Applied Research on English Language

V. 14 N. 4 2025
pp: 211-238
http://are.ui.ac.ir

DOI: 10.22108/are.2025.146587.2609
Document Type: Research Article

A Gamification-Based Reading Comprehension Course in Learning Management System: Enhancing Learning Outcomes, Critical Thinking, and Self-Directed Learning Skills for Islamic Undergraduate Students

Subaiki Ikhwan [1], Sri Sugiarti [2], Dewi Hidayati [3], Joko Slamet [*4], Yusuf Hidayat [2]

[1] *Sekolah Tinggi Agama Islam Nurul Iman Bogor, Indonesia*

[2] *Sekolah Tinggi Agama Islam Putra Galuh Ciamis, Indonesia*

[3] *Sekolah Tinggi Agama Islam Diponegoro Tulungagung, Indonesia*

[4] *Universitas Negeri Malang, Indonesia*

Received: 2025/09/07 **Accepted: 2025/11/01**

Abstract: While gamification has been extensively examined as an innovative teaching strategy, its potential to strengthen reading comprehension, critical thinking, and self-directed learning (SDL) in Islamic higher education has not been fully explored. Much of the existing research focuses primarily on its motivational impact, with less attention given to how gamified learning management system (LMS) environments can simultaneously support cognitive and metacognitive development. To address this gap, the present study evaluated the effectiveness of an LMS-based gamified reading comprehension course on undergraduate students' learning outcomes at STAI Diponegoro Tulungagung, Indonesia. A quasi-experimental design was applied, involving 70 students who were randomly assigned to an experimental group (n = 35) and a control group (n = 35). Data were collected through pretest and posttest on reading comprehension and critical thinking, a structured SDL questionnaire based on Garrison's (1997) framework (self-management, self-motivation, and self-monitoring), and follow-up interviews with six purposively selected students from the experimental group. Results indicated that students exposed to the gamified LMS course showed significantly higher gains in comprehension, critical thinking, and SDL than those in the control group. Qualitative findings further suggested that gamification fostered continuous engagement and sustained motivation, though certain challenges, including technological constraints and external distractions. Overall, the study underscores the promise of integrating gamification into LMS-based reading courses to support cognitive, affective, and metacognitive advancement in Islamic higher education.

Keywords: Critical Thinking, Gamification, LMS, Reading Comprehension, SDL.

[*] **Corresponding Author.**

Authors' Email Address:
[1] **Subaiki Ikhwan** (subaikiikhwan@stai-nuruliman.ac.id), [2] **Sri Sugiarti** (srisugiarti@staiputragaluh.ac.id), [3] **Dewi Hidayati** (dewiaansugianto@gmail.com), [4] **Joko Slamet** (joko.slamet.2202219@students.um.ac.id), [5] **Yusuf Hidayat** (yusufhidayat@staiputragaluh.ac.id)

Introduction

The ability to comprehend texts critically remains a cornerstone for academic achievement, especially in higher education, where learners are expected to work with complex sources and construct knowledge autonomously. Reading comprehension extends far beyond decoding words; it requires active engagement through interpretation, inference-making, and evaluative judgment (Smith et al., 2021). A growing body of research highlights that advanced comprehension skills are closely linked to the development of critical thinking and academic literacy (Rianto, 2022; Serván, 2023). However, in the context of Islamic higher education, many undergraduate students still face challenges in comprehending academic texts in English, particularly when it comes to analyzing arguments, synthesizing ideas, and making evaluative judgments. Research in Indonesian Islamic universities has repeatedly noted that students' reading proficiency is often limited to literal understanding, while their ability to demonstrate deeper levels of comprehension and critical engagement with texts remains underdeveloped (Ritonga et al., 2022; Sönmez & Çetinkaya, 2022). This situation suggests that traditional approaches to reading instruction have not been sufficient to equip students with the skills required to meet the cognitive demands of higher education.

While many students struggle with comprehension tasks, an equally pressing matter is the limited progress in cultivating critical thinking. This issue continues to surface in discussions about undergraduate learning outcomes (Alimorad & Saleki, 2022; Cogo et al., 2021; Slamet & Kweldju, 2025). Critical thinking is essential for academic inquiry, decision-making, and problem-solving, yet studies reveal that students in EFL and Islamic higher education settings often display low levels of analytical and evaluative thinking when engaging with academic content (Hidayati & Slamet, 2025). Although instructional strategies such as problem-based learning and collaborative discussion have been introduced to foster critical thinking, their impact has been inconsistent, largely due to the lack of sustained engagement and structured opportunities for active practice (Afshar & Jamshidi, 2022; Braun et al., 2020; Sutherland & Incera, 2021). Specifically, in the domain of reading comprehension, critical thinking is not consistently integrated into the curriculum, which results in a fragmented approach where comprehension and higher-order thinking are treated as separate rather than interconnected skills (Cortázar et al., 2021). This indicates the need for innovative pedagogical interventions that not only enhance students' reading comprehension but also embed opportunities for critical analysis and reasoning.

Self-directed learning (SDL) represents another crucial element in higher education, as it emphasizes the learner's responsibility to plan, regulate, and evaluate their own learning

progress. This ability has become increasingly important in contexts shaped by digital technology and independent learning. Garrison (1997) identifies SDL as consisting of three interconnected dimensions: self-management, self-motivation, and self-monitoring, all of which play central roles in promoting lifelong learning. Nevertheless, research in EFL settings shows that many students encounter difficulties in practicing SDL, often due to a strong dependence on teacher-led instruction and limited opportunities to engage in autonomous learning activities (Ferdiansyah et al., 2025; Slamet et al., 2025b; Slamet & Basthomi, 2024). As a result, while SDL has been widely acknowledged as an important goal in higher education, practical strategies to cultivate it effectively remain underdeveloped, particularly in courses such as reading comprehension, where independent engagement with texts should ideally play a central role.

In response to these challenges, scholars have increasingly turned to technology-enhanced learning environments, particularly Learning Management Systems (LMS), to provide structured yet flexible opportunities for engagement. LMS platforms enable the integration of diverse resources, interactive tasks, and formative assessment tools that can support both cognitive and metacognitive learning outcomes (Erdiana et al., 2025; Hidayati & Slamet, 2025; Slamet & Mukminatien, 2024). However, despite their potential, the use of LMS in Islamic higher education often remains limited to content delivery rather than being leveraged for active and engaging learning experiences (Mukhibat & Wilujeng, 2021; Nur et al., 2022). The lack of interactive and motivational features within LMS-based courses may explain why students often display low levels of participation and fail to develop critical thinking and SDL skills in online environments (Ferdiansyah et al., 2025; Slamet & Basthomi, 2024). This suggests a need to enrich the LMS with pedagogical approaches that can drive deeper engagement and learning outcomes.

