



The Impact of Gamified Learning on Student Achievement: A Narrative Literature Review

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ABSTRACT

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This narrative literature review explores the statistically significant relationship between gamified learning, student engagement, and academic achievement. Drawing from quasi-experimental studies, meta-analyses, and systematic reviews, the paper highlights how game-based elements—such as points, badges, leaderboards, and immediate feedback—enhance motivation and foster higher-order thinking skills. The review also examines the differential

impact of gamification across achievement levels and the moderating role of socio-demographic variables such as age, sex, parental education, and school type. Findings suggest that while gamification is broadly effective, its success depends on thoughtful design and contextual alignment with learner needs.



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INTRODUCTION

In recent years, the integration of gamification into educational settings has gained significant attention from educators and researchers alike. Gamification refers to the application of game design elements—such as points, badges, leaderboards, and challenges—in non-game contexts to enhance user engagement and motivation (Deterding et al., 2011). In the realm of education, these elements are strategically employed to make learning more interactive, enjoyable, and rewarding. The growing interest in gamified learning environments stems from the need to address persistent issues in student motivation, engagement, and academic performance.

The theoretical foundation of gamification in education is rooted in motivational psychology, particularly self-determination theory (Deci & Ryan, 2000). This theory posits that individuals are more likely to engage in activities when they feel competent, autonomous, and connected to others. Gamified learning environments often fulfill these psychological needs by providing immediate feedback, opportunities for mastery, and social interaction through competitive or collaborative elements. As a result, students are more likely to participate actively in learning tasks, which can lead to improved academic outcomes (Hamari et al., 2014).

Empirical studies have consistently demonstrated a positive relationship between gamification and student engagement. For instance, a meta-analysis by Subhash and Cudney (2018) found that gamified interventions significantly increased student motivation and participation across various educational levels and disciplines. Similarly, research by Alsawaier (2018) highlighted that gamification enhances students' emotional and cognitive engagement, which are critical predictors of academic success. These findings suggest that gamification is not merely a trend but a pedagogical strategy with measurable benefits.

Moreover, gamification has shown promise in improving academic achievement, particularly among students who struggle with traditional learning methods. Studies conducted in diverse educational contexts have reported statistically significant improvements in test scores, assignment completion rates, and overall academic performance following the implementation of gamified learning strategies (Solekhah et al., 2023; Han & Chen, 2024). These outcomes are attributed to the increased time-on-task and deeper cognitive processing facilitated by game-based elements.

However, the effectiveness of gamification is not uniform across all student populations. Research indicates that factors such as prior academic

achievement, age, gender, and socio-economic background can influence how students respond to gamified learning environments (Hanus & Fox, 2015; Ratinho & Martins, 2023). For example, low-achieving students may benefit more from the structured and motivational aspects of gamification, while high-achieving students may find it less impactful due to their existing intrinsic motivation. Understanding these moderating variables is essential for designing inclusive and effective gamified interventions.

Given the growing body of evidence supporting gamification's role in enhancing student engagement and achievement, this literature review aims to synthesize current research findings and explore the nuanced relationship between gamified learning and academic outcomes. It also examines the differential impact of gamification across achievement levels and the influence of socio-demographic variables, providing a comprehensive overview of its potential and limitations in educational practice

METHODOLOGY

This study employed a narrative literature review approach to synthesize existing research on the impact of gamified learning on student engagement and academic achievement. Unlike systematic reviews, which follow rigid protocols for source selection and data extraction, narrative reviews allow for a more flexible and interpretive synthesis of diverse studies (Ferrari, 2015). The researcher identified relevant literature through academic databases such as Google Scholar, ERIC, ScienceDirect, and ResearchGate, focusing on peer-reviewed articles, meta-analyses, and quasi-experimental studies published between 2015 and 2025. Keywords used in the search included “gamification,” “student engagement,” “academic achievement,” “educational technology,” and “learning motivation.” Studies were selected based on their empirical rigor, relevance to the research questions, and contribution to understanding the relationship between gamified learning and student outcomes.

The review process involved organizing the selected literature into thematic categories, including motivational mechanisms, cognitive outcomes, differential effects across achievement levels, and the influence of socio-demographic variables. This thematic synthesis enabled the researcher to identify patterns, contradictions, and gaps in the literature. The narrative format allowed for the integration of both quantitative findings and qualitative insights, offering a holistic view of how gamification affects learning. The review also considered theoretical frameworks such as self-determination theory and the expertise reversal effect to contextualize empirical results (Deci & Ryan, 2000; Kalyuga,

2007). By consolidating findings across varied methodologies and educational contexts, the narrative review provides a comprehensive understanding of gamification's potential and limitations in enhancing student achievement.

