

Gamified Education Platform

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Abstract—Nearly all higher education institutions now use e-learning platforms to deliver courses and learning activities, reflecting the evolution of university teaching methods in recent years. Nevertheless, there are high dropout and low completion rates in these online learning environments. Similar to how games can increase student engagement, gamification of education can maximize learning and help students develop specific skills. Gamification, which is the use of elements of game design in non-gaming activities, has been used to address learner distraction and increase student engagement. Teachers are increasingly using creative methods to engage and inspire students as the educational landscape continues to change in the digital age. Forty undergraduate students enrolled in first-year programming courses participated in our four-month experiment. One of two versions of the programming learning environment—a gamified version with badges, points, and ranking, or the original non-gamified version—was randomly assigned to the students. We have discovered evidence that gamification had different effects on users depending on their personality traits. Because there are no tried-and-true design strategies and no one-size-fits-all strategy that works in every gamification context, gamification designers and practitioners continue to struggle with selecting the ideal mix of game elements. By utilizing game elements to improve the educational experience for young students, gamification plays a critical role in primary education.

Index Terms—game, gamification, gamification platform, smart education

I. INTRODUCTION

In recent years, the educational landscape has undergone a dramatic shift due to the integration of digital technologies. One of the most transformative innovations in this domain is the advent of gamified learning platforms. These platforms incorporate elements of game design—such as points, levels, challenges, and rewards—into the educational process to boost motivation, engagement, and learning

outcomes among students. As traditional instructional methods increasingly struggle to captivate the digitally native generation, gamified learning offers a compelling alternative that aligns more closely with students' digital experiences and expectations. Gamification of education is a strategy for increasing engagement by incorporating game elements into an educational environment (Dichev and Dicheva 2017). The goal is to generate levels of involvement equal to what games can usually produce (Fardo 2014). The main goals of gamification are to enhance certain abilities, introduce objectives that give learning a purpose, engage students, optimize learning, support behavior change, and socialize (Knutas et al. 2014; Krause et al. 2015; Dichev and Dicheva 2017; Borges et al. 2013). Stimulated by the effects that game elements can produce, many researchers have looked into the influence of gamification in an educational context, getting favorable results, such as the increase of engagement, user retention, knowledge, and cooperation (Hakulinen and Auvinen 2014; Tvarozek and Brza 2014). Despite that, some studies have shown uncertain or prejudicial results from gamification

Gamification in education is not merely about entertainment; it represents a strategic approach to enhance cognitive engagement and promote active learning. By providing immediate feedback, clear goals, and incremental challenges, gamified platforms enable students to develop a growth mindset. These elements can create a more immersive and interactive educational experience, fostering sustained interest and deeper conceptual understanding. Furthermore, the use of digital tools enables personalized learning paths, which cater to the diverse needs and learning styles of individual students. review on gamification in science education by reviewing 24 empirical research papers. A research question related to our field of study was addressed in this review, namely, what learning theory is used, and what game elements are

incorporated into gaming apps. The findings of the study showed that most articles did not provide details about the theoretical content or the theory on which they were based. The few articles that used theoretical frameworks were based on self-determination theory SDT, flow theory, goal-setting theory, cognitive theory of multimedia learning and motivation theory. In addition, the study found that the most common game elements and mechanics used in gamified science education environments were competitive setup, leaderboards, points and levels.

II. BACKGROUND

Gamification has become a popular and highly debated method for improving learning in a variety of educational contexts. Teachers want to increase motivation, enhance engagement, and improve learning outcomes by incorporating game elements like points, badges, leaderboards, challenges, and narratives into non-gaming contexts. These components encourage students' curiosity, hold their interest, and develop favorable attitudes toward learning. Gamified tools and platforms have been increasingly popular as digital technologies become more ubiquitous in educational institutions. The shortcomings of traditional educational approaches, which frequently fail to sustain student interest and participation, particularly in online or remote learning situations, have been the driving force behind this development. Gamification is supposed to help with these issues. by incorporating a sense of development and interaction that many students find appealing.

Gamification's theoretical underpinnings are based on well-known theories such as behaviorism, constructivist learning theory, flow theory, and self-determination theory. These theories emphasize important elements that influence learners' engagement and performance, including autonomy, competence, social connection, and reinforcement. When gamification is carefully planned, it can support students' psychological needs, give them a sense of direction, and motivate them to work hard [4]. According to recent research, gamified learning environments can encourage enhanced academic achievement and better learning experiences by encouraging both emotional and cognitive investment. These advantages are not, however, ubiquitous or assured. Results frequently differ based on learners'

cultural backgrounds, developmental stages, and past technological experiences. Gamification's promise can be undermined and educational disparities reinforced by issues including an excessive dependence on extrinsic rewards, uneven use, and restricted accessibility.

III. EXISTING SYSTEM

This section highlights how gamification has been implemented across educational contexts, showcasing eight widely used platforms and summarizing their main features, purposes, and observed outcomes.

