

## Gamification and Language Learning: Exploring the Effect of Computer-Based Games on English Vocabulary Retention

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الالعاب وتعلم اللغة : استكشاف تأثير الألعاب الحاسوبية على حفظ الكلمات الإنجليزية

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### Abstract

Vocabulary retention is one of the fundamental elements of language proficiency, but traditional pedagogy may not ensure long-term memory among EFL learners. This study examines the impact of computer gamification on English vocabulary retention in 6th-grade Iraqi primary school students. With the quasi-experimental design, 60 participants were assigned to an experimental group that learned through gamified learning platforms involving points, badges, leaderboards, and immediate feedback, and a control group learning vocabulary through conventional instruction. Pre-tests, post-tests, and delayed retention tests were administered to assess both short-term learning gains and long-term retention. The results indicate that the experimental group achieved much higher than the control group on both post-test and delayed retention tests, demonstrating not only that gamification enhances short-term vocabulary acquisition but also long-term retention. Observed and engagement measures also indicate that gamification increases learners' motivation, active learning, and interest, resulting in sustained study habits which reinforce improved retention. These findings are consistent with theoretical models such as Self-Determination Theory, Cognitive Load Theory, Dual Coding Theory, and Engagement Theory that emphasize motivation, cognitive support, and interactive participation in learning words efficiently. This study contributes to language teaching with the provision of empirical evidence in support of gamified digital technology implementation in primary EFL classrooms, this is achieved by putting into perspective the pedagogical advantages of combining cognitive and motivational strategies for vocabulary retention in the long term. This study also offers practical suggestions for teachers, curriculum developers, and education technology practitioners. **Keywords:** Vocabulary retention, gamification, computer-based learning, EFL, primary education, motivation, engagement

### 1. Introduction

#### 1.1 Background of the Study

Vocabulary knowledge forms the foundation of language proficiency, and it is the foundation for successful communication, reading ability, and overall language learning. Researchers have always emphasized that poor vocabulary hinders learners from being capable of learning and using a second language proficiently. Classical vocabulary instruction is often founded on mechanical repetition, rote memorization, and discrete word lists, which may provide initial contact but in no way ensure productive usage or enduring recall of new words. Such methods can be tedious, de-motivating, and a squander of students' curiosity (Akbar, 2025; Rachmawati, 2024). With these challenges in mind, new solutions have been experimented with to maximize the aesthetic value and efficiency of vocabulary acquisition. Gamification is another technique that has been used wherein elements of games—points, badges, leaderboards, challenges, and rewards—are utilized to incorporate game-like elements within the learning space in order to bring increased degrees of engagement, motivation, and participation (Deterding et al., 2012; Zichermann & Cunningham, 2011; Lee & Hammer, 2011; Ananda, 2024). Gamification environments transform standard learning into interesting and interactive environments where students are encouraged to take charge of their progress and reduce the dullness of the standard method (Wibowo, 2023;

Purba, 2024). Research indicates that gamified platforms such as Kahoot! Quizlet, and other mobile applications make vocabulary acquisition and remembering easier through opportunities of competition and collaboration, immediate feedback, and practice interaction (Reynolds & Taylor, 2020; Chan & Lo, 2024; Waluyo & Bucol, 2021; Weissheimer et al., 2019; Wu & Huang, 2017). These platforms produce real and rich learning environments where students can apply new words actively to communicative and problem-solving activities, enhancing comprehension as well as long-term memory (Zou, Huang, & Xie, 2021; Barzilai & Blau, 2014; Calvo-Ferrer, 2017). Gamification also fosters extrinsic and intrinsic motivation. The student experiences achievement through reward and instant feedback, but cooperative and competitive elements build social interaction and a community of practice (Alsawaier, 2018; Saleem, 2022; Hellín, 2023; Alrashedi, 2024). Through the sustaining of attention and the encouragement of habitual engagement, gamified learning builds favorable attitudes towards vocabulary learning and durable study habits (Purba, 2024; Wedayanthi, 2024; Patra, 2022).

## 1.2 Statement of the Problem

While gamification in language acquisition is gaining popularity, the issue of vocabulary retention continues to be a problem for most EFL learners. Students learn new words but forget them after some time, and the outcome is passive vocabulary building that is incapable of supporting productive communication. Traditional teaching does not involve proper reinforcement, interactive practice, or application. Although computer games and gamified programs hold promise, there is not much empirical research on their direct contribution to vocabulary retention over the long term. This study tries to bridge this gap by examining the effect of computer-based gamification software on learners' vocabulary retention, motivation, and engagement.

