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Research Article

Quizlet as a Learning Tool for Enhancing L2 Learners' Lexical Retention: Should It be Used in Class or at Home?

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In the twenty-first century, with the evolution of technologies, teaching and learning practices, especially in second language acquisition, have taken a significant leap. Numerous applications and software have been created to facilitate and boost learners' L2 vocabulary. The goal of this study is to examine the effectiveness of Quizlet in enhancing lexical retention of EFL students at a private institution in Vietnam in two learning modes: at home and in class. Eighty-nine university students participated in the study and were separated into three groups. While the in-class group ($n = 31$) had weekly sessions of vocabulary revision in class with their teacher, the at-home group ($n = 30$) did the weekly reviews on Quizlet at home by themselves. The control group ($n = 28$), however, did not utilize Quizlet for vocabulary review either in class or at home. During four weeks, the three groups learned and practiced 32 target words, divided into four sets (1 set = 8 items), with each set utilized in one week. Via a quasi-experimental design including a pretest and a posttest, the quantitative data were analyzed with the employment of the Generalized Linear Mixed Model to generate reliable outcomes. Semistructured interviews were conducted after the posttest to gain insights into learners' opinions on Quizlet use. The results indicated that Quizlet was effective in boosting lexical gains in second language acquisition and that most participants were interested in interacting with this tool for reviewing vocabulary. However, there was no statistically significant difference in lexical gains between the at-home and in-class groups. Pedagogical implications, as well as recommendations for future research, were also discussed.

1. Introduction

The role of vocabulary in second language acquisition (SLA) is of paramount importance as it has been proved that second language (L2) learners need to have knowledge of 8,000-word families for listening or reading [1]. However, mastering and memorizing lexical items in the long term remains highly challenging for many learners; thus, a plethora of research has been conducted to aid in learners' retention of vocabulary [2–6]. A variety of techniques, including reading texts [7], performing oral tasks [8], watching TV [9], or viewing video lectures [10] were demonstrated to play a part in enhancing participants' memorization of unfamiliar words. These input-related studies, however, primarily focused on incidental learning, which is the unconscious acquisition of new words while doing another task. As a result, lexical gains, albeit statistically meaningful, were not substantial.

In this modern age, many researchers have even integrated technology into SLA to support lexical retention, known as CALL (computer-assisted language learning) [11–13] or MALL (mobile-assisted language learning) [14]. There has been strong evidence that these tools were effective in boosting learners' vocabulary [15, 16]. Many applications that even combine both CALL and MALL were invented to enhance their users' L2 vocabulary. One of which is Quizlet, a free website and mobile application for learning lexical items, shown to be effective in motivating and improving lexical development [17, 18]. Promising as the tool is, previous studies primarily focused on learners' perceptions of Quizlet use [19, 20]; empirical research on the effectiveness of Quizlet is still limited [21]. Furthermore, most of these works only employed the quasi-experimental design, some even without a control group [21]; very few have adopted a mixed-methods approach. Also, it seems that

none [21–23] has used modern statistical methods such as the Generalized Linear Mixed Model (GLMM) for data analysis to gain reliable outcomes. Additionally, no research has been conducted to compare the effectiveness of and learners' attitudes towards the use of Quizlet in two modes: directly in class under teachers' guidance and at home by learners themselves. Consequently, it can be inferred that more research is needed to further explore the role of this emerging tool in L2 vocabulary acquisition.

2. Literature Review

2.1. Theories supporting Vocabulary Retention. There are multiple theories behind how learners can memorize lexical items in the long term. The first one is referred to as *distributed learning*, which is proved to be more effective than *massed learning* [24, 25]. In other words, vocabulary should be learned and practiced gradually in a series of sessions, not all at once. This theory is the premise for research design, which is to divide target words into different sets so learners can absorb them more effectively. Another theory is the *testing effect*, arguing that vocabulary can be gained via tests as learners feel the gaps in their knowledge and try to make sense of missing information [26, 27]. Evidence can be found in the research done by Kasahara and Kanayama [28], which demonstrated that doing quizzes on a regular basis significantly improved learners' vocabulary retention.

One more critical theory is the *involvement load hypothesis* proposed by Laufer and Hulstijn [29]. It is postulated that there are three components in vocabulary improvement: need, search, and evaluation. This means learners should be given a problem in which there is a strong desire to solve, and they will endeavor to look for the necessary information to finally evaluate whether it is accurate or not. Besides this, the *noticing hypothesis* also plays an integral part in the process of converting comprehensible input to intake. Schmidt proposed this hypothesis in 1983, claiming that L2 learners' awareness and attention must be attracted to the language if learning gains are to occur. His viewpoint received strong support from many other linguists [30, 31]. It has been proved that those who noticed the most learning items are able to enjoy the most learning gains [32–34].

