



## Gamification in Higher Education: A PRISMA-Based Systematic Review of Motivation and Engagement Outcomes

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**Abstract:** This study presents a systematic review of empirical intervention research on gamification in higher education published between 2020 and 2025. Following PRISMA 2020 guidelines, 374 records were identified in Scopus and Web of Science, 235 duplicates were removed, and 139 studies were screened. After applying strict eligibility criteria prioritizing experimental, quasi-experimental, and mixed-methods intervention designs with measurable motivation and engagement outcomes, 34 studies were included in the qualitative synthesis. The analysis focused on methodological design, implemented game elements, and reported effects on emotional, cognitive, and behavioral engagement. Most studies employed experimental or quasi-experimental approaches (76%), indicating increasing methodological rigor. The most frequent game elements were structured challenges (61.8%), level progression systems (41.2%), and point-based rewards (35.3%). Across studies, gamification interventions were generally associated with improvements in motivation and engagement, particularly behavioral participation. However, effects were context-dependent, and enhanced engagement did not consistently translate into significant academic performance gains. Methodological limitations remain, including short intervention durations and heterogeneous measurement instruments. Overall, the findings suggest that pedagogically aligned gamification interventions can support student motivation and engagement in higher education, although effectiveness depends on instructional design quality and methodological rigor.

**Keywords:** Gamification, Higher education, Experimental research, Student motivation, Engagement.

### 1. Introduction

Higher education institutions face increasing challenges related to student motivation, sustained engagement, and active participation in diverse instructional environments. In this context, gamification, defined as the use of game design elements in non-game educational settings (Deterding *et al.*, 2011) has gained growing attention as a pedagogical strategy aimed at enhancing motivational processes and learning involvement. Unlike serious games or full game-based learning environments, gamification integrates discrete elements such as points, badges, levels, challenges, and feedback systems into existing instructional structures. Theoretical perspectives grounded in self-determination theory suggest that gamification may influence both intrinsic and extrinsic motivation by supporting autonomy, competence, and relatedness (Ryan & Deci, 2000b; Sailer *et al.*, 2017). However, its effectiveness depends on pedagogical alignment rather than the mere addition of reward mechanisms.

Previous systematic reviews have generally reported positive associations between gamification and student motivation or engagement in higher education (Ratinho & Martins, 2023; Subhash & Cudney, 2018). At the same time, concerns have been raised regarding the heterogeneity of the empirical evidence, particularly in relation to variability in research design and outcome measurement (Dichev & Dicheva, 2017). More recent syntheses continue to highlight the conceptual overlap between gamification and related approaches, as well as inconsistencies in methodological rigor (Hope *et al.*, 2023; Lampropoulos & Kinshuk, 2024; Lester *et al.*, 2023).



Empirical intervention studies have begun to examine more directly the measurable impact of gamification in higher education contexts. Improvements in student motivation have been reported following structured gamified interventions (Campillo-Ferrer *et al.*, 2020). Evidence also suggests that reward configuration influences intrinsic and behavioral engagement in different ways (Xiao & Hew, 2024). Competitive ranking systems appear to generate context-dependent effects, underscoring the importance of inclusive design (Lampropoulos & Sidiropoulos, 2024). Other intervention studies implementing gamified elements within online learning platforms and learning management systems have reported associations with increased participation and engagement (Hellín *et al.*, 2023; Maraza-Quispe *et al.*, 2024).

Despite the growing volume of research, there remains a need for a focused synthesis of empirical intervention studies capable of testing the impact of gamification on measurable motivation and engagement outcomes in higher education. Many prior reviews have included descriptive, correlational, and conceptual works, limiting the strength of causal interpretation.

By narrowing the scope to experimental, quasi-experimental, and mixed-methods intervention designs, the present review seeks to provide a more methodologically grounded understanding of gamification's potential and limitations in higher education contexts.

Accordingly, this study addresses the following research questions:

Q1. What research methodologies are most frequently employed in intervention-based gamification studies in higher education?

Q2. Which game elements are most commonly implemented in empirical gamification interventions?

Q3. What does intervention-based evidence report regarding the motivational and effectiveness outcomes of gamification in higher education?

Q4. What effects are observed across emotional, cognitive, and behavioral dimensions of student engagement?

Q5. What methodological limitations characterize recent intervention-based gamification research?

By concentrating exclusively on empirical intervention studies, this review contributes to clarifying the evidentiary strength of gamification research within higher education contexts.

## 2. Methods

### 2.1 Study Design and Data Sources

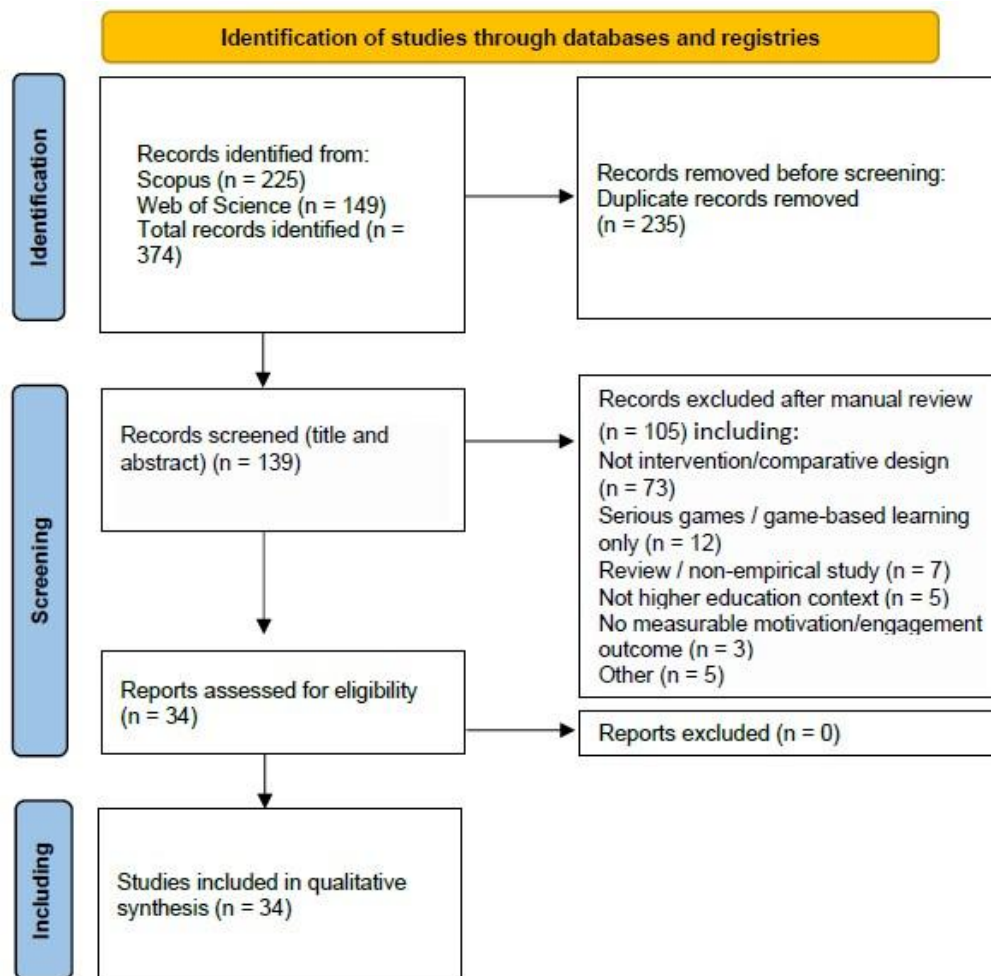
This study was conducted in accordance with the PRISMA 2020 reporting guidelines (Page *et al.*, 2021). The systematic literature review (RSL) was executed in December 2025 and covered publications from January 2020 to December 2025, inclusive. The review aimed to ensure transparency, reproducibility, and methodological rigor throughout the identification, screening, eligibility, and inclusion phases. The search was performed in two major international databases: Scopus and Web of Science, selected due to their broad coverage of peer-reviewed scholarly publications and their recognized indexing standards in educational and interdisciplinary research. The review protocol was not prospectively registered in PROSPERO or any other public repository. However, the eligibility criteria, search strategy, and screening procedures were defined a priori before the formal selection process began. Any post hoc clarifications during screening were documented and applied consistently across all records. These refinements primarily involved operational clarification of the higher education scope and verification of reported educational outcomes.