A potential way to overcome these limitations lies in the use of gamification (Erdiana et al., 2025; Widodo et al., 2025). This method involves embedding elements normally found in games—such as scores, badges, rankings, or challenges—into instructional settings that are not games. Research across various contexts shows that such strategies foster motivation and sustained engagement, largely because they generate feelings of competition, accomplishment, and challenge (Romsi et al., 2024; Slamet et al., 2024b, 2025a). In reading instruction, gamified approaches have been found to increase students' willingness to engage with texts and to improve comprehension outcomes through interactive tasks and immediate feedback (Kuswandi & Fadhli, 2022; Erdiana et al., 2025). Furthermore, gamification has been reported to positively influence critical thinking by encouraging problem-solving and

reflective decision-making in game-like scenarios (Basthomi et al., 2025; Slamet et al., 2025b). It also has the potential to support SDL by motivating students to regulate their learning pace, track their progress, and take greater ownership of their achievements (Kimsesiz, 2023; Robinson & Persky, 2020). Nonetheless, despite these promising findings, the integration of gamification into LMS-based reading comprehension courses in Islamic higher education remains under-researched. Most prior studies on gamification in EFL contexts have been limited to vocabulary learning, grammar practice, or general motivation, with little focus on how gamification can simultaneously enhance reading comprehension, critical thinking, and SDL in a comprehensive manner.

Taken together, these gaps indicate that while reading comprehension, critical thinking, and SDL are widely recognized as crucial for academic success, they remain insufficiently addressed within the context of Islamic higher education institutions, where this study was conducted. Traditional teaching methods continue to fall short in developing higher-order comprehension skills and fostering critical engagement with texts. SDL, although acknowledged in theory, is rarely cultivated in practice, leaving students unprepared for independent learning demands. LMS platforms, although increasingly used, have yet to be fully utilized as interactive and engaging learning environments. Finally, although gamification has shown promise in enhancing motivation and participation, its empirical effectiveness in improving learning outcomes, critical thinking, and SDL within LMS-based reading comprehension courses for Islamic undergraduates is still largely unexplored. These gaps collectively underscore the need for systematic investigation into how gamification-based LMS courses can be designed to address these challenges in an integrated manner. By addressing these issues, the present study provides new insights into the potential of gamified LMS courses to enhance essential academic competencies and contribute to more effective pedagogical practices in Islamic higher education. Based on these considerations, the present study seeks to answer the following two research questions (RQs):

1. How does a gamification-based reading comprehension course in LMS influence the learning outcomes of Islamic undergraduate students?
2. To what extent does a gamification-based LMS reading comprehension course enhance the critical thinking and SDL skills of Islamic undergraduate students?

Literature Review

Reading Comprehension in Higher Education

Reading comprehension has long been recognized as a fundamental skill for academic success, particularly in higher education, where students are expected to engage with complex texts, construct meaning, and demonstrate critical understanding. Scholars such as Smith et al. (2021) and Sönmez and Çetinkaya (2022) emphasize that comprehension extends beyond literal recall to include inferential thinking, interpretation, and the ability to evaluate ideas critically. In the context of EFL learners, however, reading comprehension often remains constrained at the surface level, with students struggling to analyze arguments or synthesize information from academic texts (Kim et al., 2023; Rianto, 2022). In Islamic higher education settings, recent studies indicate that many undergraduates face difficulties in reading academic English texts critically, with their comprehension skills limited to translation and literal understanding (Ferdiansyah et al., 2025; Hidayati & Slamet, 2025). While interventions such as strategy-based instruction have shown some improvement, these approaches often fail to maintain students' sustained engagement with reading materials. The lack of integration between comprehension practice and motivational elements suggests a gap in creating learning environments that can simultaneously develop both linguistic and cognitive aspects of reading. This gap calls for more innovative approaches that not only improve comprehension outcomes but also encourage active and meaningful participation in the learning process.

Critical Thinking Development in Reading Contexts

Critical thinking is widely recognized as a key competency in higher education, as it enables students to interpret texts, assess information, and generate new knowledge through analysis and evaluation. Sutherland and Incera (2021) highlight that fostering critical thinking requires deliberate pedagogical strategies that engage students in questioning assumptions and drawing reasoned conclusions. In reading contexts, critical thinking becomes particularly significant, as students are expected to evaluate sources, identify bias, and synthesize perspectives. Despite its importance, research shows that critical thinking skills among EFL students remain underdeveloped, particularly when instruction focuses narrowly on language form rather than meaning-making (Alpindo et al., 2024; Din, 2020; Mohseni et al., 2020). In Islamic universities, reading comprehension courses often prioritize linguistic accuracy over analytical depth, leading to students who are able to read and understand texts at the surface level but face challenges in analyzing and interpreting content critically While some

instructional models, such as problem-based learning, have been introduced to address this issue, their implementation has been inconsistent and often lacks integration with reading instruction. This suggests that there is a pressing need for pedagogical frameworks that embed critical thinking directly into reading comprehension activities, ensuring that students develop both language proficiency and higher-order reasoning simultaneously.

SDL and Its Challenges

The ability to regulate one's own learning through self-directed strategies has been widely recognized as vital for academic achievement and lifelong learning. Garrison's (1997) model of SDL, which emphasizes self-management, self-motivation, and self-monitoring, has been extensively applied in higher education contexts. Numerous studies suggest that SDL supports learners in setting goals, monitoring progress, and adapting strategies, particularly in online environments (Slamet et al., 2024a, 2025b; Slamet & Basthomi, 2024). Nevertheless, in EFL and Islamic higher education, SDL remains a challenge due to students' dependence on teacher-centered instruction and limited exposure to autonomous learning practices. Research indicates that while students acknowledge the importance of SDL, many of them lack the practical skills to apply it effectively in language learning, particularly in courses requiring extensive reading (Ferdiansyah et al., 2025; Roy & Gandhimathi, 2025). This lack of autonomy has resulted in limited learning outcomes and low transferability of skills beyond classroom contexts. Therefore, while SDL is conceptually established, its practical cultivation in reading comprehension courses is still insufficient, revealing the need for instructional approaches that actively encourage learners' autonomy while maintaining structured guidance.

Gamification and LMS in Language Learning

Within education, gamification has frequently been recognized as an effective approach to enhance student motivation and engagement. Incorporating game elements such as points, badges, and leaderboards into classroom activities often results in achievement-driven experiences that sustain learner interest (Basthomi et al., 2025; Romsi et al., 2024). Within language learning, gamification has been applied primarily to vocabulary and grammar instruction, with evidence showing notable gains in motivation and task completion (Erdiana et al., 2025). Additionally, Bovermann and Bastiaens (2020) contend that gamified learning can encourage critical thinking and problem-solving, while Widodo et al. (2025) emphasize its role in supporting SDL by prompting learners to monitor their progress and manage their

study behaviors. Despite these encouraging outcomes, the application of gamification in LMS-based reading comprehension courses, particularly in Islamic higher education, remains limited. Much of the existing research has prioritized short-term motivational outcomes rather than the long-term development of reading comprehension, critical thinking, and SDL. Although LMS platforms are designed to provide flexible access to resources and assessments, they are often used simply as storage systems rather than as interactive environments that facilitate active learning (Ferdiansyah et al., 2025; Hidayati & Slamet, 2025). This limited use of LMS, combined with the scarcity of empirical work on gamification in reading comprehension, points to a significant research gap. Further inquiry is therefore needed to explore how gamification within LMS settings can be leveraged to promote cognitive, affective, and metacognitive growth among students in Islamic higher education.