## 1.3 Research Objectives

The study has the following objectives:

1. Investigate the impact of computer-based gamification software on learners' motivation and engagement in learning vocabulary.
2. Explore the impact of gamified contexts on English vocabulary retention compared to non-gamified methods.
3. Explore how far gamification features—reward, feedback, and competition—influence the formation of persistent and long-term vocabulary learning habits.

## 1.4 Research Questions and Hypotheses

### Research Questions:

1. What is the impact of gamification on learners' interest and motivation in learning English vocabulary?
2. To what extent does gamification promote vocabulary retention compared to traditional learning methods?
3. In exactly what manner do gamification aspects, such as rewards, feedback, and competition, support long-term vocabulary learning maintenance?

### Hypotheses:

H1: Students learning vocabulary through gamification will demonstrate far more retention compared to students taught traditionally.

H2: Gamification will enhance learners' motivation and interest towards vocabulary learning.

## 1.5 Significance of the Study

**Theoretical Implications:** The current study contributes to the field of technology-enhanced language learning theoretically in the sense that it studies the impact of gamification on vocabulary retention. It borrows concepts from Self-Determination Theory (Deci, 2012), focusing on autonomy, competence, and relatedness in motivation; Cognitive Load Theory (Kirschner, 2002), illustrating how gamification reduces cognitive overload; Engagement Theory (Ferrer et al., 2022), highlighting active engagement; and Dual Coding Theory (Sadoski, 2013), illustrating how visual and verbal cues improve retention.

**Practical Relevance:** Findings provide recommendations to educators, curriculum designers, and digital platform creators regarding how they can create more engaging and effective vocabulary acquisition settings. The study may also inform education policy towards the promotion of the use of gamification to enhance learners' motivation, engagement, and long-term retention in EFL settings.

## 1.6 Scope and Limitations

The study examines the effect of gamification on English vocabulary retention in computer-supported settings. It experiments with elements of points, badges, leaderboards, rewards, and feedback on motivation and retention in learners. The study does not investigate other English skills such as grammar or reading comprehension and

results can be influenced by pre-exposure to gamified tools by learners, competition beliefs in cultures, and technology availability.

### 1.7 Definition of Key Terms

**Gamification:** The application of game elements, such as points, badges, leaderboards, and challenges, in non-game contexts to enhance motivation, engagement, and learning outcomes (Ananda, 2024).

**Vocabulary Retention:** The ability of learners to recall and use acquired vocabulary over time, reflecting effective long-term learning (Patra, 2022).

**Computer-Based Games:** Digital platforms or applications that incorporate gamification features to create interactive and engaging learning experiences, particularly for vocabulary acquisition (Saleem, 2022).

## 2. Literature Review

### 2.1 Theoretical Framework

#### 2.1.1 Gamification Theory and Language Learning

Gamification, or the application of game design concepts to non-game contexts, has become a top trend in educational settings to enhance learner engagement, motivation, and performance (Deterding et al., 2012; Zichermann & Cunningham, 2011). In language learning, gamification offers interactive, dynamic contexts where learners can actually do something with vocabulary, rather than being passively presented with information. Active use is crucial for vocabulary retention as it enhances repeated retrieval and meaningful use of lexical items. Self-Determination Theory (SDT) presents one of the main psychological explanations for the success of gamification in promoting retention. SDT posits that intrinsic motivation among students is developed through the satisfaction of three universal psychological needs: autonomy, competence, and relatedness (Deci, 2012). Self-determination in gamified learning is achieved through learners choosing their paths of learning, selecting activities, and controlling pacing. Mastery is facilitated by challenges, points, badges, and levels, providing learners with tangible measures of achievement. Belongingness is fostered through leaderboards, multiplayer competitions, and social collaboration, evoking a sense of belongingness. By fulfilling these needs, gamified learning promotes long-term motivation, directly affecting vocabulary retention in the long term (Wibowo, 2023; Purba, 2024).

#### 2.1.2 Cognitive Theories of Vocabulary Retention

Cognitive theories concentrate on the mental processes that are engaged in the acquisition and memorization of new words. Cognitive Load Theory (CLT) in particular refers to working memory's limited capacity and the negative impact of surplus cognitive load on learning (Kirschner, 2002). Traditional rote memorization has the tendency to burden learners' cognitive capacity with bad memorization results. Gamification avoids this by breaking down learning vocabulary into small tasks, providing interactive questions, and giving immediate feedback, enabling students to process and retain information more effectively (Srimuliyali, 2023). Dual Coding Theory posits that information is better retained when it is presented in verbal and pictorial forms (Sadoski, 2013). Gamified websites and apps frequently accompany vocabulary words with images, animations, or sound effects, providing several channels for memory encoding. Such a multimodal presentation enhances retention by appealing to multiple cognitive channels at the same time. The Spacing Effect, a principle in cognitive psychology, requires that repeated exposure to vocabulary at intervals enables long-term retention. Gamified learning platforms often adopt this principle because they structure repetition through game cycles, levels, and review sessions, reinforcing retention over a period of time (Akbar, 2025; Rachmawati, 2024).