### 2.2 Procedures

The study selection process followed the PRISMA 2020 framework, and the complete identification, screening, eligibility, and inclusion stages are illustrated in Figure 1.



The search strategy was conducted in Scopus and Web of Science Core Collection. In Scopus, the following advanced search string was applied in the TITLE-ABS-KEY field:



**Figure 1.** PRISMA flowchart of the study selection process.

**Source:** (Page MJ, *et al.*, 2021) The BMJ, 372, n160. <https://doi.org/10.1136/bmj.n160>

TITLE-ABS-KEY ( "gamif\*" AND ( "higher education" OR "university students" OR "tertiary education" ) AND ( "student motivation" OR "student engagement" OR "academic engagement" ) ) AND PUBYEAR > 2019 AND ( LIMIT-TO ( DOCTYPE , "ar" ) ) AND ( LIMIT-TO ( LANGUAGE , "English" ) OR LIMIT-TO ( LANGUAGE , "Spanish" ) )

This search yielded 225 records.

In Web of Science, the following Topic Search (TS) query was used:

TS=("gamif\*" AND ("higher education" OR "university students" OR "tertiary education") AND ("student motivation" OR "student engagement" OR "academic engagement")) AND PY=(2020-2025) NOT TS=("video games" OR "entertainment games")

After applying filters for document type (article) and language (English and Spanish), 149 records were obtained.

As presented in Figure 1, the records retrieved from both databases were exported and combined (n = 374). Duplicate records were removed (n = 235), resulting in 139 unique records for title and abstract screening. During the screening phase, 105 records were excluded because they did not meet the predefined inclusion criteria (e.g., not conducted in higher education contexts, not focused on gamification interventions, not measuring motivation or engagement outcomes, not empirical intervention/comparative studies, or corresponding to reviews or serious games research). A total of 34 full-text articles were assessed for eligibility. All 34 met the inclusion criteria and were included in the qualitative synthesis.

**Table 1.** Selection Criteria for Articles

Inclusion Criteria	Operational Definition
Publication period	Articles published between January 2020 and May 2025.
Document type	Peer-reviewed journal articles only. Conference papers, book chapters, theses, and editorials were excluded.
Language	Publications in English or Spanish.
Educational level	Studies conducted in higher education (universities, colleges, tertiary institutions). K–12 and school-level studies were excluded.
Intervention type	Empirical studies implementing gamification (use of game elements such as points, badges, levels, challenges, or feedback in non-game educational contexts). Studies focused solely on serious games or game-based learning were excluded.
Study design	Experimental, quasi-experimental, or controlled empirical intervention studies. Conceptual, theoretical, correlational, or purely descriptive studies were excluded.
Outcome measures	Studies reporting measurable outcomes related to student motivation and/or engagement (emotional, cognitive, or behavioral).
Accessibility	Full-text available for eligibility assessment.

## 2.3 Analysis

After the eligibility assessment, the 34 included studies were organized into a structured analytical matrix in Microsoft Excel. Each study was coded systematically according to predefined variables aligned with the research questions. The coding framework included the following dimensions: author(s), year of publication, geographical context, methodological design (experimental, quasi-experimental, mixed-methods), characteristics of the study population, disciplinary field, educational level, implemented game elements, reported outcomes (motivation, engagement, academic performance), and methodological limitations. The coding scheme was refined after the eligibility phase to ensure consistency with the final intervention-based inclusion criteria. Only empirical intervention or comparative studies conducted in higher education contexts were retained. Studies were cross-checked during coding to verify alignment with operational definitions of gamification and measurable motivation or engagement outcomes. Content analysis procedures followed systematic coding principles to ensure that data extraction and categorization remained consistent with the research questions (Krippendorff, 2019).

## 3. Results

### 3.1 Sociodemographic Analysis of Published Articles

The final sample comprised 34 empirical intervention studies conducted in higher education contexts between 2020 and 2025. Geographically, explicit country identification was available in a subset of studies, with China representing the largest clearly specified contributor ( $n = 3$ ), followed by Spain, Indonesia, Oman, Mexico, and the United States ( $n = 1$  each). However, in the majority of cases ( $n = 26$ ), the country of implementation was not explicitly stated in the abstract. This suggests broad international representation, though precise regional distribution cannot be fully determined from abstract-level data alone.

