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Gamification as a motivational tool in university learning: A systematic review

La gamificación como motivación en el aprendizaje universitario: una revisión sistemática

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Abstract

Given that the integration of gamification in higher education has emerged as an effective strategy to address low student motivation and engagement, this study aims to identify the most effective characteristics and elements of gamification for fostering playful learning in university settings. To this end, a systematic review of 32 recent studies from various relevant academic sources was conducted, allowing for the evaluation and synthesis of their findings. The results reveal that components such as leaderboards, point systems, and engaging narratives are essential for increasing both motivation and academic performance. Similarly, student collaboration and positive feedback significantly enhance engagement, creating a more dynamic and participatory learning environment. As a main conclusion, it is emphasized that a proper implementation of gamification not only improves academic performance but also strengthens social and collaborative skills. Furthermore, the need to adapt these strategies to diverse demographic and educational contexts is stressed, in order to maximize their effectiveness. Finally, it is suggested that future research focus on the adaptability of gamification and its long-term impact on university learning.

Keywords: playful learning, higher education, gamification.

Resumen

Considerando que la integración de la gamificación en la educación superior se ha consolidado como una estrategia eficaz para superar la falta de motivación y participación estudiantil, este estudio tiene como objetivo identificar las características y elementos de la gamificación más efectivos para fomentar el aprendizaje lúdico en entornos universitarios. Para ello, se realizó una revisión sistemática de 32 estudios recientes, provenientes de diversas fuentes académicas relevantes, que permitió valorar y sintetizar sus hallazgos. Los resultados revelan que componentes como los *leaderboards*, la acumulación de puntos y las narrativas lúdicas son fundamentales para incrementar tanto la motivación como el rendimiento académico. De igual modo, la colaboración entre estudiantes y el *feedback* positivo potencian significativamente el compromiso, generando un ambiente educativo más dinámico y participativo. Como conclusión principal, se destaca que una implementación adecuada de la gamificación no solo mejora el desempeño académico, sino que también fortalece las habilidades sociales y

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colaborativas. Además, se enfatiza la necesidad de adaptar estas estrategias a contextos demográficos y educativos diversos para maximizar su efectividad. Finalmente, se propone que futuras investigaciones se centren en la adaptabilidad de la gamificación y en su impacto a largo plazo sobre el aprendizaje universitario.

Palabras clave: aprendizaje lúdico, docencia superior, gamificación.

Introduction

The use of gamification in pedagogical contexts has gained increasing relevance in the last decade, particularly in higher education. This practice, which incorporates playful dynamics into the teaching-learning processes, aims not only to enhance student motivation and engagement but also to stimulate recreational competencies. Gamification is defined as the integration of game elements into non-entertainment domains with the goal of enriching the educational experience and user engagement (Jaramillo-Mediavilla et al., 2024). In this way, environments are created that encourage active participation from students and foster more meaningful learning.

Among the particularities of gamification, reward systems, challenges, and immediate feedback stand out, which are fundamental for consolidating a collaborative and interactive learning environment (Zourmpakis et al., 2023). Specifically, scoring schemes and incentives have been shown to increase both motivation and academic commitment, translating into improved performance. However, despite these reported benefits, there is heterogeneity in outcomes, necessitating a deeper exploration of which characteristics are particularly effective in higher education (Ismail et al., 2021).

Recent research indicates that the acceptance of gamification is influenced by demographic and gender factors, affecting the effectiveness of applied strategies (Tamrin et al., 2022). Although the integration of gamification in higher education has increased, significant gaps remain in the literature, mainly concerning the identification of elements that most contribute to the development of playful skills and academic performance.

This research aims to address these gaps by identifying and analyzing the components of gamification that are most effective in promoting playful learning in higher education. Its purpose is to provide a comprehensive and articulated view of how gamification can be strategically implemented to enhance the pedagogical experience and foster the holistic development of students' abilities.

Currently, gamification has established itself as a highly impactful teaching strategy capable of motivating students and enriching their educational experience. In this sense, recent research is reviewed to recognize the most effective elements for fostering playful learning at this educational level.

