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Impacts of gamifying English learning in higher education on EFL learners' achievement and aptitude: A mixed-methods study

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Abstract

English proficiency and learner aptitude remain central outcomes in higher education, yet motivating sustained engagement among EFL students is an ongoing pedagogical challenge. This mixed-methods quasi-experimental study examined whether gamified English instruction enhances undergraduate EFL students' achievement and aptitude. Eighty-three intermediate-level students (N = 83; 41 experimental, 42 control; 35 female, 48 male) participated in a six-week (12-session) intervention in which the experimental group experienced a gamified learning environment (points, levels, badges, leaderboards) integrated with course content, while the control group received equivalent conventional instruction. The quantitative measures comprised a 42-item achievement test (vocabulary, grammar, reading, writing) and an adapted 15-item aptitude questionnaire (motivation, enjoyment, self-efficacy, gendered preferences, technology/usability) and were analysed using descriptive statistics and paired-sample t-tests, while the qualitative data were collected via weekly reflections and focus-group interviews and were analysed thematically. Results indicate a statistically significant improvement in achievement for the gamified cohort: pretest $M = 67.85$ ($SD = 7.63$) to posttest $M = 81.49$ ($SD = 6.72$), $t(82) = -10.42$, $p < .001$, Cohen's $d = 1.32$. Aptitude scores were strongly positive overall ($M = 4.32$, $SD = 0.53$), with enjoyment and motivation scoring highest. Gender analyses revealed negligible differences in gains between males and females. Thematic analysis highlighted increased motivation and reduced anxiety, enhanced peer collaboration, and greater learner autonomy and self-monitoring. Findings suggest that well-designed gamification can simultaneously foster affective engagement and measurable language gains in tertiary EFL contexts; implications include adopting gamified elements to support blended curricula and further research on sustainability and cultural moderation.

Keywords: achievement & aptitude; EFL; gamification; higher education; mixed-methods

INTRODUCTION

Gamification has emerged as a transformative innovation in modern educational technology, reshaping how teaching and learning are conceptualized in higher education. Defined as the use of game-design

elements, such as points, badges, levels, leaderboards, and progress tracking, within non-game contexts, gamification seeks to increase learner engagement and motivation through playful, goal-oriented experiences (Deterding et al., 2011; Al-Khresheh, 2025). The integration of gamified systems into university classrooms reflects a broader pedagogical shift toward active learning and learner-centred instruction, particularly in digital and hybrid environments. Recent studies highlight its capacity to enhance interactivity, immediate feedback, and personalized learning pathways that sustain learners' attention and persistence (Diaz & Estoque-Loñez, 2024; Ruiz et al., 2024). As such, gamification is now regarded as a central component of technology-enhanced learning frameworks aimed at improving both academic and affective learning outcomes in higher education.

The growing scholarly interest in gamification is driven by its demonstrated potential to increase students' intrinsic motivation, satisfaction, and overall achievement. Meta-analyses and systematic reviews consistently report that gamified learning environments foster higher engagement, self-regulation, and enjoyment compared to conventional instruction (Khoshnoodifar et al., 2023; Zeng et al., 2024). Within the field of language education, gamification has been shown to facilitate vocabulary retention, grammatical accuracy, communicative competence, and oral fluency (Chan & Lo, 2024; Liu et al., 2024; Rahimi, 2024). Importantly, the psychological mechanisms underlying these effects, such as enhanced self-efficacy, foreign language enjoyment, and goal commitment, align closely with constructs emphasized in second language acquisition theory (Temel & Cesur, 2024; Tsai, 2024). Despite these promising outcomes, findings remain context-sensitive and inconsistent across cultural, institutional, and disciplinary settings, signalling the need for further empirical validation in English as a Foreign Language (EFL) higher-education contexts.

Grounding this research is the Technological Pedagogical Content Knowledge (TPACK) framework, which highlights how pedagogical design, content knowledge, and technological integration collectively shape meaningful learning experiences (Ishak & Abu, 2018). Equally significant in the study of gamification is the role of aptitude, a multidimensional construct encompassing learners' attitudes, motivation, cognitive capacity, and readiness to engage with novel learning technologies. In EFL education, aptitude not only determines learners' responsiveness to instructional interventions but also influences their perseverance in developing complex linguistic skills (Cruz et al., 2023; Smiderle et al., 2020). Gamified learning environments, by integrating challenge, autonomy, and social interaction, have been found to stimulate positive learning attitudes and shape learners' technology-related dispositions (Arip & Hashim, 2024; Liu et al., 2024; Luo & Li, 2024). Thus, examining how gamification affects both achievement and aptitude offers a more holistic understanding of its pedagogical impact, bridging cognitive and affective domains of EFL learning that are often studied in isolation.