It is evident that lexical retention is well fortified by many theories and hypotheses, including *distributed learning*, *testing effect*, *involvement load hypothesis*, and *noticing hypothesis*. By frequently and gradually being exposed to unfamiliar words and given problems to work on, learners are able to master and memorize these lexical items better.

2.2. Empirical Research on Quizlet. As a prominent Web 2.0 application, Quizlet is a free website platform that provides students with learning resources, such as flashcards, study, and gaming modes. In 2005, high school sophomore Andrew Sutherland designed a website for vocabulary learning. Since then, more than 50 million users on the internet have created hundreds of millions of flashcard sets, proving Quizlet's popularity and recognition [35].

Several empirical studies in various learning contexts have been performed to investigate the role of Quizlet in learners' vocabulary knowledge [11, 36, 37]. However, such research primarily concentrated on only one mode of using this tool for practice, either in class or at home; it seems that none has explored the difference between the two modes. Further, very few studies employed a mix-methods approach to gain insights into the relationship between quantitative and qualitative data. Additionally, there were still limitations in the statistical analyses of previous research, rendering their outcomes questionable.

Phỉ et al. [38] researched to examine the impact of Quizlet on vocabulary acquisition among 210 students at a university in Vietnam. The study's instruments included the students' vocabulary test scores, questionnaires, and interviews. The researchers let the participants do practice on Quizlet after class, without any control, completely depending on the learner's autonomy. However, the study did not present any statistical results of the tests, yet only reported the participants' opinions, which made the findings questionable. Also, asking students to use Quizlet at home, Waluyo and Bucol [21], examined whether undergraduates at a university in Thailand, whose English proficiency was A1-A2 according to the CEFR (Common European Framework for References of Languages), made any lexical improvements. They employed a quasi-experimental design, yet without a control group, with paired-samples t-test analyses. The results showed that the participants had significant progress after five weeks of using Quizlet. However, it is uncertain that all of the students did use the tool to learn vocabulary at home as required, which raised the question of whether learning gains resulted from Quizlet practice or other elements. Another study was performed by Dreyer [22] for 14 weeks, with the participation of 95 high school students who were required to use Quizlet for vocabulary practice at home. Weekly tests in class were conducted to measure the participants' scores. The results indicated that those who worked on Quizlet more often outperformed those with less time spent on it. Nonetheless, it was unclear whether the vocabulary retention was due to Quizlet exposure or in-class quizzes themselves (impact of the testing effect).

As learning success depends significantly on learners' autonomy [39], which is hard to measure, in-class implementation of Quizlet was investigated. Dizon's research in 2016 focused on Japanese undergraduates' using Quizlet in the classroom under the teacher's guide. The findings of the pretest and posttest design demonstrated that the students made statistically significant gains in vocabulary retention. Dizon also employed a questionnaire to investigate the participants' perspectives on this tool, which indicated Quizlet preference. Another empirical investigation of Quizlet in class was conducted by Korlu and Mede [23]. Following a quasi-experimental design combined with vocabulary test scores, the researchers found that Turkish EFL (English as a Foreign Language) undergraduates' performances bettered after their practice using Quizlet. Interviews were also applied to further explore learners' and teachers' viewpoints on Quizlet use. However, these studies only employed conventional statistical tests such as paired-sample t-tests and independent-sample t-tests, which might have triggered

Type I and Type II errors. Therefore, a more modern method, such as the GLMM, should be employed to generate more reliable outcomes.

2.3. Learners' Attitudes towards Quizlet. A growing body of research has explored learners' perceptions of Quizlet, and results indicated that a majority of participants held favorable opinions on this learning tool [18, 20, 23, 40]. In Dizon's study, he found that there was a high acceptance of Quizlet among Japanese learners ($M > 4.0$ on a 5-point Likert scale). Similarly, Pham [20] conducted a survey on 148 undergraduates in Vietnam about their view on Quizlet; the results demonstrated that there was a positive adoption of the tool ($M > 3.5$ on a 5-point Likert scale, one-sample t -test with a mean score different from 3.0). Regarding interview data, Phi et al. [38] revealed that most learners liked to use Quizlet for reviewing and practicing L2 vocabulary. However, the researchers also recommended that this tool should not be overused as it might lead to boredom. The results from the study by Korlu and Mede [23] also confirmed a positive attitude toward Quizlet from Turkish EFL undergraduates.