For instance, Núñez-Pacheco et al. (2023) explore faculty perceptions of the use of digital competencies and gamification at a Peruvian university, highlighting the need to update pedagogical skills to optimize the application of these strategies, a key aspect for student education in the 21st century. Similarly, Saleem and Mirza (2024) analyze how gamified applications have transformed education by introducing recreational dynamics into the teaching process, thereby intensifying motivation.

In a similar tone, Pegalajar-Palomino and Martínez-Valdivia (2024) emphasize the role of information technologies in the implementation of gamification, underscoring how tools like Kahoot! and Socrative stimulate both student engagement and the sustainable achievement of academic objectives. Concurrently, Velásquez et al. (2024) conduct a systematic review of gamification in university mathematics education, evidencing the effectiveness of elements such as badges and scoring systems in improving academic performance.

Along the same lines, Zhang (2024) demonstrates that gamification, by promoting active participation, positively impacts learning outcomes and the value students assign to their educational process. Collectively, these studies provide a comprehensive framework for understanding and more efficiently applying gamified elements, establishing solid foundations for future research.

Nevertheless, the growing interest in this pedagogical strategy has not overcome several gaps in research. First, there is a lack of a unified theoretical framework that connects the characteristics of gamification with the development of playful competencies in higher education. Núñez-Pacheco et al. (2023) indicate that many studies do not establish direct relationships between gamified components and their pedagogical effectiveness, highlighting the need to systematize these elements and clarify their impact.

Secondly, there is little research on the differentiated acceptance of gamified characteristics across various demographic groups. Terán et al. (2024) caution that, while gamification is popular, there is still limited exploration of how its effectiveness varies by gender or educational level, necessitating a move towards more personalized strategy design.

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Thirdly, the scientific production on the long-term effects of gamification is limited. Most studies focus on initial motivation without assessing its sustained influence on academic engagement, an aspect already noted by Nasralla (2022). This gap underscores the importance of investigating how gamification elements impact long-term learning.

Fourthly, there is frequent confusion between gamification and educational games. The absence of a clear and consensual definition, highlighted by Aksoy et al. (2022), has led to dispersed applications of these dynamics, emphasizing the need for precise classification to maximize their effectiveness.

Finally, there is a scarcity of studies on the specific use of digital platforms in gamification in higher education. Camacho-Sánchez et al. (2022) note that, although these tools have transformed teaching, research examining their systematic integration into gamified strategies is lacking, opening a promising field of study.

Within this framework, the objective of this article is to identify the most effective components of gamification for fostering playful learning in higher education. Through a systematic review, it seeks to fill existing gaps and propose a theoretical framework that clearly links gamified elements with the development of playful skills.

