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Digital Gamification as a Foundation for Critical Reading in EFL Higher Education: Evidence from Cross-Platform Secondary Analysis

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Abstract
Critical reading in a second language depends on more than understanding individual words. Readers need enough lexical access, attention, self-monitoring, and feedback to question claims and compare evidence. This study reanalysed three existing technology-mediated vocabulary datasets to examine whether gamified platforms provide those enabling conditions. The source corpus comprised a Blooket questionnaire study (n = 20), a Quizizz open-ended questionnaire study (n = 18), and a Wayground questionnaire/interview study (n = 41). Because the original instruments did not directly test critical reading, the analysis deliberately treats the findings as evidence of critical-reading readiness rather than critical-reading achievement. A cross-platform coding framework examined five dimensions: lexical processing, engagement and persistence, formative feedback, metacognitive self-evaluation, and constraints created by time pressure or competition. Blooket received 94.5% positive responses overall, although its perception mean (3.20/4) exceeded its skill mean (3.11/4). Quizizz responses consistently linked scores with participation, progress monitoring, self-evaluation, and competitive effort. Wayground produced 70.0% positive responses, with its strongest item indicating greater engagement than traditional vocabulary work (M = 3.76/5). Across platforms, gamification appears to create useful conditions for sustained lexical attention and self-monitoring. Yet the same data show a gap between engagement and deeper evaluation. Timers, ranking, and rapid-response formats may reward retrieval before justification. The study proposes a staged design in which gamified vocabulary practice is followed by inference, evidence checking, source comparison, and written justification. The findings support technology as a gateway to critical reading, not as evidence that critical reading has already been acquired.
Keywords: critical reading; gamification; vocabulary learning; formative feedback; self-regulated learning; EFL; Blooket; Quizizz; Wayground

1. Introduction

Digital quizzes have become ordinary classroom infrastructure in many EFL programs. Their attraction is easy to see. A student answers, receives a score, checks a rank, and tries again within seconds. Recent synthesis work shows that feedback, points, quizzes, leaderboards, time limits, and competition are among the most common elements in gamified

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EFL instruction (Zhang & Hasim, 2023). Evidence from Quizizz also suggests that gamified formative assessment can support more internalized forms of motivation (Zhang & Crawford, 2024). What remains less clear is whether these highly responsive environments help learners move toward critical reading, where speed and correctness are only part of the task.

Critical reading requires a reader to follow a text, recognize lexical relationships, make inferences, notice uncertainty, judge evidence, and monitor whether an interpretation is warranted. Technology can support some of these processes, but not automatically. A randomized trial of a gamified, self-regulated reading environment found gains in reading-related outcomes when game features were combined with self-regulation support (Qiao et al., 2022). A separate gamified reading application reported improvements across direct, deductive, and critical comprehension levels (AlZuhair & Alkhuzaim, 2022). These findings matter because they shift the discussion away from whether games are enjoyable and toward the design conditions under which enjoyment may become cognitively productive.

Vocabulary is a sensible starting point for this question. Limited lexical knowledge can consume attentional resources before a reader reaches inference or evaluation. Interactive work that joins lexical learning with reading comprehension has shown positive results (Yang, 2023), while cloud-based tool mediation has also been associated with vocabulary and reading gains (Tsegaw et al., 2024). Still, vocabulary fluency should not be mistaken for critical reading. Fast recognition may free cognitive resources, but evaluative reading requires a second move: readers must use those resources to test interpretations rather than simply retrieve meanings.

The present project contains three datasets that illuminate this boundary from different angles. The Blooket study provides item-level descriptive evidence about perception and vocabulary-related skill. The Quizizz study adds students' explanations of how scores influence motivation and self-evaluation. The Wayground study contributes a larger descriptive profile and reports practical constraints, including time pressure, connectivity, unfamiliar vocabulary, and competitive pressure. Reanalysed together, these datasets can answer a new question without pretending they measured something they did not measure.

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Accordingly, this study treats the existing outcomes as indicators of critical-reading readiness. The term refers here to conditions that may support later evaluative reading: lexical access, sustained engagement, feedback use, self-monitoring, and willingness to revisit performance. This distinction is important. Research on technology and critical thinking suggests a positive relationship is possible, but instructional design remains decisive (Schenck, 2024). Technology-mediated EFL instruction can strengthen critical thinking when tasks explicitly require analysis and reflection (Algouzi et al., 2023), and online problem-based reading can improve both comprehension and critical thinking (Orhan, 2024). A gamified vocabulary quiz, by contrast, may stop one step earlier unless the teacher deliberately builds the bridge.

