ISSN E: 3006-1466
ISSN P: 3006-1458
CONTEMPORARY JOURNAL OF SOCIAL SCIENCE REVIEW
CJSSR
CONTEMPORARY JOURNAL OF SOCIAL SCIENCE REVIEW
Vol.03 No.02 (2025)

STUDY OF EFFECTIVENESS OF GAMIFICATION AND ITS IMPACT ON THE EDUCATION: A REVIEW

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ABSTRACT
The overall purpose of this study is to clarify how gamification impacts educational achievement so as to gain new insights into its efficacy. Current research captures the growing acknowledgement of tracking motivation over time, consideration of individual motivational profiles, and immerse learning environments. The results indicate that the effectiveness of gamification hinges on the length of the intervention and the motivational patterns of individual pupils. If these two factors are properly accounted for, educators can design appropriate gamified learning experiences to suit the needs and motivations of learners with variations. Integrating virtual reality technologies could, furthermore, stimulate students' engagement and enhance learning outcomes. The research offers insights for formulating effective strategies of gamification aimed at stimulating student motivation and enhancing students' academic performance. The findings of the study have meaningful implications for teaching practice by raising a call for personalistic experiences of learning and immersive experiences. With these insights, designers can better craft effective gamification interventions that benefit student outcomes and build a better learning experience. This research is an additional contribution to the ongoing discourse on the quality of gamification in education.

Keywords: Gamification, Game element, Adult education, Study engagement.

INTRODUCTION

Playing is a part of human nature that motivates individuals to participate in group work (Staller and Koerner, 2021). Today new methods of education have been emerged and used. One of these new education methods is gamification. Gamification is defined as the use of game elements in non-gaming fields. Gamification can increase motivation for learning in individuals (Majuri t al., 2018). The aim of teaching using gamification is to increase internal and external motivations and learners' communication, while maintaining independence and mastering the educated title in a serious environment (Oliveira et al., 2022). Education through gamification especially through digital games can improve creativity and problem-solving skills and can also increase the knowledge of the player due to integration with the game (El-Tanahi et al., 2023).

The advancements in technology in all fields including education has necessitated the integration of new technologies in education. However, the benefits of these technologies for education should be proven to outperform their limitations in order to be used by educators. Gamification was found to have a significant effect on students' engagement and learning outcomes. For instance, a systematic review by Deterding et al. (2011) reported that gaming mechanisms could guide motivation and engagement in education (Deterding et al. 2011). A systematic review by McCoy et al. (2016) on the use of gamification-based education in Medicine, pointed out that gamification can be effective in improving knowledge, engagement, and cooperation among medical students (McCoy et al., 2016). Similarly, Kapp (2012) and McCall et al. (2016) stated that gamification-based education can improve clinical skills and the use of acquired knowledge in nursing students (Kapp 2018; Huang et al., 2020).

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CJSSR
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In the current educational institutions, the main objective is to achieve comprehensive and integrated learner Development that encompasses the cognitive, emotional, physical, and social aspects of the students (Rasheed et Al., 2021). Developments in digital technology have resulted in innovative transformations in teaching and Learning processes (Jdaitawi, 2020a; Jdaitawi, 2020b; Jdaitawi et al., 2019). Literature dedicated to education has been largely focused on gamification in light of its use and implementation in different environments to assist in Achieving aims and objectives in learning (Julieth et al., 2020). Based on the studies, playing electronic games, including fencing games, can develop innovation and decision-making in students, enhance their problem-solving, and learn fencing laws via the inculcation of general information and educational initiatives, which eventually have a positive effect on the abilities of learners and their integration into the IT and technology realm (Rasha, 2011).

As gamification is incorporated into education, this vision is becoming more and more realistic. Studies examining the efficacy of gamification have increased dramatically as a result of educators' and academics' keen interest in gamification's ability to completely transform the educational process.