#### 2.1.3 Constructivist and Engagement-Based Learning Approaches

Constructivist theories emphasize active, meaningful interaction with content. Engagement Theory suggests that learners better retain information when they are involved in interactive, real-world tasks rather than passively receiving information (Ferrer et al., 2022). Gamified learning environments are congruent with this theory because they encourage learners to apply vocabulary to problem-solving activities, interactive quizzes, and collaborative challenges. Active application in these environments triggers deeper cognitive processing that enhances long-term recall (Hellín, 2023).

### 2.2 Gamification in Education

#### 2.2.1 Elements of Gamification

Gamification employs a few design elements in order to attain higher engagement, motivation, and retention. They include: Points and levels, which reinforce learning progress immediately and encourage continued effort. Badges and rewards, which recognize accomplishment and foster intrinsic and extrinsic motivation. Leaderboards and competition, which trigger social comparison, encourage repeated participation,

and provide a feeling of achievement. Challenges and interactive exercises, which place vocabulary usage in context and enable retention through active practice (Ananda, 2024; Saleem, 2022; Alrashedi, 2024).

These elements do not only involve learners but also structure learning experiences to enable cognitive processing and retention, particularly in language learning contexts.

### **2.2.2 Previous Studies on Gamification and Student Motivation**

A number of studies emphasize the positive influence of gamification on learner engagement and motivation. Barzilai and Blau (2014) demonstrated that scaffolding game-based learning promoted learner motivation, engagement, and content knowledge retention. Calvo-Ferrer (2017) demonstrated that educational games supported L2 vocabulary retention through interactive and enjoyable learning. Chan and Lo (2024) emphasized that gamified approaches invariably lead to higher learner participation, sustained motivation, and improved vocabulary achievements in EFL/ESL contexts. Alsawaier (2018) noted that gamification increases intrinsic and extrinsic motivation, through which learners engage with learning material routinely, a crucial factor for long-term retention. Similarly, Purba (2024) found that gamified activities foster the sense of accomplishment and camaraderie, encouraging learners to practice vocabulary every day, which consolidates memory.

## **2.3 Vocabulary Retention in EFL/ESL Contexts**

### **2.3.1 Importance of Vocabulary Retention**

Vocabulary retention refers to the ability to recall and apply correctly previously learned words over time. It is a key element of language proficiency because learners with poor vocabulary retention are limited in reading, writing, listening, and speaking activities (Akbar, 2025; Rachmawati, 2024). Retention is not merely an issue of memorizing words but also of integrating them into practical language use. Without effective retention strategies, learners may develop superficial knowledge of words that they readily forget.

### **2.3.2 Traditional Approaches to Vocabulary Retention**

Traditional vocabulary instruction—such as memorization, flashcards, and isolated word lists—has been widely criticized for having little impact on retention. While such approaches can make students remember in the short term, they tend not to foster meaningful practice or repetition, which are essential for long-term retention (Akbar, 2025; Rachmawati, 2024). Research shows that retention is significantly enhanced when learners are involved in contextualized, interactive, and engaging activities that promote repeated exposure and intentional use of words (Saleem, 2022; Alsawaier, 2018).

## **2.4 Computer-Based Games in Language Learning**

### **2.4.1 Serious Games vs. Educational Games**

The games that focus on learning a language can be divided into two categories, the first of which is the serious games, which are designed with the exclusive purpose of education. The second category is what is called the educational games, which embed learning in entertaining gameplay. Both have been shown to promote long-term retention of words through repeated, contextualized practice in engaging contexts (Zou, Huang & Xie, 2021; Weissheimer et al., 2019).

### **2.4.2 Empirical Studies on Computer-Based Games and Vocabulary Retention**

The literature indicates that computer-based gamification promotes long-term vocabulary retention:

Reynolds and Taylor (2020) reported that Kahoot! quizzes enhanced vocabulary recall through repeated practice and social competition. Waluyo and Bucol (2021) found that gamified Quizlet exercises significantly enhanced retention among low-proficiency students through the delivery of immediate feedback and interactive practice.

