

THE IMPORTANCE OF GAMES FOR STUDENT LEARNING IN HIGHER EDUCATION: A LITERATURE REVIEW

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Abstract

Games, gamification, and serious games have moved from the margins of entertainment into the mainstream of instructional design in colleges and universities. This article examines why game-based approaches matter for learning in higher education by synthesising recent empirical and review literature published between 2009 and 2026. Using a narrative literature review method, sources were retrieved from academic databases and analysed thematically around four outcome domains: motivation and engagement, academic achievement, cognitive and metacognitive skills, and collaborative or soft-skill development. The review finds consistent, though not unconditional, evidence that well-designed games and gamified activities increase student engagement, sustain motivation, and can improve measurable learning outcomes when game mechanics are aligned with pedagogical goals. At the same time, the literature cautions that novelty effects fade, that extrinsic game elements such as points and leaderboards can undermine intrinsic motivation if poorly designed, and that teacher scaffolding remains essential. The article concludes that games are best understood not as a replacement for instruction but as a pedagogical tool that, when purposefully integrated, can strengthen active learning, deepen conceptual understanding, and prepare students for collaborative problem-solving in professional contexts.

Keywords: Game-Based Learning, Gamification, Serious Games, Higher Education, Student Motivation, Academic Achievement.

Introduction

Higher education institutions worldwide are under growing pressure to rethink how they teach a generation of students who have grown up surrounded by interactive digital media. Traditional lecture-based instruction, while still dominant in many disciplines, is increasingly criticized for producing passive recipients of information rather than active, self-regulated learners. Against this backdrop, games, gamification, and simulations have gained substantial traction as pedagogical strategies capable of transforming static content delivery into dynamic, participatory experiences. Prensky (2001) was among the earliest scholars to argue that digital-native learners respond differently to instruction than previous generations, and that educational systems designed around single, linear methods of delivery risk losing the attention of students accustomed to interactive, feedback-rich environments. More than two decades later, this argument continues to shape debates about curriculum design in universities, professional schools, and vocational training programs.

The terms used in this field are related but distinct, and clarifying them is a necessary first step. Game-based learning (GBL) refers to the use of an actual game—digital or analog—as the primary vehicle through which content is taught, such that playing the game constitutes the learning activity itself. Gamification, in contrast, refers to the application of game design elements, such as points, badges, levels, and leaderboards, to non-game learning contexts, without the learning task itself being restructured as a game (Deterding et al., 2011). Serious

games occupy a related space: they are purpose-built games whose primary objective is not entertainment but the acquisition of knowledge, skills, or attitudes relevant to a real-world domain, frequently used in fields such as medicine, business, and public health. Although these three approaches differ in design and implementation, they share a common theoretical foundation: they attempt to harness the motivational and cognitive properties of play to support learning objectives that would otherwise be delivered through more conventional instructional formats.

Several theoretical frameworks help explain why games can be pedagogically powerful. Csikszentmihalyi's (1990) flow theory proposes that optimal learning experiences occur when a task's level of challenge is well matched to a learner's skill level, producing a state of deep absorption and intrinsic satisfaction; well-designed games are structured precisely around this challenge-skill balance, offering graduated difficulty and immediate feedback. Self-determination theory, as articulated by Ryan and Deci (2000), holds that human motivation flourishes when three basic psychological needs are met: autonomy, competence, and relatedness. Games can support all three by giving players meaningful choices, providing frequent and specific feedback on performance, and, in multiplayer or team-based formats, embedding learning within a social context. Expectancy-value theory, developed by Eccles and Wigfield (2002), further suggests that students engage more deeply with tasks they value and believe they can succeed at, both of which are frequently reinforced by the goal structures and reward systems that games provide. Building on these psychological foundations, Gee (2003) argued that well-designed commercial video games embody sound learning principles, including situated meaning, identity investment, and well-ordered problem sequencing, that formal educational settings could learn from and adapt.

Despite this substantial theoretical grounding, the practical case for integrating games into higher education curricula ultimately rests on empirical evidence of impact. University instructors, curriculum designers, and policymakers require more than a plausible theory; they need to know whether games and gamified activities reliably improve engagement, achievement, retention, and the higher-order skills that universities are expected to cultivate. This is particularly pressing given that higher education faces documented challenges with student disengagement, attrition, and gaps between classroom learning and workplace readiness. Kuh (2009) identified student engagement as one of the most robust predictors of persistence and achievement in postsecondary settings, which raises the question of whether game-based strategies represent a scalable lever for improving engagement across diverse institutional contexts.