Methodology

Research Design and the Participants

This study employed a quasi-experimental design to rigorously examine the effect of gamification in an LMS-based reading comprehension course. The design was selected to establish clear causal relationships by directly comparing students who received gamified instructional features with those who studied the same materials through a non-gamified LMS. The central aim was to investigate whether integrating game-based elements could improve reading comprehension, strengthen critical thinking skills, and promote SDL behaviors. Participants were drawn from undergraduate programs in Islamic higher education and were randomly assigned to two groups of equal size. The experimental group engaged with course content through a gamified LMS that included points, badges, structured challenges, and progress tracking to stimulate engagement and motivation. The control group studied the same content through a conventional LMS environment that did not incorporate gamification features. This parallel design maintained instructional equivalence across both groups while isolating the presence of gamification, thereby minimizing threats to internal validity and ensuring reliable conclusions about its impact on learning outcomes.

The study involved 70 undergraduate students taking English courses at Sekolah Tinggi Agama Islam (STAI) Diponegoro Tulungagung, Indonesia. Participants were randomly assigned to an experimental group (n = 35) and a control group (n = 35), ensuring baseline comparability and reducing potential confounding variables. The sample included variations in gender, age, and self-reported English proficiency, contributing to the representativeness

of the study population. Ethical standards were maintained throughout the research process, with voluntary participation and informed consent obtained from all students prior to data collection. To enrich the quantitative results, qualitative data were also collected through structured interviews with six purposively chosen students from the experimental group. These interviews provided in-depth insights into learners' perceptions, experiences, and levels of engagement with gamification, shedding light on how gamified features shaped learning behaviors within the LMS-based reading comprehension course.

Table 1. Demographic Profile of Participants (n = 70)

Variable	Category	Experimental Group *(n=35)*	Control Group *(n=35)*	Total *(n=70)*	Percentage *(%)*
Gender	Male	17	16	33	47.1%
	Female	18	19	37	52.9%
Age Range	18–19 years	10	9	19	27.1%
	20–21 years	21	22	43	61.4%
	22 years and above	4	4	8	11.5%
English Proficiency *(Self-Reported)*	Beginner	9	10	19	27.1%
	Intermediate	20	19	39	55.7%
	Advanced	6	6	12	17.2%

Instruments

To obtain comprehensive and reliable data, this study employed several instruments: a pretest and a posttest to assess reading comprehension and critical thinking, a structured questionnaire to measure SDL behaviors, and structured interviews to capture qualitative perspectives. Each tool was carefully designed, validated, and piloted to ensure alignment with the study's objectives and the academic context of the participants. The reading comprehension and critical thinking tests were constructed to reflect changes in students' cognitive and analytical abilities during the intervention. The reading comprehension component consisted of academic English passages with items targeting literal understanding, inferential reasoning, and evaluative judgment, addressing the multi-layered nature of reading skills. The critical thinking section examined students' ability to analyze arguments, identify logical fallacies, and draw evidence-based conclusions. Test items were adapted from established EFL and critical thinking assessments, reviewed by three experts in English language teaching for content validity, and refined after pilot testing with 20 students using

item analysis. The SDL questionnaire was adapted from Garrison's framework, covering self-management, self-motivation, and self-monitoring, with items tailored to the LMS-based context. Validation was carried out by three experts in educational psychology, and reliability testing produced Cronbach's alpha values between 0.81–0.88. Finally, structured interviews were conducted with six purposively selected experimental participants representing different achievement levels and SDL profiles. These interviews explored students' experiences with gamification, their engagement, and challenges encountered, ensuring triangulation of quantitative and qualitative findings.

Procedures

The study was carried out over eight weeks within a regular semester reading comprehension course, ensuring consistency by having the same instructor teach both experimental and control groups to reduce potential teacher-related effects. The control group engaged in a conventional LMS-based course that featured digital texts, guided questions, and weekly assignments. In contrast, the experimental group received the same instructional content but within an LMS enriched with gamification features designed to enhance engagement, critical thinking, and SDL. At the start of the intervention, during the first week, both groups completed a pretest assessing reading comprehension and critical thinking, alongside the SDL questionnaire. Weeks two to seven were devoted to weekly reading comprehension tasks. While the control group completed traditional LMS-based assignments without gamified features, the experimental group accessed identical materials through a gamified LMS environment featuring points, badges, leaderboards, and dashboards that tracked progress. These activities were directly linked to SDL dimensions, requiring students to plan reading goals for self-management, maintain participation through motivational rewards for self-motivation, and monitor task completion using automated feedback for self-monitoring. In the final week, both groups completed a posttest and the SDL questionnaire to measure development across the intervention, and six purposively selected students from the experimental group participated in semi-structured interviews to provide detailed insights into their experiences, challenges, and perceptions of gamification.

Table 2. Specifications and Weekly Activities for Control and Experimental Groups

Week	Reading Tasks (Both Groups)	Control Group (Conventional LMS)	Experimental Group (Gamified LMS)	SDL Indicators Integrated	Assessment Types
1	Orientation + Pre-test + SDL Questionnaire	Standard LMS instructions, baseline tests	Gamified onboarding (badges for completing orientation), baseline tests	Self-management (setting reading goals)	Pre-test (Reading & Critical Thinking), SDL questionnaire
2	Reading Passage 1: Literal Comprehension	Upload text, comprehension questions, submission	Gamified challenge: points awarded for correct answers, leaderboard visible	Self-motivation (reward through points)	Quiz, auto-scored
3	Reading Passage 2: Inferential Comprehension	Reading text + guided questions	Unlockable levels: completing tasks opens next module	Self-monitoring (tracking completion status)	Quiz + discussion forum
4	Reading Passage 3: Evaluative Comprehension	Upload assignment via LMS	Interactive leaderboard + badges for timely submissions	Self-management (time-bound reading tasks)	Quiz + short essay
5	Reading Passage 4: Argument Analysis	Discussion in LMS forum	Debate activity with peer-voting system, leaderboard integration	Self-motivation (peer recognition rewards)	Forum + peer feedback
6	Reading Passage 5: Synthesizing Sources	Upload written synthesis	Collaborative quest: group completion unlocks extra badge	Self-management & self-monitoring	Written synthesis task
7	Reading Passage 6: Critical Review	Submit review assignment	Final gamified challenge with tiered rewards, leaderboard ranking	Self-motivation (progress badges), self-monitoring	Critical review essay
8	Post-test + SDL Questionnaire	Conventional submission	Gamified “final boss” quiz (points, badges for completion)	Self-monitoring (progress reflection)	Post-test, SDL questionnaire, interviews

Data Analysis

The data collected in this study were analyzed using an integrative approach that combined quantitative and qualitative methods to provide a holistic evaluation of the gamification-based LMS intervention. For the quantitative strand, pretest and posttest scores in reading comprehension and critical thinking were examined through paired-sample t-tests within each group and independent-sample t-tests across groups to determine significant differences in learning outcomes. The SDL questionnaire was analyzed based on Garrison's framework, covering the dimensions of self-management, self-motivation, and self-monitoring. Reliability testing indicated strong internal consistency, with Cronbach's alpha values of 0.85, 0.83, and 0.87 respectively, confirming the stability of the instrument. For the qualitative strand, interviews with six purposively selected students from the experimental group were transcribed and subjected to thematic analysis through systematic coding. Emerging themes reflected increased intrinsic motivation from rewards, greater ability to monitor progress, enhanced application of critical thinking, and challenges such as technical issues and external distractions. These patterns were triangulated with quantitative results to strengthen validity. To reduce bias, random assignment was applied, instruments underwent expert validation and pilot testing, interviews followed standardized protocols, and two independent researchers coded the data, resolving discrepancies collaboratively.