Wu and Huang (2017) showed that mobile game-based exercises enhanced vocabulary retention through the combination of enjoyable tasks with instant reinforcement. Patra (2022) found that learners exposed to digital gamification performed higher in long-term retention compared to traditional memorization, highlighting the importance of structured repetition and feedback. Saleem (2022) and Alsawaier (2018) observed that gamification supports long-term retention because it brings together motivational and cognitive mechanisms, so students not only engage with words but also store them in their minds over time. Cumulatively, these studies demonstrate that gamification renders vocabulary learning an active, contextualized, and enjoyable process, in immediate support of long-term retention.

## **2.5 Research Gap and Contribution of the Study**

While previous research confirms that gamification enhances engagement, motivation, and short-term vocabulary recall, empirical investigations of the direct impact on long-term vocabulary retention in EFL settings are limited. The majority of research focuses on immediate learning results or learners' attitudes, with the impact on long-term memory being less explored (Purba, 2024; Wedayanthi, 2024).

This study addresses this gap by investigating how computer-based gamification achieves long-term vocabulary retention, not only considering motivational and cognitive processes but also the efficacy of specific game elements, such as rewards, feedback, and competition. The study is expected to contribute to theory by linking gamification to retention-focused cognitive and engagement models, and to practice by providing actionable recommendations for EFL instructors and platform designers.

### **3. Methodology**

#### **3.1 Research Design**

This study made use of a quasi-experimental design in order to investigate the effect of computer-based gamification on English vocabulary retention of 6th-grade EFL learners. Both short-term learning results and long-term retention were assessed by means of a pre-test, post-test, and delayed retention test (Creswell & Creswell, 2018).

The two-group design was employed, with one group undergoing gamified vocabulary training and another control group being taught conventionally. This model allows for easy comparison across teaching approaches, emphasizing gamification's effectiveness in fostering retention in a manner that preserves ecological validity in real-life classroom settings (Fraenkel, Wallen, & Hyun, 2019). The inclusion of a delayed retention test in the study ensures it specifically assesses the long-term maintainability of vocabulary knowledge, an essential aspect of the research goals.

#### **3.2 Participants**

Sample was drawn from 60 sixth-grade students of an Iraqi primary school. Participants were assigned to the control and experimental groups randomly. The sample represented age groups of 11–12 years, with half male students and half female students. The following were the selection criteria:

1. Elementary English proficiency, as indicated by teacher evaluation and prior school performance in English.
2. No prior knowledge of the target vocabulary items of the study.
3. Punctuality and motivation to engage in computer learning exercises.

A purposive sampling technique was employed to recruit participants who satisfied the above requirements and were members of the target group of 6th-grade EFL learners (Etikan, Musa, & Alkassim, 2016). This guaranteed that the findings could be generalized to similar learning environments.

#### **3.3 Instruments**

##### **3.3.1 Computer-Based Game Used**

The experimental group utilized gamified websites designed for vocabulary mastery, such as Quizlet and Kahoot. The websites facilitated points, badges, levels, leaderboards, and instant feedback to promote learning. Activities were contextualized and interactive, incorporating matching practice, fill-in-the-blanks, and timed quizzes to involve repeated practice and active retrieval of vocabulary (Lee & Hammer, 2011; Zichermann & Cunningham, 2011).

##### **3.3.2 Vocabulary Pre-Test and Post-Test**

A researcher-developed vocabulary test was administered to both conditions before and after the intervention. The test included:

- Multiple-choice items
- Matching exercises
- Sentence-completion exercises

All target vocabulary words drawn from the 6th-grade English curriculum were addressed by the items. Test validation by English language teaching experts ensured accuracy and appropriateness of content. Reliability was assessed using Cronbach's alpha, with a 0.85 coefficient, which indicates good internal consistency.

##### **3.3.3 Retention (Delayed) Test**

To gauge long-term vocabulary retention, a delayed post-test was administered two weeks after the intervention. The test was as similar as possible to the post-test in content and design but also scrambled items to prevent recall as an item position effect. This delayed test served mainly as the marker of retention, capturing learners' ability to hold and retrieve vocabulary over time (Patra, 2022; Wu & Huang, 2017).

### **3.4 Procedures**

#### **3.4.1 Preparation Phase**

All participants completed the pre-test prior to intervention to establish a baseline vocabulary knowledge. The experimental group underwent training of how to utilize the gamified platform, how points, badges, and feedback function, and how to engage in competitive and cooperative endeavors. The control group was trained

in traditional teaching methodologies, teacher explanations, drills, and written exercises to maintain procedural fidelity.

### 3.4.2 Computer-Based Games Implementation

The intervention was four weeks long with three 45-minute sessions every week. During sessions:

Experimental group: engaged in gamified exercises dealing with the intended vocabulary items. Tasks included interactive quizzes, time races, and group challenges. Instant feedback was provided to remedy mistakes and facilitate learning. Points and badges were awarded to motivate persistent effort and participation (Reynolds & Taylor, 2020; Waluyo & Bucol, 2021).

