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Gamified Vocabulary Learning in Vocational EFL Contexts: A Longitudinal Mixed-Methods Study of Motivation, Anxiety, and Lexical Gains

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Abstract: Gamification has attracted sustained interest in EFL pedagogy as a strategy for increasing learner engagement and reducing the affective barriers that often accompany vocabulary learning. Yet most studies have examined gamified vocabulary instruction in general secondary or university settings, leaving vocational EFL contexts where learners typically have specific occupational language goals, constrained instructional time, and varied prior exposure to English underrepresented in the research. This study investigates the effects of gamified vocabulary learning on motivation, foreign language anxiety, and lexical gains among vocational high school students in Aceh, Indonesia, over fourteen weeks. Using a mixed-methods sequential explanatory design, the study combines pre- and post-test vocabulary measures, Foreign Language Anxiety Scale scores, and Intrinsic Motivation Inventory ratings with qualitative data from semi-structured interviews and classroom observations. Findings indicate significant gains in vocabulary breadth and retention for the gamified group compared to a control group receiving conventional instruction, alongside reductions in anxiety and increases in intrinsic motivation. Qualitative data complicate this broadly positive picture, however, revealing that gamification's motivational effects were uneven: competitive elements energised high-achieving students while quietly increasing the anxiety of lower-confidence learners. The study draws on Self-Determination Theory (Deci & Ryan, 2000; Ryan & Deci, 2020) and Complexity Theory perspectives on language learning (Larsen-Freeman & Cameron, 2008) to argue that effective gamified vocabulary instruction in vocational EFL contexts requires careful attention to how competition, collaboration, and learner identity intersect in the specific cultural and institutional conditions of each classroom.

Keywords: Gamification, vocabulary learning, foreign language anxiety, Self-Determination Theory.

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INTRODUCTION

English language instruction in Indonesian vocational high schools occupies a distinctive position within the national education system because it is expected to equip students with linguistic competencies directly applicable to future workplaces. Vocational students are required not only to master general communicative English but also to acquire the technical and semi-technical vocabulary associated with their respective professional fields, including hospitality, healthcare, engineering, and business services (Coxhead,

2020; Sunardi et al., 2020). Despite this practical orientation, vocabulary instruction in many vocational English as a Foreign Language (EFL) classrooms continues to rely heavily on traditional pedagogical approaches characterized by word memorization, translation exercises, isolated vocabulary drills, and periodic testing (Musthafa, 2021; Sunardi et al., 2020). Such approaches often promote superficial learning and limited long-term retention, as they rarely provide the repeated encounters, meaningful contextualization, active retrieval, and distributed practice that vocabulary acquisition research identifies as essential conditions for sustainable lexical development (Nation, 2022; Webb & Nation, 2017).

The challenges associated with vocabulary learning are particularly significant because vocabulary knowledge constitutes one of the most fundamental dimensions of language proficiency. Research consistently demonstrates that vocabulary breadth and depth strongly influence learners' abilities to comprehend texts, engage in communication, and develop overall language competence (Nation, 2022; Webb & Nation, 2017). In vocational contexts, the stakes are even higher because inadequate vocabulary mastery may directly affect students' readiness to participate in professional environments where English serves as an important medium of communication. Consequently, there is an increasing need for instructional approaches capable of enhancing both the effectiveness and the attractiveness of vocabulary learning in vocational EFL settings.

One pedagogical innovation that has attracted considerable scholarly attention is gamification. Broadly defined, gamification refers to the integration of game design elements such as points, badges, levels, leaderboards, immediate feedback mechanisms, and progression systems into non-game educational contexts (Deterding et al., 2021; Kapp, 2021). Rather than transforming learning into a game itself, gamification seeks to employ motivational structures commonly associated with games in order to increase learner engagement and persistence. The theoretical rationale underlying gamification is supported by motivational research suggesting that game-based environments can satisfy learners' needs for competence, autonomy, and relatedness, thereby fostering intrinsic motivation and sustained participation in learning activities (Deci & Ryan, 2000; Ryan & Deci, 2020).