Regarding educational level, undergraduate populations were explicitly identified in 8 studies, while 2 studies focused on graduate-level cohorts. In the remaining studies ( $n = 24$ ), the higher education level was specified but not further differentiated by degree level. These findings indicate that while undergraduate contexts remain important, gamification interventions are not limited exclusively to one academic tier. In terms of disciplinary distribution, engineering and computer science contexts accounted for the largest share of interventions ( $n = 17$ ), followed by education-related programs ( $n = 12$ ) and business/economics fields ( $n = 5$ ). This distribution reflects a



strong presence of gamification research in technical and applied disciplines, alongside pedagogical domains. Sample sizes varied across studies. Among the eight studies that explicitly reported participant numbers in their abstracts, sample sizes ranged from 45 to 333 students ( $M \approx 129$ ). However, many studies did not specify exact sample sizes in the abstract, requiring consultation of full texts for precise reporting. Most interventions were implemented in authentic educational settings, including face-to-face, blended, and online environments, demonstrating the adaptability of gamification strategies across diverse instructional formats.

### 3.2 Study Methodologies

Across the 34 empirical intervention studies included in this review, gamification was generally associated with improvements in student motivation and engagement-related indicators in higher education contexts. However, the magnitude and consistency of these effects varied depending on instructional design, intervention duration, disciplinary context, and evaluation methods. As shown in Table 2, the final sample ( $n = 34$ ) reveals a predominance of structured intervention-based research designs. Experimental studies with randomized or controlled group comparisons account for 32% of the included research ( $n = 11$ ), while quasi-experimental designs without full randomization represent 44% ( $n = 15$ ). Mixed-methods intervention studies comprise the remaining 24% ( $n = 8$ ).

Experimental designs implemented clearly defined gamification interventions and compared outcomes between treatment and control groups, allowing for stronger causal inference. Controlled interventions have been conducted in accounting education to examine the effects of gamification under structured experimental conditions (Ramesh *et al.*, 2025). Differential reward configurations in gamified online learning environments have also been analyzed to determine their distinct impact on student outcomes (Xiao & Hew, 2024). Similarly, structured gamified interventions in criminal law education have been implemented to evaluate their effect on student motivation within controlled settings (Torres-Tellez, 2025).

Quasi-experimental designs constituted the largest methodological group. These studies typically involved pre–post comparisons or non-equivalent group designs conducted in authentic university contexts. Gamified digital frameworks have been evaluated using quasi-experimental designs to assess learning and motivational outcomes in higher education (Carrión-Candel *et al.*, 2025). The impact of gamification on academic performance and engagement in university settings has likewise been examined through quasi-experimental approaches (Hmoud *et al.*, 2024). Similar designs have been applied to analyze academic performance and motivation among preservice teachers (Soria-Vílchez & Palazón-Herrera, 2025).

Mixed-methods studies combined quantitative measures (e.g., validated Likert-scale instruments and performance indicators) with qualitative components such as reflective responses or interviews. Mixed analytical approaches have been employed to examine student participation and motivational dynamics within gamified modules (Ng & Lo, 2022). Quantitative performance data have also been integrated with analytical modeling techniques to explore engagement patterns in gamified classroom environments (Duggal *et al.*, 2021). Additionally, methodological rigor has been strengthened through the design and validation of instruments specifically developed to evaluate gamified strategies in higher education e-learning environments, reflecting increased attention to measurement reliability within intervention-based research (Vélez-Loor *et al.*, 2025).

**Table 2.** Methodology of the selected studies

Methodology	Frequency	Percentage
<b>Experimental</b> (randomized control)	11	32%
<b>Quasi experimental</b> (non-randomized)	15	44%
<b>Mixed-methods</b> Intervention	8	24%
<b>Total</b>	<b>34</b>	<b>100%</b>

**Resource:** Authors



Overall, 76% of the included studies ( $n = 26$ ) relied on experimental or quasi-experimental approaches. This distribution reflects a methodological strengthening of gamification research in higher education, emphasizing intervention testing rather than purely descriptive or correlational analysis.

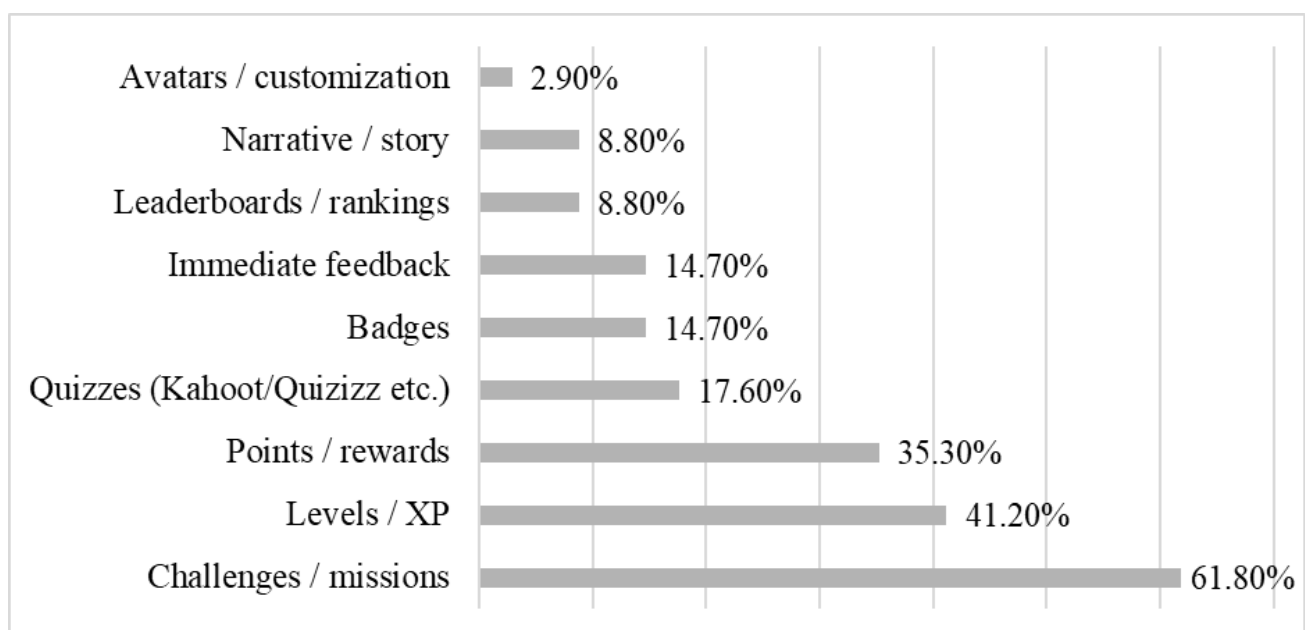
### 3.3 Game Elements in Gamified Designs

The analysis of the 34 included intervention studies reveals a heterogeneous yet structured integration of game design elements in higher education contexts. As shown in Figure 2, the most frequently implemented element was structured challenges or mission-based activities ( $n = 21$ ; 61.8%). These mechanics were typically designed to scaffold learning tasks progressively and stimulate sustained engagement. Mission-based programming tasks, for example, have been embedded to maintain participation across course modules in higher education settings (de la Peña *et al.*, 2021; Nascimento *et al.*, 2025).