It is obvious that Quizlet was considered a favorable tool by a large number of learners for vocabulary gains. However, it still remains unclear whether learners prefer in-class or at-home practice, which warrants further research.

In brief, the literature review has summarized the background information about Quizlet and its effectiveness as well as several gaps. Driven by such gaps, this study is aimed at (a) investigating whether Quizlet is an effective tool for retaining vocabulary, (b) examine whether there is a difference in lexical gains between in-class and at-home practice using Quizlet, and (c) explore how learners react to the use of this tool in each mode. A quasi-experimental design with a control group as well as a reliable statistical method (GLMM) is employed to formulate more objective and valid data. Following this, semistructured interviews were performed to gain insights into learners' perspectives on Quizlet use, providing profound information and explanations for the quantitative data.

To address those gaps, the following questions were generated:

(1) Is there a significant difference in lexical gains between learners who use Quizlet for practice and those who do not?

(2) Is there a significant difference in lexical gains between in-class and at-home practice via Quizlet?

(3) What are learners' attitudes towards the use of Quizlet in class and at home?

As a result, this study is beneficial to multiple parties. First, it gives in-depth information about the effects that in-class and at-home use of Quizlet has on vocabulary learning, enriching the literature on second language acquisition. Second, teachers and students can proactively allocate time and resources for the use of this tool in class or at home more appropriately. Finally, it provides educators with details of learners' outlook on Quizlet, from which necessary modifications to the lessons can be made to better meet their expectations.

3. Methodology

3.1. Participants. To determine the required sample size for this study, the researchers ran the "a priori power analysis" using G*Power 3.1 software [41]. With the alpha level at .05, the medium-sized effect ($f = .25$), the power value at .95, and the within-between groups 2×3 ANOVA experimental design, the minimum number of participants needed was 66.

Initially, 94 students from three EFL classes at a private university in Vietnam took part in the research. However, five did not attend all of the lessons due to their absence from class, so their data were discarded. In other words, only 89 participants fully joined the study until the end. These learners (54 males and 35 females, aged 19-20) all majored in Digital Marketing, taking English courses to reach a sufficient level equivalent to B2 in the CEFR (Common European Framework of References for Languages) before enrolling in specialized programs. Their proficiency in English was expected to be similar to the A2 level based on the CEFR, as they had to take the school's placement test designed by Pearson Education at the beginning of the course [42]. Although they came from three separate classes, they were instructed by the same teacher.

All participants were recruited on a voluntary basis, with private information and data kept strictly confidential. Their participation or withdrawal from the research did not affect their grades in any way. Permission was also granted by the school's board of management.

3.2. Research Design and Instruments. This study was conducted following a quasi-experimental design, including a pre-test and a post-test, with three intact groups of students: the control group (Group 1, from class 1, $n = 30$), in-class group (Group 2, from class 2, $n = 31$), and at-home group (Group 3, from class 3, $n = 28$). While Group 2 was trained using Quizlet to practice vocabulary in class, Group 3 worked on Quizlet as homework. The control group received ordinary teaching without Quizlet use.

Prior to the research, all of the participants were given a vocabulary pretest on paper consisting of 50 target words extracted from the textbook used in their curriculum. They were asked to provide first-language (L1) meanings (Vietnamese) of the English items. If they did not know the meaning of any single word, they were instructed to make their best guess or leave it unanswered. The participants had 25 minutes to finish the test without having any discussions or using dictionaries. Upon completion, they handed the papers back to the researchers.

Then, the two researchers worked independently and marked the papers. An answer was marked correct if it conveyed the relevant L1 meaning regardless of spelling mistakes. An answer was considered incorrect if it was unrelated to the word's core meaning. After marking, the researchers compared the scores and discussed with each other until agreements on all scorings were reached. Next, the researchers

Table 1: The target words.

No.	Item (word form)	No.	Item (word form)
1	Essence (n)	17	Retain (v)
2	Expertise (n)	18	Transparent (adj.)
3	Intuition (n)	19	Recession (n)
4	Acquire (v)	20	Referrals (n)
5	Retain (v)	21	Optimal (adj.)
6	Gesture (n)	22	Evolve (v)
7	Means (n)	23	Distinction (n)
8	Facilitate (v)	24	Blur (v)
9	Systematic (adj.)	25	Complexity (n)
10	Myth (n)	26	Stem from (v)
11	Inferior (adj.)	27	Alternate (v)
12	Comparative (adj.)	28	Defect (n)
13	Cognition (n)	29	Convey (v)
14	Quip (v)	30	Taboo (adj.)
15	Imply (v)	31	Utterance (n)
16	Classification (n)	32	Substandard (adj.)

decided to remove the items that even one participant had previously known from the target list. Finally, 18 words were discarded, with only 32 items left. These 32 words, which none of the participants were familiar with, were demonstrated in Table 1.