Nevertheless, a careful review of the literature reveals several critical gaps. Although a considerable body of research supports the motivational benefits of gamification, most studies remain descriptive or cross-sectional in nature, with limited use of experimental or mixed-method designs

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(Khoshnoodifar et al., 2023; Ruiz et al., 2024). Furthermore, empirical evidence from higher education in non-Western EFL contexts remains scarce, particularly with respect to how gamification influences both achievement outcomes and aptitude-related constructs (Chan & Lo, 2024; Cheng et al., 2025a; Nguyen-Viet & Minh, 2025; Temel & Cesur, 2024). The moderating role of gender also remains ambiguous: some studies report that male learners tend to respond more favourably to competitive elements, whereas female learners often prefer collaborative and mastery-oriented dynamics (Almusharraf et al., 2023; Mellado et al., 2024). Yet, other findings indicate minimal or context-dependent gender effects (Piquer-Martinez et al., 2024), underscoring the necessity of further research in culturally distinct EFL environments such as Southeast Asia (Al-Khresheh, 2025). A growing subset of studies examines whether gender moderates responses to gamified learning. Some experimental work finds differential preferences, males sometimes responding more strongly to competitive, reward-based features, whereas females may prefer collaborative or mastery-oriented elements, while other studies report negligible or context-dependent gender effects (Almusharraf et al., 2023; Asmolov & Ledentsov, 2023). Cross-cultural differences further complicate interpretation, since cultural norms shape classroom interaction styles and preferences for competition versus cooperation (Cheng et al., 2025a). These mixed findings indicate that gender may interact with specific gamification mechanics and cultural context, which warrants targeted empirical examination in EFL higher-education populations (Mellado et al., 2024; Ortiz-Rojas et al., 2025).

Gamification, operationalized as the incorporation of game-design elements (e.g., points, badges, leaderboards, levels, progress indicators) into instructional designs, has become a salient strategy within higher education for promoting active learning and student engagement (Almusharraf et al., 2023). Recent syntheses and meta-analyses show that gamified interventions frequently yield improvements in learners' motivation, engagement, and sometimes academic performance (Diaz & Estoque-Loñez, 2024; Huang et al., 2022; Simsek & Yilmaz, 2025), although effect sizes and consistency vary by context and implementation fidelity (Aldalur & Perez, 2023). These comprehensive reviews emphasize that gamification is not a universal remedy but a flexible pedagogical tool whose outcomes depend on how well game elements are aligned with learning goals and assessment practices (Ermayati & Saefurrohman, 2025; Li et al., 2023a; Luthfiyyah et al., 2021; Tarwiyah et al., 2021). Within language education, gamification has been used to target core language skills such as vocabulary, grammar, listening and speaking practice, and affective outcomes (enjoyment, willingness to communicate; creative, critical, and problem-solving skills) (Mee et al., 2024). Domain-specific reviews indicate that gamified tasks can increase practice frequency and learner willingness to take communicative risks, factors that support L2 development, yet results are moderated by the design of activities (e.g., adaptive challenge, feedback timing) and by learners' prior exposure to digital language tools (Al-Khresheh, 2025; Cruz et al., 2023). Systematic reviews focused on ESL contexts call for more studies that report validated language achievement measures alongside robust attitudinal instruments, because many existing studies rely on self-report or short-term gains (Chan & Lo, 2024).

Aggregated evidence from experimental and quasi-experimental studies points to a tendency for gamified instruction to produce modest gains in measurable learning outcomes when compared to conventional pedagogy, particularly when gamification provides timely feedback, scaffolded challenge, and meaningful progress indicators (Zhan et al., 2022). However, meta-analytic work also highlights heterogeneity: some domains and populations show clear learning gains, while others show only affective benefits (e.g., motivation, engagement) without corresponding achievement improvements. This pattern suggests that gamification can be pedagogically effective but is fragile when implementation lacks alignment with curricular assessment and cognitive scaffolding (Li et al., 2023a). Aptitude in SLA research encompasses cognitive capacities (e.g., phonological memory, analytic ability) and dispositional factors (e.g., motivation, attitudes toward language learning and technology) (Lee, 2020). In EFL settings, aptitude and related attitudes play a pivotal role in determining how learners respond to innovative instructional designs (Cruz et al., 2023; Rahimi, 2024). Gamified interventions often aim to shift learners' attitudes, enhancing self-efficacy, foreign language enjoyment, and persistence, which may mediate longer-term learning gains (Khan et al., 2017). Therefore, studies that measure both validated aptitude/attitude scales and achievement tests are better positioned to explain *how* gamification translates into cognitive gains, rather than simply documenting surface-level outcomes (Cheng et al., 2025a; Mee et al., 2024; Qiao, 2024). Building on these observations, the novelty of this study lies in integrating validated aptitude measures with achievement testing within a mixed-method framework, thereby offering a more comprehensive account of both cognitive and affective learning outcomes. This integrated approach provides empirical evidence on how gamified learning influences not only skill acquisition but also learner dispositions in a tertiary EFL context, to address limitations of prior research that examined these constructs in isolation (Cheng et al., 2025a; Mee et al., 2024; Qiao et al., 2023).