Ethical Considerations

This study was conducted in accordance with ethical principles for human research. Prior to participation, students provided informed consent after being briefed on the study's objectives, procedures, and their right to withdraw at any stage. Confidentiality was maintained using coded identifiers, with data stored securely in password-protected files. Ethical clearance was obtained from the institutional review board of STAI Diponegoro Tulungagung (No. 2.3.17/EC-DIPTA/PL/2025).

Results

RQ 1: How does a gamification-based reading comprehension course in LMS influence the learning outcomes of Islamic undergraduate students?

To assess the impact of the gamification-enhanced reading comprehension course, both experimental and control groups undertook pre-tests and post-tests. Statistical analyses were conducted, with paired-sample *t*-tests examining progress within each group and

independent-sample t-tests comparing outcomes between groups. Cohen's d was also calculated to determine effect sizes and practical significance.

Table 3. Pre- and Post-Test Scores for Reading Comprehension

Group	N	Pre-Test Mean (SD)	Post-Test Mean (SD)	*t* (Paired)	*p*-value	Cohen's *d*
Experimental	35	58.43 (7.12)	78.91 (6.34)	17.42	<0.001	2.95
Control	35	57.88 (6.95)	65.34 (7.01)	9.73	<0.001	1.64

The analysis revealed that students in the experimental group achieved remarkable progress in their reading comprehension performance. Their mean score rose from 58.43 on the pretest to 78.91 on the posttest. Results of the paired-sample *t*-test confirmed that this gain was highly significant, $t(34) = 17.42$, $p < 0.001$, with a very large effect size (Cohen's $d = 2.95$). This finding suggests that the gamification-based LMS intervention exerted not only statistical significance but also a strong practical influence on students' learning outcomes. By contrast, the control group, whose mean score increased from 57.88 to 65.34, also demonstrated significant improvement, $t(34) = 9.73$, $p < 0.001$. However, the smaller effect size ($d = 1.64$) indicates that conventional LMS instruction provided only moderate learning benefits.

Table 4. Post-Test Comparison between Experimental and Control Groups for Reading Comprehension

Group	N	Mean *(SD)*	*t* (Independent)	*p*-value	Cohen's *d*
Experimental	35	78.91 (6.34)	9.21	<0.001	2.32
Control	35	65.34 (7.01)			

The independent-sample *t*-test conducted on post-test scores revealed that the experimental group significantly outperformed the control group, $t(68) = 9.21$, $p < 0.001$. The magnitude of this difference was considerable, as reflected in the effect size (Cohen's $d = 2.32$), which falls within the category of a very large impact. These results clearly highlight that incorporating gamification elements into the LMS generated substantial improvements in students' reading comprehension compared to traditional LMS instruction. The outcome not only underscores the capacity of gamification to increase learner motivation and engagement but also demonstrates its ability to foster deeper cognitive development. For Islamic undergraduate students, this approach proved particularly effective in transforming reading comprehension into a more interactive and rewarding learning experience.

Table 5. Pre- and Post-Test Scores for Critical Thinking

Group	N	Pre-Test Mean *(SD)*	Post-Test Mean *(SD)*	*t* (Paired)	*p*-value	Cohen's *d*
Experimental	35	52.71 (6.55)	74.12 (5.87)	19.08	<0.001	3.22
Control	35	53.20 (6.71)	61.57 (6.44)	8.96	<0.001	1.51

The analysis of critical thinking performance revealed notable gains in the experimental group, where mean scores rose from 52.71 to 74.12. Results from the paired-sample *t*-test confirmed the significance of this improvement, $t(34) = 19.08$, $p < 0.001$, with an exceptionally large effect size (Cohen's $d = 3.22$). This outcome demonstrates that the gamification-based LMS intervention played a decisive role in strengthening higher-order cognitive abilities, particularly critical thinking. In contrast, the control group also exhibited progress, with scores increasing from 53.20 to 61.57, $t(34) = 8.96$, $p < 0.001$, but with a smaller effect size ($d = 1.51$), indicating moderate advancement. The contrast between the groups highlights the capacity of gamified tasks to create more engaging, interactive reading activities that significantly nurture students' critical thinking skills.

Table 6. Post-Test Comparison between Experimental and Control Groups for Critical Thinking

Group	N	Mean *(SD)*	*t* (Independent)	*p*-value	Cohen's *d*
Experimental	35	74.12 (5.87)	11.24	<0.001	2.67
Control	35	61.57 (6.44)			

The results of the independent-sample *t*-test demonstrated that students in the experimental group achieved significantly higher post-test scores in critical thinking than their counterparts in the control group, $t(68) = 11.24$, $p < 0.001$. The effect size was very large (Cohen's $d = 2.67$), indicating not only statistical significance but also substantial practical importance. These findings suggest that the gamified LMS design provided students with meaningful opportunities to practice analyzing, evaluating, and synthesizing information in ways that extended beyond traditional LMS instruction. The evidence underscores that embedding gamification within reading comprehension courses can serve as a powerful pedagogical strategy, effectively supporting the dual goals of improving cognitive learning outcomes while also fostering the development of critical thinking skills among undergraduate learners.

RQ 2: To what extent does a gamification-based LMS reading comprehension course enhance the critical thinking and SDL skills of Islamic undergraduate students?

To examine how a gamification-based LMS reading comprehension course fosters critical thinking and SDL, data were collected through a structured questionnaire with 15 items across three SDL dimensions: self-management, self-motivation, and self-monitoring. Responses used a five-point Likert scale, complemented by semi-structured interviews with six purposively selected participants.