The 32 keywords in Table 1 were taken from the textbook of the participants' English course, meaning they would learn these items in class no matter which group they were in. These words were divided into four sets, each with eight items. The teacher taught the first eight items (set 1) in the second week, and the other sets were introduced in the third, fourth, and fifth weeks, respectively.

Following the posttest, semistructured interviews were performed with five random participants from Group 2 and another five random interviewees from Group 3 to gain insights into what learners' perceptions of Quizlet use were. There were three open-ended questions and one close-ended question (See Appendix). Follow-up questions were posed based on the answers of the interviewees to obtain data as profound as possible. Each interview lasted for about five to seven minutes and was audio-recorded with the interviewees' permission. The language used was L1 (Vietnamese) to foster sharing and avoid misunderstanding.

3.3. The Procedure. All of the data were collected over a period of seven weeks. This was also the duration of the English course, with two 90-minute sessions a day, five days a week. In the first week, the participants in three groups took the pretest so that the researchers were able to filter out the words they had previously known and only keep the ones they did not know. From the second week to the fifth one, their teacher conducted lessons in the way that he normally did. However, at the end of each week, the researchers, with permission from the school and the teacher, went to Group 2's class and helped the teacher to organize a 20-minute activity of reviewing vocabulary with

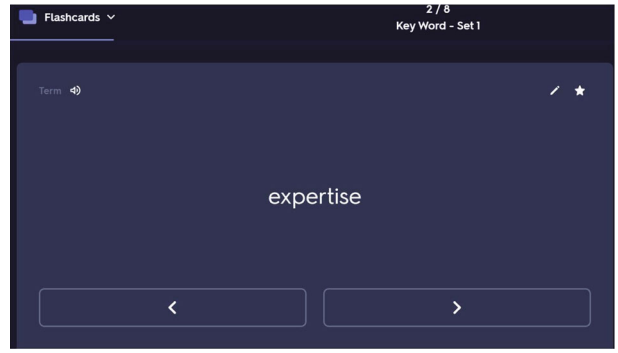

Figure 1: *Flashcards* Feature.

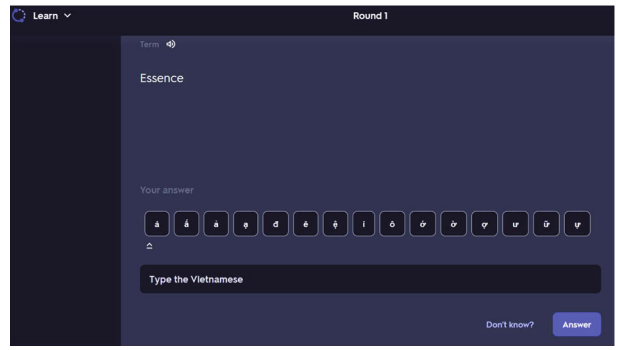

Figure 2: *Learn* Feature.

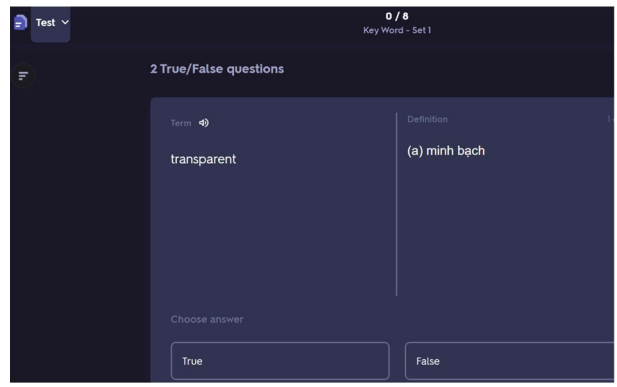

Figure 3: *Test* Feature.

the participants using Quizlet (1 set per week). As all of the Group 2 learners ($n = 31$) had laptops with the Internet access, the teacher gave them the link to the review task on Quizlet so that they could practice the vocabulary. While the teacher was observing the students, the researchers went around the class to ensure they were doing the task and offered technical assistance, if any. Finally, if required by the students, their teacher gave answers and explanations for the practice. There were four tasks on Quizlet for each set of vocabulary: *Flashcards* (viewing words and L1 meanings on each side of the card, Figure 1), *Learn* (providing L1 meanings, Figure 2), *Test* (deciding whether words and L1 meanings match—True or False, Figure 3), and *Match* (matching words and L1 meanings together from a matrix, Figure 4), illustrated as follows:

