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A Review of Studies Examining the Use of Gamification in Educational Settings and Its Effects on Student Motivation and Achievement

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ABSTRACT

This paper presents a review of the existing literature regarding the integration of gamification in teaching-learning environment with a focus on the effects on students' motivation and achievement. Gamification, the process of applying game elements into non-game contexts, has received a lot of attention in universities as a way of promoting user engagement and motivation in learning. Based on self-determination theory, the paper explores how the use of gamification promotes autonomy, competence, and relatedness, which are related to intrinsic motivation. The review integrates findings from different studies and meta-analyses done by Deterding et al. (2011), Anderson et al. (2016), and Hamari et al. (2014), which shows that the integration of gamified features improves engagement, interest and persistence. Furthermore, it investigates the effects of gamification on learners in terms of achievement based on Kapp's (2012) analysis of game-based methods and techniques. This reflects the fact that gamification has the ability to enhance comprehension, recall, and effective use of knowledge, as asserted by Hamari et al. (2014). Some areas for future research include employing longitudinal designs, adopting individual differences into the intervention, and creating an ideal framework for designing and assessing gamification in education. Such findings enrich the emerging body of literature on gamification in education by expanding knowledge of motivational outcomes and academic results, as well as suggesting avenues for future research and application.

Keywords: *Integration of gamification, teaching-learning, environment, students' motivation, gamification.*

Introduction

The concept of gamification, defined as the application of game-design elements on non-game domains, has attracted a lot of interest as a creativity paradigm for increasing users' interest and motivation. Consequently, gamification has become one of the promising approaches in educational contexts, where the maintenance of students' engagement and accomplishment is crucial. The following literature review seeks to provide a synthesis of the current literature on the application of gamification in learning contexts and the effects on learners' engagement and performance. Motivation in education is a multifaceted construct influenced by various factors. Thus, gamification provides a unique approach to address these. According to self-determination theory advanced by Deci and Ryan in 1985, people are motivated by internal factors that include; autonomy, competence, and relatedness. The use of game elements in education allows students to be self-directed, gain competencies and interact with others, which is in line with self-determination theory (Ahmad et al., 2024). Other researchers who have focused on the motivational properties of gamification include Deterding et al. (2011), who, in their literature review, show evidence of a positive correlation between the use of elements of games and increased motivation. It also establishes that gamification focuses on the intrinsic elements of motivation to make the learning processes engaging for the students.

Anderson et al. (2016) looked into the motivational benefits of applying gamification to learners in high school, noting that learners who had to perform tasks within the context of games showed better interest, engagement and persistence. The paper demonstrates the usefulness of implementing the gamification components to develop a long-term motivation framework in education. One facet of education is academic achievement, and gamification enhances it, according to the results of the study. According to Hamari et al. (2014), there is a correlation between gamified elements and better performances, implying that game mechanics can easily be used to boost academic results and are useful for educational purposes. Kapp (2012) has also provided additional ideas on gamification in learning through his anatomy of gamification in education as a guide to designing gamification for desired educational outcomes (Fatima et al., 2024). Nonetheless, there are still some barriers that are worth recognizing concerning the precise use of gamification. These are issues that both researchers and practitioners have to consider to accommodate the objectives of gamification in learning environments without becoming disruptive. Further research is needed concerning the effectiveness of the gamification approach in the long term and the effects it has on student engagement and outcomes.

Motivation in Educational Settings

Motivation is one of the most important determinants of the learning environments and the academic performance of students. Self-determination theory (Deci & Ryan, 1985) posits that intrinsic features such as autonomy, competence and relatedness are the primary sources of motivation. They suggest that game-related aspects can be used to support the development of these elements in learners, boosting their autonomy, skills, and social achievements within the educational process. This is perceived self-organization, another component of self-determination theory, and is about people wanting to be in charge of what they do and how they behave. Gamification means that the student must be allowed to make choices, set goals

and achieve them based on a timeline of their learning (Riaz et al., 2024). This empowerment is in tune with the learning styles of the populations and how they perceive learning and education that is being imparted to them. Promoting skill development, which is also considered to be a motivational factor, entails providing elements of a game, including challenges, quests, and levels. These aspects foster active learning environments that foster competency achievement (Landers, 2014). It is due to repetitive feedback and motivation associated with the game that constant feedback accelerates performance, thus boosting students' competency and self-esteem. Communication, a basic element of human life, is also incorporated in the concept of gamification. Group assignments, boards and challenges improve student interaction and foster a supportive learning environment Cheong et al. (2014). This relatedness helps boost motivation and the feeling of being a part of the activity. Additional evidence for autonomy, competence, and relatedness comes from Ryan et al. (2006), who also established that the states fostered by the perceived environment increase well-being and maintain intrinsic motivation. In adhering to these principles, therefore, gamification has the propensity to influence students' motivation for learning and experience positively.