Gamification should be treated as a design layer rather than a learning outcome. Reviews of EFL gamification report benefits in motivation, engagement, language performance, and autonomy, while also identifying technical problems, short-lived effects, and negative competition (Zhang & Hasim, 2023). Similar caution appears in higher education research. Students often value immediate evaluation and competitive features (Aguilos & Fuchs, 2022), but leaderboards can increase participation without guaranteeing durable attention or deeper task quality (Cigdem et al., 2024). The practical implication is simple: a game mechanic changes what learners do next; it does not define the intellectual quality of that next action.

This distinction is especially useful for reading. A social reading game can stimulate reflection and discussion around books (Freiermuth & Ito, 2022), and a technology-based reading platform can support literary, informational, and argumentative competence (Leal Uhlig et al., 2023). These examples include more than scoring. They ask learners to interact with texts, explain selections, or work through structured reading tasks. The contribution of gamification appears stronger when the game structure is attached to a meaningful literacy operation.

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Individual game elements also matter. Perceived collaboration, competition, favorable feedback, self-expression, and control can contribute differently to intrinsic motivation (Luarn et al., 2023). Discovery-oriented gamification likewise suggests that involvement increases when learners must act on information rather than merely receive it (Aldalur & Perez, 2023). For critical-reading pedagogy, this implies that the central design question is not whether to use points or scores. It is what kind of reading behavior the points or scores make more likely.

Immediate feedback can reduce the distance between an error and a corrective decision. In foreign-language online assignments, end-of-question feedback produced stronger posttest performance than delayed end-of-assignment feedback under the conditions studied (Lu et al., 2023). Mobile gamified quizzing also appears more productive when followed by reflective class feedback (Mimouni, 2022). These findings help explain why the scoring features in Quizizz and Wayground may matter beyond motivation. A score can become information for self-regulation when a learner uses it to diagnose what is known, uncertain, or misunderstood.

Metacognition provides the clearest conceptual link to critical reading. Large-scale evidence suggests that metacognition helps explain relationships between ICT use and reading literacy (Li & Wang, 2022). In online English learning, gamification paired with active learning has also been associated with self-regulatory strategies such as time management and environmental structuring (Waluyo et al., 2024). Work on virtual learning environments similarly treats self-regulation as something that can be taught and supported through deliberate design (Sáiz-Manzanares et al., 2022).

Formative assessment matters because it can make thinking visible before a final judgment is made. Higher education studies emphasize iterative evidence and learner involvement in formative processes (Parmigiani et al., 2024). Learning experience design research also shows that task value, self-efficacy, and self-regulation predict engagement, elaboration, and critical-thinking behaviors (Wong & Hughes, 2023). Together, these studies suggest a plausible pathway: game mechanics attract attention; feedback provides performance

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information; self-regulation turns that information into adjustment; and explicit critical-reading tasks determine whether the adjustment becomes evaluative thinking.

Student-centered digital practice works best when interactions with content, teachers, and peers remain connected (Otto et al., 2024). Thinking skills also need explicit teaching and assessment rather than being assumed to emerge from technology use (Dori & Lavi, 2023). Open digital environments can support critical and complex thinking, yet such outcomes depend on how resources are reused, questioned, and transformed (Sanabria-Z et al., 2024). These points justify the conservative framing used in this study. Positive perceptions of Blooket, Quizizz, or Wayground can show readiness conditions. They cannot establish critical-reading skill unless students actually analyze claims, sources, reasoning, or evidence.

Three research questions guide the analysis: (1) Which critical-reading-enabling affordances are visible across the Blooket, Quizizz, and Wayground datasets? (2) How do scoring, feedback, competition, and time pressure support or constrain lexical processing and metacognitive readiness? (3) What instructional sequence is suggested by the combined evidence for moving from gamified vocabulary practice toward critical reading?

2. Method

2.1 Research design and source corpus

The study used a comparative secondary-analysis design. No new participants were recruited, and no new critical-reading test was created. The analysis used only data already reported in three project manuscripts. Their reported participant counts total 79 cases across documents, but this number is not treated as a pooled sample because the studies used different designs, instruments, response scales, and sampling procedures. Possible overlap between course cohorts also cannot be ruled out from the available manuscripts.