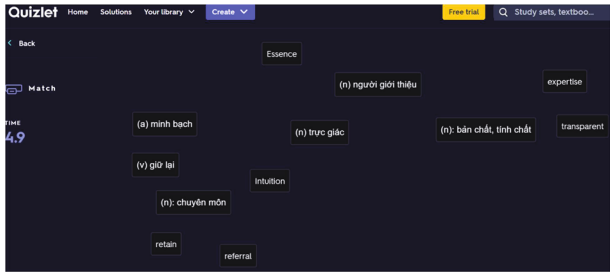

Figure 4: *Match* Feature.

The participants in the control group (Group 1) did not use Quizlet or any technological tools to review the vocabulary. Their teacher conducted vocabulary teaching, as usual, giving them traditional practice tasks such as gap-filling exercises in the textbook. Group 3 was trained in a way similar to Group 1's, but they were given the link to the Quizlet activities and required to complete the practice by themselves at home.

At the beginning of week 7, the three groups took the posttest with the same format as in the pretest, but with only 32 words in a different order, without prior notice. After that, five participants from the at-home group and five others from the in-class group were randomly invited for the semistructured interviews.

The whole procedure was summarized in Table 2.

3.4. Statistical Analysis. The posttest scores were graded manually and separately by the two researchers. The correct answer, in L1 meaning, was marked as 1, while the incorrect one, wrong meanings or blanks, was given a zero. Then, interrater reliability tests were run; the results were .93, .94, and .94 for Groups 1, 2, and 3, respectively, which indicated a strong consensus between the two raters. Any discrepancies were solved through discussions until agreements were reached on all of the scorings.

All of the data were imported into Microsoft Excel before being transferred to R (version 4.2.1) [43] for analysis. First, the researchers checked the distribution of the scores in the posttest by using the Shapiro-Wilk tests. The results revealed that they were not normally distributed (Group 1: $W = .571$, $p < .001$; Group 2: $W = .625$, $p < .001$; and Group 3: $W = .589$, $p < .001$). Therefore, the Generalized Linear Mixed Model (GLMM) was employed to examine whether there was a significant difference between the three groups. The use of GLMM could deal with data that was of nonnormality and help overcome the weaknesses of other statistical tests. While ANOVA and *t -tests* have been widely used, they might overlook individual differences in the random effects, such as participants and lexical items [44]. Moreover, these kinds of statistics may generate Type I and Type II errors. The GLMM could alleviate these problems, which creates more reliable results [45].

In this research, the posttest scores were treated as the dependent variable, while the groups (control, in-class, and at-home) were the independent variables or fixed effects. Participants and target words were regarded as random effects. Moreover, as the scores were marked as 1 for correct answers and 0 for incorrect answers, the family type in the GLMM formula was "binomial". Finally, the fitted model was $Scores \sim Groups + (1|participant) + (1|item)$, run in R using the lme4 package [46].

3.5. Qualitative Analysis. As for the interviews, thematic analysis was employed. The researchers manually analyzed the data without using any software such as NVivo due to the small number of interviewees and responses. First, we listened to the recordings and transcribed participants' remarks together before separately highlighting keywords and putting them into opening codes. After that, we worked together and compared the codes from which common categories and themes were generated. Any differences in the process were resolved via discussions between the two researchers. This procedure was based on the 6-step model of qualitative analysis proposed by Creswell and Creswell [47], illustrated in Figure 5.

4. Results

4.1. Research Questions 1 and 2: Differences in Lexical Gains among Three Modes: No Quizlet Use, Quizlet Use in Class, and Quizlet Use at Home. As can be seen from Table 3, the values in the pretest were at 0, which was because the researchers purposefully removed all of the words the participants had previously known, only retaining unfamiliar items. In the posttest, students in three groups improved in the acquisition of L1 meanings of the target words, with average gains being .29, .39, and .31 for Groups 1, 2, and 3, respectively. It could be inferred that learners enjoyed lexical gains irrespective of their learning modes.

Table 3 also showed that the posttest scores were significantly higher than the pretest scores. This was confirmed via the Wilcoxon signed-rank one-sample tests (with the hypothesized median value at 0, all three p values under .001).