Methodology

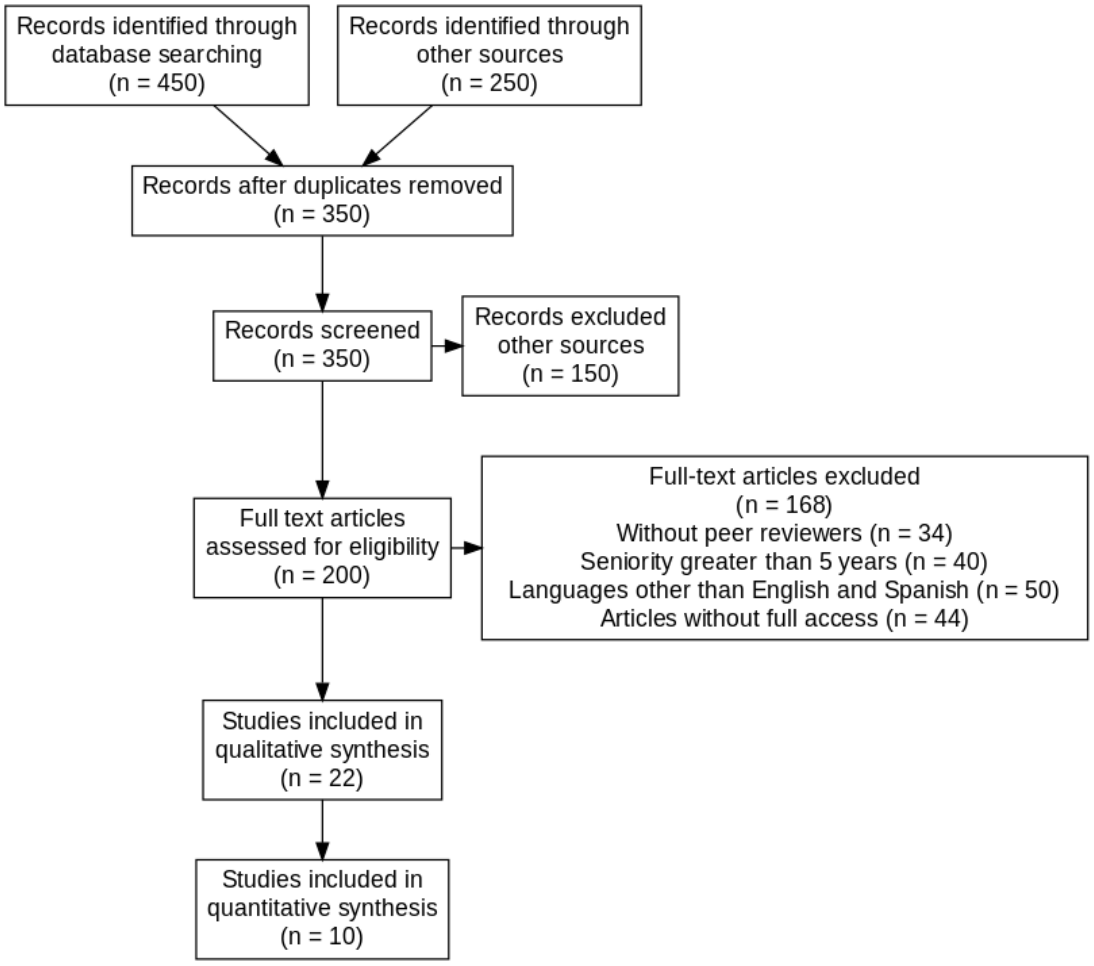
To conduct this research, the PRISMA method (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) was employed. Three fundamental questions were formulated: 1) What are the most common characteristics of gamification implemented in higher education? 2) Which gamification elements are most significantly associated with the improvement of learning in university students? 3) Are there differences in the effectiveness of these gamified strategies based on the demographic context of the students?

The keywords used for the search were: "gamification," "learning," "higher education," "gamification elements," and "educational effectiveness." The search was conducted in recognized databases such as Scopus, Web of Science (WOS), and Scielo.

Table 1
Inclusion and exclusion criteria

Inclusion criteria	Exclusion criteria
Peer-reviewed articles	Non-peer-reviewed documents
Publications from the last five years	Publications older than five years
Articles in English or Spanish	Articles in languages other than English or Spanish
Full-text access available	Articles without full-text access

Figure 1
PRISMA flow diagram



Results and discussion

The results obtained from the analysis of various studies on gamification in higher education are presented below. The tables summarize key information regarding the main characteristics of gamification, the specific elements influencing learning, and variations in the effectiveness of these strategies based on demographic and contextual variables.

Table 2
Characteristics of gamification

Author	Gamification Elements	Findings
Ortiz-Rojas et al.	Leaderboards, points, badges, competition	Improve performance and motivation in calculus.
Keshmiri	Risk, rewards, scenarios, collaboration	Increased self-efficacy and learning.
Lee et al.	Serious games, escape rooms, badges, levels, narratives	Most common elements impacting motivation.
White et al.	Narrative, multisensory experiences, pedagogical balance	Favor resilience and meaningful learning.