Control group: provided with traditional vocabulary instruction using teacher explanations, repetition drills, and written practice, on the same set of vocabulary items as the experimental group.

### 3.4.3 Testing and Data Collection

**Post-test:** administered after the final intervention session to measure short-term gains in learning.

Delayed retention test: administered two weeks after the post-test to measure long-term vocabulary retention.

Observation and engagement logs: captured from the gamified platform to explore participation patterns, motivation, and interaction, providing qualitative context to retention outcomes.

### 3.5 Data Analysis Methods

Quantitative data from the pre-test, post-test, and delayed retention test were analyzed using:

Descriptive statistics: mean, standard deviation

Inferential statistics: paired-samples t-tests for within-group differences and independent-samples t-tests for between-group differences

Effect size analysis (Cohen's d): to assess the size of differences between groups (Field, 2018).

Gamified platform interaction data were analyzed descriptively in terms of participation patterns, frequency, and interactivity and then compared to retention scores to ascertain the interaction between vocabulary retention and engagement.

### 3.6 Ethical Considerations

School administration and relevant education authorities approved ethical clearance. Parental permission from students and pupil assent were received prior to their involvement. Main ethical precautions included:

Providing anonymity and confidentiality of participant details

Allowing withdrawal of rights at any time with no penalty

Reporting result in a summary format to ensure confidentiality of individuals

Protecting data and restricting access to the research team only (Cohen, Manion, & Morrison, 2018).

## 4. Results

### 4.1 Descriptive Statistics

Descriptive statistics were calculated on experimental and control group pre-test, post-test, and delayed (retention) test scores. Scores range from 20 points.

Table (1) Descriptive Statistics of Test Scores

Group	N	Test Type	Mean	SD	Min	Max
Experimental	30	Pre-test	8.33	2.15	4	12
		Post-test	16.47	1.78	13	20
		Delayed Test	15.53	2.04	12	19
Control	30	Pre-test	8.20	2.08	4	12
		Post-test	12.30	2.32	8	16
		Delayed Test	10.87	2.25	7	14

### Observations:

The two groups had similar pre-test scores initially, showing equal baseline vocabulary knowledge.

The experimental group registered a substantial increase in post-test scores over the control group.

Delayed retention scores were also significantly higher for the experimental group, reflecting better long-term retention of vocabulary.

### 4.2 Inferential Statistics

Independent-samples t-tests and paired-samples t-tests were employed to determine if differences found were statistically significant.

#### 4.2.1 Pre-test Comparison

An independent-samples t-test confirmed that there was no pre-test group difference:

$t(58) = 0.22, p = 0.83$

This shows that groups had the same initial word knowledge.

#### 4.2.2 Post-test Comparison

Experimental group mean = 16.47, Control group mean = 12.30

$t(58) = 7.63, p < 0.001, \text{Cohen's } d = 1.96$

It shows a very highly significant difference in favor of the experimental group.

#### 4.2.3 Delayed Retention Test

Experimental group mean = 15.53, Control group mean = 10.87

$t(58) = 7.85, p < 0.001, \text{Cohen's } d = 2.01$

The results indicate that learning vocabulary through gamification increased long-term retention significantly.

#### 4.2.4 Within-Group Comparison

Paired-samples t-tests were utilized to contrast gains for each group:

Experimental group: Pre-test vs. Post-test  $t(29) = 18.21, p < 0.001$ ; Post-test vs. Delayed test  $t(29) = 2.87, p = 0.007$

Control group: Pre-test vs. Post-test  $t(29) = 8.92, p < 0.001$ ; Post-test vs. Delayed test  $t(29) = 5.41, p < 0.001$

This indicates that the two groups were better immediately post-instruction, but the experimental group maintained more vocabulary over time.

### 4.3 Experimental and Control Group Comparison

Table (2) Mean Test Scores Across Groups

Test Type	Experimental Mean	Control Mean	Difference
Pre-test	8.33	8.20	0.13
Post-test	16.47	12.30	4.17
Delayed Test	15.53	10.87	4.66

#### Interpretation:

Pre-test means were extremely close together, confirming homogeneity of groups.

Post-test scores increased significantly for both groups, but the experimental group scored over 4 points above the control group.

Delayed retention test scores show a greater lead for the experimental group, which suggests improved vocabulary recall due to gamification.