Experience progression systems, including levels and XP accumulation, were identified in 14 studies (41.2%). These elements were used to visually represent progress and unlock subsequent tasks, reinforcing perceptions of competence and achievement. Level-based progression systems have been incorporated in social sciences education (Campillo-Ferrer *et al.*, 2020), and the influence of reward structures and progression systems on intrinsic and behavioral engagement in online university learning environments has also been examined (Xiao & Hew, 2024). Progression-based mechanics have likewise been integrated into programming education, demonstrating sustained learning involvement (Mellado *et al.*, 2024).

Point-based reward systems appeared in 12 studies (35.3%), often functioning as mechanisms for performance tracking and motivational reinforcement. Structured point systems implemented in accounting education have been associated with improvements in task persistence and engagement (Ramesh *et al.*, 2025). Similarly, enhanced participation has been reported through structured point accumulation and progress visualization mechanisms (Wang *et al.*, 2025).

Quiz-based gamified tools (e.g., Kahoot-type or LMS-integrated quizzes) were identified in 6 studies (17.6%). These tools were commonly used for formative assessment and active participation. Interactive quiz-based dynamics have been implemented to promote classroom participation (Zainuddin, 2024), and game-based response systems such as Kahoot have been examined as innovation tools in university teaching (Aibar-Almazán *et al.*, 2024). Badges as symbolic achievement markers were present in 5 studies (14.7%). Digital badges have been reported to support persistence in remote higher education environments (Ferriz-Valero *et al.*, 2020), and their effects on psychological need satisfaction among university students have also been analyzed (Schürmann & Quaiser-Pohl, 2022).



**Figure 2.** Most used game elements in gamified environments.



Immediate feedback mechanisms were explicitly described in 5 studies (14.7%), typically functioning as regulatory components that support self-monitoring and engagement. Differential motivational effects of feedback structures have been emphasized in online gamified environments (Xiao & Hew, 2024), and multimodal feedback has been incorporated into gamified reading platforms to enhance knowledge retention (Pelumi & Gordon, 2025).

Leaderboards or ranking systems were less frequent ( $n = 3$ ; 8.8%). Engagement dynamics in online gamified systems suggest that competitive visibility may initially stimulate participation while also producing novelty-related fluctuations over time (Tsay *et al.*, 2020). Competitive features implemented in participatory university contexts require careful design to avoid uneven motivational effects depending on student positioning (Vergara-Borge *et al.*, 2025).

Narrative elements were identified in 3 studies (8.8%), generally used to contextualize learning tasks within broader story-based structures. Transmedia skill development in gamified augmented environments illustrates how narrative coherence may support engagement (del Moral Pérez *et al.*, 2024). Avatars or customization features appeared in only 1 study (2.9%), suggesting that identity-based personalization is not a dominant component in higher education gamification interventions within the selected sample.

Notably, most interventions combined multiple elements rather than relying on a single mechanic. Overall, gamification in higher education tends to prioritize structured task progression (challenges and levels), performance-based reinforcement (points), and formative assessment tools over purely competitive or aesthetic features.

### 3.4 Motivation and Effectiveness of Gamification in Learning

A substantial proportion of experimental and quasi-experimental studies reported statistically significant increases in motivational outcomes. Structured point-based gamification systems implemented in accounting education have been associated with significant enhancements in student engagement and task persistence (Ramesh *et al.*, 2025). Different reward configurations in gamified online learning environments have been shown to influence intrinsic motivation and behavioral engagement (Xiao & Hew, 2024). Improvements in participation and perceived engagement have also been documented in structured college course interventions (Wang *et al.*, 2025). Enhanced motivational involvement following gamified instructional redesign in higher education settings has likewise been reported (Buenadicha-Mateos *et al.*, 2025). Analyses of LMS-based behavioral data in gamified blended cybersecurity courses indicate increased participation and sustained interaction patterns following implementation (Hsu, 2025).

Quasi-experimental research has similarly provided evidence of positive associations between gamification and motivational constructs. Improvements in both engagement and academic performance have been observed following the implementation of gamification strategies in university contexts (Hmoud *et al.*, 2024). Enhanced motivation and achievement have been reported after redesigning instructional activities through gamified digital tasks (de la Peña *et al.*, 2021). Significant gains in student participation have been documented in structured quasi-experimental designs (Montero-Benavides *et al.*, 2025), and improvements in motivational indicators and performance have been identified in physical education programs (Ferriz-Valero *et al.*, 2020).

Several studies emphasized improvements in perceived usefulness, satisfaction, and participation rather than exclusively academic performance. Increased perceived usefulness and motivational involvement have been reported in gamified e-learning contexts (Aguilos & Fuchs, 2022). Enhanced discussion engagement has been observed when gamification was aligned with self-determination theory principles (Pradana *et al.*, 2024). Positive associations between gamified learning environments and engagement indicators have also been identified (Bilro *et al.*, 2021). Increased student commitment in undergraduate cohorts exposed to structured gamification models has likewise been highlighted (Madero & Vazquez-Hernandez, 2025).

The implementation of gamified tools within digital and blended environments has been associated with increased classroom dynamism and participation. Higher levels of active engagement have been observed through Kahoot- and Quizizz-based interventions (Maraza-Quispe *et al.*, 2024). Sustained learning participation has been reported in online programming platforms incorporating gamification mechanics. Enhanced engagement in remote higher education settings has been documented (Zainuddin, 2024), as well as positive effects within gamified virtual laboratory environments (Sanzana, 2024).



Nevertheless, findings were not uniformly positive. Potential novelty effects in online gamified systems suggest that initial engagement gains may diminish over time (Tsang *et al.*, 2020). Increased behavioral participation has not consistently corresponded to statistically significant improvements in academic performance (Khanchai *et al.*, 2025; Vergara-Borge *et al.*, 2025). The durability of motivational outcomes appears to depend on design coherence and implementation quality (Tsang *et al.*, 2024; Q. F. Yang *et al.*, 2023). Overall, the evidence supports a cautiously optimistic interpretation: well-designed gamification interventions in higher education are frequently associated with improved motivational and engagement-related outcomes. However, effectiveness remains context-sensitive and dependent on instructional coherence, inclusive design, measurement rigor, and sustained application over time.