BACKGROUND

Incorporating aspects of game design into non-gaming situations is known as "gamification," and it has been gaining popularity in a number of domains, including education. Gamification, the use of game elements in non-game contexts, is increasingly being employed in education to enhance motivation and/or learning outcomes. While there seems to be no disagreement that gamification helps enhance these elements of engagement in the business and educational settings, there exist differences in opinions as to the evidence that supports such arguments. The behavior of respondents to gamification has been emphasized In the research, but there is some consideration that gamification can also engage the deeper cognitive and affective aspects. The influence of gamification on student engagement through and into learning is still an area of significant contention in the existing literature, with inadequate works covering the subject. In this conceptual article, a gap is bridged between the two—practice and theory—by synthesizing the literature on student engagement and gamification into a new Gamification for Student Engagement Framework. The proposed Framework will for the first time give practitioners-a new scope to systematically conceptualize and design gamified learning experiences that engage their students both directly via the forethoughtful allocation of game attributes to the intended student experience and indirectly through engagement outcomes. While the major focus is on the learning outcome, the Framework exists with a potential to improve others, including perceived student satisfaction and wellbeing, and across many situations and disciplines; it is also geared towards accumulating much-needed evidence for some of the working aspects of the line of the approach. Through the use of games' innate motivational qualities, educators hope to establish a dynamic and captivating learning environment that fosters academic success and improves the educational process as a whole. According to research, gamification can improve student motivation, engagement, and learning.

SIGNIFICANCE

Nonetheless, there is ongoing discussion on the efficacy of gamification in education, with some studies revealing conflicting findings and unfavorable outcomes. The potential for this study to add to the expanding corpus of research on gamification in education is what makes it significant. This study intends to offer insights that might guide the development and application of gamification tactics in educational contexts by investigating the efficacy of gamification and its underlying mechanisms. The study's conclusions can assist educators and legislators in creating more captivating and successful educational opportunities, which will eventually boost student satisfaction and academic performance. When creating gamification techniques, it is crucial to take individual variances in motivational profiles and personality factors into account, according to recent studies. In addition to examining how gamification can be modified to accommodate the various demands of learners, this study will examine

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CJSSR
CONTEMPORARY JOURNAL OF SOCIAL SCIENCE REVIEW
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the effects of gamification on students who possess a variety of personality qualities, including extroversion, agreeableness, and conscientiousness. Additionally, in order to promote intrinsic motivation and academic engagement, this project will investigate how need-supporting gamification might help learners' basic psychological needs be satisfied. Even though gamification is becoming increasingly popular, more thorough research on its efficacy in education is still required. By offering a comprehensive knowledge of gamification's effects on student engagement, motivation, and academic performance, this study seeks to fill up the gaps in the literature. This study can aid in the creation of more sustainable and successful gamification tactics in education by examining the intricacies of gamification and its underlying mechanics. This introduction lays the groundwork for a thorough examination of gamification's efficacy in education, stressing both the possible advantages and difficulties of putting it into practice. This study intends to add to the expanding body of research on gamification in education and help guide the creation of more successful learning experiences by examining the research topics and offering fresh perspectives.

LITERATURE REVIEW

The usefulness of gamification in the educational sector has attracted much scholarly attention in the last few decades. Empirical studies indicate that the application of game principles in teaching can go a long way in promoting student engagement and motivation while increasing knowledge retention. Methods used in gamification, such as point allocation systems, competitive leaderboards, and interactive challenges, promote more joy and active participation during learning. A lack of interest accompanied by traditional forms of teaching tends to work against student engagement; gamification strategies seem to counteract these effects. Much research has been done to incorporate gamification into various educational settings, thereby proving to be beneficial to learners of different ages and backgrounds. To identify and reflect on the complex challenges educators are facing in their attempts to smoothly adopt gamification into the academic environment.