The purpose of this article is therefore to synthesize the recent literature on games, gamification, and serious games in higher education in order to answer three interrelated questions. First, what effects do game-based approaches have on student motivation and engagement in university settings? Second, what evidence exists regarding their impact on academic achievement and cognitive skill development? Third, what conditions, limitations, or risks are associated with their use, and what do these imply for how instructors should design and implement game-based activities? By addressing these questions through a structured review of recent empirical studies, systematic reviews, and meta-analyses, this article aims to provide higher education practitioners and researchers with an evidence-based account of both the promise and the boundaries of game-based pedagogy.

Method

This article adopts a narrative literature review approach, a method well suited to synthesizing a heterogeneous body of research spanning multiple disciplines, methodologies, and educational contexts. Unlike a systematic review, which follows a fixed protocol for study selection, a narrative review allows for thematic organization of findings drawn from primary

studies, systematic reviews, and meta-analyses, enabling a broader interpretive synthesis of a rapidly evolving field.

Relevant literature was identified through searches conducted primarily via academic search platforms and journal databases, including sources indexed in ScienceDirect, PubMed Central, Frontiers, SAGE, Springer, and open-access repositories such as ERIC and ResearchGate. Search terms combined variations of "game-based learning," "gamification," and "serious games" with terms such as "higher education," "university students," "academic performance," "motivation," "engagement," and "critical thinking." The search was restricted to literature published mainly between 2009 and 2026, prioritizing systematic reviews and meta-analyses where available, since these aggregate findings across multiple primary studies and offer a more stable evidentiary basis than any single experiment.

Inclusion criteria required that a source (a) addressed game-based learning, gamification, or serious games as applied to postsecondary or adult learners, (b) reported empirical findings, a systematic synthesis of empirical findings, or a well-established theoretical framework directly relevant to explaining game-based learning outcomes, and (c) was published in a peer-reviewed journal, edited volume, or reputable academic repository. Sources focused exclusively on primary or secondary school contexts were generally excluded unless they contained findings of direct theoretical relevance to higher education, such as foundational studies on motivation or engagement. Foundational theoretical works predating 2009, such as Csikszentmihalyi's flow theory and Ryan and Deci's self-determination theory, were retained given their continued centrality to the field.

Following retrieval, sources were read and organized thematically according to four recurring outcome domains identified across the literature: motivation and engagement, academic achievement, cognitive and metacognitive skill development, and collaborative or interpersonal skill development. A fifth thematic category was created to capture recurring challenges, limitations, and boundary conditions reported across studies. This thematic organization forms the structure of the Results section that follows.

Results

Motivation and Engagement

The most consistently reported outcome across the reviewed literature is that games and gamified activities increase student motivation and engagement in higher education settings. A systematic review by Ratinho and Martins (2023), which analyzed forty studies identified through a PRISMA-guided search, concluded that game elements such as points, badges, and rankings are widely used across university and secondary contexts to motivate students, and that gamification strategies generally exert a positive influence on students' willingness to engage with learning tasks. Similarly, Sailer and Homner's (2020) meta-analysis, cited across multiple subsequent reviews, found a significant overall effect of gamification on learners' motivation to learn, reinforcing the view that this is one of the more robust findings in the field.

Engagement itself is understood in the literature as a multidimensional construct encompassing behavioral, emotional, and cognitive components (Fredricks et al., 2004). A mixed-methods study examining game-based learning's effect on student engagement found high levels of engagement across all three dimensions, with emotional engagement rated most strongly, and qualitative data pointing to increased enjoyment, motivation, cooperation, and confidence among participating students. This aligns with Kuh's (2009) broader argument that engagement functions as a critical determinant of both achievement and retention in postsecondary education, suggesting that any pedagogical strategy capable of reliably increasing engagement, including game-based approaches, has implications well beyond a single course or assignment.

Research grounded in service-learning and childhood-education teacher training programs similarly found that combining playful, game-based methodologies with experiential service-learning produced greater engagement and psychological flow among university students than a purely directive instructional approach, describing the game element as a strong contributor to conceptual understanding and immersion. A separate systematic review focused specifically on school and higher education contexts found that gamification strategies contribute to what researchers describe as school or academic engagement by embedding metacognitive prompts that encourage students to monitor, plan, and evaluate their own learning process, an effect noted across numerous studies spanning primary, secondary, and higher education classrooms.