### 3.5 Emotional, Cognitive, and Behavioral Engagement

The included intervention studies ( $n = 34$ ) reported engagement-related outcomes across three commonly described dimensions: emotional, cognitive, and behavioral engagement. Although the operationalization of engagement varied across studies, the evidence suggests that gamification interventions most consistently influenced behavioral engagement (e.g., participation, task completion, interaction frequency), while emotional and cognitive engagement outcomes were more sensitive to instructional design and measurement strategy.

Emotional engagement was frequently reflected through indicators such as enjoyment, satisfaction, perceived fun, and affective connection with learning activities. Improvements in motivational involvement and more positive student perceptions in gamified environments have been reported (Carrión-Candel *et al.*, 2025). Increased affective engagement within gamified learning contexts has likewise been documented (Bilro *et al.*, 2021), as well as enhanced perceived enjoyment and classroom dynamism in structured interventions (Wang *et al.*, 2025).

Cognitive engagement was typically measured through self-reported indicators of attention, effort investment, persistence, and perceived competence. Studies implementing structured challenges and level-based progression frequently reported improvements in sustained effort and task focus. Progressive mission-based interventions in programming or design courses have been associated with higher levels of cognitive involvement (Torres-Tellez, 2025). Increases in learning persistence and self-regulated engagement have also been documented in quasi-experimental university contexts (Mellado & Cubillos, 2024; Montero-Benavides *et al.*, 2025). Evidence further suggests that the type and balance of reward configurations influence cognitive involvement in differentiated ways (Xiao & Hew, 2024).

Behavioral engagement was the most consistently reported dimension, typically operationalized through participation rates, forum interaction, assignment completion, and platform usage metrics. Increased participation in competitive programming contexts has been observed (Chan *et al.*, 2025), as well as higher classroom interaction levels through gamified quiz platforms (Maraza-Quispe *et al.*, 2024). Greater behavioral participation in distance learning environments incorporating gamified structures has also been documented (de la Peña *et al.*, 2021). Improvements in task completion rates within gamified spatial crowdsourcing interventions have similarly been identified (Vergara-Borge *et al.*, 2025).

However, behavioral engagement gains were not always accompanied by equivalent improvements in academic performance outcomes. Although engagement increased in gamified digital board game environments, learning gains varied depending on contextual factors (Khanchai *et al.*, 2025). Potential novelty effects have also been highlighted, suggesting that initial engagement increases may not persist longitudinally (Tsang *et al.*, 2020).

Leaderboard-based competition appeared in a limited number of intervention studies and produced mixed effects. Competitive visibility has been shown to require careful pedagogical alignment to avoid uneven motivational responses (Tsang *et al.*, 2024). These findings reinforce that engagement outcomes depend not solely on gamification mechanics but also on pedagogical alignment, inclusivity, and contextual adaptation.

Overall, the evidence from the 34 intervention studies suggests that gamification can support engagement in higher education, particularly in behavioral and motivational domains. Nevertheless, engagement effects remain sensitive to study design, duration, and measurement instruments, warranting cautious interpretation and stronger longitudinal validation in future research.



### 3.6 Study Limitations

Despite the methodological refinement of the final sample ( $n = 34$ ), several recurring limitations were identified across the included intervention studies.

First, sample size variability remains a concern. Although some studies involved large university cohorts, many interventions were conducted with relatively small groups, limiting statistical power and external validity.

Second, while 76% of the studies employed experimental or quasi-experimental designs, full randomization was not always feasible. Several relied on non-equivalent group comparisons or pre-post designs without strict control groups, requiring cautious interpretation of causal claims.

Third, intervention duration was often limited to a single semester or shorter instructional periods. Longitudinal evidence examining sustained motivational and engagement effects remains scarce, restricting conclusions about long-term impact.

Fourth, outcome measurement approaches varied substantially. Many studies relied on self-report Likert-type instruments, and although some used validated scales, others employed researcher-developed questionnaires. Behavioral metrics (e.g., platform logs, participation rates) were sometimes included but not consistently integrated with validated psychological measures.

Fifth, multiple gamification elements were frequently implemented simultaneously, making it difficult to isolate the specific contribution of individual mechanics.

Finally, contextual concentration within particular disciplines (e.g., engineering, business, programming) may limit cross-disciplinary generalizability.

Overall, although the reviewed studies provide structured evidence supporting the potential of gamification to enhance motivation and engagement in higher education, methodological heterogeneity and contextual variability warrant cautious interpretation. Future research would benefit from larger multi-site randomized designs, standardized measurement instruments, and longitudinal follow-up.

## 4. Discussion

This review synthesized 34 empirical intervention studies on gamification in higher education published between 2020 and 2025. By restricting inclusion to experimental, quasi-experimental, and mixed-methods intervention designs with measurable motivation and engagement outcomes, the present synthesis provides a more methodologically focused perspective than earlier reviews that incorporated heterogeneous designs. Consistent with previous systematic reviews, quantitative approaches continue to dominate gamification research (Hope *et al.*, 2023; Subhash & Cudney, 2018). In this sample, 76% of the studies employed experimental or quasi-experimental designs, indicating a consolidation toward structured intervention testing in authentic higher education contexts.

With regard to game elements, earlier literature emphasized the predominance of points, badges, and leaderboards as core gamification mechanics (Dichev & Dicheva, 2017; Ratinho & Martins, 2023). While these elements remain present in the current sample, the most recurrent components were structured challenges and level-based progression systems. Scaffolded task sequencing and progressive design have been shown to sustain engagement beyond simple reward accumulation (Carrión-Candel *et al.*, 2025; Khanchai *et al.*, 2025; Mellado *et al.*, 2024). This pattern aligns with arguments that gamification effectiveness depends on meaningful instructional integration rather than isolated extrinsic incentives (Sailer *et al.*, 2017).

In terms of motivational outcomes, the findings broadly corroborate earlier conclusions that gamification can positively influence student motivation in higher education (Aguilós & Fuchs, 2022; Campillo-Ferrer *et al.*, 2020). Statistically significant improvements in engagement-related indicators have been reported in experimental research (Ramesh *et al.*, 2025; Wang *et al.*, 2025; Xiao & Hew, 2024). Quasi-experimental studies have similarly observed increased motivational involvement and participation following gamified interventions (Hmoud *et al.*, 2024; Montero-Benavides *et al.*, 2025; Pradana *et al.*, 2024). Additional evidence suggests that gamification may enhance perceived usefulness and learning engagement across blended and online formats (Bilro *et al.*, 2021; de la Peña *et al.*, 2021).