1. **Duolingo: Gamification for Language Learning**
Duolingo is one of the most widely studied examples of gamification in education. As a mobile and web-based platform, Duolingo uses points, streaks, badges, and adaptive challenges to motivate consistent language practice. Studies have shown it improves vocabulary retention and promotes self-directed learning habits over time
2. **Classcraft: Role-Playing and Collaborative Learning**
Classcraft turns classrooms into multiplayer role-playing games where students earn points and unlock powers through teamwork and positive behaviour. Research indicates it strengthens engagement and classroom community while supporting intrinsic motivation
3. **Kahoot: Game-Based Assessment and Immediate Feedback**
Kahoot transforms quizzes into competitive games, driving participation and enjoyment. Reviews have found it particularly effective for increasing attention and engagement, although learners find it tedious
4. **Quizizz: Personalized Practice and Mastery Learning**
Quizizz gives students a self-paced way to take quizzes, letting them work independently while earning points, badges, and tracking their progress. Balakrishnan and Ganme reported that Quizizz improved student motivation and perceived competence in secondary science courses. Recent evaluations show it supports mastery learning through repeated practice and immediate corrective feedback.
5. **Minecraft - Education Edition: Constructivist Learning Through Simulation**
Minecraft: Education Edition offers open-ended environments for exploration and simulation. Studies highlight its role in fostering creativity,

collaboration, and problem-solving, especially in science and engineering contexts.

IV. IMPACT ON STUDENT ENGAGEMENT AND LEARNING OUTCOMES

Gamification's theoretical underpinnings are based on well-known theories such as behaviorism, constructivist learning theory, flow theory, and self-determination theory. These theories highlight key components such as autonomy, competence, social connection, and reinforcement that affect students' performance and engagement. Gamification may provide students with a sense of purpose, fulfill their psychological needs, and inspire them to put in a lot of effort when it is correctly prepared [4]. Recent study indicates that by promoting both emotional and cognitive investment, gamified learning environments can promote improved learning experiences and increased academic accomplishment. However, these benefits are neither universal nor guaranteed. Depending on learners' cultural backgrounds, developmental phases, and prior technological experiences, results often vary. Issues including an over-reliance on extrinsic rewards, uneven use, and limited accessibility can undercut the promise of gamification and entrench educational inequities. Maintaining involvement requires motivation. Extrinsic incentives like points and badges can increase early interest, according to research, but they run the danger of eroding intrinsic motivation if they are not linked to significant learning objectives. On the other hand, settings that incorporate cooperation, adaptive challenges, and progress feedback encourage self-regulated learning and greater motivation. Results are also influenced by environmental and cultural factors. While students from individualistic backgrounds might be more motivated by personal accomplishment, team-based awards frequently have greater effects in collectivist settings. Furthermore, the extent and efficacy of gamification may be limited by differences in digital literacy and technology availability. To effectively use these tools, teachers must be prepared and supported.

V. RESEARCH DESIGN

In order to investigate how gamified learning platforms affect student engagement, this study used a

mixed-methods research design that combined quantitative and qualitative techniques. The academic engagement levels of students exposed to gamified platforms and those involved in conventional digital learning settings were compared using a quasi-experimental approach. The study allowed for longitudinal observation and data gathering over the course of a 12-week academic term. Techniques for Gathering Data Standardized engagement surveys, such as the Student Engagement Instrument (SEI), were used to gather quantitative data both before and after the intervention. Platform data, such as task completion, badge acquisition, and login frequency, were also documented. Qualitative data was gathered through focus group discussions and semi-structured interviews with students and teachers, aiming to capture nuanced perspectives on motivation, participation, and perceived value of gamified tools.

VI. DATA SOURCES INCLUDED

- Pre- and post-intervention student engagement surveys
- Learning platform activity logs
- Classroom observations
- Teacher and student interviews

Inclusion Criteria:

- Students enrolled in grades 6 to 10 in participating schools
- Availability of stable internet connectivity and access to digital devices
- Consent obtained from students and guardians

Exclusion Criteria:

- Students with severe cognitive or learning disabilities that might impede digital interaction
- Students not present for at least 80% of the intervention period
- Incomplete pre- or post-intervention data submissions

VII. FUTURE SCOPE

The future of gamified education platforms lies in AI-driven personalization, immersive technologies, and data-driven learning. Artificial intelligence and machine learning will enable adaptive challenges and personalized feedback based on each learner's performance. Integration with Virtual Reality (VR), Augmented Reality (AR), and the metaverse will

create more interactive and realistic learning experiences.

Future platforms will also emphasize inclusive design, supporting diverse learners through universal design for learning (UDL) principles. Blockchain-based certifications and deeper integration with Learning Management Systems (LMS) are expected to enhance the credibility and scalability of gamified learning.

Additionally, future research should focus on long-term learning outcomes, ethical data use, and sustainable motivation strategies to ensure that gamification improves both engagement and real educational achievement.

VIII. CONCLUSION

This review has examined how gamification is changing education in K–12, higher education, and non-formal contexts. Based on a variety of studies and theoretical frameworks, such as Self-Determination Theory, Flow Theory, and Constructivist Learning Theory, the results indicate that skill development, motivation, and active engagement can all be enhanced by well-designed gamified settings. However, recognizing cultural and developmental settings, addressing ethical and fairness issues, and matching tools with learning objectives are all necessary for gamification to be effective. Inadequate competitive dynamics or an over-reliance on outside incentives might reduce intrinsic motivation and widen educational gaps. The absence of long-term data also emphasizes the necessity of thorough, ongoing research. Going forward, educators, researchers, and policymakers should embrace gamification as an evidence-based approach that has great potential for developing dynamic, inclusive, and captivating learning experiences when used carefully. Gamification can help students succeed academically and develop the curiosity, resiliency, and self-direction necessary for lifelong learning by fusing theoretical understanding with practical innovation and ethical responsibility.

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