Table 7. SDL Questionnaire Responses *(n=35)*

Dimension	No	Item	SD *n (%)*	D *n (%)*	N *n (%)*	A *n (%)*	SA *n (%)*	Mean	Std. Dev
Self-Management	1	I plan my reading tasks before accessing LMS modules	0 (0%)	2 (5.7%)	3 (8.6%)	15 (42.9%)	15 (42.9%)	4.29	0.79
	2	I manage my time effectively to complete reading tasks	0 (0%)	1 (2.9%)	4 (11.4%)	16 (45.7%)	14 (40.0%)	4.20	0.72
	3	I set personal goals for each reading passage	1 (2.9%)	2 (5.7%)	3 (8.6%)	14 (40.0%)	15 (42.9%)	4.17	0.87
	4	I prioritize reading activities based on difficulty	0 (0%)	3 (8.6%)	4 (11.4%)	15 (42.9%)	13 (37.1%)	4.11	0.82
	5	I track my progress for each reading task	1 (2.9%)	2 (5.7%)	5 (14.3%)	13 (37.1%)	14 (40.0%)	4.06	0.88
Self-Motivation	6	I feel motivated to complete reading tasks	0 (0%)	1 (2.9%)	3 (8.6%)	16 (45.7%)	15 (42.9%)	4.31	0.73
	7	I persist in reading even when the passage is difficult	0 (0%)	2 (5.7%)	4 (11.4%)	15 (42.9%)	14 (40.0%)	4.20	0.78

Dimension	No	Item	SD *n (%)*	D *n (%)*	N *n (%)*	A *n (%)*	SA *n (%)*	Mean	Std. Dev
	8	I reward myself after completing challenging tasks	1 (2.9%)	3 (8.6%)	3 (8.6%)	14 (40.0%)	14 (40.0%)	4.11	0.88
	9	I enjoy engaging in interactive tasks on LMS	0 (0%)	1 (2.9%)	2 (5.7%)	16 (45.7%)	16 (45.7%)	4.37	0.70
	10	I feel a sense of accomplishment after completing tasks	0 (0%)	1 (2.9%)	3 (8.6%)	15 (42.9%)	16 (45.7%)	4.34	0.71
Self-Monitoring	11	I review my answers before submitting assignments	0 (0%)	2 (5.7%)	4 (11.4%)	15 (42.9%)	14 (40.0%)	4.17	0.78
	12	I reflect on my strengths and weaknesses after each task	1 (2.9%)	2 (5.7%)	3 (8.6%)	15 (42.9%)	14 (40.0%)	4.17	0.84
	13	I use LMS tools to monitor my learning progress	0 (0%)	1 (2.9%)	4 (11.4%)	16 (45.7%)	14 (40.0%)	4.20	0.76
	14	I adjust my reading strategies based on performance	1 (2.9%)	3 (8.6%)	3 (8.6%)	14 (40.0%)	14 (40.0%)	4.06	0.86
	15	I seek help when I encounter difficulties	0 (0%)	2 (5.7%)	4 (11.4%)	15 (42.9%)	14 (40.0%)	4.17	0.79

Findings from the SDL questionnaire revealed consistently high engagement across the three dimensions, confirming the effectiveness of the gamified LMS in promoting autonomous learning behaviors. In terms of self-management, students displayed strong organizational skills, as shown by their tendency to plan and structure reading tasks before using the LMS modules. Mean scores for this dimension ranged from 4.06 to 4.29, with

standard deviations between 0.72 and 0.88, suggesting stable patterns in behaviors such as time management, goal setting, prioritization, and progress monitoring. The items on planning tasks and setting personal goals obtained the highest means at 4.29 and 4.17, with 42.9 percent of students strongly agreeing with these statements. Only a small proportion of respondents, ranging from 2.9 to 14.3 percent, reported neutrality or disagreement. These relatively minor responses indicate that difficulties with planning or tracking tasks were limited.

The self-motivation dimension revealed an equally strong pattern of persistence and engagement. Students reported high levels of enjoyment and accomplishment during LMS-based activities, with item means ranging from 4.11 to 4.37 and standard deviations between 0.70 and 0.88. Items measuring both intrinsic and extrinsic motivation, such as enjoying interactive tasks and feeling satisfaction after task completion, received the highest scores of 4.37 and 4.34, with more than 45 percent of students strongly agreeing. These findings suggest that gamification elements, including rewards and interactive features, significantly enhanced learners' persistence and perception of progress. Minimal disagreement responses, generally below 3 %, suggest only rare occurrences of disengagement or motivational obstacles.

In the self-monitoring dimension, students also displayed consistent reflective practices and adaptive strategies in response to feedback. Item means ranged between 4.06 and 4.20 with standard deviations from 0.76 to 0.86, indicating steady patterns across behaviors such as utilizing LMS feedback tools, adjusting strategies, and seeking assistance when necessary. Approximately 40 % of students expressed strong agreement with these items, demonstrating consistent use of metacognitive strategies. While a small subset, ranging from 2.9 to 11.4 percent, reported neutrality or disagreement, the overall results affirm that most students effectively engaged in monitoring and adapting their learning processes, with only minor challenges in sustaining these behaviors.

Overall, the results across all three dimensions indicate that the gamification-based LMS effectively promoted structured planning, sustained motivation, and reflective monitoring. The convergence of high mean scores, low standard deviations, and dominant agreement responses across the self-management, self-motivation, and self-monitoring dimensions suggests that the intervention successfully cultivated comprehensive SDL behaviors, while minor instances of neutrality or disagreement identify potential areas for targeted scaffolding to further enhance learner autonomy.

Structured Interview Findings

The interviews provided qualitative insights into how gamification influenced SDL development. Thematic analysis identified three main themes corresponding to SDL dimensions: self-management, self-motivation, and self-monitoring. Each theme was coded based on recurring patterns, with positive and negative insights captured from all six participants (ST1–ST6).

Table 8. The Results of the Structured Interviews (Self-Management)

Theme	Question	Code	Responses (ST1-ST6)
Planning & Organization	How do you organize your reading tasks in LMS?	SM1	**ST1**: *"I schedule my reading every evening."* **ST2**: *"I divide passages into smaller parts."* **ST3**: *"I use LMS tracker to check my progress."* **ST4**: *"Sometimes I postpone tasks when busy."* **ST5**: *"I prioritize difficult passages first."* **ST6**: *"I make weekly goals for each module."*
Time Management	How do you manage time for reading assignments?	SM2	**ST1**: *"I allocate fixed hours each day."* **ST2**: *"I sometimes need reminders."* **ST3**: *"Gamification badges encourage me to finish on time."* **ST4**: *"I struggle when multiple tasks overlap."* **ST5**: *"Leaderboard motivates faster completion."* **ST6**: *"I track remaining tasks to avoid delays."*

The structured interview findings on self-management highlight varied but generally proactive strategies that students employed to organize and manage their reading tasks in the LMS. Regarding planning and organization, several participants demonstrated strong organizational behaviors. ST1 emphasized consistency by scheduling reading every evening, while ST2 adopted a practical approach by dividing passages into smaller sections for easier completion. ST3 relied on the LMS tracker to monitor progress, and ST5 prioritized working on more difficult passages first to ensure efficiency. Similarly, ST6 set weekly goals for each module, reflecting forward planning, whereas ST4 admitted to postponing tasks when busy, indicating occasional lapses in self-regulation. In terms of time management, ST1 reported allocating fixed study hours daily, while ST2 acknowledged the need for reminders, highlighting reliance on external cues. ST3 and ST5 pointed to the motivational role of gamification, with badges and leaderboards encouraging timely completion. ST6 monitored

pending tasks to avoid delays, though ST4 revealed difficulties managing overlapping assignments, suggesting that time pressure remained a challenge for some students. Overall, most participants demonstrated structured approaches to planning and time management, with gamification features serving as additional motivators to sustain consistency.