#### 4.4 Summary of Findings

- Baseline Equivalence:** Both groups' pre-test scores were matched, confirming that initial vocabulary awareness was also matched.
- Immediate Learning Gains:** The experimental group had significantly higher post-test scores, confirming that computer-based gamification enhanced immediate vocabulary learning efficiently.
- Long-Term Retention:** The experimental group demonstrated increased scores on the delayed retention test, confirming that gamification supports vocabulary long-term retention.
- Educational Implication:** Gamified learning of vocabulary can be a valuable pedagogical method for English as a foreign language primary school learners, particularly in settings where long-term retention of vocabulary is a major concern.

### 5. Discussion

#### 5.1 Results Interpretation in Context of Research Questions

The primary aim of the current study was to investigate the impact of computer-based gamification on the recall of English vocabulary among 6th-grade EFL learners. The results indicate that gamified vocabulary learning enhances both immediate gains in learning and long-term memory recall relative to non-gamified instruction.

**RQ1:** What impact does gamification have on learners' interest and motivation in learning English vocabulary? The experimental condition revealed consistently higher levels of engagement and interest throughout the treatment. Engagement logs, observation records, and performance metrics revealed students to be highly participative with gamified activities, such as gaining points, mastering challenges, and progressing in levels. What the findings show is that gamification does not only amplify active engagement but also encourages students to persist in activities even when they have achieved partial success. This outcome is in line with Self-Determination Theory (Deci, 2012), whereby the fulfillment of the psychological needs of students—autonomy,

competence, and relatedness—drives intrinsic motivation. For instance, allowing the students to select tasks or pace control strengthened autonomy, providing challenges at appropriate difficulty levels fostered competence, and cooperative or competitive exercises enhanced relatedness. In combination, all these factors appear to drive long-term participation, which is essential for meaningful vocabulary retention.

**RQ2:** To what extent does gamification improve vocabulary recall compared to non-gamified learning?

Post-test and delayed retention test scores were compared to indicate that those in the experimental gamified group not only posted higher scores after the intervention but also remembered words in a better way in the long term. The delayed post-test two weeks later, which involved the delayed test, showed minimal forgetting in the experimental group versus significant forgetting in the control group. This suggests that gamification allows for long-term retention, most likely because interactivity of tasks, immediate feedback, and frequent exposure strengthen encoding and retrieval processes. These findings are consistent with Cognitive Load Theory (Kirschner, 2002), which posits that instructional methods limiting extraneous cognitive load and dividing learning into small, significant pieces result in better memory retention. Dual Coding Theory (Sadoski, 2013) also considers the multimodal nature of gamified learning- those are the visual feedback, the auditory and interactive feedback- this particular nature of gamified learning is distinguished by its richer trace, which results in better retention of vocabulary.

**RQ3:** To what specific degree do gamification features such as rewards, feedback, and competition lead to the long-term retention of vocabulary learning?

The studies presented herein in which rewards and feedback were found to reinforce correct word use and that game-like elements such as leaderboards caused learners to continue self-improving. These procedures also appear to enhance rehearsal, retrieval practice, and memory consolidation for words. Observational data also show that students were more likely to return and practice difficult items over and over again when there was observable progress being achieved and rewarded. In essence, gamification transformed learning vocabulary into an active, iterative, intrinsically satisfying process that promotes intensive engagement and long-term retention.

## 5.2 Gamification and Motivation in Vocabulary Retention

The findings stress the pivotal role of motivation as a mediator between word retention and gamification. The motivation, in this context, is defined as a combination of intrinsic (curiosity, interest, need to control words) and extrinsic (fame, badges, points) motivations. The findings imply that gamified sites leverage both dimensions:

### 1. Intrinsic Motivation:

Aspects of controlling learning speed, activity choice-making, and instantaneous consequences of one's actions created a sense of ownership and personalization. Constructivist theories of learning models adhere to the principle that learners learn optimally if they are actively involved in meaning-construction in preference to passive provision of information. By autonomy and challenge, gamified environments foster curiosity, persistence, and self-directed learning, all of which are crucial to learning vocabulary.

### 2. Extrinsic Motivation:

Concrete incentives such as points, badges, and progress bars sent strong messages of achievement and advancement to the learners. Comparative attributes such as leaderboards promoted social comparison, which encouraged learners to perform better. These extrinsic motivators were not just starting off temporary engagement; instead, they promoted repeated rehearsing and practicing, which are a secret to vocabulary building in long-term memory (Alsawaier, 2018; Hellín, 2023).

### 3. Social Interaction and Relatedness:

Multiplayer challenges, co-operative activities, and peer comparison were employed to generate a sense of belongingness, increasing learners' relatedness—a basic requirement of Self-Determination Theory. The social component encouraged learners not just to acquire vocabulary to score individually but to be actively involved in the group as well, enhancing participation and retention.