However, the motivational literature also contains an important caveat. Ratinho and Martins (2023) noted that while gamification produces clear short-term motivational gains, this effect can weaken over time as the novelty of game elements diminishes, and that reward-oriented mechanics such as points and rankings tend to foster extrinsic rather than intrinsic motivation. This distinction matters because self-determination theory predicts that motivation sustained primarily by external rewards is less durable and less conducive to deep learning than motivation rooted in autonomy, competence, and relatedness (Ryan & Deci, 2000). Consistent with this concern, other research cited within recent systematic reviews found that competitive game elements can sometimes decrease motivation when they conflict with a course's underlying pedagogical objectives, while game designs incorporating narrative or collaborative elements tend to produce more durable motivational gains than those relying solely on competition and rewards.

Academic Achievement

Beyond motivation, a growing body of evidence links game-based approaches to measurable gains in academic performance, though this evidence is more variable than the motivational findings. A meta-analysis synthesizing thirty-eight experimental studies conducted between 2000 and 2018 examined the effect of game-based learning methods on student academic achievement across a range of educational levels and found an overall positive effect, lending quantitative weight to the claim that game-based instruction can outperform, or at least match, conventional instructional methods on measures of academic achievement.

At the level of individual studies within higher education specifically, a quasi-experimental study conducted with undergraduate engineering students in an English-language course found that a web-based, game-based intervention produced significant improvements in vocabulary and grammar performance relative to a control group receiving conventional instruction, with both quantitative testing and mixed-methods analysis supporting the result. In a different disciplinary context, research examining game-based online learning among a large sample of college students in China found that gameful self-regulation strategies and academic self-efficacy played a pivotal role in shaping students' technology acceptance, which in turn positively influenced both perceived learning and measured academic performance, highlighting those psychological mechanisms as important explanatory variables rather than treating the game format as sufficient on its own.

More recent meta-analytic work specifically targeting gamification, rather than full game-based learning, in higher education similarly reports a positive overall effect on both motivation and what researchers describe as deep learning outcomes, while cautioning that the size and consistency of this effect depends heavily on how well game mechanics are aligned with the pedagogical objectives of a course (Gyedu et al., 2026). This point is echoed in a broader meta-analysis of gamification's effects on learning outcomes, which found statistically significant benefits for knowledge, attitudes, and behavioral engagement overall, but noted that effects at the secondary and university levels were not uniformly positive, implying that gamification is not a universally effective intervention irrespective of context or

design quality. Taken together, these findings suggest that academic achievement gains associated with games and gamification are real but conditional, dependent on factors such as instructional alignment, learner self-regulation, and the specific game elements employed.

Cognitive and Metacognitive Skills

A third recurring theme in the literature concerns the cognitive and metacognitive benefits associated with game-based learning, particularly the development of critical thinking, problem-solving, and complex reasoning. Several studies point to serious games and simulations as especially well suited to cultivating these higher-order skills because they place students in realistic scenarios with meaningful consequences but without real-world risk. A systematic account of educational simulators and serious games in higher education found that these tools promote active learning by requiring students to directly engage with course material through practice and experimentation, while offering what researchers describe as a safe environment in which mistakes can be made and learned from without real-world costs, an important condition for developing complex, systemic, and critical thinking skills relevant to professional practice.

Research specifically focused on developing critical thinking through gamified, role-play-based serious games found that collaborative role-playing formats were particularly effective for social learning, allowing participants to depart from their habitual viewpoints and consider alternative perspectives while collaboratively analyzing information and drawing reasoned conclusions. In the health sciences, a mixed-methods study describing the development of a serious game application designed to help university students critically evaluate health claims found a strong positive correlation between how often students replayed the game and the number of points achieved, alongside qualitative feedback describing the experience as both enjoyable and educational, suggesting that repeated voluntary engagement with the game was itself associated with skill reinforcement.