Nevertheless, the findings also support earlier cautions against assuming universal effectiveness (Dichev & Dicheva, 2017). Several studies reported mixed or context-dependent outcomes. Potential motivational risks associated with competitive ranking systems have been highlighted (Tsang *et al.*, 2024; Q. Yang *et al.*, 2023), and novelty effects that may diminish over time have been identified (Tsay *et al.*, 2020). In addition, increases in behavioral participation have not consistently corresponded to statistically significant improvements in academic performance (Khanchai *et al.*, 2025; Vergara-Borge *et al.*, 2025). These findings reinforce the importance of distinguishing between engagement metrics and achievement outcomes.

The multidimensional nature of engagement emphasized in theoretical frameworks is reflected in the present findings (Rivera & Garden, 2021). Behavioral engagement was the most consistently reported dimension, whereas emotional and cognitive engagement appeared more sensitive to instructional coherence and feedback structure. This pattern is consistent with self-determination theory, which suggests that gamification is most effective when it supports autonomy, competence, and meaningful feedback rather than relying solely on competitive or extrinsic mechanisms (Ryan & Deci, 2000a).

Furthermore, the review contributes to ongoing calls for conceptual clarity in the field. Distinguishing gamification from serious games and game-based learning remains essential for theoretical precision (Lampropoulos & Kinshuk, 2024; Lester *et al.*, 2023). By excluding studies focused exclusively on serious games or non-gamified designs, the present review narrows the evidentiary scope and strengthens definitional coherence.

Despite the overall positive trends observed, methodological heterogeneity persists. Variability in intervention duration, sample sizes, disciplinary contexts, and measurement instruments limits comparability. Many studies continue to rely on self-report measures, and longitudinal follow-up remains limited. Future research should prioritize multi-site randomized designs and standardized engagement measures to strengthen causal inference.

## 5. Conclusion

This systematic review examined 34 empirical intervention studies on gamification in higher education published between 2020 and 2025. By focusing exclusively on experimental, quasi-experimental, and mixed-methods intervention designs with measurable motivation and engagement outcomes, the review provides a methodologically refined synthesis of recent evidence.

The findings confirm that experimental and quasi-experimental designs predominate in contemporary intervention-based gamification research, reflecting a progressive strengthening of methodological rigor. In terms of instructional design, gamification interventions most frequently employed structured challenges, level-based progression systems, and point-based reinforcement mechanisms, typically embedded within pedagogically organized learning sequences rather than implemented as isolated reward structures.

Across the included studies, gamification was commonly associated with improvements in motivational and engagement-related indicators. Effects were most consistently observed in behavioral engagement, particularly participation and interaction, while emotional and cognitive engagement dimensions showed greater contextual variability. Importantly, increases in engagement did not consistently translate into statistically significant improvements in academic performance, underscoring the need to distinguish between participation-based metrics and achievement outcomes.

The review also highlights persistent methodological limitations, including variability in sample sizes, intervention duration, and measurement approaches. Although recent research demonstrates increased use of structured intervention designs, longitudinal and multi-institutional evidence remains limited.

Overall, the evidence suggests that well-designed and pedagogically aligned gamification interventions can support student motivation and engagement in higher education. However, effectiveness remains context-sensitive and contingent upon instructional coherence, inclusive design, rigorous outcome measurement, and sustained implementation over time. Future research should prioritize longitudinal designs, standardized engagement measures, and clearer conceptual distinctions between gamification and related instructional approaches.



## References

- Aguilos, V., Fuchs, K. (2022). The Perceived Usefulness of Gamified E-Learning: A Study of Undergraduate Students with Implications for Higher Education. *Frontiers in Education*, 7, 1-11. <https://doi.org/10.3389/educ.2022.945536>
- Aibar-Almazán, A., Castellote-Caballero, Y., Carcelén-Fraile, M. C., Rivas-Campo, Y., González-Martín, A. M. (2024). Gamification in the Classroom: Kahoot! As a tool for University Teaching Innovation. *Frontiers in Psychology*, 15, 1370084. <https://doi.org/10.3389/fpsyg.2024.1370084>
- Bilro, R.G., Loureiro, S.M.C., De Aires Angelino, F.J. (2021). The Role of Creative Communications and Gamification in Student Engagement in Higher Education: A Sentiment Analysis Approach. *Journal of Creative Communications*, 17(1), 7-21. <https://doi.org/10.1177/0973258621992644>
- Buenadicha-Mateos, M., Sánchez-Hernández, M.I., González-López, O.R., Tato-Jiménez, J.L. (2025). From Engagement to Achievement: How Gamification Impacts Academic Success in Higher Education. *Education Sciences*, 15(8), 1054. <https://doi.org/10.3390/educsci15081054>
- Campillo-Ferrer, J.M., Miralles-Martínez, P., Sánchez-Ibáñez, R. (2020). Gamification in Higher Education: Impact on Student Motivation and the Acquisition of Social and Civic Key Competencies. *Sustainability (Switzerland)*, 12(12), 4822. <https://doi.org/10.3390/SU12124822>
- Carrión-Candel, E., De la Peña, C., Chávez-Yuste, B. (2025). A Gamified Digital Framework in Higher Education: Impact on Learning and Motivation. *Turkish Online Journal of Distance Education*, 26(3), 60-84. <https://doi.org/10.17718/tojde.1556533>
- Chan, S.L., Tai, J., Fung, C., Wong, S., Chi, C., Cheng, W., Jung, J., Lee, J., Choi, R., Wan, W.H., Withrow, H., Po, R., Poon, W., Lam, C.F., Chung, H., Chan, C.K., Lin, C.C. (2025). Educational technology enhanced interprofessional E-learning for engaging cross-institutional and cross-border healthcare students: A mixed-methods study. *International Journal of Nursing Studies Advances*, 9, 100404. <https://doi.org/10.1016/j.ijnsa.2025.100404>
- De La Peña, D., Lizcano, D., Martínez-Álvarez, I. (2021). Learning through Play: Gamification Model in University-Level Distance Learning. *Entertainment Computing*, 39, 100430. <https://doi.org/10.1016/j.entcom.2021.100430>
- Del Moral Pérez, E., López-Bouzas, N., Castañeda-Fernández, J. (2024). Transmedia skill derived from the process of converting films into educational games with augmented reality and artificial intelligence. *Journal of New Approaches in Educational Research*, 13(1), 15. <https://doi.org/10.1007/s44322-024-00015-8>
- Deterding, S., Dixon, D., Khaled, R., Nacke, L. (2011). From game design elements to gamefulness. *Proceedings of the 15th International Academic MindTrek Conference: Envisioning Future Media Environments*, 9-15. <https://doi.org/10.1145/2181037.2181040>
- Dichev, C., Dicheva, D. (2017). Gamifying education: what is known, what is believed and what remains uncertain: a critical review. *International Journal of Educational Technology in Higher Education*, 14(1), 9. <https://doi.org/10.1186/s41239-017-0042-5>
- Duggal, K., Gupta, L.R., Singh, P. (2021). Gamification and Machine Learning Inspired Approach for Classroom Engagement and Learning. *Mathematical Problems in Engineering*, 18. <https://doi.org/10.1155/2021/9922775>
- Ferriz-Valero, A., Østerlie, O., Martínez, S.G., García-Jaén, M. (2020). Gamification in Physical Education: Evaluation of Impact on Motivation and Academic Performance within Higher Education. *International Journal of Environmental Research and Public Health*, 17(12), 4465. <https://doi.org/10.3390/ijerph17124465>
- Hellín, C.J., Calles-Esteban, F., Valledor, A., Gómez, J., Otón-Tortosa, S., Tayebi, A. (2023). Enhancing Student Motivation and Engagement through a Gamified Learning Environment. *Sustainability*, 15(19), 14119. <https://doi.org/10.3390/su151914119>