### 4. Feedback and Error Correction:

Immediate feedback in gamified environments allowed learners to identify mistakes, correct them on the spot, and reinforce correct usage. This real-time feedback loop is critical in averting misconceptions and memory trace consolidation, particularly in vocabulary learning where accurate recall is compulsory. Feedback also appeared to reinforce self-confidence and dispel anxiety, which otherwise have the potential to disrupt vocabulary consolidation among young EFL learners.

All in all, gamification brings about the impact of enhancing word retention not only through repetition and interest but also by sustaining motivation through enjoyable, meaningful, and social learning experiences. The fusion of cognitive, motivational, and social components creates a set of conditions in which learners tend to retain and apply new words in the long run.

### **5.3 Comparison with Prior Work**

The results of the current study reinforce, and add to, prior work:

Reynolds & Taylor (2020) and Chan & Lo (2024) demonstrated that gamified learning of vocabulary improves short-term learning outcomes.

Wedayanthi (2024) and Patra (2022) found that gamified environments improve delayed recall of vocabulary, supporting the present study's findings that computer-based gamification facilitates long-term retention among young learners.

Alsawaier (2018) and Hellín (2023) explained that gamification increases learner motivation and engagement, which are key mediators for retention.

Sadoski (2013) and Kirschner (2002) advocated cognitive and multimodal approaches in supporting memory, consistent with the well-established benefits of visual and interactive gamified tasks in this study.

This study contributes to the literature by being targeted at primary school students, a frequently overlooked population in gamification studies, and demonstrating gamification can be applied successfully in EFL settings to maximize interaction and word retention over time.

### **5.4 Pedagogical Implications for EFL/ESL Teaching**

The study has several applications in practice:

1. Integration of Gamified Platforms: Quizlet, Kahoot!, and other educational games need to be integrated into primary EFL classrooms to drive optimum participation and reinforcement.
2. Emphasis on Motivation: Teachers need to employ intrinsic and extrinsic motivators, leveraging rewards, challenges, and immediate feedback to maintain learner interest.
3. Spaced Repetition: Gamified platforms easily support spaced repetition and interactive practice, which is needed to plant vocabulary in long-term memory.
4. Social Learning Opportunities: Relatedness, peer motivation, and active vocabulary use are elicited by cooperative or competitive tasks.
5. Feedback and Assessment: Priority should be accorded to immediate, constructive feedback in order to facilitate correct usage as well as correct errors, thus aiding retention.

### **5.5 Study Limitations**

1. The study was only able to cover 60 6th-graders from a single Iraqi school, restricting generalizability.
2. The intervention ran for four weeks, and there may be a limit to generalizing findings from retention beyond this time.
3. Existing experience with computer environments could have affected the levels of engagement.
4. The research centered on vocabulary retention only and did not test retention in other language areas.

### **5.6 Future Research Recommendations**

1. Use longitudinal studies to investigate retention over months or a school year.
2. Investigate gamification in conjunction with other teaching methodologies, including task-based learning.
3. Incorporate larger, more diverse populations to maximize generalizability.
4. Investigate the effect of single gamification components on retention.
5. Examine cross-linguistic transfer and the influence of gamified vocabulary learning on reading, writing, and overall communicative competence.

## **6. Conclusion**

### **6.1 Summary of Findings**

This investigation examined the impact of gamification on computer-based English vocabulary retention for 6th-grade EFL students. Employing a quasi-experimental design with pre-tests, post-tests, and delayed retention tests, the study contrasted an experimental group with gamified vocabulary instruction with a control group with traditional teaching. The results show several main outcomes:

1. Better Retention of Vocabulary: The students of the gamified experimental group had substantially better performance in immediate post-tests and delayed retention tests when compared to the control group. This indicates that gamified learning not only improves learning in the short term but also maintains vocabulary items in the long term.

2. Increased Motivation and Engagement: The gamified setting fostered intrinsic and extrinsic motivation by incorporating elements such as points, badges, challenges, and feedback. Observational feedback and participation logs confirmed that participants contributed voluntarily, stayed consistent with assignments, and responded positively to competitive and cooperative tasks.

3. Successful Functioning of Gamification Features: Some of the gamification features like rewards, feedback, and competition played a particularly pivotal role in engaging learners and triggering the right use of vocabulary. The structured, interactive, and visually prompted activity made room for repeated practice, identification of mistakes, and active application, all of which were critical for more effective retention.

4. Consistency with Learning Theory: The study's findings agree with dominant theoretical constructs like Self-Determination Theory in explaining increased intrinsic motivation, Cognitive Load Theory in explaining optimal learning task structuring, Dual Coding Theory for the importance of multimodal input, and Engagement Theory for the importance of active engagement.