To compare the posttest scores among three groups, the GLMM was run in R. The results were as follows:

Table 4 represented a statistical significance in vocabulary retention among the three groups. In particular, students in the control group scored significantly lower than those in the in-class group ($\beta = -.5214$, $p < .001$) and in the at-home group ($\beta = -.389$, $p < .001$). These values indicated that lexical retention of learners utilizing Quizlet was considerably better than those who did not.

Due to the nonnormal distribution of data, a Dunn Test was performed in R for posthoc comparisons with p values adjusted according to the Bonferroni method.

Table 5 demonstrated that there were significant differences in the posttest scores between the control and in-class group ($z = 5.575$, $p < .001$) as well as between the control and at-home group ($z = 4.290$, $p < .001$). However, there was no statistically significant difference in the scores of the in-class and the at-home group ($z = -1.333$, $p = .55$). In other words, those who used Quizlet for practice, either at home or in class, significantly achieved better scores than those who did not. Further, learning gains did not considerably differ between reviewing vocabulary via Quizlet in class and at home.

Table 2: Data collection procedure.

Week	In-class group	Control group	At-home group
1	Took the paper-based pre-test		
2	Trained normally by their teacher + friday: reviewed vocabulary set 1 using Quizlet in class	Trained normally by their teacher + did vocabulary tasks in the textbook, without using Quizlet at all	Trained normally by their teacher + did vocabulary tasks on Quizlet at home each week
3	Trained normally by their teacher + friday: reviewed vocabulary set 2 using Quizlet in class		
4	Trained normally by their teacher + friday: reviewed vocabulary set 3 using Quizlet in class		
5	Trained normally by their teacher + friday: reviewed vocabulary set 4 using Quizlet in class		
6 - 7	Trained normally by their teacher Took the paper-based posttest without prior notice		
7	Took the interview	Nothing	Took the interview

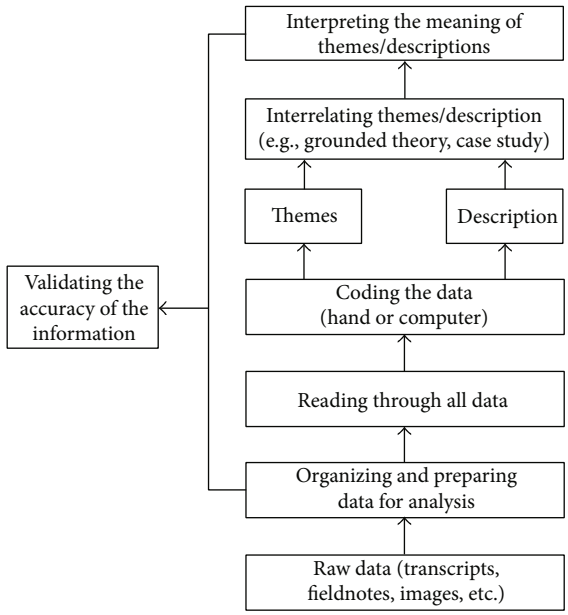

Figure 5: Creswell and Creswell's 6-step model of qualitative analysis.

Table 3: Descriptive statistics for the pre-test and post-test.

Group	Pretest			Posttest		
	Mean	SD	95% CI	Mean	SD	95% CI
Group 1, control ($n = 28$)	0	0	0	0.29	0.455	[0.26-0.32]
Group 2, in-class ($n = 31$)	0	0	0	0.41	0.493	[0.38-0.44]
Group 3, at-home ($n = 30$)	0	0	0	0.32	0.456	[0.29-0.35]

Table 4: Fixed effects from the GLMM.

	β	SE	z	p
Intercept	−0.392	0.097	-4.050	<.001
In-class group	−0.524	0.114	-4.566	*<.001*
At-home group	−0.380	0.112	-3.408	*<.001*

p value is significant at .001.

Table 5: Posthoc analysis among three groups.

Group	z	Unadjusted p	Adjusted p
Control–In-class	5.575	<.001	<.001
Control–At-home	4.290	<.001	<.001
In-class–At-home	-1.333	0.18	0.55

p value is significant at .001.

The pretest and posttest scores among the three groups were illustrated in Figure 6.

To calculate the effect size, the Kruskal Wallis test was used to generate the Chi-squared and the degree of freedom values, which are 34.71 and 2, respectively. According to Murphy [48], Lakens [49], and Cohen [50], the partial eta squared is calculated as follows:

$$F(\text{dfn}, \text{dfd}) = \frac{\text{Chi}^2}{k-1}, \qquad \eta_p^2 = \frac{F \times \text{dfn}}{F \times \text{dfn} + \text{dfd}}, \tag{1}$$

(with dfn as numerator degree of freedom, dfd as denominator degree of freedom, k as the number of groups).