According to the work of John Henry, Fujia Li, Sylvester Arnab (2024) in On the Pre- Perception of Gamification and Game-Based Learning in Higher Education Students, gamification and game-based learning as fields are maturing rapidly, where researchers are studying the use of gamification in education using different approaches from several case studies. Our understanding of the effect pre-perception may have on the results reported by research on gamification applications for higher education is limited. We encourage more, non-empirical research, to be conducted around pre-perception, and more research that considers gamification and game-based learning applications for higher education first published online August 19, 2024John Henry Fujia Li Sylvester Arnab on the Pre-Perception of Gamification and Game-Based Learning in Higher Education Students: A Systematic Mapping Study El-Tanahi, N., Soliman, M., Abdel Hady, H., Alfrehat, R., Faid, R., Abdelmoneim, M., Torki, M., C Hamoudah, N. (2024) work on the effectiveness of gamification in physical education that the development of digital technology in leaps and bounds has resulted in offering different learning options and alternatives in physical education. In this regard, technology techniques, like gamification, have been utilized in several areas of education, leading to the identification of its several usage benefits. Nevertheless, there is a lack of studies concerning how gamification would enhance students' skills in physical education.

Therefore, this study systematically reviews gamification in the physical education literature from 2015 to 2022, focusing on 27 indexed papers published in international databases. Based on the results, most studies had positive findings on gamification effectiveness in physical education samples. Besides, based on the findings, gamification studies primarily focused on how physical skills can be enhanced among physical education students. The findings contribute to the way technology enhances students' skills in physical education. To this end, more studies are required to mitigate the remaining

gaps in gamification literature.

This study was conducted as a systematic review of 27 studies on gamification use in the physical education field culled from several databases. The findings highlighted the effectiveness of gamification in enhancing physical education and several skills and behaviors (Arufe-Giráldez et al., 2019; Xu et al., 2022). They also supported that the focus of most studies on gamification in physical education was primarily placed on higher education settings because of the student's curriculum and available resources.

Gamification is effective in learning physical activities although studies in this field are still lacking despite the need to validate the results. Lastly, the conducted systematic review of relevant literature indicated challenges concerning gamification implementation in physical education. Among these are the limited availability of internet connection and access and personal issues like attitudes, preparation, and acceptance of users.

Research review done by Tahereh Fathi Najafi, Nafise Andaroon, Nasibeh Bolghanabadi, Neda Sharifiand Sareh Dashti (2025) on Gamification in midwifery education showed that nowadays, the use of modern methods in education, especially in the clinical field, has become very important. Gamification is one of the new tools in midwifery pedagogy. Increasing the concentration and problem solving skills and improving the understanding of the problem are among the most important achievements of game-based education. Based on the evaluation of the 6 studies in this systematic review, gamification-based education through both the digital and non-digital methods can be beneficial.

Although the number of studies evaluated in this systematic review was limited, the use of gamification is expanding surprisingly in the field of midwifery. There is a need for further studies in this filed in order to provide a better understanding on the effective education methods in game-based education. This systematic review also showed that digital games can be more effective in improving the satisfaction level of midwifery students compared to non-digital fames. Therefore, it is suggested that new gamification methods be incorporated especially in the clinical and emergency midwifery education. The use of scape room can be a good choice of game-based education that could be evaluated in further studies.

OBJECTIVES

Research Question 1: Will gamification increase motivation and engagement in students in classrooms?

Gamification, defined as using game-related elements and systems in non-game settings has the potential to increase motivation and engagement for students. With game-like features such as rewards (points, badges), challenges, and interactive elements added to the learning context, learning may become less passive and more goal directed. Deci and Ryan (2000) argued that game-like features can create intrinsic motivation as these features help satisfy the basic psychological needs. Hamari, Koivisto, and Sarsa (2014), completed a systematic literature review on gamification and found that gamification encourages user engagement and motivation in educational settings; however, they cautioned that gamification may have differing results depending on the context and the implementation.

Moreover, Deterding et al. (2011) suggested that gamification has the motivational potential to show clear cognitive goals, rapid feedback, and progress, which are characteristics of effective game design and support theories of motivational psychology. When gamification elements align with curricular goals, the proposed benefits includes increased time-on-task, reduced dropout rates, and improved learning outcomes.

Research Question 2: What are the fundamental psychological processes involved in the success of gamification in the classroom?