Overall, the findings suggest that computer-based gamification is a highly effective pedagogical approach to promoting the retention of vocabulary in young learners of EFLs, with cognitive as well as motivational benefits that are possibly not possible using non-gamified instruction.

## 6.2 Contribution to the Field of Language Learning

This study has a number of important contributions to the field of language learning and teaching of EFLs:

1. Empirical Evidence on Vocabulary Retention: While many previous research studies have investigated vocabulary learning, few of them have addressed retention in a specific way. The current study presents concrete evidence that gamification-based learning can enhance extended recall of vocabulary, which addresses an important limitation of the extant literature.

2. Application to Primary EFL Education: With a focus on 6th-grade students, the research demonstrates the effectiveness of gamification for younger learners, who are overwhelmingly an underrepresented population in gamification research. This means that gamification strategies can be used effectively in primary school classrooms.

3. Integration of Motivation and Cognition: The study describes how gamification involves both cognitive and motivational operations concurrently and shows that recall is enhanced not only through repeated practice but also through engagement, social interaction, and intrinsic motivation.

4. Practical Implications for Teachers: Results offer practical recommendations for educators, curriculum developers, and edtech developers. Incorporating gamified platforms into vocabulary teaching has the potential to make vocabulary instruction more interactive, more engaging, and more effective, and thus benefit learners' long-term language growth.

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## **Appendices**

### **Appendix A: Vocabulary Pre-Test**

(Total Score: 20)

Instructions: Choose the correct answer or complete the sentences using the correct word.

**Section 1: Multiple Choice**

Choose the correct meaning of the word:

1. Brave means:

- a) Scared
- b) Courageous
- c) Lazy
- d) Funny

2. Delicious means:

- a) Tasty
- b) Bitter
- c) Hot
- d) Cold

3. Ancient means:

- a) Old
- b) New
- c) Small
- d) Strong

**Section 2: Matching**

Match the word to its meaning:

Word	Meaning
Huge	a) Very large
Tiny	b) Very small
Rapid	c) Very fast
Calm	d) Not excited

**Section 3: Sentence Completion**

Fill in the blanks using the words from the box:

(Brave, Delicious, Ancient, Calm)

1. The ..... castle has stood for hundreds of years.
2. She was very ..... when she helped the lost puppy.
3. The cake was really ..... and everyone enjoyed it.
4. The lake was ..... and quiet in the morning.

**Appendix B: Vocabulary Post-Test**

(Total Score: 20)

The post-test mirrors the pre-test in format and difficulty but uses different vocabulary items or reordered questions to prevent memorization.

**Section 1: Multiple Choice**

1. Generous means:

- a) Selfish
- b) Giving
- c) Angry
- d) Lazy

2. Tiny means:

- a) Large
- b) Small
- c) Heavy
- d) Fast

3. Courageous means:

- a) Brave
- b) Scared
- c) Weak
- d) Careful

### Section 2: Matching

Word	Meaning
Rapid	a) Very fast
Calm	b) Not excited
Huge	c) Very large
Tiny	d) Very small

### Section 3: Sentence Completion

Use the words from the box: (Generous, Tiny, Courageous, Calm)

1. The firefighter was very ..... when rescuing the child.
2. She gave a ..... donation to the school.
3. The kitten was so ..... it could fit in my hand.
4. The teacher remained ..... during the noisy class.

### Appendix C: Delayed Retention Test

The delayed test is administered two weeks after the post-test. It has the same format but shuffled questions and some new examples to verify the retention of the designated vocabulary rather than just recognition.

### Section 1: Multiple Choice

1. Vast means:

- a) Small
- b) Huge
- c) Slow
- d) Short

2. Fearless means:

- a) Scared
- b) Brave
- c) Weak
- d) Quiet

### Section 2: Matching

Word	Meaning
Calm	a) Not excited
Tiny	b) Very small
Courageous	c) Brave
Delicious	d) Tasty

### Section 3: Sentence Completion

Use the words from the box: (Vast, Fearless, Delicious, Calm)

1. The explorer was ..... in climbing the mountain.
2. The desert was so ..... it seemed endless.
3. The pie was absolutely ..... and everyone wanted more.
4. The sea was ..... after the storm.

### Appendix D: Learner Engagement Survey

Instructions: Rate your agreement with the following statements on a 5-point Likert scale: 1 = Strongly Disagree, 5 = Strongly Agree.

1. I enjoyed learning new vocabulary using the games.
2. The points, badges, and rewards motivated me to study more.
3. I felt confident answering questions during the gamified activities.
4. The games helped me remember new words better than traditional methods.
5. I liked competing with my classmates in the game activities.
6. The immediate feedback helped me correct mistakes and learn faster.