Srivastava et al.	Board games, collaboration, creativity	Increase participation and engagement.
Shadan et al.	Game "Diabe-teach," interaction, feedback, collaboration	Improves retention, confidence, and communication.
Fatima et al.	Game "Ethical Monopoly," rules, dilemmas, cards	Enhances motivation, interest, and learning.
Yew & Ismail	Metaverse, immersive simulation	Increases interest, understanding, and engagement.
Musyaffi et al.	Business simulation, autonomy, competition, realism	Strengthens motivation and autonomy, with challenges in social interaction.
Eyal & Hayak	Interaction, feedback, practical application	Favor the integration of digital games in education.

Table 3
Gamification elements and their impact

Author	Gamification Elements	Impact
Ortiz-Rojas et al.	Leaderboards	Improve academic performance.
Hong, Saab & Admiraal	Competition, ranking, feedback, time, levels	Competition motivates, while ranking can demotivate. Feedback and adjusted levels favor achievement.
Jaworska & Wesołowska	Points, rewards, challenges, levels, personalization	Points and rewards generate extrinsic motivation. Challenges drive intrinsic motivation.
Shatila, Martínez-Climent, Enri-Peiró & Pérez-Ruiz	Points, levels, and immediate feedback	Increase enjoyment and academic performance.
Hidayat et al.	Levels, challenges, and collaborative work	Improve metacognitive awareness and problem-solving.
Chen, Zhang & Yin	Competition, collaboration, immersion	Mixed effects: reduce anxiety but may increase cognitive load.
Roslan, Ayub, Ghazali & Zulkifli	Gamified e-quiz with feedback	Increases motivation and continuity in learning.

Table 4
Differences in effectiveness based on demographic and contextual variables

Author	Demographic Variable	Finding
Arrue et al.	Gender	Escape room enhances motivation and performance, with differences by gender.
Cubillos et al.	Gender	Gamification was not equally effective for women compared to men.
Hamadneh et al.	Age, gender, prior experience	Positive perceptions; differences attributable more to experience than age or gender.
Humenniuk	Gender, age	Competition and ranking negatively affect women. Age influences the use of ICT.
Mellado et al.	Gender	Men improve with gamification; women achieve better results without it.

Ortiz-Rojas et al.	Gender, video game experience	Leaderboards are more effective for men and those with prior experience.
Ramesh et al.	Gender, prior academic performance	Gamification has a greater impact on men and students with good academic performance.
Tong & Hee	Gender (only women)	Educational game increased health awareness in an exclusively female environment.
Vergara et al.	Gender, age, teaching experience	Player profiles vary by gender and age, influencing gamification effectiveness.
Hu	Cultural context	Games facilitate intercultural adaptation, with variations based on cultural background.
Karkoulian	Gender, culture	Gender and culture mediate the relationship between gamification and teacher engagement.
Krishnan et al.	Gender (perceptions)	Virtual escape room well-rated; perception differences observed by gender.
Qiao et al.	Culture, age	Gamification improves job engagement, moderated by organizational culture.
Rodríguez-Rivera et al.	Gender (including non-binary)	Cooperative video games promote inclusion and motivate students of diverse gender identities.
Roslan et al.	Does not analyze gender/age in detail	Satisfaction and perceived utility are key factors influencing continued use of gamified applications.
Saavedra et al.	Age, gender (perceptions)	Kahoot increases motivation and participation. Findings on differences limited.
Squire	Modality, gender (future)	Interactive PowerPoint was more effective than Socrative. Gender analysis proposed for future research.

The results of this systematic review highlight the properties and components of gamification that have proven effective in strengthening playful learning in the university context. As summarized in Table 2, various studies indicate resources such as leaderboards, points assignment, and badges, which not only improve academic performance but also enhance student motivation. These findings align with previous literature, where it has been noted that competition, when applied appropriately, acts as a particularly strong intrinsic motivator (Nivela-Cornejo et al., 2021). Conversely, elements such as narrative, described by García-Martín et al. (2021), are linked to the need to construct meaningful learning environments that capture student attention while fostering resilience and deep learning.

Furthermore, factors such as cooperation and creativity, emphasized by Morales-Morales and Lucio-Ramos (2022), are essential for enhancing student participation and engagement. This reinforces the notion that gamification not only stimulates academic performance but also strengthens social and collaborative skills. From this perspective, gamification should be understood as a structural component capable of transforming higher education experiences, rather than merely an accessory or supplementary resource.