The success of gamification in education is largely based on Self-Determination Theory (SDT) (Deci C Ryan, 1985; 2000). SDT suggests that the motivation of humans is based on 1) Autonomy, the

ISSN E: 3006-1466
ISSN P: 3006-1458
CONTEMPORARY JOURNAL OF SOCIAL SCIENCE REVIEW
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feeling of volition and willingness in their own action, 2) Competence, the feeling of effectiveness and mastery, 3) Relatedness, the feeling of connection and belonging with others (Ryan C Deci, 2000). Gamification may satisfy each identified need (autonomy: by allowing students to choose ways of learning; competence: by giving feedback and manageable challenges; and relatedness: by using game dynamics to encourage cooperation and social engagement).

Ryan and Deci (2000) argued that when the three psychological needs are satisfied, learners are more likely to experience deep engagement and be intrinsically motivated; both are predictors of success in school and learning in general.

In addition to SDT, there are a number of supporting studies. Sailer et al. (2017) linked specific game elements (e.g., points and leader boards) to psychological needs – specifically related to intrinsic motivation. The results demonstrated leaderboards serve to promote competence, badges serve to promote perceived achievement, and avatars or social missions serve to promote relatedness.

Research Question 3: How can teachers create and use gamification methods that are based on elements that support the best psychological processes identified through (SDT) as part of their pedagogy?

The effective use of gamification in education requires much more than just a focus on the game elements. It must be thoughtful and learner-centered. As Kim and Lee had indicated (2015), the practice of gamification must be revised in a way that supports individual learners' goals and differences. Three core strategies are:

1. Personalized learning paths – The ability to customize content and pacing to match the learner's individual interests, prior knowledge, and progress builds motivation and develops ownership.
2. Adaptive difficulty levels – The match between challenge is relative to skill (Csikszentmihalyi, 1990, flow theory); the difficulty of the learning task must remain engaging and be on the stimulating side without becoming overwhelming or boring.
3. Choice and autonomy – Allowing the learners to control some learning environment factors (choice of project, team formation) satisfies the need for autonomy and increases intrinsic motivation (Deci C Ryan, 2000). In addition to the strategies mentioned, applying gamification strategies based on individual personality and motivational types could further strengthen potential effectiveness. Buckley and Doyle (2016) concluded that not all students will respond to gamification in the same way; some students with a competitive nature may thrive with competitive leaderboards, while others may desire collaboration or exploration, or all three. Tackett et al. (2017), found that aligning levels of game elements with the Big Five personality traits (e.g., extraversion, conscientiousness) could potentially improve effectiveness. Landers and Callan (2011) provided a final glimpse into a theory of gamified learning examining the distinction between mediating variables (engagement) and outcomes in learning (learning persistence). Urging researchers and practitioners to consider both the psychological mechanisms and the contextual factors when designing gamified systems.

- **Examples of gamified learning:**

As stated previously about the impact of gamification in business, it is also apparent that the implementation of the gamification systems can also create a positive atmosphere in teaching and learning contexts. In education, most children invest their time in playing video games. Educators have sought new tools to incorporate gamification into the classroom learning experience. Gamification in education is focusing on encouraging students to work together in a cooperative learning environment, communicate with each other in a positive manner, and the positive attitude encourages students that learning can be an enjoyable process. During the process of creating a approach to design a gamified online course the researcher needed search a few other examples of the use of gamification in online education.

There are a number of applications that can gamify a learning environment. One of the more

ISSN E: 3006-1466
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CONTEMPORARY JOURNAL OF SOCIAL SCIENCE REVIEW
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dependable applications is

•**Classcraft:** that adds RPG (Role-Play Game) elements to gamify learning such as classes, monster fights, skill trees, random encounters, and boss fights. Classcraft creates a learning experience where the educator acts as a game master and rewards the students with xxx points (XP) based on how well they may perform or behave during learning. The example of how the gamification would benefit a student depends on the RPG element piece as a hypothetical example; a student has a warrior class, the warrior has the most HP, and he can use his skills to protect team members when other students attack. The Educator can ask a question, if a student answers correctly the students future offensive battle adventures would obtain and be enhanced.