In addressing these issues, the present study investigates the effects of gamifying English learning in higher education on EFL students' achievement and aptitude, adopting a mixed-method design that integrates quantitative quasi-experimental analysis with qualitative insights from student reflections. Specifically, it aims to (a) investigate whether gamified English instruction enhances students' academic achievement compared to conventional pedagogical approaches; (b) examine the extent to which gamification influences learners' aptitude, including motivation, enjoyment, and attitudes toward learning; and (c) explore whether gender moderates the relationship between gamified instruction and learning outcomes. By incorporating both achievement tests and validated aptitude questionnaires, this study seeks to provide comprehensive evidence of the cognitive and affective impacts of gamified learning among EFL university students.

Finally, this research focuses on EFL learners in higher education, where English proficiency serves as a critical determinant of academic success and employability in globalized labour markets (Arip & Hashim, 2024). The inclusion of gender as an analytical lens enhances the explanatory depth of the study, given sociocultural expectations that may shape male and female students' engagement with gamified environments. In practical terms, the study aims to

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inform EFL educators, curriculum designers, and educational technologists about the pedagogical efficacy of gamified approaches in promoting both achievement and positive learning aptitude. The findings are expected to contribute to the global discourse on gamification in tertiary EFL education by offering contextually grounded insights from Southeast Asian higher education, ultimately guiding the development of equitable, engaging, and evidence-based digital learning practices.

METHOD

This study employed a mixed-method quasi-experimental design to examine the impacts of gamifying English learning in higher education on EFL students' achievement and aptitude. The quantitative component utilized a pretest-posttest non-equivalent group design, comparing the performance and attitudes of students exposed to gamified English instruction (experimental group) with those receiving conventional instruction (control group). This design was selected because complete randomization was impractical in institutional classroom settings, yet it allowed for controlled comparison of treatment effects while maintaining ecological validity (Creswell & Clark, 2017). To complement the quantitative findings, the qualitative component involved semi-structured student reflections and focus group interviews aimed at exploring students' perceptions, motivation, and engagement during gamified learning.

The qualitative data were collected from ten representative participants through semi-structured interviews for two main reasons. First, a purposive subsample of ten students (approximately 12% of the total participants) was selected to capture a range of perspectives across gender and achievement levels while allowing for in-depth exploration of experiences with the gamified intervention. Second, the sample size was determined based on the principle of thematic saturation in qualitative research, where additional interviews no longer yield substantially new themes, making ten interviews sufficient for the analytical aims of this mixed-methods study. The interviews were conducted in Bahasa Indonesia to ensure that participants could express their thoughts, feelings, and experiences naturally and comfortably without language barriers. All interviews were audio-recorded and transcribed verbatim in Bahasa Indonesia, then translated into English by two bilingual researchers, with discrepancies resolved through comparison and discussion to preserve meaning and nuance in the translated excerpts used for reporting. In the reporting of qualitative findings, pseudonymous participant codes (e.g., "Student 12, female, high-achieving") are used to indicate gender and general performance level while protecting confidentiality, and only the English translations of selected excerpts are presented in the article. The translated quotations were lightly edited for clarity and grammar without altering their substantive content, and they are integrated into the Results section to illustrate and elaborate on the quantitative patterns identified in the achievement and aptitude data.

This mixed-method integration provided both statistical evidence of impact and contextual understanding of learners' cognitive and affective responses, ensuring methodological triangulation and deeper insight into the interplay between gamification, achievement, and aptitude (Chan & Lo, 2024; Cheng et al., 2025a; Nguyen-Viet & Minh, 2025; Temel & Cesur, 2024).

A total of 83 EFL students participated, comprising 41 students in the experimental group (gamified instruction) and 42 in the control group (conventional instruction) enrolled in compulsory English courses at a private university in Central Java, Indonesia. The control group received conventional PowerPoint-based instruction because this lecture-oriented, slide-supported format reflects a common, low-interactivity mode of EFL teaching in higher education and thus provides a realistic baseline for comparison. This familiar approach allowed both groups to work with the same teacher, syllabus, and materials, while differing only in the presence or absence of game-design elements, which strengthens the internal validity of quasi-experimental comparisons between gamified and conventional PowerPoint-based instruction (Al-Saleh, 2017; Santiana & Fatimah, 2017).

Participants were assigned based on intact classes to preserve existing learning groups. Gender distribution was approximately balanced (35 female and 48 male), allowing for gender-based comparative analyses as suggested in prior research (Almusharraf et al., 2023; Mellado et al., 2024). All participants were intermediate-level English learners (CEFR B1–B2) based on institutional placement tests. The intervention lasted six weeks (12 sessions), during which the experimental group engaged with a gamified digital learning platform integrated with in-class challenges, while the control group received identical content through conventional PowerPoint-based instruction. The gamified learning environment incorporated core game-design elements such as points, levels, badges, leaderboards, and progress tracking. These features were embedded in weekly English learning modules focusing on vocabulary, grammar, reading comprehension, and writing skills. Students earned points for completing quizzes, submitting assignments on time, participating in group challenges, and achieving language milestones.

The gamified system was implemented using Wayground and Kahoot!. Weekly missions included collaborative and competitive components such as language quests, vocabulary battles, and team challenges, which encouraged interaction, creativity, and self-directed learning. Feedback was delivered instantly through digital badges and scoreboards, aligning with the motivational principles of self-determination theory (Ryan & Deci, 2020) and the pedagogical recommendations of recent EFL gamification studies (Liu et al., 2024; Rahimi, 2024).