The analysis of gamified elements in relation to their impact on learning demonstrates that competition, ranking positions, and feedback are key factors for optimizing student performance. This finding is supported by research highlighting how clear and timely feedback is indispensable for effective learning, as it enables students to adjust their cognitive strategies and academic focus (Nivela-Cornejo et al., 2021). However, it is important to note that ranking systems can produce negative effects in certain contexts, particularly among heterogeneous populations regarding skills and trajectories, as shown by Chen, Zhang and Yin (2022) and Sosa (2023), who report increased anxiety in specific groups.

Additionally, differences in the effectiveness of gamification based on demographic variables underscore the importance of considering factors such as gender and age. Evidence suggests that dynamics like escape rooms generate differentiated effects based on gender, with greater benefits observed in male students. However, other research indicates that gamification does not uniformly impact all groups, although robust evidence in this

area is still lacking (Arroyo & Chiza, 2024). This variability highlights the need to design inclusive and flexible gamified strategies that ensure equitable benefits for all students.

Despite significant contributions, this review acknowledges certain limitations. Firstly, the focus on recent publications may have excluded classic studies that, although older, offer valuable insights into gamification. Similarly, the restriction to research in English and Spanish may reduce the cultural and epistemological diversity of the sample. Finally, variability in the definition of gamification across different studies introduces a degree of subjectivity and potential bias into the selection process. These limitations should be considered when interpreting the results and assessing their applicability in other educational contexts.

Considering these findings and constraints, it is proposed that future research delve into the impact of gamification in environments characterized by cultural and socioeconomic diversity to understand how these variables influence the effectiveness of such practices. Additionally, promoting longitudinal studies that analyze the sustained effects of gamification on motivation and learning is essential, as is optimizing implementation strategies in various educational settings. Finally, it would be valuable to explore in greater detail the role of specific digital tools, such as applications designed with gamified dynamics, to enhance their transformative effect in higher education.

Conclusions

The findings underscore the relevance of the characteristics and elements of gamification within higher education. The review of studies indicates that components such as leaderboards, point acquisition, badges, and competition exert a notable influence on student motivation and academic performance. These results align with previous research evidencing that a correct application of gamification has the potential to transform the educational process, creating a more active and participatory learning environment. Furthermore, it is highlighted that, when implemented appropriately, gamification contributes to the development of essential transversal skills, such as collaboration and problem-solving ability, which are key elements for comprehensive student training.

In line with the objective of this research, which was to identify the most effective attributes and elements of gamification to enhance playful learning in university contexts, it was evidenced that components such as narrative, cooperation, and positive feedback are indispensable. Studies indicate that integrating pedagogical narratives alongside collaborative dynamics increases motivation and fosters more meaningful learning. This evidence underscores the necessity of designing and implementing gamified strategies based on these elements, ensuring they are aligned with the concrete expectations and needs of students.

This work, structured through a systematic review, allowed for an exhaustive exploration of the academic production on gamification and its impact on higher education. This approach facilitated the identification of recurring and convergent patterns, as well as enabling a critical examination of the evidence, establishing a solid foundation for future research. Clarity in objectives and methodological rigor provide a coherent framework that helps contextualize the results and guides the incorporation of gamified strategies into teaching practice.

The implications of this study are particularly relevant for educators and administrators in higher education institutions, who must consider the integration of gamified dynamics as a tool to maximize student engagement and learning. However, there is also a recognition of the need for future studies to broaden the analysis to less explored areas, such as the variability in the effectiveness of gamification based on cultural and demographic factors.

Moreover, it is crucial to promote longitudinal research evaluating the sustained impact of gamification on knowledge acquisition and competency development over time. This type of approach will allow for refining gamified strategies to respond to the ongoing transformations in the educational environment and the changing expectations of students.

Therefore, the consolidation of gamification in higher education represents a promising avenue for significantly transforming the valuation and effectiveness of learning at this level, provided that its implementation is planned, coherent, and sustainable.

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