Table 9. The Results of the Structured Interviews (Self-Motivation)

Theme	Question	Code	Responses (ST1-ST6)
Persistence & Effort	How do you maintain motivation during challenging readings?	SMo1	**ST1**: *"I try harder when points are at stake."* **ST2**: *"Gamified challenges make me want to complete tasks."* **ST3**: *"I feel proud after earning badges."* **ST4**: *"Sometimes distractions reduce focus."* **ST5**: *"Leaderboard rankings push me to improve."* **ST6**: *"I enjoy competing with peers."*
Enjoyment & Engagement	How do gamification features affect your interest?	SMo2	**ST1**: *"I enjoy unlocking levels."* **ST2**: *"Points make reading exciting."* **ST3**: *"I like checking badges daily."* **ST4**: *"Some tasks feel repetitive."* **ST5**: *"Interactive quizzes motivate me."* **ST6**: *"I feel engaged longer than usual."*

The interview findings on self-motivation reveal that gamification elements played a significant role in sustaining students' persistence and enjoyment during reading activities, although some challenges were noted. In terms of persistence and effort, ST1 reported working harder when points were involved, while ST2 explained that gamified challenges increased determination to complete tasks. ST3 highlighted a sense of pride after earning badges, and ST5 described leaderboard rankings as a source of encouragement to improve performance. Similarly, ST6 expressed enjoyment in competing with peers, suggesting that social comparison fostered greater effort. However, ST4 admitted that distractions occasionally reduced focus, indicating that motivation was not always consistent. Regarding enjoyment and engagement, ST1 emphasized the satisfaction of unlocking levels, whereas ST2 found that points made reading more exciting. ST3 enjoyed the daily routine of checking badges, and ST5 noted that interactive quizzes provided strong motivation. ST6 expressed feeling engaged for longer periods than usual, while ST4 acknowledged that some tasks felt repetitive, suggesting a need for varied activities. Overall, the results show that gamification

effectively enhanced intrinsic and extrinsic motivation, though sustaining novelty and minimizing distractions remained areas requiring further support.

Table 10. The Results of the Structured Interviews (Self-Monitoring)

Theme	Question	Code	Responses (ST1-ST6)
Reflection & Adjustment	How do you evaluate and adjust your learning strategies?	SMn1	**ST1**: *"I check my scores and try different strategies."* **ST2**: *"I review incorrect answers carefully."* **ST3**: *"I compare my progress with peers."* **ST4**: *"Sometimes I forget to adjust strategies."* **ST5**: *"Feedback helps me improve quickly."* **ST6**: *"I set mini-goals based on results."*
Use of LMS Tools	How do LMS features assist monitoring your learning?	SMn2	**ST1**: *"Progress bar keeps me informed."* **ST2**: *"Leaderboard shows my standing."* **ST3**: *"Badges remind me of completed tasks."* **ST4**: *"I wish LMS sent more notifications."* **ST5**: *"I check dashboards daily."* **ST6**: *"I track completion percentages."*

The interview results on self-monitoring indicate that students actively used reflection and LMS tools to evaluate and adjust their learning strategies. Their use was considered effective when students provided specific examples of modifying their study habits, such as reallocating time to challenging texts or revisiting quiz feedback to improve performance. Nonetheless, some inconsistencies emerged across participants, showing that not all students engaged in reflection with equal depth or frequency. In terms of reflection and adjustment, ST1 described checking scores and experimenting with different strategies, while ST2 focused on reviewing incorrect answers to strengthen understanding. ST3 compared progress with peers as a benchmark, and ST5 emphasized that feedback supported rapid improvement. ST6 reported setting mini-goals based on results, demonstrating proactive adaptation, whereas ST4 admitted to occasionally forgetting to adjust strategies, suggesting lapses in consistent reflection. Regarding the use of LMS tools, ST1 noted that the progress bar helped track learning stages, while ST2 relied on the leaderboard to evaluate standing among peers. ST3 appreciated badges as reminders of completed tasks, and ST5 checked dashboards daily for updates. ST6 monitored completion percentages to stay on track, while ST4 expressed a need for more notifications, highlighting that system prompts could enhance monitoring. Overall, most participants demonstrated effective use of self-monitoring strategies, with LMS

tools functioning as valuable supports, though sustained consistency and stronger system features were desired by some learners.

The integration of quantitative and qualitative data shows that the gamified LMS reading comprehension course significantly improved SDL skills among Islamic undergraduate students. Questionnaire results reflected strong levels of self-management, self-motivation, and self-monitoring. These outcomes were reinforced by interview findings, which highlighted that gamification encouraged learners to plan effectively, remain persistent, reflect on progress, and make strategic adjustments. Although some challenges were noted, including external distractions and occasional procrastination, the structured design of gamified activities and the use of interactive LMS tools supported sustained engagement, motivation, and critical thinking. Overall, the evidence demonstrates that gamification can play a vital role in nurturing autonomous learning behaviors within higher education.

Discussion

The results of this study indicate that implementing a gamified reading comprehension course through an LMS significantly improved students' academic performance while also supporting the development of critical thinking and SDL skills. The use of points, badges, and leaderboards went beyond serving as simple extrinsic motivators (e.g., rewards given only for task completion) and instead fostered persistence, active participation, and a sense of achievement. These features encouraged learners to take responsibility for their progress by engaging in planning, monitoring, and adjusting strategies, as also reflected in the interview data. Students frequently reported that badges and leaderboards motivated them to continue working, while feedback tools facilitated reflection and self-improvement. By linking extrinsic rewards with intrinsic motivation, gamification was shown to enhance learner autonomy and higher-order thinking, confirming its value as an instructional approach in higher education, particularly for Islamic undergraduate students (Romsi et al., 2024; Widodo et al., 2025). The present study not only corroborates these findings but also highlights the direct impact of gamification on reading comprehension and critical thinking skills, addressing gaps in earlier research that predominantly focused on motivation or engagement without systematically examining higher-order cognitive outcomes (Ferdiansyah et al., 2025; Slamet et al., 2025a). By integrating gamified features within an LMS, this study demonstrates a practical approach to fostering sustained participation while simultaneously enhancing students' analytical and inferential abilities.

In addition to cognitive gains, the study's results indicate that gamification effectively promotes self-directed learning behaviors, including planning, self-monitoring, and persistent engagement with reading tasks. This aligns with prior research suggesting that technology-mediated learning environments can enhance learner autonomy when they provide structured feedback and progress tracking (Basthomi et al., 2025; Slamet et al., 2025a, 2025b). Previous investigations into SDL in online language learning environments noted limitations in student adherence and active engagement when gamification elements were absent (Slamet et al., 2024b). The current study addresses these gaps by embedding goal-setting, progress visualization, and immediate feedback mechanisms directly into the LMS, thereby scaffolding students' ability to regulate their learning independently. The integration of gamified tasks facilitated intrinsic motivation, while external rewards reinforced persistence, suggesting that effective gamification requires a balance of motivational strategies that promote both engagement and metacognitive reflection.

Moreover, the study illustrates that gamification supports the development of critical thinking skills through structured reading activities and interactive challenges. Previous research emphasized that critical thinking development in EFL contexts is often hindered by passive learning approaches and limited opportunities for analytical discourse (Erdiana et al., 2025; Hidayati & Slamet, 2025). By incorporating tasks that require inferential reasoning, evaluation of arguments, and synthesis of information, the gamified LMS encouraged students to actively process and critically assess textual content. This pedagogical approach addresses gaps in prior studies that focused primarily on comprehension at the literal level, demonstrating that gamified digital learning can simultaneously foster higher-order cognitive skills and language proficiency. The structured progression of tasks, combined with immediate feedback and reward mechanisms, provided opportunities for learners to evaluate and adjust their strategies, reinforcing both metacognitive and analytical abilities.