Further, as the Kruskal-Wallis is a statistical test in which a single factor enters into analysis without any other variables affecting the variance of the dependent variable,

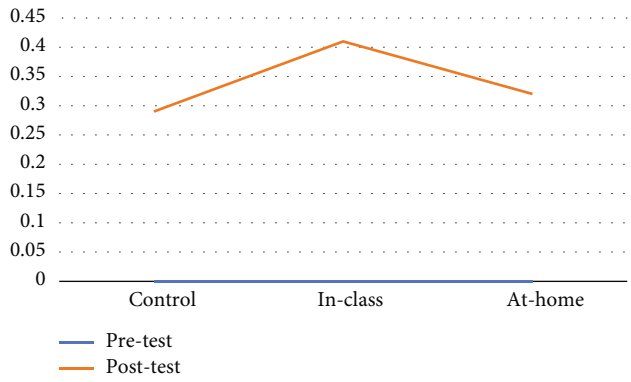

Figure 6: Comparisons of pretest and posttest scores in three groups.

partial eta squared can be considered as eta squared. As a result, with $\eta 2 = .28$, it could be concluded that there was a large effect size, indicating practical significances.

4.2. Research Question 3: Learners' Attitudes towards Quizlet Use. Prior to the interview process, the researchers tracked the Quizlet system and found that 13.3% ($n = 4$) of the participants in the at-home group did not do any practice. Therefore, these students were not counted in the list of interviewees. Five participants out of the others ($n = 26$), together with five participants in the in-class group, were selected randomly for the semistructured interviews.

After the analysis, three major themes were formulated: positivity, negativity, and preferred mode.

4.2.1. Positivity. When asked to rate how much they liked using Quizlet as a practice tool on a scale from 1 to 10, 70% of participants ($n = 10$) chose 8, and 30% voted for 7. This indicated that all of the interviewees adopted a favorable opinion on the use of Quizlet. There were a variety of reasons why they preferred this tool, from being simple and easy to use (80%), more interesting than the textbook (90%), able to learn at one's own speed (60%) to being helpful in memorizing L1 meanings (60%). These points were well illustrated through the remarks of two participants as follows:

"*I think Quizlet is fun, more interesting than the tasks in the textbook. I don't need to wait for anyone. When I finish one part, I move to another part. And it's convenient, fast. It helps me review vocabulary better*" (Participant 1, in-class group).

"*I don't know why I'm excited when using Quizlet, but when I do practice in the book, I feel sleepy. Maybe because it's like a mini-game, very interesting. I can use it easily as long as I have Internet access, as fast or slow as I like*" (Participant 3, at-home group).

4.2.2. Negativity. However, there were some problems the interviewees faced when using Quizlet for practice. First, 50% ($n = 5$) said that this tool was not fun anymore after four weeks with repeated types of tasks. Second, 30% ($n = 3$) shared that they did not feel motivated because there was a lack of competition among classmates. Participant 4 (in-class group) said, "*At first, I was very excited, but after some weeks, I felt bored. There were no new features or even no competitions*". Supporting this view, participant 3 (at-home class) told the researchers, "*I felt bored with the same tasks, over again and again. I want something new, something more interesting. It's boring when I have to do Quizlet practice alone*". Other members reported that they did not have any problems with this learning tool.

4.2.3. Preferred Mode: In-Class Practice. Upon the choice of at-home or in-class use of Quizlet, 70% ($n = 7$) wanted to practice vocabulary in class because there were instructions or guides from the teacher, giving them more motivation. The sharing of Participant 1 and Participant 3 (in-class group) as well as Participant 2 (at-home group) below clearly demonstrated these ideas:

"*I want to do Quizlet practice in class because the teacher can help me. I am very lazy at home. I need motivation*" (Participant 1, in-class group).

"*Doing practice on Quizlet in class is better. The teacher can support me. At home, I just want to sleep or play games*" (Participant 3, in-class group).

"*I want to do it in class. I don't want to do practice at home anymore. I have no motivation. I need someone to encourage me*". (Participant 2, at-home group).

Only 20% ($n = 2$) chose to practice on Quizlet at home as they could do it whenever they liked, and only one student (10%) said that it did not matter to him where to study because Quizlet was accessible almost everywhere.

In brief, most interviewees were satisfied with the use of Quizlet for practicing vocabulary. Moreover, they liked to do the Quizlet practice in class more than at home, mainly due to a need for motivation from the teacher.