RESULTS AND DISCUSSION

The findings from the reviewed literature consistently affirm that gamified learning environments positively influence student engagement and academic achievement. Game elements such as points, badges, leaderboards, and immediate feedback have been shown to enhance both intrinsic and extrinsic motivation (Hamari et al., 2014; Subhash & Cudney, 2018). These motivational drives lead to increased participation, improved attitudes toward learning, and better performance in assessments. For example, Han and Chen (2024) reported significant gains in science achievement among Grade 6 students in the Philippines following a gamified intervention, while Li et al. (2024) found similar improvements among engineering students in Turkey.

The impact of gamification is particularly notable among low- and average-achieving students. These learners often struggle with self-efficacy and engagement in traditional learning environments. Gamification provides structured feedback and a safe space for experimentation, which helps reduce anxiety and build confidence (Nugroho, 2026). High-achieving students also benefit, though the effects are often less pronounced due to their existing intrinsic motivation. The “Expertise Reversal Effect” explains this variation, suggesting that structured interventions are more effective for novices than for experts (Kalyuga, 2007).

Socio-demographic variables such as parental education, number of siblings, school type, and gender further influence the effectiveness of gamified learning. Students from families with higher parental education levels tend to perform better academically, and gamification may amplify these advantages by providing additional motivational support (Dubow et al., 2009; Baldonado & Pantao-o, 2025). Similarly, students in private schools may benefit more from gamification due to better access to technological resources (Bacang et al., 2025). Gender differences in science achievement have also been observed, though findings are mixed and context-dependent (King, 2016).

Despite the overall positive findings, some studies report mixed results. In certain cases, gamification improved engagement but did not significantly affect academic achievement (Hanus & Fox, 2015). These discrepancies highlight the importance of thoughtful design and alignment of gamified elements with specific learning objectives. Poorly implemented gamification

may lead to superficial engagement without meaningful learning gains.

Meta-analyses provide strong statistical support for gamification's effectiveness. For example, Diaz and Estoque-Loñez (2024) reported a large effect size (Hedges' $g = 1.30$) for gamification on learning achievement, while Li et al. (2023) found a medium-to-large effect size ($g \approx 0.85$) for math and science subjects. These findings underscore the potential of gamification to enhance academic performance across disciplines and educational levels.

In summary, gamified learning environments offer a promising approach to improving student engagement and achievement. However, their success depends on careful design, consideration of learner characteristics, and alignment with pedagogical goals. Literature supports gamification as a valuable tool, especially for students who struggle with motivation and traditional instructional methods.

DIRECTIONS FOR FURTHER RESEARCH

(1) Longitudinal Impact Studies: Future research should investigate the long-term effects of gamified learning on academic achievement, retention, and student motivation across different grade levels and subjects. (2) Personalized Gamification Systems: Studies should explore adaptive gamification models that respond to individual learner profiles, including prior achievement, socio-demographic background, and learning preferences. (3) Cross-Cultural and Institutional Comparisons: Comparative research across diverse educational settings—such as rural vs. urban schools and public vs. private institutions—can provide insights into how contextual factors influence the effectiveness of gamification.

Gamification enhances both intrinsic and extrinsic motivation by providing immediate feedback and a sense of progression. Studies consistently show that gamified environments lead to increased participation and improved academic performance. For example, Han and Chen (2024) reported significant gains in science achievement among Grade 6 students in the Philippines following a gamified intervention. Similarly, Li et al. (2024) found that leaderboards improved engagement and achievement among Turkish engineering students.

Meta-analyses support these findings, with Li et al. (2023) reporting an effect size of 0.728 and Diaz and Estoque-Loñez (2024) noting a Hedges' g of 1.30 for gamification's impact on learning.

CONCLUSIONS

Gamification has proven to be an effective educational strategy for enhancing student engagement and academic achievement. By incorporating game design elements into instructional practices, educators can foster motivation, encourage active participation, and support the development of higher-order thinking skills. The literature indicates that gamification is particularly beneficial for low- and average-achieving students, helping to close performance gaps and promote equity in learning outcomes.

However, the effectiveness of gamification is influenced by various contextual and individual factors. Socio-demographic variables, prior academic performance, and the quality of instructional design all play critical roles in determining the success of gamified interventions. To maximize its benefits, educators must tailor gamification strategies to the specific needs of their learners and ensure that game elements are meaningfully integrated into the curriculum.

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