Recent empirical studies have reported encouraging findings regarding the effectiveness of gamified vocabulary instruction. Research conducted across diverse EFL contexts indicates that gamification can improve vocabulary acquisition, retention, and learner engagement when compared with more conventional instructional approaches (Demir & Kayaoğlu, 2022; Hamari et al., 2020; Zainuddin et al., 2020). Studies examining platforms such as Quizizz, Kahoot!, Duolingo, Memrise, and other gamified learning applications generally reveal superior post-test vocabulary outcomes among learners exposed to gamified interventions (Lam, 2021; Raza et al., 2022). Several design characteristics appear particularly beneficial for vocabulary learning, including immediate corrective feedback, repeated retrieval opportunities, spaced repetition, and contextualized exposure to target vocabulary items (Demir & Kayaoğlu, 2022; Nation, 2022; Webb & Nation, 2017). These features align closely with established principles of vocabulary acquisition and suggest that gamification may offer a practical means of embedding evidence-based learning conditions within classroom instruction.

Nevertheless, the growing body of literature on gamification also reveals important limitations and unresolved questions. Most studies emphasize aggregate outcomes and report average treatment effects, often overlooking substantial variation in how individual learners experience and respond to gamified environments (Lam, 2021; Raza et al., 2022). Such variation is particularly relevant in vocational classrooms, where learners frequently exhibit considerable differences in language proficiency, academic confidence, career aspirations, and motivation toward English learning. While gamification may increase engagement for some learners, its effects may not be universally positive. Competitive elements such as leaderboards and public ranking systems, which are often regarded as

central motivational features of gamification, may produce markedly different responses among students with varying levels of confidence and language competence.

This concern is closely connected to the issue of foreign language anxiety (FLA), one of the most extensively documented affective variables in second language acquisition research. Foreign language anxiety encompasses communication apprehension, test anxiety, and fear of negative evaluation, all of which can negatively influence language learning outcomes (Horwitz et al., 1986; Zheng & Cheng, 2022). Studies conducted in Indonesian EFL contexts consistently demonstrate that anxiety is associated with lower vocabulary knowledge, reduced oral participation, and diminished willingness to communicate (Elaldi, 2022; Putri & Maarof, 2021; Sunardi et al., 2020). In vocational classrooms, where proficiency levels often vary considerably among students, public performance and social comparison may amplify feelings of inadequacy among lower-confidence learners. Consequently, certain forms of gamification may inadvertently increase anxiety rather than alleviate it, particularly when competitive visibility becomes a dominant feature of instructional design.

Although the motivational benefits of gamification are widely acknowledged, evidence regarding its relationship with anxiety remains inconclusive. Several studies report improvements in learner engagement and enjoyment within gamified environments (Hamari et al., 2020; Raza et al., 2022). However, scholars have also raised concerns that excessive emphasis on competition may shift learners' attention from mastery-oriented goals toward performance-oriented goals, thereby undermining intrinsic motivation and potentially reducing long-term learning persistence (Deci & Ryan, 2000; Ryan & Deci, 2020). This tension suggests that the effectiveness of gamification may depend not only on whether game elements are present but also on how those elements are designed and experienced by different groups of learners.

Self-Determination Theory (SDT) provides a useful framework for understanding these dynamics. According to SDT, intrinsic motivation flourishes when learning environments support individuals' psychological needs for competence, autonomy, and relatedness (Deci & Ryan, 2000; Ryan & Deci, 2020). Within gamified learning environments, competence may be enhanced through achievable challenges and immediate feedback, autonomy through meaningful choices and learner agency, and relatedness through collaborative interactions and social engagement. However, competitive structures may simultaneously support competence for high-performing learners while undermining it for those who struggle academically. Effective gamification design therefore requires careful balancing of competitive, collaborative, and mastery-oriented elements to ensure that motivational benefits are distributed across diverse learner profiles rather than concentrated among already successful students.

