 2014). Some principles of gamification include game mechanics, which are the set of actions, rules, rewards, and control mechanism of the gamified system– is what essentially the game designer assembles in creating an engaging experience (e.g., points, badges, levels, leaderboard). Game dynamics is another principle representing the behavior, desires, and motivators of the mechanics–the concept that guides human behavior in certain ways that may cause users to feel a sense of achievement, progression, and challenge (e.g., challenge, progression, relationship). Lastly, game aesthetics refers to the user goals, experience, and the "fun" aspect of the gamified system (Dichev & Dicheva, 2017). These are challenges, interaction, and expression. Utilizing gamified frameworks such as the Mechanics, Dynamics, and Aesthetics (MDA) framework helps guide a careful integration of game mechanics, narratives, and interactive elements on a gamified platform (Kusuma, et al., 2018).

2.2 Intrinsic Motivators According to Self-Determination Theory

Motivation is demonstrated by an individual's choice to engage in an activity and the intensity of effort or persistence in that activity (Alsawaier, 2018). As Rheinberg & Vollmeyer (2018) put it, motivation can be defined as "activating orientation of current life pursuits toward a positively evaluated goal state". Motivation is among the important predictors of a student's achievements that influence their engagement with the academic environment (Dichev & Dicheva, 2017). Learning outcomes are influenced by different types of motivation that stem from external factors, personal values or beliefs, and intrinsic interests. (Howard, et al., 2021). Motivation has often been grouped into extrinsic and intrinsic (Dichev, Dicheva, Angelova, & Agre, 2014).

Self-Determination Theory (SDT) is based on recognizing three fundamental psychological needs essential for human motivation and overall well-being. These needs are autonomy, competence, and relatedness. ad to greater happiness and well-being. Within the framework of SDT, three fundamental psychological needs stand out: autonomy, competence, and relatedness. Autonomy pertains to a sense of initiative and ownership in one's actions, competence involves the pursuit of mastery and growth, and relatedness emphasizes the significance of connection and belonging. Fulfilling these needs is crucial for nurturing motivation and well-being, while neglecting them can have detrimental effects on academic motivation and engagement (Deci & Ryan, 2020).

3. Methodology

3.1 Research Design

The research design utilized in this research was a quantitative experimental design. This kind of research will test causal relationships through the manipulation of an independent variable and measuring its effect on the dependent variable. In terms of the study, this research design allowed for the testing of the causal relationship of the gamification elements as the independent variable and the motivation level of the students as the dependent variable. The identified participants for FLOU were a total of 40 first-year students belonging to the College of Computer Studies courses: Information Technology (IT), Computer Science (CS), and Information Systems (IS). The total number of participants were halved between Non-users & Users of the proposed gamified platform.

3.2 Gamification Design of FLOU

The PBL approach is simply not enough to cultivate intrinsic stimulation from learners. Hence, FLOU made use of other game elements to improve our understanding of how individual game elements are linked to behavioral and motivational outcomes, and how they function to devise a successful gamification design that fosters intrinsic motivation of students. Some game elements featured in FLOU are Story Roadmap, Badges, Mastery, Daily and Weekly tasks, and User Progression (Goal tracking). However, FLOU intends to put more emphasis on the user's engagement with the Story roadmap and Mastery. To put it explicitly, the gamification elements were designed to be employed according to what intrinsic motivation they may signify. Autonomy-related elements include Story Roadmap, User Customization, and Goal Tracking. Competence-related elements include Badges, Daily/Weekly Tasks, Mastery, and User Progression. Relatedness-related elements include the Story Roadmap, Badge Showcase, and Friends Function.

4. Results and Discussion

4.1 Effect of Gamification on the Intrinsic Motivation

The initial motivation scores of the participants were accumulated through the Situational Motivation Scale Questionnaire by Guay, F., Vallerand, R. J., & Blanchard in 2000. In the context of this study, the SIMS (Situational Motivation Scale) is a questionnaire used to identify a student's experience in university activities/programs in terms of their motivation and engagement with the activity. The researchers observed that for almost every activity, external regulation garners the highest points among all factors. Essentially, this has resulted in a huge gap between the intrinsic motivation and extrinsic regulation. It is also particularly evident that External regulation has garnered higher points on questions such as: “Because I am supposed to do it” and “Because it is something that I have to do”, to which we can infer that students are likely to participate because of external factors, of such for “compliance”.