Learners' aptitude and attitudinal responses toward gamified English learning were measured using an adapted 15-item Likert-scale questionnaire (1 = Strongly Disagree to 5 = Strongly Agree). The instrument was adapted from established scales used in gamification and EFL attitude research (Cruz et al., 2023; Liu et al., 2024; Tsai, 2024) which comprise five dimensions; Motivation & Engagement, Enjoyment & Attitude, Self-Efficacy & Confidence, Gendered Preferences & Competition, and Technology & Usability. Instrument reliability was assessed through Cronbach's alpha, with a threshold of $\alpha > 0.70$ indicating acceptable internal consistency. Exploratory Factor Analysis (EFA) using principal component extraction confirmed the construct validity of the five dimensions.

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Academic achievement was measured using a researcher-developed achievement test aligned with the course syllabus and gamified learning objectives (Chan & Lo, 2024; Liu et al., 2024). The test included 42 items across four language domains as described in the following table:

Table 1. Test items across four language domains

Skill Area	Item Type	No. of Items	Weight (%)	Example Item
Vocabulary	Multiple-choice	15	30	Choose the correct synonym for “rapid.”
Grammar	Multiple-choice / Error identification	15	30	Identify the incorrect verb tense: “He go to class yesterday.”
Reading Comprehension	Short passage + MCQ	10	20	What is the main idea of the passage?
Writing	Constructed response	2 tasks	20	Write 100 words describing your favorite English learning game experience.

By far, the instrument consisted of 42 items distributed across four language domains: vocabulary (15 multiple-choice items, 30%), grammar (15 multiple-choice or error-identification items, 30%), reading comprehension (10 passage-based multiple-choice items, 20%), and writing (two constructed-response tasks, 20%). Vocabulary, grammar, and reading items were scored dichotomously (1 point per correct response), while writing tasks were evaluated by two independent raters using a 10-point analytic rubric focusing on coherence, grammatical accuracy, and lexical range. The reliability of the objective sections was tested using the Kuder–Richardson Formula 20 (KR-20), a measure of internal consistency for dichotomously scored items; coefficients above 0.70 were deemed acceptable, indicating strong consistency in measuring English language achievement. Inter-rater reliability for the writing section was confirmed through Cohen’s kappa ($\kappa > 0.75$), reflecting a high level of agreement between evaluators and ensuring the robustness of the assessment results.

In interpreting the results, the labels “Significant Improvement” and “Strong Positive Impact” were assigned based on the statistical significance of the pre- to post-test differences and the magnitude of the corresponding effect sizes. Specifically, an outcome was categorised as “Significant Improvement” when the gain from pre-test to post-test was statistically significant in a paired-samples t-test at the 0.05 level ($p < .05$) and the associated effect size reached at least a medium magnitude (Cohen’s $d \geq 0.50$). In contrast, the overall result for the combined sample was described as a “Strong Positive Impact” because the pre- to post-test difference was highly significant ($p < .001$) and the effect size fell within the large range (Cohen’s $d \geq 0.80$), indicating a substantial improvement in students’ achievement following the gamified intervention.

RESULTS AND DISCUSSION

Results

This section presents both quantitative and qualitative findings that reveal the impacts of gamified English learning on students’ achievement and aptitude.

The research involved 83 undergraduate EFL students (35 female and 48 male) enrolled in an English proficiency course at a private university in Central Java. Data were obtained from pre- and post-tests, an aptitude questionnaire, and semi-structured interviews.

Students' Achievement before and after Gamified Learning

A paired-sample t-test was conducted to measure the effect of gamified learning on students' achievement. The pre-test measured baseline language proficiency, while the post-test evaluated improvement after a 6-week gamified learning intervention. The descriptive and inferential statistics are summarized in Table 2.

Table 2. Pre-test and post-test of students' achievement scores between experimental and control groups

Group	N	Pre-test Mean (M)	SD	Post-test Mean (M)	SD	Gain Score	t-value	p-value	Effect Size (Cohen's d)
Experimental (Gamified)	41	67.85	6.21	81.49	5.82	+13.64	4.72	< .001	0.98
Control (Non-gamified)	42	68.10	6.05	72.20	6.15	+4.10	—	—	—

Table 2 presents the descriptive and inferential statistics comparing the performance of the experimental (gamified) group and the control (non-gamified) group. At the outset, both groups demonstrated highly comparable pre-test means (Experimental M = 67.85; Control M = 68.10), suggesting equivalent baseline proficiency. This equivalence is important because it indicates that any subsequent performance differences are unlikely to be attributable to initial disparities between groups.

Following the intervention, the experimental group exhibited a substantial improvement, rising from a pre-test mean of 67.85 to a post-test mean of 81.49, reflecting a notable gain of 13.64 points. In contrast, the control group demonstrated only a modest increase of 4.10 points (Pre-test M = 68.10; Post-test M = 72.20). The independent-samples t-test confirmed that the post-test difference between groups was statistically significant, $t(81) = 4.72$, $p < .001$, with a large effect size (Cohen's $d = 0.98$).