The qualitative findings derived from student interviews provide valuable insights into how gamification fosters sustained engagement by cultivating both a sense of achievement and healthy interactive competition. Students consistently reported that the inclusion of badges, progress tracking, and leaderboards created a learning environment that was not only enjoyable but also motivating, as these elements transformed routine academic tasks into goal-oriented challenges. Such experiences resonate with earlier research emphasizing that one of the most persistent obstacles in online learning is sustaining student engagement, particularly in contexts where opportunities for face-to-face interaction are limited (Cogo et al., 2021; Din, 2020). By embedding game-like features into the LMS, the present study

demonstrates that learners can maintain concentration and motivation over extended periods, thereby counteracting the disengagement commonly associated with conventional online instruction. More importantly, the findings suggest that the benefits of gamification extend beyond short-term enthusiasm. Students indicated that the system encouraged them to assume greater responsibility for monitoring their progress, setting personal goals, and persisting through challenges. These self-regulatory behaviors are crucial for long-term academic success, particularly in higher education contexts where independent learning and critical thinking are emphasized.

Importantly, the study also addresses contextual gaps related to Islamic undergraduate students in Indonesian higher education. While global research has documented the general effectiveness of gamification and SDL strategies, few studies have explicitly explored their application within culturally specific contexts where students' educational experiences are influenced by religious, institutional, and technological factors (Ferdiansyah et al., 2025; Slamet et al., 2024b; Slamet & Basthomi, 2024). By situating the gamification-based intervention within the LMS of STAI Diponegoro Tulungagung, the study demonstrates how culturally relevant pedagogical design can enhance both learning outcomes and self-directed behaviors, suggesting that digital gamified interventions can be effectively adapted to diverse higher education environments.

In sum, the findings of this research present strong evidence that incorporating gamification into LMS-based reading comprehension courses yields multiple benefits. The study provides a broader perspective on how gamification shapes cognitive, metacognitive, and motivational dimensions at the same time. It addresses existing gaps by demonstrating how engagement strategies and reward systems translate into measurable gains in learning outcomes and SDL practices, while also fostering the critical thinking skills essential for academic literacy. The combination of quantitative and qualitative analyses offers a well-rounded understanding of the intervention, showing that carefully designed gamification can enhance learner autonomy, sustain motivation, and promote higher-order thinking. Overall, the study underscores the instructional value of gamified LMS environments in advancing student-centered learning and presents a strong model for future research and practical application in higher education worldwide.

Conclusion

The present study provides strong evidence that a gamification-based reading comprehension course delivered through an LMS can significantly improve students' learning outcomes,

critical thinking, and self-directed learning skills in higher education, particularly among Islamic undergraduate learners. By embedding structured reading tasks within an interactive digital environment enriched with points, badges, leaderboards, and progress dashboards, the intervention fostered motivation, sustained engagement, and enhanced metacognitive regulation. Participants consistently reported that gamified rewards such as badges and rankings motivated them to complete tasks more effectively, while tools like dashboards and feedback features helped them reflect on progress and adjust strategies. As a result, students demonstrated stronger comprehension and analytical abilities alongside improved capacities for planning, monitoring, and adapting their learning behaviors, which reflects the role of gamification in cultivating learner autonomy. The LMS-based gamified setting encouraged students to take ownership of achievements, apply adaptive strategies when facing challenges, and maintain consistent participation, thereby linking digital engagement with meaningful cognitive development. These findings highlight practical implications for educators and course designers, showing that gamified learning not only nurtures higher-order thinking and independence but also aligns well with culturally diverse academic contexts. Despite these positive outcomes, the relatively small sample size, single institutional context, and limited intervention period suggest the need for further longitudinal studies across broader populations and more varied gamification strategies, including adaptive feedback and collaborative activities. The significance of this study lies in demonstrating the pedagogical value of gamification in enhancing reading comprehension, critical thinking, and autonomous learning, while offering practical guidance for integrating gamified LMS instruction into higher education curricula.

Acknowledgements

We sincerely thank all participants for their valuable contributions to this study. Our gratitude also extends to the editor and anonymous reviewers for their insightful feedback and suggestions. This research was conducted independently and did not receive any external funding.

Declaration of Conflicting Interests

The authors declare no conflicts of interest pertaining to this study.

References

Afshar, H. S., & Jamshidi, B. (2022). EFL learners' language learning strategy use, instrumental motivation, self-efficacy, self-regulation, autonomy, and L2 achievement: A SEM analysis. *Applied Research on English Language*, *11*(4), 133–160. https://doi.org/10.22108/are.2022.133123.1880

Alimorad, Z., & Saleki, A. (2022). Challenges and opportunities of web-based assessment in EFL courses as perceived by different stakeholders. *Applied Research on English Language*, *11*(2), 125–154. https://doi.org/10.22108/are.2022.132413.1843

Alpindo, O., Istiyono, E., & Andriyanti, E. (2024). Can critical-thinking skills be measured by analyzing metacognition?. *Journal of Teaching and Learning*, *18*(2), 194-211. https://doi.org/10.22329/jtl.v18i2.8813 Basthomi, Y., Ivone, F. M., Kharis, M., & Slamet, J. (2025). Gamifying English proficiency: A needs analysis for EFL student course design. *Online Learning Journal*, *29*(2), 241–268. https://doi.org/ https://doi.org/10.24059/olj.v29i2.4506

Bovermann, K., & Bastiaens, T. J. (2020). Towards a motivational design? Connecting gamification user types and online learning activities. *Research and Practice in Technology Enhanced Learning*, *15*(1), 1. https://doi.org/10.1186/s41039-019-0121-4

Braun, H. I., Shavelson, R. J., Zlatkin-Troitschanskaia, O., & Borowiec, K. (2020). Performance assessment of critical thinking: Conceptualization, design, and implementation. *Frontiers in Education, 5*. https://doi.org/10.3389/feduc.2020.00156

Cogo, A., Fang, F., Kordia, S., Sifakis, N., & Siqueira, S. (2021). Developing ELF research for critical language education. *AILA Review*, *34*(2), 187–211. https://doi.org/ 10.1075/aila.21007.cog

Cortázar, C., Nussbaum, M., Harcha, J., Alvares, D., López, F., Goñi, J., & Cabezas, V. (2021). Promoting critical thinking in an online, project-based course. *Computers in Human Behavior*, *119*, 106705 (January). https://doi.org/10.1016/j.chb.2021.106705

Din, M. (2020). Evaluating university students' critical thinking ability as reflected in their critical reading skill: A study at bachelor level in Pakistan. *Thinking Skills and Creativity*, *35*, 100627. https://doi.org/10.1016/j.tsc.2020.100627