Effects of Gamification on Student Motivation

The role of gamification in influencing the motivation rates of students has been widely documented, and several works have noted some promising findings. Deterding et al. (2011) undertook a meta-analysis that showed an equally positive relationship between the incorporation of gamified elements and the user engagement level. Their findings rely on features such as points, badges and leaderboards to identify how these elements sustain student interest in learning. Similarly, Anderson et al. (2016) examined high school students' experience of learning games that enhanced interest, participation, and persistence. The game elements worked as a reward system to make students MORE active and exhibit behaviours that not only promoted learning but also kept them active (Khan et al., 2024). Thus, Domínguez et al. (2013) contributed to the expansion of knowledge in the field by showing the psychological processes that concern the outcomes of gamification in increasing motivation. Based on their research, the authors concluded that integrating game elements increases intrinsic motivation as it is based on individual's needs to achieve, compete and gain status, which in turn results in improved learning and longer time spent on instructional materials. Similarly, Hamari et al. (2014) also presented the literature review and concluded that gamification enhances user motivation. Their work concentrated on the mobility of the gamification elements and possibilities to use them in different learning contexts and the potential of using different motivational aspects for different types of learners. But there are still some problems which exist. For instance, Nacke et al. (2017) noted that individual differences are important when it comes to gamified interventions. They also focus on the individual differences that should be considered in order to meet students' needs, learning preferences, and motivation.

Academic Achievement and Gamification

In addition to the influence of motivation, research on gamification has indicated promising results on academic performance. Focusing on the effectiveness of gamified elements, Hamari et al. (2014) also proved that game mechanics foster better learning and retention of

knowledge, as well as better performance in learning activities. Kapp (2012) builds on this, providing ways how to practically apply the game-based approach to enhance learning. He specifically notes that the use of gamification is not only done to motivate learners but also to enhance understanding of subject content.

According to Gee (2003), video games as a form of literacy embody the notion of 'good learning' as it involves problem-solving, working in teams, and being able to bond. According to him, these characteristics can be included in educational processes and set up educational activities that will transform the process into an exciting game that will enhance the performance of students. Furthermore, Landers (2014) introduces the theory of gamified learning, associating serious games with gamification to create successful learning processes. They are consistent with Gardner's ideas about using game elements to support specific learning goals and outcomes. But it is imperative to be precise at this point. According to Steinkuehler and Duncan (2008), the context and content of learning games are the most crucial factors that determine the outcome of the games. They contend that incorporating well-designed games into the curriculum in a strategic manner can be of great value in achieving educational objectives.

Conclusion

The current systematic review offers a comprehensive synthesis of the multifaceted construct of gamification in the context of education while maintaining a specific emphasis on the roles of student engagement and achievement. Therefore, according to the outlined literature review, the application of game elements in non-game contexts is a valid strategy to enhance students' engagement, motivation, and performance.

Motivational elements of gamification, based on the self-determination theory proposed by Deci and Ryan, emphasize the value of autonomy, competence, and relatedness for the student. Consequently, the application of gamification gives students a chance to be autonomous, to develop competencies and to interact with others. Deterding et al. (2011) meta-analysis and Anderson et al. (2016) high school study extends the evidence of the positive association between gamified elements and user engagement, thus supporting the idea of applying gamification as a motivational technique. Furthermore, the impact of gamification on academic performance, as studied by scholars, also presents a positive correlation. According to Hamari et al.'s (2014) research, the incorporation of game mechanics increases the learners' comprehension, recall, and practical use of information, leading to higher academic achievement. In Kapp's (2012) theoretical approach, gamification is not only the incentive to perform better but also a way to improve the actual content of the learning process, which supports the belief that the application of well-designed game mechanics can improve the quality of the teaching and learning process.

Gee's (2003) perspectives on the possibilities of video games as potential models for teaching and learning environments and Landers' (2014) approach to the theory of gamification learning also underscore the significance of establishing the right balance between the game components and instructional objectives to enhance students' performance. The practice-oriented concept of Steinkuehler and Duncan (2008) underlines the context- and content-dependency of game-based learning strategies and educational applications of games.

Future Scope and Direction of Research

Looking at the future of this field of study, several directions can be highlighted for research: First of all, it is possible to conduct long-term research in order to analyze the impact of gamification on learners' motivation and achievement. The observations made indicate that the benefits of gamification unfold over time and reflect on the need to gather more evidence on the impact it has in a timely manner.

Secondly, the research on the impact of gamification on users is another area of research that requires more information. Nacke et al.'s (2017) focus on individual differences points to the fact that one must take into account students' preferences, learning modalities, and self-regulatory sources. Gamified treatments can be made more effective and not exclusive by personalizing the treatments for each patient.

Furthermore, the implementation of guidelines for the conceptualization and assessment of the effectiveness of gamification in education can be useful for the identification of evidence-based practices to scale up the research. The frameworks provided here would be useful for educators and researchers to develop games for learning that have coherence with their learning outcomes and are comparable in different contexts for validity.

In summary, the promotion of game-like elements in learning environments has great potential for increasing students' engagement and outcomes. In conclusion, this review serves as the groundwork for subsequent research initiatives regarding gamification, motivating scholars to discover fresh perspectives, overcome obstacles, and expand the collection of knowledge surrounding the ever-evolving paradigm of gamification and education. In this regard, throughout the course of the journey, the potential to enhance learning experiences and outcomes at multiple levels based on the proposed strategic and creative approaches of integrating game design affordances within learning environments continues to represent a seductive vision.

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