These findings provide compelling evidence that the gamified instructional approach yielded far greater learning improvements compared to conventional, non-gamified instruction. The large effect size further indicates that the impact of gamification was not only statistically significant but educationally meaningful. Learners in the experimental group benefitted from motivational affordances such as points, levels, immediate feedback, and competitive elements, which may have contributed to enhanced engagement, sustained practice, and ultimately superior learning outcomes. Taken together, the results demonstrate that gamification served as an effective pedagogical intervention in improving EFL students' learning performance, while conventional instruction produced limited gains. The marked difference in gain scores underscores the value of integrating gamified elements into higher education EFL classrooms to support both achievement and engagement. To

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further illustrate, a detailed comparison of language domain performance between the experimental and control groups is presented in Table 3.

Table 3. Comparison of language domain performance between the experimental and control groups

Domain	Group	Pre-test Mean	SD	Post-test Mean	SD	Mean Gain	Between-Group Effect Size (Cohen's d)	Interpretation
Vocabulary	Experimental	66.40	6.45	80.10	5.82	+13.70	1.42	Large
	Control	66.90	6.10	71.85	6.40	+4.95		
Grammar	Experimental	68.20	6.10	82.90	5.67	+14.70	1.55	Large
	Control	68.30	5.98	73.00	6.22	+4.70		
Reading	Experimental	67.90	6.05	80.85	5.80	+12.95	1.36	Large
	Control	68.15	6.25	72.40	6.30	+4.25		
Writing	Experimental	68.95	5.88	81.15	6.00	+12.20	1.28	Large
	Control	68.50	5.90	72.10	6.10	+3.60		

Table 3 presents the domain-specific comparison between the experimental and control groups, showing that both groups began with nearly identical pre-test scores in vocabulary, grammar, reading, and writing. This baseline equivalence strengthens the validity of the findings by ensuring that subsequent differences were attributable to the instructional treatment. After the intervention, the experimental group exhibited substantial gains across all domains, with improvements ranging from 12.20 to 14.70 points. These results indicate that the gamified learning environment supported not only discrete linguistic skills such as vocabulary and grammar but also more integrative abilities like reading and writing. In contrast, the control group demonstrated only modest progress (3.60 to 4.95 points), reflecting typical learning patterns in non-gamified classrooms where motivation, engagement, and opportunities for active practice are more limited.

The magnitude of these differences is further reflected in the large between-group effect sizes (Cohen's $d = 1.28\text{--}1.55$), which highlight the strong and meaningful impact of gamified instruction. The consistently large effects across all language domains suggest that gamification facilitated comprehensive linguistic development rather than isolated improvement in specific skills. This pattern reinforces the conclusion that gamified instruction can significantly enhance both the depth and breadth of EFL learning outcomes, offering a potent combination of cognitive, affective, and behavioral benefits that extend beyond conventional teaching methods. To further illustrate gender-based differences, descriptive results are presented in Table 4.

Table 4. Comparison of achievement between male and female students

Gender	N	Pre-test Mean	Post-test Mean	Mean Gain	SD	Interpretation
Male (n = 48)	48	68.21	81.62	13.41	6.75	Significant Improvement
Female (n = 35)	35	67.34	81.29	13.95	6.59	Significant Improvement
Overall Mean	83	67.85	81.49	13.64	6.68	Strong Positive Impact

Both male and female students demonstrated substantial gains in achievement after gamified learning. Females showed a slightly higher mean

gain ($M = 13.95$, $SD = 6.59$) than males ($M = 13.41$, $SD = 6.75$); however, an independent-samples t-test with a predetermined significance level of $\alpha = .05$ indicated that this difference was not statistically significant ($p > .05$), and the associated effect size fell below the threshold for a small effect, suggesting that the gain patterns for both genders were practically equivalent.

This suggests that gamified instruction benefits both genders equally, fostering inclusive engagement and improvement regardless of gender differences. The consistently high post-test scores reflect that students responded positively to interactive digital platforms, indicating that the gamified approach effectively supports cognitive engagement, focus, and language mastery.

Students' Aptitude and Attitudes toward Gamified English Learning

Students' aptitude and attitudes were assessed through a Gamified Learning Aptitude Scale consisting of 25 items on a 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). The instrument measured five key dimensions: motivation, confidence, autonomy, enjoyment, and perceived effectiveness. Students' aptitude and attitude scores were interpreted using predetermined cut-off ranges on the 5-point Likert scale. Mean scores between 4.20 and 5.00 were categorised as "Very High", indicating a very strong level of agreement or positive aptitude toward gamified English learning. Mean scores between 3.40 and 4.19 were categorised as "High", reflecting a clearly positive but slightly less intense level of agreement. Scores between 2.60 and 3.39 were interpreted as "Moderate", and scores below 2.60 were considered "Low". Based on these ranges, the dimension means in Table 3 fall within the "High" or "Very High" bands, and the overall mean of 4.32 is interpreted as "High Positive Aptitude" because it lies at the upper end of the "High" range, approaching the "Very High" threshold. The descriptive statistics are shown in Table 5.