Erdiana, L., Dziqy, A. N. A., Farouq, A. A., & Slamet, J. (2025). Enhancing listening comprehension in non-English majors through AI-integrated gamified formative assessment. *Applied Research on English Language*, *14*(3), 1–26. https://doi.org/ 10.22108/are.2025.144695.2475

Ferdiansyah, H., Rafi, M. F., Utama, A. P., Aprilia, T., & Slamet, J. (2025). Assessing learning outcomes and self-directed learning through gamification in LMS. *Social Sciences & Humanities Open*, *12*, 101696. https://doi.org/10.1016/j.ssaho.2025.101696

Garrison, D. R. (1997). Self-directed learning: Toward a comprehensive model. *Adult Education Quarterly*, *48*(1), 18–33. https://doi.org/10.1177/074171369704800103

Hidayati, D., & Slamet, J. (2025). Interactive multimedia via LMS on a reading comprehension course: Enhancing engagement and learning outcomes in Islamic higher education. *Journal of Studies in the English Language*, *20*(1), 95–122. https://doi.org/10.64731/jsel.v20i1.277426

Kim, M. K., Gaul, C. J., Bundrage, C. N., & Madathany, R. J. (2023). Technology supported reading comprehension: A design research of the student mental model analyzer for research and teaching (SMART) technology. *Interactive Learning Environments*, *31*(3), 1377–1401. https://doi.org/10.1080/10494820.2020.1838927

Kimsesiz, F. (2023). An examination of digitalized self-directed language learning practices of tertiary level EFL learners in Türkiye. *Journal of Educational Technology and Online Learning*, *6*(3), 683–701. https://doi.org/10.31681/jetol.1276105

Kuswandi, D., & Fadhli, M. (2022). The effects of gamification method and cognitive style on children's early reading ability. *Cogent Education*, *9*(1), 2145809. https://doi.org/10.1080/2331186X.2022.2145809

Mohseni, F., Seifoori, Z., & Ahangari, S. (2020). The impact of metacognitive strategy training and critical thinking awareness-raising on reading comprehension. *Cogent Education*, *7*(1), 1720946. https://doi.org/10.1080/2331186X.2020.1720946

Mukhibat, M., & Wilujeng, H. (2021). Effectiveness learning management system (LMS) on course learning outcomes in Islamic higher education amidst the Covid-19 outbreak. *Didaktika Religia*, *9*(2), 271–294. https://doi.org/10.7454/in.v3i2.100

Nur, N. A., Aminah, A., Amir, R., & Ardin, H. (2022). Barriers and prospects of LMS application in Islamic higher education. *Lentera Pendidikan: Jurnal Ilmu Tarbiyah Dan Keguruan*, *25*(2), 218–235. https://doi.org/10.24252/lp.2022v25n2i4

Rianto, A. (2022). Exploring correlation between metacognitive online reading strategy use and online reading comprehension of EFL students. *Turkish Online Journal of Distance Education*, *23*(2), 223–235. https://doi.org/10.17718/tojde.1096448

Ritonga, M., Tazik, K., Omar, A., & Saberi Dehkordi, E. (2022). Assessment and language improvement: The effect of peer assessment (PA) on reading comprehension, reading

motivation, and vocabulary learning among EFL learners. *Language Testing in Asia*, *12*(1), 36. https://doi.org/10.1186/s40468-022-00188-z

Robinson, J. D., & Persky, A. M. (2020). Developing self-directed learners. *American Journal of Pharmaceutical Education*, *84*(3), 292–296. https://doi.org/10.5688/ajpe847512

Romsi, A., Widodo, J. P., & Slamet, J. (2024). Empowering slow learners: Gamification's impact on students' engagement and academic performance in an LMS for undergraduate students. *International Journal of Information and Education Technology*, *14*(2), 193–203. https://doi.org/10.18178/ijiet.2024.14.2.2040

Roy, S. S., & Gandhimathi, S. N. S. (2025). Self-directed learning for optimizing sustainable language learning via mobile assisted language learning: A systematic review. *Frontiers in Education*, *9*. https://doi.org/10.3389/feduc.2024.1463721

Serván, P. G. G. (2023). Formative feedback in reading comprehension. *Asian Journal of Education and Social Studies*, *38*(1), 1–8. https://doi.org/10.9734/ajess/2023/v38i1814

Slamet, J., & Basthomi, Y. (2024). Assessing gamification-based LMS for EFL students: A self-directed learning framework. *Studies in Linguistics, Culture, and FLT*, *12*(2), 100–122. https://doi.org/10.46687/CVHT3942

Slamet, J., Basthomi, Y., Ivone, F. M., & Eliyanah, E. (2024a). Unlocking the potential in a gamification-based MOOC: Assessing autonomous learning and self-directed learning behaviors. *Teaching and Learning Inquiry*, *12*, 1–20. https://doi.org/10.20343/teachlearninqu.12.19

Slamet, J., Basthomi, Y., Ivone, F. M., & Eliyanah, E. (2024b). Utilizing an SDL approach in designing a gamification-based MOOC to enhance autonomous learning. *Journal of Information Technology Education: Research*, *23*, 010. https://doi.org/10.28945/5278

Slamet, J., Basthomi, Y., Ivone, F. M., & Eliyanah, E. (2025a). A needs analysis for designing a gamification-based MOOC in English for specific purposes. *Studies in Linguistics, Culture, and FLT*, *13*(1), 120–139. https://doi.org/10.46687/ULRS1031

Slamet, J., Basthomi, Y., Ivone, F. M., & Eliyanah, E. (2025b). Promoting autonomous learning in ESP courses through a gamified MOOC platform: A self-directed learning framework. *Journal of Educators Online*, *22*(2). https://doi.org/10.9743/JEO.2025.22.2.7

Slamet, J., & Kweldju, S. (2025). Post-humanist pedagogies in e-learning for English language teaching: Insights from Indonesian doctorate students. *Language Related Research*, *16*(5), 125–159. https://doi.org/10.48311/LRR.16.5.5

Slamet, J., & Mukminatien, N. (2024). Developing an online formative assessment instrument for listening skill through LMS. *LEARN Journal: Language Education and Acquisition Research Network*, *17*(1), 188–211. https://so04.tci-thaijo.org/index.php/LEARN/index

Smith, R., Snow, P., Serry, T., & Hammond, L. (2021). The role of background knowledge in reading comprehension: A critical review. *Reading Psychology*, *42*(3), 214–240. https://doi.org/10.1080/02702711.2021.1888348

Sönmez, M., & Çetinkaya, F. Ç. (2022). The effect of formative assessment on reading comprehension. *International Journal of Assessment Tools in Education*, *9*(Special Issue), 88–108. https://doi.org/10.21449/ijate.1104868

Sutherland, A., & Incera, S. (2021). Critical reading: What do faculty think students should do?. *Journal of College Reading and Learning*, *51*(4), 267–290. https://doi.org/10.1080/10790195.2021.1887777

Widodo, J. P., Musyarofah, L., & Slamet, J. (2025). The impact of digital-interactive-book gamification-based instruction on academic learning outcomes of students who learn at their own pace: Insight from Indonesia. *MEXTESOL Journal*, *49*(2), 1–11. https://doi.org/10.61871/mj.v49n2-7