5. Discussion

This present study proves that using Quizlet can significantly promote learners' vocabulary retention. This finding is in line with previous research adopting the quasi-experimental design regardless of statistical methods [18, 21, 23]. There are a variety of factors behind this, the first one being the *involvement load hypothesis* which states that learners improve language acquisition by having a need to solve a problem (the target words), searching for ways to solve it (recall of L1 meanings), and evaluating whether the solution works (checking the answers) [29]. Another explanation is due to *distributed learning* [24, 25], which postulates that vocabulary is better gained via gradual learning, not massed learning. In this study's design, the participants in the experimental group reviewed lexical items weekly according to sets, each with only eight words, not being exposed to a long list of words all at once. Furthermore, as Quizlet features many tasks emulating a test itself, the positive result can be due to the benefits of the *testing effect*. This theory argues that through quizzes, learners recognize their knowledge gaps and try to acquire unknown information [26, 27].

The second finding is that participants using Quizlet to review vocabulary achieved significantly better scores than those who did not. This could be attributed to the gamified design of the technological tool. In fact, gamified English learning has been proven to bring a motivating, engaging, and enjoyable learning atmosphere for learners [21]. Quizlet provides users with a wide range of tasks such as *Flash Cards, Learn, Test*, and *Match* to activate their acquisition, which is probably one of the reasons why it has attracted tens of millions of learners all around the world [35]. This may be the reason why most learners had a positive viewpoint on the use of Quizlet as vocabulary practice. This confirms the conclusions from past research [18, 20, 23], strengthening the literature on technological tools and L2 gains.

The third point relates to the mode of Quizlet use, at home or in class. It was found that although the in-class group had better posttest scores ($M = .41$) compared to the at-home group ($M = .32$), the difference was not statistically significant (via the GLMM result). The explanation is that most students in the at-home group still completed their weekly practice on Quizlet, with only three out of 30 did not perform any tasks on this platform. In other words, the noticing amount of time and exposure to vocabulary practice on Quizlet of students in the two groups was quite similar. As claimed by many linguists [32–34], learning gains align with students' noticing of the language.

Pedagogically, it is recommended that schools and teachers should incorporate learning tools such as Quizlet in their lessons to aid in learners' L2 lexical retention. The variety of the tasks as well as the fun atmosphere, should be the required elements in choosing an appropriate technological tool for practice. Additionally, teachers need to ensure that students interact with the given technology-based activities, not using their laptops or phones for entertaining purposes. This can be achieved with disciplined management; for example, teachers should move around the class, continuously reminding, and motivating students to focus on their practice. As for home practice, teachers need to track students' progress on Quizlet and remind them to do the practice in case some may forget or may not want to do it. Teachers should also have a weekly report in front of the class on top Quizlet performers so that students feel challenged and motivated to learn. Another implication is that teachers are expected to allocate time and resources skillfully and appropriately in class. This means vocabulary should be retained or reviewed gradually, on a regular basis. Promising as deemed, Quizlet needs to be utilized when necessary to avoid overuse which may lead to boredom or violation of the curriculum.

6. Conclusion

This research investigated the effectiveness of using Quizlet as a learning tool in supporting learners' vocabulary gains. By employing a quasi-experimental design combined with semistructured interviews, the researchers found that learners who used Quizlet for practice had considerably higher lexical gains than those who did not work on this tool. Moreover, there was no significant difference in lexical gains between at-home and in-class practice as long as students completed their revision tasks on Quizlet. Another finding that confirmed previous research was learners' favorable opinions on the use of this tool. Therefore, it is highly recommended that Quizlet, in particular, and technological learning devices and software, in general, should be adopted and implemented in the curriculum. However, there are a number of limitations to this study. First, this research only focused on the meaning-recall (L1 meanings); other aspects of vocabulary, such as form-recall and form-recognition, have not been explored. Second, due to time constraints, no delayed posttests were conducted to measure learners' attrition. Future works can delve into these undiscovered issues to make the literature on L2 vocabulary acquisition via technology-based activities more robust.

Appendix

Interview questions

(1) What do you like about reviewing vocabulary on Quizlet? Please explain.

(2) What do you not like about reviewing vocabulary on Quizlet? Please explain.

(3) Do you prefer to review vocabulary on Quizlet in class or at home? Why?

(4) On a scale from 1 to 10, how would you rate vocabulary review on Quizlet?

Data Availability

All the data used in this study belong to the authors and will be shared upon reasonable request.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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