In addition to SDT, Complexity Theory offers a complementary perspective for interpreting learner responses to gamified instruction. From a complexity perspective, language learning is viewed as a dynamic and non-linear process shaped by interactions among multiple cognitive, affective, social, and contextual factors (Larsen-Freeman & Cameron, 2008). Small differences in learners' initial conditions—including prior vocabulary knowledge, motivational orientations, anxiety levels, and classroom relationships—may generate substantially different developmental trajectories over time. This perspective highlights the importance of examining not only overall intervention effects but also the classroom processes and learner-specific experiences that contribute to those outcomes.

Despite the increasing popularity of gamification in language education, relatively little research has simultaneously examined vocabulary achievement, learner motivation, and foreign language anxiety within vocational EFL contexts, particularly in Indonesia. Existing studies frequently focus on short-term interventions and quantitative outcomes while providing limited insight into the classroom-level mechanisms that shape learner experiences. Furthermore, few investigations have explored how different learner profiles mediate the effectiveness of gamified instruction over an extended period of

implementation. Addressing these gaps is important for developing a more nuanced understanding of when, how, and for whom gamification contributes to successful vocabulary learning.

Against this background, the present study investigates the effects of gamified vocabulary instruction among vocational high school students in Aceh, Indonesia. Employing a mixed-methods approach, the study compares a class receiving gamified vocabulary instruction with a class receiving conventional instruction over a fourteen-week period. In addition to measuring vocabulary achievement, intrinsic motivation, and foreign language anxiety, the study incorporates classroom observations and student interviews to explore the mechanisms underlying observed outcomes. By integrating quantitative and qualitative evidence, this research seeks to contribute to a more comprehensive understanding of the opportunities and limitations of gamification in vocational EFL education and to provide insights for designing motivationally effective vocabulary instruction that accommodates the diverse needs of learners.

METHODS

The study used a sequential explanatory mixed-methods design (Creswell & Plano Clark, 2018). In the first phase, quantitative data were collected to measure vocabulary gains, anxiety, and motivation in experimental and control conditions. In the second phase, qualitative data from semi-structured interviews and classroom observations were used to explain and contextualise the quantitative findings. The integration of the two data strands was analytical rather than sequential: qualitative data were used not simply to illustrate the quantitative results but to interrogate and deepen their interpretation.

The study was conducted at a vocational high school in Banda Aceh, Indonesia, during the second semester of the 2023–2024 academic year. Two intact classes from the same year group and vocational track (Tourism and Hospitality) were assigned to conditions: one class (n = 32) received gamified vocabulary instruction (the experimental group) and one class (n = 31) received conventional instruction (the control group). Both classes were taught by the same teacher, who had received orientation on both instructional approaches prior to the study. The teacher was a participant in the study and contributed to the qualitative data strand. Participants were aged 16–18, with English proficiency at A2–B1 levels based on pre-course placement.

The experimental group received vocabulary instruction through a structured gamification protocol developed for the study. Each week, target vocabulary (drawn from the tourism and hospitality strand of the vocational curriculum) was introduced through contextualised reading activities, then practised through a sequence of gamified exercises: individual vocabulary quizzes on Quizizz with immediate feedback and running scores; collaborative team challenges in which groups competed to use target vocabulary correctly in spoken or written production tasks; and a mastery progression system in which students could unlock additional challenge activities once they had demonstrated a defined level of accuracy with each vocabulary set. The leaderboard was visible during individual quiz phases and hidden during collaborative challenges—a design decision made deliberately to balance competitive and cooperative elements.

The control group received the same target vocabulary through conventional instructional methods: teacher-led presentation of vocabulary with translation equivalents, gap-fill exercises, vocabulary matching activities, and weekly written vocabulary tests. Both conditions covered the same target vocabulary across the fourteen weeks.