Table 1. Source corpus retained for secondary analysis

Source study	Participants and original design	Technology	Data retained for reanalysis
Blooket vocabulary study	20 EFL university students; descriptive quantitative, 10-item 4-point Likert questionnaire	Blooket	Item frequencies and means; perception/skill means; overall response distribution
Quizizz score study	18 undergraduates: 10 Indonesia and 8 Kazakhstan; qualitative open-ended questionnaire	Quizizz	Five representative de-identified responses; motivational and self-evaluation themes

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Source study	Participants and original design	Technology	Data retained for reanalysis
Wayground vocabulary study	41 EFL learners; descriptive quantitative with selected interviews	Wayground	Response distribution; highest item mean; reported benefits and constraints

The Blooket manuscript reports 10 questionnaire items. Perception items produced a mean of 3.20/4, skill items 3.11/4, and the grand mean was 3.15/4. Across 200 item responses, 94.5% were Agree or Strongly Agree. The Quizizz manuscript reports 18 open-ended responses and displays five as representative cases. Those cases emphasize enjoyment, active participation, competition, self-evaluation, progress monitoring, and a desire to improve scores. The Wayground manuscript reports 70.0% positive responses across its questionnaire, 24.4% neutral responses, and 5.6% negative responses. Its highest-rated item was “More engaging than traditional methods” (M = 3.76/5).

2.2 Re-coding framework and comparative procedure

A five-dimension framework was developed deductively from recent research and then applied to the reported results. Lexical processing captured perceived vocabulary understanding, recall, and access. Engagement and persistence captured enjoyment, participation, effort, and willingness to continue. Formative feedback captured scoring, correction, and immediate performance information. Metacognitive self-evaluation captured monitoring of strengths, weaknesses, or progress. Constraint indicators captured time pressure, competition, connectivity, unfamiliar vocabulary, and limited depth. The framework was intentionally narrower than critical-reading ability. No item was re-labelled as evidence evaluation or argument analysis unless the source data explicitly contained that behavior.

The comparative procedure had three stages. First, each source result was summarized without changing its original metric. Second, findings were mapped to the five dimensions. Third, convergent and divergent patterns were compared across platforms. Means from the 4-point and 5-point questionnaires were not pooled. Qualitative statements were used as explanatory evidence, not converted into pseudo-quantitative scores. This avoided producing statistical precision unsupported by the source data.

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2.3 Research integrity and secondary-use boundary

The source manuscripts describe voluntary participation and academic use of responses. This secondary analysis uses de-identified aggregate statistics and de-identified excerpts already contained in those manuscripts. Before submission to a journal, the authors should verify that the original consent and institutional requirements permit secondary analysis. Any prior publication, preprint, or formal dissemination of the source studies should also be disclosed. The present manuscript makes no claim that critical-reading performance was directly measured.

No new participant data or critical-reading scores were created for this adaptation. The analysis preserves the original metrics and treats the reported outcomes only as indicators of readiness conditions. Authors should verify secondary-use permission and disclose any prior publication or formal dissemination of the source studies before submission.

3. Findings and Discussion

3.1 Engagement and behavioral readiness

The clearest shared pattern is engagement. Blooket produced 189 positive responses from 200 item responses, equivalent to 94.5%. Its perception mean of 3.20/4 was slightly higher than its skill mean of 3.11/4. Wayground showed a less emphatic but still positive profile: 70.0% of responses were positive, and the strongest item favored the platform over traditional vocabulary work (M = 3.76/5). Quizizz participants repeatedly described scores as making practice more enjoyable, active, or competitive. The three datasets therefore converge on a behavioral readiness condition: learners are willing to attend, respond, and persist.

That convergence is relevant to critical reading because sustained attention is necessary for evaluation. It is not sufficient, however. The Blooket gap between perception and skill is small, yet directionally important. Students were more positive about their experience than about skill-related items. The pattern cautions against interpreting enthusiasm as equivalent to deeper comprehension. This aligns with wider gamification research showing that engagement benefits can coexist with short-lived effects or design-related drawbacks (Zhang & Hasim, 2023).

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The findings fit a staged account of technology-supported reading. At the first stage, gamification stabilizes participation and repeated lexical contact. At the second, feedback makes success and error visible. At the third, learners use this information to regulate attention and strategy. Only at the fourth stage does the teacher require critical operations such as source comparison, inference testing, or evidence judgment. Research on self-regulated gamified reading supports the value of connecting game features to regulatory support rather than leaving them isolated (Qiao et al., 2022). Evidence from reading-competence platforms similarly shows stronger literacy outcomes when technology is built around reading tasks, not merely around points (Leal Uhlig et al., 2023).