Table 2. *Motivation scores of Flou users and Non-Flou users*

SIMS	Flou Users	Non-Flou Users
Intrinsic motivation	3.29 (0.81)	3.045 (1.76)
Identified regulation	3.92 (1.15)	3.75 (2.02)
External regulation	4.56 (0.83)	4.63 (1.67)
Amotivation	2.83 (0.20)	1.995 (0.45)

The implementation of the gamified platform did not have any significant effect on the motivation of the learners to participate in school activities. From the statistical analysis, users have a significant effect on elements from Autonomy and Competence. One plausible explanation for this could be having a user-centric design on gamification that focuses on the three intrinsic motivators may need to be studied more. Additionally, the gamification design can be designed more in the sense that it will cater to a wide range of personalities that exist among learners. Simply put, making a *user-centric* design that centers around simple Intrinsic Motivators is not favorable in many cases such that learners have their own ways of motivating themselves.

4.2 Effects of Gamification Elements

The different gamified elements implored in the design of the gamified platform was incorporated into the concept of SDT: the three motivators, namely: Autonomy, Competence, Relatedness. Part of the research question was to determine if the different gamified elements have an influence on the reported intrinsic motivation of the participants. A regression analysis was conducted to determine which gamified elements and motivators influence the intrinsic motivation score of users after the conduct of Intrams. It is revealed that only elements belonging to Autonomy and Competence have an influence on the reported intrinsic motivation (p-value < 0.05). These elements are Story Roadmap, Goal tracking, Badges, Mastery, Progression, and Tasks. Lastly, the linearity of the residual found from the regression analysis on the Figure 1 of the engagements to the intrinsic motivation suggests that more data on the engagements on the motivators must be attained to acquire a more reliable difference in their effectiveness.

5. Conclusion and Recommendations

5.1 Conclusion

In summary, this study was conducted to evaluate the intrinsic motivation of students in their engagement and participation in their academic programs, specifically, on school activities. The gamified platform uses the concept of SDT in exploring the concept of Intrinsic motivation. Findings from this led to the implementation of a user-centric design on the implored gamified platform– by the use of features that benefit the user's internal behavior. The findings reveal that the use of the implored gamified platform did not have a significant effect on the user's initial and final intrinsic motivation. The gamified elements were found to be lacking—with only Badges attaining the most interactions.

5.2 Recommendations

Although this study contributes to the existing literature found on the concept of gamification in the context of education and provides implications for its use, there are still limitations that should be addressed through more varied research. The present study was not able to deploy the gamified platform for a longer period of time during the experiment period. The intrinsic motivation scores are not sufficient enough to tell if there was a change in their motivation, considering that it was only evaluated for one month with only one activity, which is the Intramurals 2024, held during the experiment. Aside from this, the longer duration of the experiment will help discover more trends and patterns in the motivation score data among users. Furthermore, one of the observations of the researchers during the experiment was that participants did not show much enthusiasm towards the use of the application so this could have had implications on its design. In addition, several participants expressed their difficulties in terms of attaining badges. Some find it inconvenient that they still have to email or approach one of the administrators for them to get a unique QR code for that badge. In line with this, there are a lot of badges available on the platform–it would have been better if badges are condensed into tiers or grouped with similar requirements, or a grouped badge leading to a higher tiered badge. One of the user-centric strategies implemented on the features is the "mastery badges" since it has categories pertaining to the an individual's general skills. Since there are little interaction made by the users on this feature, this specific feature could be more enhanced so that users would find it more engaging to interact with. Lastly, intrinsic motivation cannot be controlled and therefore varies among individuals. Considering this, future studies can explore more on how gamified features can work well with fostering an individual's intrinsic motivation, rather than extrinsic motivation.

Acknowledgments

We would like to thank all the people who prepared and revised previous versions of this document.

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