Vocabulary gains were measured using a researcher-designed Vocabulary Levels Test adapted from Nation's (2022) framework, assessing both recognition-level (breadth) and use-level (depth) knowledge of target vocabulary at three points: pre-test (week 1), immediate post-test (week 14), and delayed retention post-test (week 18, four weeks after instruction ended). The Foreign Language Anxiety Scale (FLAS; adapted from Horwitz et

al., 1986) was administered at weeks 1 and 14. The Intrinsic Motivation Inventory (IMI; Ryan, 2009) was administered at week 7 and week 14. Cronbach's alpha coefficients for all instruments were satisfactory (FLAS α = .88; IMI α = .84; vocabulary test parallel-forms reliability r = .79).

Semi-structured interviews (30–45 minutes each) were conducted with twelve purposively selected students from the experimental group (six high-achieving, six lower-achieving based on pre-test scores) and with the classroom teacher, at weeks 7 and 14. Interviews explored students' experiences of the gamified activities, their feelings about the competitive and collaborative elements, and their sense of their own vocabulary development. Classroom observations were conducted twelve times across the fourteen weeks, using a structured observation protocol focused on engagement patterns, anxiety indicators, and peer interaction dynamics.

Quantitative data were analysed using SPSS 27. Independent samples t-tests and repeated measures ANOVA were used to test differences in vocabulary gains between conditions and across time points. Effect sizes were calculated using Cohen's d. ANCOVA controlling for pre-test scores was used to assess post-test differences. Qualitative data were analysed using thematic analysis (Braun & Clarke, 2021), with initial coding focused on motivational experiences, anxiety triggers, and learning strategy use. Integration of quantitative and qualitative findings followed a building explanations strategy (Creswell & Plano Clark, 2018): qualitative themes were developed with reference to the patterns in the quantitative data that most required explanation.

RESULTS AND DISCUSSION

The experimental group showed significantly greater gains from pre-test to immediate post-test on both breadth (M experimental = 31.4, SD = 4.2; M control = 24.6, SD = 5.1; $t(61) = 5.87$, $p < .001$, $d = 1.46$) and depth measures (M experimental = 22.8, SD = 3.9; M control = 17.3, SD = 4.7; $t(61) = 5.12$, $p < .001$, $d = 1.27$). These are large effect sizes by conventional standards (Cohen, 1988), suggesting that the gamified condition produced substantially better immediate learning outcomes than conventional instruction for target vocabulary.

The delayed retention data told a more nuanced story. On breadth measures, the experimental group retained a significantly higher proportion of vocabulary at week 18 than the control group ($t(61) = 3.44$, $p = .001$, $d = 0.86$), suggesting that the immediate gains were not simply a testing effect. On depth measures, however, the gap between conditions narrowed considerably ($t(61) = 1.98$, $p = .052$, $d = 0.49$), suggesting that depth of vocabulary knowledge—the ability to use words appropriately in context—was less durably acquired in the gamified condition than the immediate post-test data had implied. This finding is consistent with critiques of quiz-based gamification platforms for privileging recognition over productive use (Lam, 2021; Nation, 2022).

FLAS scores at pre-test did not differ significantly between groups ($t(61) = 0.84$, $p = .40$). At post-test, the experimental group showed significantly lower mean anxiety scores than the control group (M experimental = 68.4, SD = 11.2; M control = 74.9, SD = 12.7; $t(61) = 2.21$, $p = .031$, $d = 0.55$). However, examination of individual score trajectories within the experimental group revealed a pattern that group means obscured: while the majority of students in the experimental group showed reduced anxiety from pre- to post-test, eight students showed increased anxiety scores—a pattern concentrated among students with lower pre-test vocabulary scores and higher initial anxiety.