The secondary data also explain why the transition should not be assumed. Students can be highly engaged while remaining focused on retrieval. Blooket's strongest item concerned time-pressured memorization. Wayground's strongest item concerned engagement compared with traditional methods. Quizizz responses centered on scores, progress, and competition. None of those findings is trivial; they are useful motivational resources. Yet each points toward the need for a teacher-designed second task that asks, 'What does this word choice do in the argument?' or 'Which sentence supports your answer, and is that evidence sufficient?'

3.2 Feedback, scoring, and metacognitive monitoring

Quizizz provides the strongest direct evidence of self-evaluation. Participants described scores as helping them judge progress, recognize performance, and decide to improve. Competition with peers was often framed as a reason to exert more effort. These responses do more than indicate liking. They show that a score can become a reference point for monitoring. This is the mechanism most relevant to critical-reading readiness: a learner who notices uncertainty or error is better positioned to revisit a word, sentence, or claim.

Wayground findings point in the same direction. The source manuscript highlights immediate feedback, rapid correction, and participation as perceived benefits. Blooket also supplies immediate outcome information during repeated retrieval. Recent evidence indicates

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that feedback is most useful when it arrives early enough to shape the next attempt (Lu et al., 2023) and when learners receive an opportunity to reflect on what the response means (Mimouni, 2022). The three platforms therefore provide a plausible monitoring loop: attempt, result, comparison, adjustment.

The same sequence can strengthen self-regulation. Students might tag an answer as certain, uncertain, or guessed before submitting. After feedback, they can compare confidence with accuracy. Over several sessions, this creates a simple calibration record. Such monitoring reflects the metacognitive pathways linked to reading literacy in digital settings (Li & Wang, 2022). It also avoids a common weakness in gamified classrooms: students know their rank but not why their reasoning failed.

3.3 Lexical speed versus evaluative depth

Blooket's highest item was Q9 (M = 3.35/4; 83.8%), interpreted in the source manuscript as time constraints motivating students to actively memorize English word meanings. The lowest means were Q5 and Q10 (both M = 3.00/4; 75.0%). Although still positive, the pattern suggests that rapid retrieval and involvement were more salient than the weaker skill endpoints. Wayground reports a similar tension. Students valued engagement and rapid feedback, yet the source also records difficulties with limited answer time, unfamiliar vocabulary, and competitive pressure.

For critical reading, the tension matters. Fast lexical access may reduce basic processing load, which can help readers allocate attention to inference and evaluation. Yet a timer can also narrow attention toward the first acceptable answer. Critical reading often requires the opposite behavior: slowing down, checking a contextual meaning, comparing two possible interpretations, or asking whether a claim is adequately supported. The data do not show that gamification prevents these actions. They show that the platforms' most visible incentives do not require them.

A practical sequence can preserve the advantages of all three platforms. Round 1 can target lexical recognition and contextual meaning. Round 2 can present two plausible

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interpretations and ask learners to select one. Round 3 can remove or relax the timer and require a short justification. Round 4 can introduce a second source that contradicts or qualifies the first. Round 5 can ask learners to revise their answer after feedback. This pattern is consistent with formative assessment principles because feedback is used to change subsequent performance rather than merely report it (Parmigiani et al., 2024).

3.4 Competition and collaborative justification

Quizizz participants often described competition positively. Wayground also uses competition as part of its appeal, while noting that competitive pressure can be uncomfortable. Blooket's time-based modes likewise make speed and relative performance visible. This pattern matches recent research in which competition and leaderboards can raise participation or achievement while requiring careful attention to individual differences (Cigdem et al., 2024). Students who read more slowly, or who deliberately recheck evidence, may be disadvantaged if speed is treated as the primary sign of competence.

The implication is not to remove competition. A better approach is to change what earns recognition. Points can reward a justified inference, a corrected interpretation, a well-supported disagreement, or the identification of an unreliable claim. This preserves the motivational architecture while changing the intellectual target. Gamification then becomes a mediator of reading behavior rather than a race through surface questions.

Collaboration deserves equal attention. Digital learning research repeatedly shows that student-centered environments depend on interactions among learners, content, and teachers (Otto et al., 2024). A competitive individual round can therefore be followed by a pair or small-group 'defend your answer' round. Students must cite the sentence, explain a contextual clue, or challenge another group's interpretation. This adds discourse without discarding the energy generated by the game.