A systematic review focused specifically on medical education examined the alignment between gamified learning interventions and the Structure of Observed Learning Outcomes taxonomy, a framework used to classify the depth of learning outcomes from surface-level to highly integrated understanding (Huang et al., 2024). The review found that a majority of the studies it examined were associated with relatively lower levels of this taxonomy, indicating that while gamified interventions in medical education frequently produce measurable learning gains, many current implementations may not yet be designed to cultivate the deepest, most integrated levels of clinical reasoning, pointing to an area where instructional design could be strengthened. This finding is a useful corrective to overly optimistic claims about games automatically producing deep learning; it suggests that the cognitive benefits of games depend substantially on how deliberately a game is designed to target higher-order thinking rather than mere content recall.

Collaboration and Soft-Skill Development

A fourth theme concerns the role of games and serious games in cultivating collaborative and interpersonal competencies increasingly demanded by employers and professional bodies. Research investigating serious games designed to enhance graduate employability found qualitative evidence supporting the idea that serious games benefit students' soft skills, including critical thinking and teamwork, framing such games as practical tools for preparing skilled individuals for professional environments. Within this body of work, a marketing-focused simulation game requiring undergraduate students to manage a virtual business in groups while competing against other teams was found to facilitate favorable communication and negotiation skills alongside critical thinking and the practical application of course concepts.

In project management education specifically, a quasi-experimental study piloting ten different game-based learning methods across six European higher education institutions found that these methods could be used to motivate students and prepare them to manage uncertainty in ways that mirror real-world project environments, yielding a set of educational

implications intended to guide future implementation of game-based methods in similar professional-preparation contexts. Related research applying serious games in global health education, through a simulation of international negotiations around a global pandemic treaty conducted with graduate public health students, reported that the exercise helped students grapple with operationalizing abstract theoretical concepts and encouraged them to consider complex, ethically loaded problems from multiple stakeholder perspectives, reinforcing the broader claim that serious games can bring abstract disciplinary theory into an experiential, collaborative format.

Collectively, this body of research indicates that games are not solely tools for content acquisition but can also function as structured environments for rehearsing the collaborative, communicative, and negotiation skills that are difficult to teach through lecture-based instruction alone, and increasingly considered indispensable in professional and civic life.

Challenges and Limitations

Despite this generally favorable picture, the literature also identifies important limitations and risks associated with the use of games in higher education, which merit careful attention from instructors and institutions considering their adoption. The most frequently cited concern is the novelty effect: motivational and engagement gains associated with newly introduced game elements tend to be strongest shortly after implementation and can decline as students become accustomed to the format, raising questions about the durability of gamification's benefits over a full semester or degree program.

A second concern relates to the risk of poorly designed extrinsic reward structures undermining intrinsic motivation. Evidence cited in recent systematic reviews indicates that when competitive game mechanics conflict with a course's substantive learning objectives, motivation can actually decrease rather than increase, underscoring that gamification is not inherently beneficial and can backfire when game elements are added superficially rather than integrated with pedagogical intent. A third limitation concerns generalizability and moderating variables; a meta-analysis examining gamification across educational levels found that certain moderator variables, including academic discipline, learning mode, and the specific type of gamified application used, did not always produce statistically uniform effects, implying that findings from one disciplinary or institutional context cannot be assumed to transfer automatically to another.

A fourth and more structural concern is the continued importance of teacher scaffolding. Reviews of game-based learning in educational contexts emphasize that the presence and quality of instructor guidance and scaffolding is essential to successful gamified experiences (Sun et al., 2023), suggesting that games do not function as autonomous instructional solutions but rather as tools whose effectiveness is heavily mediated by how instructors design, introduce, and support their use within a broader course structure. Related literature has also raised concerns regarding excessive gaming behavior and its relationship to academic outcomes, noting that game addiction, distinct from purposeful educational gaming, has been found to negatively affect academic achievement (Sahin et al., 2016), a reminder that the line between beneficial, purposeful game use and excessive or maladaptive use requires deliberate attention from both students and instructors.

Finally, several reviews note methodological limitations within the underlying evidence base itself, including a reliance on self-reported measures of learning and performance, small sample sizes in individual primary studies, and a predominance of cross-sectional rather than longitudinal designs, which together limit the strength of causal claims that can currently be made about the long-term impact of game-based learning on academic and professional outcomes.