- Hmoud, A.Y.R., Salah, O.H., Altalib, R.A.H. (2024). The Adoption of Gamification in Higher Education and its Impact on Academic Performance: Empirical Evidence from Jordan and Palestine. *Cogent Education*, 11(1). <https://doi.org/10.1080/2331186X.2024.2428907>
- Hope, D.L., Grant, G.D., Rogers, G.D., King, M.A. (2023). Gamification in pharmacy education: a systematic quantitative literature review. *International Journal of Pharmacy Practice*, 31(1), 15-31. <https://doi.org/10.1093/ijpp/riac099>
- Hsu, W.S. (2025). Analyzing Student Engagement and Learning Outcomes in a Gamified Blended Cybersecurity Course Using LMS-Based Behavioral Data. *International Journal of Engineering Pedagogy*, 15(6), 111-122. <https://doi.org/10.3991/ijep.v15i6.57015>
- Khanchai, S., Worragin, P., Ariya, P., Intawong, K., Puritat, K. (2025). Toward Sustainable Digital Literacy: A Comparative Study of Gamified and Non-Gamified Digital Board Games in Higher Education. *Education Sciences*, 15(8), 966. <https://doi.org/10.3390/educsci15080966>
- Krippendorff, K. (2019). Content Analysis: An Introduction to Its Methodology. *SAGE Publications, Inc.* <https://doi.org/10.4135/9781071878781>
- Lampropoulos, G., Kinshuk. (2024). Virtual reality and gamification in education: a systematic review. *Educational Technology Research and Development*, 72(3). <https://doi.org/10.1007/s11423-024-10351-3>
- Lampropoulos, G., Sidiropoulos, A. (2024). Impact of Gamification on Students' Learning Outcomes and Academic Performance: A Longitudinal Study Comparing Online, Traditional, and Gamified Learning. *Education Sciences*, 14(4), 367. <https://doi.org/10.3390/educsci14040367>
- Lester, D., Skulmoski, G.J., Fisher, D.P., Mehrotra, V., Lim, I., Lang, A., Keogh, J.W.L. (2023). Drivers and barriers to the Utilisation of Gamification and Game-Based Learning in Universities: A Systematic Review of Educators' Perspectives. *British Journal of Educational Technology*, 54(6), 1748-1770. <https://doi.org/10.1111/bjet.13311>
- Madero, C., Vazquez-Hernandez, J. (2025). The Impact of Gamification on Undergraduate Students' Motivation during the COVID-19 Pandemic. *TQM Journal*, 10-12. <https://doi.org/10.1108/TQM-12-2024-0508>
- Maraza-Quispe, B., Traverso-Condori, L.C., Torres-Gonzales, S.B., Reyes-Arco, R.E., Tinco-Túpac, S.T., Reyes-Villalba, E., Carpio-Ventura, J.D.R. (2024). Impact of the Use of Gamified Online Tools: A Study with Kahoot and Quizizz in the Educational Context. *International Journal of Information and Education Technology*, 14(1), 132-140. <https://doi.org/10.18178/ijiet.2024.14.1.2033>
- Mellado, R., Cubillos, C., Vicari, R.M., Gasca-hurtado, G. (2024). Leveraging Gamification in ICT Education: Examining Gender Differences and Learning Outcomes in Programming Courses. *Applied Sciences*, 14(7933). <https://doi.org/10.3390/app14177933>
- Montero-Benavides, P., Albort-Morant, G., Masero-Moreno, C. (2025). Evaluating a Gamified Assessment model to Enhance Performance and Engagement in Finance Education: A Quasi-Experimental Study. *The International Journal of Management Education*, 23. <https://doi.org/10.1016/j.ijme.2025.101266>
- Nascimento, L., Palacios, R., Mendonça, M., de Souza, L.B., Fabri, J.A. (2025). Prog-Poly : A Board Game for Project-Based Learning in Programming and Software Engineering. *IEEE Revista Iberoamericana De Tecnologias Del Aprendizaje*, 20(11), 209-219. <https://ui.adsabs.harvard.edu/abs/2025IRITA..20..209N/abstract>
- Ng, L., Lo, C. (2022). Flipped Classroom and Gamification Approach: It's Impact on Performance and Academic Commitment on Sustainable Learning in Education. *Sustainability*, 14(5428). <https://doi.org/10.3390/su14095428>
- Page, M.J., McKenzie, J.E., Bossuyt, P.M., Boutron, I., Hoffmann, T. C., Mulrow, C.D., Shamseer, L., Tetzlaff, J.M., Akl, E.A., Brennan, S.E., Chou, R., Glanville, J., Grimshaw, J.M., Hróbjartsson, A., Lalu, M.M., Li, T., Loder, E.W., Mayo-Wilson, E., McDonald, S., McGuinness, L.A., Stewart, L.A., Thomas, J., Tricco, A.C., Welch, V.A., Whiting, P., Moher, D. (2021). PRISMA 2020 Explanation and Elaboration: Updated Guidance and Exemplars for Reporting Systematic Reviews. *The BMJ*, 372, n160. <https://doi.org/10.1136/bmj.n160>