- **Duolingo**: is a famous language-learning app which incorporates gamification techniques like points, streaks, badges, and leaderboards to encourage user participation. These elements are aimed at making language learning fun and consistent. The app's design supports user engagement, which is proven to be effective in sustaining interest over time.
- **Minecraft**: Education Edition adapts the widely known sandbox game into an educational resource, enabling learners to study history, science, and mathematics through engaging and cooperative virtual worlds. Research shows that immersive learning environments can result in increased student activity and engagement.
- **Dragon Box**= is a collection of games that impart math learning by WeWantToKnow AS. It helps the learner to acquire the concepts of algebra, numbers, geometry, etc., through solving a puzzle instead of conventional problems or equations.

How gamification involves education:

Progressive difficulty: The game first starts with a simple visual puzzle and then makes it more complex by including and getting the child to think more and more through the input of algebraic reasoning.

Visual manipulation: Here, players treat cards and shapes to put them into position to solve the puzzles, using connections to algebraic operations without needing to treat numbers initially.

Immediate feedback: The players know whether they made the correct moves as soon as they are done.

Rewards C Unlocks: Complete levels to open up more content and new challenges.

Educational values: Make abstract concepts in maths tangible and intuitive.

Help children develop algebraic reasoning early on.Make learning a very fun and exploratory activity and that would subsequently mean reducing math anxiety.

- **Kahoot** = Is a game-based learning platform allowing teachers, trainers, and students to create and take real-time quizzes and surveys across various settings, including classrooms, remote learning, and corporate training.

What element helps make learning a game?

Points C Leaderboards: Points are given for a correct answer, quicker responses register more points, and scores rank on a leaderboard after each question.

Timer C Music: The game has a countdown which creates urgency, and music adds hype.

Team Play: Kahoot! Supports group competition-a form of collaboration. Custom Avatars C **Themes:** Players can spice things up with personalization. Educational Benefits:

Increases student engagement and motivation.

Improves recall and retention of knowledge through repetition paired with immediate feedback.

Good for formative assessment, with which the teacher can gauge students' state of mind.

DISCUSSION

The data also suggest that gamification will develop soft skills, for example, collaboration, critical thinking, problem-solving, and digital literacy. In group-based gamified tasks, students learn teamwork and communication. Other skills developed in an individual challenge include self-discipline

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CONTEMPORARY JOURNAL OF SOCIAL SCIENCE REVIEW
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and goal setting. Such education can be holistic in preparation for real-world challenges.The article notes that students respond differently to game elements, which allows teachers to tailor tasks to individual strengths and needs. For example, weaker students may be motivated by earning points for small achievements, while advanced learners might strive to unlock higher levels or top leaderboards. This adaptability creates a more inclusive and supportive environment that nurtures different learning styles.

The data also suggest that gamification cultivates soft skills, such as collaboration, critical thinking, problem-solving, and digital literacy. In group-based gamified tasks, students learn teamwork and communication, while individual challenges enhance self-discipline and goal setting. This holistic development is vital in preparing students for real-world demands.Though it has advantages, the article also discusses the limitations and drawbacks associated with gamification. Poor implementation can lead to a shallow and counterproductive approach which can result in distraction, over-competition, or reliance on external rewards. The article warns teachers and educators about the sustaining balance so that gamified systems facilitate learning, rather than serve as engagement tools. The article emphasizes that game components have to be integrated into the lessons and objectives set in the curriculum frameworks philosophy and logic-goal pedagogy and learning theory.Teacher training and institutional support are two critical aspects that were discussed. The existence of tools is secondary to the willingness of educators to explore, adapt, and innovate. The article underscores the need for development programs that help teachers build the competence and confidence to utilize gamified approaches across subjects and grade levels, rather than confining them to specific scopes or domains.