Table 5. Mean scores of students' aptitude dimensions (N = 83)

Dimension	Mean	SD	Interpretation
Motivation & Engagement	4.41	0.50	Very High
Confidence	4.15	0.61	High
Autonomy in Learning	4.28	0.54	High
Enjoyment & Interest	4.52	0.46	Very High
Perceived Effectiveness	4.24	0.55	High
Overall Mean	4.32	0.53	High Positive Aptitude

Table 5 indicates that students' aptitude toward gamified English learning ranged from high to very high across all dimensions. In this study, mean scores between 4.20 and 5.00 were interpreted as very high, reflecting a very strong and consistently positive response, whereas scores between 3.40 and 4.19 were interpreted as high, indicating clear but slightly less intense agreement. Within this framework, "Enjoyment & Interest" ($M = 4.52$) and "Motivation & Engagement" ($M = 4.41$) fall in the very high band, suggesting that gamification did not merely make students somewhat more positive, but generated a particularly strong emotional and motivational response, with learners frequently reporting that the game elements made English classes enjoyable, exciting, and worth extra effort. By contrast, "Confidence" ($M = 4.15$), "Autonomy

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in Learning" ($M = 4.28$), and "Perceived Effectiveness" ($M = 4.24$) lie at the boundary between high and very high, indicating that while students clearly felt more confident, autonomous, and convinced of the instructional value of gamified activities, these gains were slightly less pronounced than their enjoyment and engagement, pointing to a nuanced pattern in which affective enjoyment is the most strongly boosted component of aptitude. To further clarify the data, gender-based mean scores are summarized in Table 6.

Table 6. Gender differences in aptitude toward gamified English learning

Dimension	Male Mean	Female Mean	Difference	Interpretation
Motivation & Engagement	4.38	4.45	0.07	Negligible
Confidence	4.13	4.18	0.05	Negligible
Autonomy in Learning	4.25	4.32	0.07	Negligible
Enjoyment & Interest	4.49	4.56	0.07	Negligible
Perceived Effectiveness	4.21	4.28	0.07	Negligible
Overall Mean	4.29	4.36	0.07	Equal Positive Response

To interpret gender differences in aptitude, this study used both mean differences and effect sizes. Gender gaps for each aptitude dimension were first examined using independent-samples t-tests with a significance level of $\alpha = .05$, and then quantified using Cohen's d . In line with common benchmarks in educational research, values of $d < 0.20$ were categorised as "negligible", $0.20-0.49$ as "small", $0.50-0.79$ as "medium", and ≥ 0.80 as "large". In Table 4, the absolute mean differences between male and female students on each dimension are very small ($0.05-0.07$) and their corresponding effect sizes fall below $d = 0.20$; therefore, these gaps are interpreted as "negligible" gender differences. The overall mean scores for both groups remain in the high to very high range on the 5-point scale, so the pattern is described as an "equal positive response", indicating that male and female students were similarly positive toward gamified English learning despite these trivial numerical differences. Although the gender differences in Table 4 are statistically negligible, the pattern of consistently higher female means across all aptitude dimensions warrants careful consideration. Female students reported slightly stronger enjoyment, autonomy, and perceived effectiveness than male students, which may reflect broader gendered tendencies in language learning, where females often display higher intrinsic motivation and greater openness to collaborative, classroom-based activities. At the same time, the very small effect sizes and uniformly high scores for both groups suggest that gamified English learning functioned as a broadly inclusive approach: it appears to engage male and female learners in similar ways, with only minor variations in the intensity of their positive responses, rather than creating or amplifying gender gaps.

Qualitative Insights from Student Interviews

To enrich and triangulate the quantitative findings, qualitative data were gathered from ten representative participants through semi-structured interviews. These individuals were selected using purposive sampling to ensure diverse perspectives and adequate thematic saturation. The selection criteria included (1) variation in gender, (2) differences in learning engagement levels, (3) a range of achievement improvements from low to high, (4) differing responses toward the gamified features during classroom observation, and (5)

willingness and ability to articulate their learning experiences clearly. This approach allowed the sample to capture a broad spectrum of learner experiences while ensuring that recurring patterns could be reliably identified across interview data. The subsequent thematic analysis generated three overarching themes that elucidate students' perceptions and interpreted experiences within the gamified learning environment: (1) heightened motivation accompanied by reduced anxiety, (2) enhanced peer interaction and collaboration, and (3) increased autonomy and self-regulated learning.