IMI scores at week 7 were significantly higher in the experimental group than the control group on the interest/enjoyment subscale ($t(61) = 3.76$, $p < .001$, $d = 0.94$) and the perceived competence subscale ($t(61) = 2.88$, $p = .005$, $d = 0.72$). By week 14, the interest/enjoyment gap remained significant ($t(61) = 2.54$, $p = .013$, $d = 0.64$) but had narrowed, suggesting some attenuation of novelty effects over time. Perceived pressure/tension—an SDT indicator of extrinsic rather than intrinsic motivation—was not

significantly different between groups at either time point, though it was elevated among the experimental group's lower-achieving students relative to higher achievers within that group.

The qualitative data gave texture and specificity to the quantitative picture, and introduced complications that the numbers alone did not resolve. Three themes emerged with particular clarity across interviews and observations.

Theme 1: Competitive visibility as double-edged. High-achieving students in the experimental group consistently described the public leaderboard as a source of energy and motivation. Rasyid, one of the top-performing students, put it plainly: *"When I see my name going up, I want to keep going. It's like a game—you want to be the winner."* Lower-achieving students described the same leaderboard very differently. Mira, whose pre-test score placed her in the bottom third of the class, said: *"I don't want to look at it. When I'm at the bottom it makes me feel like everyone knows I'm bad at English. So I stop trying so hard—what's the point?"* Classroom observations corroborated these accounts: during individual quiz phases, engagement was high across the class in early weeks but showed differentiation by week six, with several lower-achieving students becoming visibly less active during the public scoring phases.

Theme 2: Collaborative challenges as equaliser. The collaborative team challenge component of the gamified instruction was described by both high- and lower-achieving students as qualitatively different from the individual quiz phases—and more consistently positive. Lower-achieving students described the team context as less threatening: *"In the team game, if I make a mistake it's not just me. We help each other"* (Sari). Several students noted that the team challenges were where they felt they had actually learned vocabulary, as opposed to just scored points: *"In the quiz I just click fast. In the team game I have to think and say the word, so I remember it better"* (Fadlan). Observations supported these accounts, showing richer peer interaction, more productive vocabulary-focused discussion, and more evident engagement from previously disengaged students during collaborative phases.

Theme 3: Novelty and sustainability. Both students and the teacher described a motivational arc across the fourteen weeks: high engagement and novelty effects in the first four to five weeks, a middle period of sustained but slightly diminished engagement, and signs of motivational plateauing in the final weeks. The teacher observed: *"At first they were very excited—it was different from what they usually do. But by the end, some of them were just going through it. It was still better than before, but the magic was smaller."* This finding is consistent with research on novelty effects in gamified learning and raises questions about long-term sustainability that a fourteen-week study cannot fully answer (Hamari et al., 2020; Raza et al., 2022).

The headline finding of this study is broadly consistent with the existing literature: gamified vocabulary instruction produced significantly better immediate learning outcomes than conventional instruction, with large effect sizes and meaningful, if smaller, retention advantages. For a vocational EFL context in which vocabulary retention under conventional instruction is typically shallow, these are practically significant findings.

But the study's mixed-methods design makes it possible to say something more precise than "gamification works." It works differently for different learners, and the competitive elements that drive its motivational effects for confident, higher-achieving students risk producing increased anxiety and disengagement in lower-achieving ones. This is not a new concern in the gamification literature (Hamari et al., 2020; Raza et al., 2022), but it is one that is insufficiently attended to in implementation practice. A classroom intervention that systematically advantages students who were already advantaged—in vocabulary knowledge, in English confidence, in social comfort with public performance—is not a neutral pedagogical gain, even if group means improve.

Self-Determination Theory helps explain why the competitive elements produced such different motivational profiles across the class. For students with sufficient perceived competence, competition satisfies the need for challenge and mastery feedback—it tells

them, in real time, that they are capable, which feeds intrinsic motivation. For students with low perceived competence, the same competition does the opposite: it provides repeated, public evidence of their relative inability, which is neither competence-satisfying nor autonomy-supporting nor relatedness-enhancing. It is, in SDT terms, a controlled motivational environment experienced as threat rather than challenge (Deci & Ryan, 2000; Ryan & Deci, 2020).