Discussion

Synthesizing across these four outcome domains and their associated limitations, several conclusions emerge regarding the importance of games for student learning in higher education. First, the evidence for motivational and engagement benefits is the most consistent and robust finding across the literature, appearing across systematic reviews, meta-analyses, and individual empirical studies spanning multiple disciplines and countries. This is theoretically coherent: games are, almost by definition, structured to sustain attention, provide clear goals, and deliver immediate feedback, all of which map directly onto the psychological needs identified by self-determination theory and the challenge-skill balance central to flow theory. For instructors seeking practical, evidence-based strategies to counter documented patterns of student disengagement in large lecture courses, gamification and game-based activities represent a well-supported option.

Second, the evidence for academic achievement gains, while generally positive, is more conditional and context-dependent than the motivational evidence. Meta-analytic findings suggest an overall positive effect of game-based learning and gamification on academic performance, but multiple reviews caution that this effect is moderated by factors including instructional alignment, learner self-regulation, and discipline-specific implementation choices. This implies that institutions and instructors should not treat the introduction of game elements as a guarantee of improved grades or test scores; rather, achievement gains appear most reliable when game design is deliberately and tightly coupled to specific learning objectives, a point echoed across the reviewed studies on both gamification and full game-based learning interventions.

Third, the cognitive and collaborative benefits associated with serious games and simulations appear to be particularly promising for professional and graduate education, where realistic, consequence-free practice environments allow students to rehearse complex reasoning, negotiation, and ethical decision-making before encountering these challenges in professional practice. At the same time, the finding that many gamified medical education interventions cluster at lower levels of a recognized learning-outcomes taxonomy is an important reminder that simply adding game elements to a course does not automatically produce the deep, integrated learning that games are theoretically capable of supporting; deliberate instructional design remains the decisive factor.

Fourth, the challenges identified in the literature, including novelty effects, the risk of undermining intrinsic motivation through poorly designed extrinsic rewards, variability across disciplinary contexts, and the continued necessity of instructor scaffolding, collectively suggest that games should be understood as a pedagogical tool requiring the same careful instructional design as any other teaching method, rather than a self-sufficient solution to engagement or achievement gaps. This nuanced conclusion is consistent with the broader trajectory of the field, which has moved from early, largely theoretical enthusiasm exemplified by Prensky (2001) and Gee (2003) toward a more empirically grounded, conditional understanding of when and how games support learning.

These findings carry several practical implications for higher education practitioners. Instructors considering game-based approaches should prioritize alignment between game mechanics and specific learning objectives rather than adopting generic point-and-badge systems detached from course content. Where possible, game designs that incorporate narrative, collaboration, and meaningful choice appear to sustain motivation more durably than those relying primarily on competition and extrinsic rewards. Institutions investing in serious games for professional or clinical training should evaluate not only whether students enjoy or engage with these tools but also whether the games are designed to target the depth of learning outcomes appropriate to advanced professional competence. Finally, given the reliance on self-reported measures and cross-sectional designs in much of the current literature, faculty and researchers implementing game-based interventions are encouraged to

incorporate objective performance measures and, where feasible, longitudinal follow-up to strengthen the evidence base for their own institutional context.

This review has limitations. As a narrative rather than systematic review, it does not follow a fully standardized search and screening protocol, and the selection of sources, while guided by clear inclusion criteria, retains an element of interpretive judgment. The rapidly evolving nature of this research area also means that new empirical studies and meta-analyses continue to emerge, and conclusions drawn here should be understood as reflecting the state of evidence at the time of writing rather than a permanently settled picture. Future research would benefit from more longitudinal designs tracking student outcomes across full academic programs, greater use of objective rather than self-reported achievement measures, and further investigation into which specific game design elements, rather than game-based approaches in general, are most strongly associated with durable gains in motivation, achievement, and professional skill development.

Conclusion

Games, gamification, and serious games occupy an increasingly important place in the pedagogical toolkit of higher education. The literature reviewed here indicates that these approaches reliably enhance student motivation and engagement, offer conditional but meaningful benefits for academic achievement, and provide a particularly promising avenue for developing the critical thinking, collaboration, and professional reasoning skills that universities are expected to cultivate. However, these benefits are neither automatic nor unconditional: they depend on thoughtful instructional design, alignment between game mechanics and learning objectives, adequate instructor scaffolding, and realistic expectations about the durability of motivational effects over time. Rather than viewing games as a novel add-on or a replacement for sound pedagogy, higher education institutions are best served by treating them as one evidence-supported instructional strategy among many, to be integrated purposefully into a broader, well-designed curriculum.

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