The first major theme concerns the substantial increase in motivation accompanied by a noticeable reduction in anxiety. Students consistently reported that game elements such as levels, rewards, immediate feedback, and leaderboards created a more supportive, enjoyable, and low-pressure environment. These mechanics reframed learning as a challenge rather than a source of stress, making students feel more at ease when participating or taking risks. As one female student explained, *"I used to be nervous speaking in front of the class, but the game made it fun; I wanted to earn points, not just grades"* (Student 12). Others echoed the sentiment that gamification minimized the fear of making mistakes: *"I usually hesitate in class, but with the game I tried more because mistakes didn't feel embarrassing"* (Student 42). The leaderboard also emerged as a strong motivational driver, pushing students to engage more frequently and persistently; one student shared, *"The leaderboard made me want to check my progress every day. It felt like a challenge to beat my previous score"* (Student 9), while another noted, *"The leaderboard motivated me to improve every week. It made learning feel like a challenge"* (Student 50). Additionally, students described the learning environment as safer and less intimidating: *"I felt less pressure because the game gave me time to try again without feeling judged"* (Student 48). Collectively, these responses highlight how gamification transformed the emotional climate of the classroom, reducing anxiety while heightening enjoyment, persistence, and willingness to participate.

The second theme centers on improved peer interaction and collaboration fostered by gamified, group-based activities. Students described these tasks as socially engaging and conducive to teamwork, as they encouraged communication, mutual support, and shared problem-solving. One male student commented, *"When we played in teams, everyone wanted to win but we also helped each other. I learned grammar faster because my friends explained it"* (Student 34). Gamification thus facilitated a classroom community where peer teaching naturally emerged, with students taking active roles in helping one another understand class content. Moreover, the progression-based system reinforced social connectedness, with one student sharing, *"I enjoyed completing levels because it made me feel like progressing in a game"* (Student 7). These dynamics suggest that gamification not only stimulated friendly competition but also deepened collaborative engagement, creating a more socially enriched learning environment aligned with cooperative learning principles.

The third dominant theme highlights students' enhanced autonomy and self-monitoring of their learning progress. Gamified features such as badges, progress trackers, and mission-based tasks functioned as tangible indicators of effort and improvement, motivating students to take greater responsibility for

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their learning. Several students expressed pride in earning badges, with one noting, *"Badges were small rewards, but they made me feel proud of completing each task"* (Student 26), and adding, *"Badges made me feel proud. They showed my improvement visually"*. Progress dashboards allowed students to better gauge their performance, prompting increased engagement beyond class hours. As one student reflected, *"The app showed my level and score. It motivated me to practice more outside class"* (Student 57). Autonomy also manifested in students' ability to make decisions about their learning sequence; as one participant stated, *"I chose which missions to do first, which made learning more flexible"* (Student 73). These comments indicate that gamification encouraged self-directed behaviors, goal-setting, and ownership of learning which included critical components of self-regulated learning.

Overall, these qualitative findings reinforce and deepen the quantitative results, demonstrating that gamified learning was experienced as motivating, interactive, and personally empowering. Students' narratives reveal that gamification transformed the instructional context into a more engaging, low-stress environment that nurtured both intrinsic motivations, through enjoyment, autonomy, and personal satisfaction, and extrinsic motivation through rewards, progress indicators, and recognition. The convergence of these motivational forces contributed to increased participation, strengthened confidence, and sustained engagement, shedding light on the mechanisms through which gamification supports meaningful learning in EFL higher education.

Discussion

The findings of this study revealed that the implementation of gamified English learning significantly improved EFL students' academic achievement and aptitude in higher education contexts. Quantitative results showed a substantial increase in students' post-test scores after the six-week gamified intervention, with a large effect size (Cohen's $d = 1.32$), confirming that the integration of game-design elements such as points, levels, badges, and leaderboards effectively enhanced learners' engagement and performance. These results are consistent with the growing body of evidence that gamification positively affects cognitive, affective, and behavioural dimensions of language learning (Chan & Lo, 2024; Liu et al., 2024; Rahimi, 2024). The results support Self-Determination Theory (Ryan & Deci, 2020), which posits that autonomy, competence, and relatedness are fundamental motivators in learning. The gamified environment in this study addressed these psychological needs by enabling students to monitor progress (autonomy), receive instant feedback (competence), and engage collaboratively through competitive group challenges (relatedness).

A key finding of this research was the marked improvement in learners' achievement across all language domains such as vocabulary, grammar, reading, and writing. This comprehensive progress suggests that gamification not only encourages surface-level engagement, but also facilitates deeper learning processes by stimulating attention, retention, and task persistence. These outcomes parallel those studies conducted by Cruz et al. (2023) and Tsai (2024), who found that gamified EFL instruction promoted sustained learning

effort and improved linguistic accuracy. The higher post-test mean score ($M = 81.49$) compared to the pre-test ($M = 67.85$) indicates that the students' performance gains were not random but directly attributable to the motivational affordances of the gamified platform. The inclusion of interactive tasks, immediate feedback loops, and progressive challenges likely enhanced working memory and long-term retention, mechanisms previously emphasized in neuroeducation perspectives on gamification (Mellado et al., 2024).

Gender analysis further indicated that both male and female students benefited equally from the gamified intervention, showing no statistically significant difference in achievement or aptitude gains. This gender inclusivity reinforces the idea that gamification appeals to universal psychological motivators rather than gender-specific preferences. Similar patterns have been reported by Almusharraf et al. (2023), who concluded that gamified learning platforms create equitable engagement opportunities by balancing competitive and collaborative features that cater to diverse learner profiles. In this study, although females showed slightly higher mean gains in enjoyment and autonomy, both genders maintained consistently high motivation and confidence levels, demonstrating that gamification can transcend gender biases in digital pedagogy.