- Pelumi, I., Gordon, N. (2025). SmartRead: A Multimodal Ereading Platform Integrating Computing and Gamification to Enhance Student Engagement and Knowledge Retention. *Multimodal Technology Interactive*, 9(10), 101. <https://doi.org/10.3390/mti9100101>
- Pradana, R., Pinem, A., Handayani, P. (2024). Influence of Gamification on Student Engagement in Online Discussions Using Self-Determination Theory. *Journal of Educators Online*, 21(2), n2. <https://doi.org/10.9743/JEO.2024.21.2.6>
- Ramesh, G., Azzah, A.M., Habiba, M.S.A.M., Pauline, S.M. (2025). Gamification and Students' Engagement in Accounting Courses – an Experimental Study. *Learning and Teaching in Higher Education: Gulf Perspectives*, 19(1), 35-48. <https://doi.org/10.1108/LTHE-12-2020-0063>
- Ratinho, E., Martins, C. (2023). The Role of Gamified Learning Strategies in Student's Motivation in High school and higher education: A systematic review. *Heliyon*, 9(8), e19033. <https://doi.org/10.1016/j.heliyon.2023.e19033>
- Ryan, R.M., Deci, E.L. (2000a). Self-Determination Theory and the Facilitation of Intrinsic Motivation, Social Development, and Well-Being. *American Psychologist*, 55(1), 68-78. <https://doi.org/10.1037/0003-066X.55.1.68>
- Ryan, R.M., Deci, E.L. (2000b). Intrinsic and Extrinsic Motivations: Classic Definitions and New Directions. *Contemporary Educational Psychology*, 25(1), 54-67. <https://doi.org/10.1006/ceps.1999.1020>
- Sailer, M., Hense, J.U., Mayr, S.K., Mandl, H. (2017). How Gamification Motivates: An Experimental Study of the Effects of Specific Game Design Elements on Psychological Need Satisfaction. *Computers in Human Behavior*, 69, 371-380. <https://doi.org/10.1016/j.chb.2016.12.033>
- Sanzana, M.R. (2024). Gamified Virtual Labs : Shifting from Physical Environments for Low-Risk Interactive Learning. *Journal of Applied Research in Higher Education*, 16(1), 208-221. <https://doi.org/10.1108/JARHE-09-2022-0281>
- Schürmann, L., Quaiser-Pohl, C. (2022). Digital Badges affect Need Satisfaction but not Frustration in Males in Higher Education. *Computers & Education*, 182, 104484. <https://doi.org/10.1016/j.compedu.2022.104484>
- Soria-Vílchez, A., Palazón-Herrera, J. (2025). Effects of gamification on preservice primary music teachers' academic performance, motivation and technology acceptance. *Journal of Music, Technology & Education*, 16(3), 219-245. [https://doi.org/10.1386/jmte\\_00069\\_1](https://doi.org/10.1386/jmte_00069_1)
- Subhash, S., Cudney, E.A. (2018). Gamified Learning in Higher Education: A Systematic Review of the Literature. *Computers in Human Behavior*, 87, 192-206. <https://doi.org/10.1016/j.chb.2018.05.028>
- Torres-Tellez, J. (2025). The Code of Thrones : Gamifying Criminal Law to Rule Student Motivation. *Journal of Criminal Justice Education*, 1-25. <https://doi.org/10.1080/10511253.2025.2565822>
- Tsang, Y.P., Man Lee, C.K., Ho Wu, C., Lin, Y. (2024). Gamified Blockchain Education in Gamified Blockchain Education in Experiential Learning: An Analysis of Students' Cognitive Well-Being. *IEEE Transactions on Education*, IEEE, 67(4), 620-628. <https://doi.org/10.1109/TE.2024.3395617>
- Tsay, C.H., Kofinas, A.K., Trivedi, S.K., Yang, Y. (2020). Overcoming the Novelty Effect in Online Gamified Learning Systems: An Empirical Evaluation of Student Engagement and Performance. *Journal of Computer Assisted Learning*, 36(2), 128-146. <https://doi.org/10.1111/jcal.12385>
- Vélez-Loor, J., Pérez, E., Conde, J. (2025). Design and Validation of an Instrument to Evaluate a Gamified Strategy in E-Learning Environments in Higher Education. *Journal of Information Technology Education: Innovations in Practice*, 24(10). <https://doi.org/10.28945/5521>
- Vergara-Borge, F., López-de-Ipiña, D., Emaldi, M., Olivares-Rodríguez, C., Khan, Z., Soomro, K. (2025). Gamifying Engagement in Spatial Crowdsourcing: An Exploratory Mixed-Methods Study on Gamification Impact Among University Students. *Systems*, 13(519). <https://doi.org/10.3390/systems13070519>



- Wang, C.C., Chang, S.C., Han Yu, Y.H. (2025). Using Gamification to Enhance Learning : A College Course Case Study. *Entertainment Computing*, 54, 100942. <https://doi.org/10.1016/j.entcom.2025.100942>
- Xiao, Y., Hew, K.F.T. (2024). Intangible Rewards Versus Tangible rewards in Gamified Online Learning: Which Promotes Student Intrinsic Motivation, Behavioural Engagement, Cognitive Engagement and Learning Performance? *British Journal of Educational Technology*, 55(1), 297-317. <https://doi.org/10.1111/bjet.13361>
- Yang, Q.F., Lian, L.W., Zhao, J.H. (2023). Developing a Gamified Artificial Intelligence Educational Robot to Promote Learning Effectiveness and Behavior in Laboratory Safety Courses for Undergraduate Students. *International Journal of Educational Technology in Higher Education*, 20(1), 18. <https://doi.org/10.1186/s41239-023-00391-9>
- Zainuddin, Z. (2024). Integrating ease of use and Affordable Gamification - Based Instruction into a Remote Learning Environment. *Asia Pacific Education Review*, 25, 1261 –1272. <https://doi.org/10.1007/s12564-023-09832-6>

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Ygnacio Tomaylla-Quispe: Conceptualization, Methodology, Writing – Original Draft, Supervision. Olger Gutierrez-Aguilar: Data Curation, Investigation, Writing – Review & Editing. Sandra Chicana-Huanca: Formal Analysis, Visualization, Supervision. All the authors have read and agreed to the published version of the manuscript.

### Does this article screen for similarity?

Yes

### Conflict of Interest

The authors have no conflicts of interest to declare. There is also no financial interest to report. The author certifies that the submission is original work and is not under review at any other publication.

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