To sum up, this article explains how, unlike other educational trends, gamification holds enduring potential. When combined with learning objectives, a student-focused approach, and good assessment methods, the likelihood of improving student motivation, active participation, and academic achievement significantly increases. Interactivity—along with personalization and enjoyment—forms the core of gamified learning, making it especially beneficial to 21st-century learners. In a world of changing educational demands, the pace of which is now accelerated by so many external global factors, gamification proves to be a trusted supporter of education's future evolution. Test the efectiveness of individual game element or gamifcation mechanism in learning . Since gamifcation can take many forms and can combine game design elements in many diferent ways, it is inappropriate to study the motivational effects of gamifcation as a generic construct (Sailer et al., 2017; Seaborn & Fels, 2015). Therefore, researchers could experimentally investigate the efectiveness of individual game element on learning motivation and performance (Deterding et al., 2011; Linehan et al., 2011; Mekler et al., 2017). This goal can be achieved by removing certain game elements from a gamifed learning tool and compare the results of controlled and experimental groups (Seaborn & Fels, 2015).This author noticed that previous studies investigated the impact of individual game elements, including points (Attali & Arieli-Attali, 2015), badges (Anderson et al., 2013; Antin & Churchill, 2011; Botra et al., 2014; Bustillo et al., 2017; Hakulinen et al., 2013; Hakulinen et al., 2015; Hamari, 2017; Kyewski & Kramer, 2018; Sailer et al., 2017), leaderboard (Landers et al., 2017; Pedersen et al., 2017; Sailer et al., 2017), performance graphs (Sailer et al., 2017), and the combination of points, badges and leaderboard (PBL) (Mekler et al., 2017). A very limited number of studies investigated the impact of individual gamifcation mechanisms, such as achievement (Groening & Binnewies, 2019) and competition (Sepehr & Head, 2013). Future studies could lay more emphasis on investigating the impact of an individual game element or gamifcation mechanisms, especially those besides PBL. Even more attention can be address to understanding how gamifcation mechanisms work in learning practices and impact the final results.

Investigate how gamifcation impacts diferent types of students. Though some researchers held a positive attitude to the efectiveness of educational gamifcation, they still call for cautions in implementing this approach as not everyone benefits from it (Buckley & Doyle, 2017; Hwang et al.,

2012). There is a need to study learner differences and how they influence the efectiveness of educational gamifcation. Notably, it is common to build an involuntary connection between learner differences and player types, especially the gamifcation user type measured by the 24-item Gamifcation User Types Hexad Scale (Tondello et al., 2016); however, Luo et al. (2020) criticized the rationality of categorizing students into a certain number of groups, since there is a lack of theoretical coherence or reliability in making the categorization, while learners are possible to be negatively influenced by the accompanying self-suggestion (which make the learners to behave in the way they thought they are expected to, namely unconsciously put themselves into pre-set stereotypes). Luo et al. (2020) suggested to fix the gap by focusing on "learner difference", which avoids categorizing students into groups; instead, it investigates learners' preferences and the providence of customized learning materials. The learner difference study also applies to the refinement of educational gamifcation.

CONCLUSIONS

The study of gamification in an educational context shows that this subject has great power for changing the paradigms of teaching and learning methodology. As the entire article points out, gamification-the infusion of game mechanics such as points, badges, levels, leaderboards, and rewards into non-game contexts-has proved to be an innovative method that engages and motivates students while enhancing their learning outcomes. From all the evidence provided from different case studies, surveys, and educational trials, we can affirm that when gamification is effectively designed and implemented, it can play a major role in elevating the quality and experience of learning. A very powerful point in the article is how gamification has dealt with some of the main challenges posed by traditional education systems. Disinterest and lack of motivation, passive learning, and shrinking attention spans are all very real concerns for today's learners. Gamification addresses the intrinsic motivators in students that encourage them to actively participate and sustain effort in their learning experience by introducing elements of challenge, immediate feedback, and tangible rewards. Popularity among educational settings with the use of several applications such as Kahoot!, Duolingo, and Classcraft, as mentioned in the article, provide strong evidence of how a gamified environment increases student participation, retention, and, ultimately, achievement. It has also benefited personalized learning. So, each student may respond differently to certain game elements, so teachers can use that to personalize tasks according to specific students' strengths and areas of need. For instance, weaker students may be motivated to work for points gained for small achievements, while higher-level students may strive to unlock levels or reach the top positions of leaderboards. In this way, an environment is created in a much more inclusive and supportive way, catering to diverse learning styles.

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