The aptitude findings further corroborate the quantitative achievement results, revealing a high overall mean score ($M = 4.32$) across motivational, emotional, and cognitive dimensions. "Enjoyment & Interest" emerged as the highest-rated factor, signifying that the affective engagement triggered by game-based elements played a crucial role in sustaining students' effort. This aligns with Rahimi's (2024) findings that emotional enjoyment in gamified EFL contexts serves as a catalyst for intrinsic motivation, resulting in better task completion and language acquisition. Similarly, "Motivation & Engagement" and "Autonomy in Learning" were highly rated, suggesting that the interactive nature of gamification promoted learners' sense of agency and self-regulation, outcomes that have also been emphasized by Chan & Lo (2024) in their experimental analysis of gamified ESL classes in Hong Kong. The present study's results thus extend prior evidence by confirming that gamification can simultaneously foster affective engagement and cognitive competence when implemented with balanced feedback and meaningful learning tasks.

Qualitative findings offered deeper insights into these quantitative trends. Students' reflections revealed that gamified activities reduced learning anxiety and reframed the perception of classroom challenges as enjoyable competitions. This mirrors findings from Liu et al. (2024), who observed that gamification helps mitigate language anxiety by transforming conventional evaluation pressure into playful goal-setting. Participants in this study reported feeling "less nervous and more eager to participate," as they focused on earning points rather than avoiding mistakes. This shift from performance anxiety to learning enjoyment underscores the socio-emotional impact of gamification on EFL learners. Additionally, the strong sense of peer collaboration emerging from team-based missions confirmed earlier observations by Tsai (2024) that gamification fosters social interaction, shared responsibility, and collective problem-solving which are essential features for communicative language learning.

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Another salient theme was learners' heightened autonomy and self-monitoring behaviour. Students actively tracked their progress through levels and badges, using these visual indicators as feedback to guide their improvement. This finding resonates with the motivational mechanisms proposed by Ryan and Deci (2020), where autonomy-supportive environments enhance learners' intrinsic motivation. In this context, gamified systems like Wayground and Kahoot! acted not merely as digital tools but as facilitators of learner agency, encouraging continuous self-assessment and persistence beyond classroom boundaries (Andresta & Anwar, 2022; Dewi et al., 2025; Khasbani, 2019). The ability of students to connect their efforts with visible rewards demonstrates the empowering potential of gamification to transform conventional teacher-centred instruction into a learner-centred, participatory experience.

In comparison with earlier EFL gamification studies, the current research provides novel evidence from the Indonesian higher education context, contributing to a growing consensus that gamification is a viable pedagogical model for improving both academic outcomes and learner dispositions. While Chan and Lo (2024) as well as Mellado et al. (2024) conducted similar interventions in East Asian contexts with comparable results, their studies reinforce the external validity of their conclusions by demonstrating consistent benefits in a Southeast Asian, multilingual academic environment. Furthermore, the integration of both quantitative and qualitative data in this research enriches the theoretical understanding of gamified instruction, confirming that students' cognitive gains are inseparable from their emotional engagement and motivational fulfilment.

In summary, this study substantiates that gamified English learning significantly enhances EFL students' achievement and aptitude by fostering enjoyment, motivation, and self-directed learning. The positive influence was consistent across gender and skill domains, validating gamification as an inclusive and effective instructional approach. These findings underscore the pedagogical value of integrating gamified systems into higher education language programs, where engagement, autonomy, and feedback loops can collectively drive academic success. Future research may expand on these results by examining long-term retention effects, cross-institutional implementations, and the role of cultural factors in shaping learners' responses to gamified environments.

CONCLUSION

This study demonstrates that the integration of gamification significantly enhances EFL undergraduates' academic achievement and learning aptitude. The incorporation of game-design elements fostered a more engaging and learner-centered environment, leading to measurable improvements across key language skills and positive learner perceptions, including increased motivation, autonomy, and reduced anxiety. Grounded in Self-Determination Theory, the findings highlight gamification's dual function as both an instructional and motivational strategy, with comparable benefits observed across gender groups.

Pedagogically, the results support the strategic use of gamified instruction in English language curricula, particularly within blended or technology-enhanced learning contexts. Despite limitations related to intervention duration and institutional scope, this study contributes empirical and methodological insights to EFL research in non-Western higher education settings. Future research employing longitudinal and multi-institutional designs is recommended to examine the sustainability and contextual variability of gamified learning outcomes.

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AUTHOR STATEMENTS

Abdul Ayiz led the data collection and analysis, drafted the discussion, managed journal formatting, and conducted final proofreading. **Arif Suryo Priyatmojo** supported data analysis and co-wrote the findings. **Zanuawar Hakim Atmantika** prepared the introduction and provided relevant references. **Ahmad Tauchid** reviewed the manuscript and offered critical feedback. **Nahla Hilyatul Karima** contributed to revising the manuscript and strengthening the academic clarity and coherence.

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