3.5 Cross-platform readiness profile, contribution, and implications

Taken together, the datasets support a readiness profile with three strengths: learners engage, they receive rapid performance information, and they have opportunities to monitor

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improvement. The principal gap is epistemic. None of the original instruments directly asked students to challenge an author, inspect evidence quality, compare sources, or justify why one interpretation is stronger than another. The appropriate conclusion is therefore conditional: the platforms appear useful for preparing learners to do critical reading, but critical reading still has to be explicitly taught and assessed.

Table 2. Cross-platform critical-reading readiness profile

Dimension	Cross-platform evidence	Critical-reading interpretation	Design implication
Lexical processing	Blooket skill mean 3.11/4; repeated retrieval; Wayground reports remembering vocabulary; Quizizz centers on vocabulary-linked scoring experiences	Supports access to text but does not directly establish evaluation	Follow retrieval with contextual inference and explanation
Engagement and persistence	Blooket 94.5% positive; Wayground 70.0% positive; Quizizz responses emphasize enjoyment, participation, and effort	Provides a strong behavioral condition for sustained reading activity	Use engagement as an entry point, not as the endpoint
Feedback and self-evaluation	Immediate responses across platforms; Quizizz scores support progress monitoring; Wayground feedback reveals errors	Creates the clearest metacognitive bridge toward critical reading	Require revision, confidence checks, or evidence-based correction
Time and competition	Timers, rankings, connectivity issues, unfamiliar vocabulary, and competitive pressure appear across datasets	May narrow attention toward rapid retrieval rather than justification	Relax time limits for evaluative rounds and reward evidence quality

The study contributes a distinction between gamified engagement and critical-reading readiness. The first describes observable willingness to participate in a technology-mediated task. The second describes whether the task creates cognitive conditions that can be redirected toward evaluative reading. This distinction may help explain mixed findings in gamification research. A platform can succeed behaviorally while remaining neutral about higher-order thinking. Recent work on technology-enhanced critical thinking makes a similar point: technology matters through the tasks, interactions, and habits it organizes (Schenck, 2024). Thinking skills must be designed into the activity and assessed directly (Dori & Lavi, 2023).

For EFL teachers, three design changes follow from the data. First, use Blooket, Quizizz, or Wayground to secure lexical access and participation, then switch the success criterion from speed to justification. Second, make feedback actionable. A wrong answer should trigger a second reading, a clue, a comparison, or a short explanation. Third, treat ranking cautiously. Leaderboards can remain, but they can include categories such as strongest evidence, best revision, or most convincing counterargument. These changes preserve the

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platforms' motivational strengths while aligning game mechanics with critical-reading behavior.

For researchers, future studies should add direct critical-reading outcomes. A pretest-posttest design could measure inference, argument recognition, source credibility, evidence evaluation, and justified interpretation. Process data would also help. Response times, answer revisions, confidence ratings, and written rationales could distinguish rapid guessing from deliberate evaluation. Without such measures, positive perceptions should remain evidence about engagement and readiness, not proof of critical-reading skill.

This study is constrained by the source corpus. The datasets were originally designed for vocabulary learning and student perceptions, not critical reading. Their instruments and response scales differ, preventing pooled statistical analysis. Individual-level raw data were not available for all studies, and the possibility of participant overlap between project courses cannot be excluded. The Quizizz dataset is qualitative and displays five representative responses rather than all 18 verbatim responses. Finally, the analysis infers readiness mechanisms from reported experiences. It does not establish causal effects of Blooket, Quizizz, or Wayground on critical-reading performance.

4. Conclusion

Across Blooket, Quizizz, and Wayground, gamified vocabulary learning consistently supports conditions that matter before critical reading can occur. Students engage, respond repeatedly, receive rapid performance information, and often use scores to monitor progress. The evidence is strongest for participation and feedback use. It is weaker for depth. Time pressure and competition can sharpen attention, but they can also privilege rapid retrieval over explanation.

The most defensible adaptation of these datasets is therefore not a claim that gamification improved critical-reading skill. It is a more useful claim: gamified vocabulary platforms can create critical-reading readiness when teachers connect lexical practice to metacognitive checking and then to explicit evaluative tasks. The next pedagogical step should ask students not only to answer correctly, but to show why an answer deserves to be believed.

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DECLARATION OF GENERATIVE AI

During preparation of this manuscript, the authors used ChatGPT to support language editing and structural adaptation to the journal template. The authors reviewed and edited the resulting text, verified the data interpretation and cited sources, and take full responsibility for the final content.

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