The collaborative challenge component partially addressed this by creating conditions in which the competence-relatedness-autonomy balance was more equitably distributed: all students could contribute something to a team effort, lower-achieving students were not publicly ranked against higher-achieving ones, and the social context of shared work created a form of relatedness that the individual quiz format did not. The implication is not that competitive elements should be removed from gamified vocabulary instruction—they clearly served important motivational functions for a significant portion of the class—but that they should be balanced with collaborative structures that can support the motivational needs of learners who do not thrive under performance comparison.

The delayed retention finding—strong retention of vocabulary breadth but attenuated retention of vocabulary depth in the gamified condition—deserves attention. It suggests that the specific design features of quiz-based gamification platforms, which dominated the individual practice phase of this study, may be better suited to developing recognition-level vocabulary knowledge than productive, context-appropriate use. This is a genuine limitation, not just of the study but of the most widely used gamification platforms in EFL vocabulary instruction: Quizizz, Kahoot!, and similar tools are built primarily around recognition tasks—multiple choice, matching, timed selection—that practise breadth but not depth.

For vocational EFL learners who ultimately need to use their vocabulary productively in professional contexts, this is a significant concern. Breadth gains that do not transfer to productive use may be impressive on a post-test but disappointing in a job interview. The collaborative team challenge component, which required students to use target vocabulary in spoken and written production, showed more promise in this regard—consistent with research showing that production-based vocabulary practice supports depth of word knowledge more effectively than recognition-based practice (Nation, 2022; Webb & Nation, 2017). Future implementations of gamified vocabulary instruction in vocational contexts might usefully shift the balance of gamified activity away from quiz formats and towards game structures that require meaningful production.

The Acehnese context of this study introduces considerations that the gamification literature—predominantly produced in Western and East Asian higher education settings—rarely addresses. Aceh is a predominantly Muslim province with a strong communal culture and, historically, a schooling tradition that has placed high value on cooperation, collective solidarity, and restraint in self-display (Musthafa, 2021). The competitive, individually ranked dynamics of leaderboard-based gamification sit in tension with these values in ways that are not trivial. Several students in the interview data described the public ranking system as *malu*—a Malay/Indonesian concept often translated as "shame" or "embarrassment" but which carries a broader social meaning related to the preservation of face in communal contexts. The design decision to hide the leaderboard during collaborative phases was the right one for this context; a more thorough cultural adaptation might consider whether individual leaderboards are appropriate at all, or whether team-based ranking better suits the relational values of the classroom community.

CONCLUSION

This study set out to investigate whether gamified vocabulary instruction could produce meaningful lexical gains in a vocational EFL context while also attending to its

motivational and affective effects across a range of learner profiles. The answer to the first part of that question is clearly yes: the gamified condition produced significantly better vocabulary breadth gains, retained over time, than conventional instruction. The answer to the second part is more qualified: gamification's motivational effects were real but uneven, concentrated among already-confident learners, and accompanied by anxiety increases in the very students for whom motivational support was most needed.

The practical implication for vocational EFL teachers considering gamification is not to avoid it but to design it more carefully than most off-the-shelf implementations require. Competition needs to be balanced with collaboration. Public ranking needs to be managed in relation to the cultural values and social dynamics of the specific classroom. And vocabulary practice needs to go beyond the recognition tasks that quiz-based platforms favour, into the production-oriented activities that build the depth of lexical knowledge that vocational learners actually need.

The theoretical implication is that complexity matters. Gamification is not a single intervention with a single effect—it is a family of design decisions that interact with learner profiles, cultural contexts, and classroom social dynamics in ways that group-level means systematically obscure. Future research in this area will benefit from designs that attend to that complexity: longitudinal, mixed-methods, and attentive to who gamification is working for as well as whether it is working at all.

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