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# Students' Vocabulary Development through the implementation of Quizlet in Cambridge International School in Iran: Perspectives and Implications

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**ABSTRACT**

The use of technology in learning English vocabulary for academic purposes (EAP) aims to enhance learners' academic vocabulary knowledge and provide access to a wide range of educational content, as it creates valuable and flexible learning conditions. The present study was conducted with the aim of expanding learners' vocabulary range through the use of Quizlet at Cambridge International School in Iran, employing a mixed-methods approach at the international school and the Embassy of Pakistan College in Tehran, affiliated with the University of Cambridge. Seventy students from medical and business disciplines at levels O1, O2, O3, and A2 were trained to use the Quizlet application in specialized language classes to improve their vocabulary. A questionnaire, interviews, pre-tests, and post-tests were used to collect data. The research findings indicated a significant difference between the pre-test and post-test results, and students expressed satisfaction with the use of technology in their classes, as it facilitated the learning process and increased efficiency. The use of this application as a technological tool provided students with the opportunity to select relevant learning strategies and apply them in their language production, particularly in writing specialized texts. Additionally, such instruction received positive feedback from learners and led to greater collaboration among them. Therefore, language instructors at Cambridge schools should emphasize academic vocabulary in schools, and this emphasis should be sustained throughout learners' education.

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## 1. Introduction

The use of technology in learning has ample advantages (Eady & Lockyer, 2013) and has improved numerous aspects of language learning such as vocabulary (Wang et al., 2023). Vocabulary knowledge determines how well students speak, write, listen, and read (Richards & Renandya, 2002) in the target language. EAP and technical vocabulary items are specific words that belong to a narrow and particular area of language (Nation, 2001). One of the most important factors in language learning which enables students to perform cognitive tasks such as the preparation of academic work assignments, the development of research projects, and the composition of a dissertation or thesis is learning EAP terms related to their specific field of study (Gardner & Davies, 2014). Learning English for Academic Purposes (EAP) vocabulary in a second or foreign language (L2) presents challenges due to its context-specific nature. Limited vocabulary knowledge hinders learners' ability to communicate effectively, particularly in selecting contextually appropriate terms (Cahyono & Widiati, 2008). Integrating technology into language education can support both individual and collaborative learning by encouraging active engagement and content creation rather than passive consumption (Chun & Plass, 1996). This is especially relevant in international schools where English is the medium of instruction, as technological tools can enhance students' global competitiveness and readiness for international collaboration (Arno-Macià et al., 2020; Bi, 2020). Consequently, educators strive to design lesson plans that foster motivation, improve the effectiveness of English language instruction, and incorporate up-to-date teaching materials to enhance students' EAP vocabulary knowledge (Raman & Mohammed, 2013). One of the most practical ways for learning and applying vocabulary in a foreign language, is repeated exposures to target words over time as a part of vocabulary intervention programs (Cepeda et al., 2006). Quizlet application, one of the mobile applications specializing in vocabulary learning, has been chosen for obtaining systematically categorized information. Quizlet effectively supports vocabulary learning through features such as targeted testing and practice, self-paced learning environments, multimodal input, gamified elements, and immediate feedback (Nguyen & Le, 2023; Mykytka, 2023; Yüksel et al., 2022; Solhi Andarab, 2019; Barr, 2016; Dizon, 2016; Chien, 2015). These functionalities make it particularly suitable for enhancing student engagement with discipline-specific vocabulary in English for Academic Purposes (EAP) contexts, where learners often struggle to acquire and retain specialized academic terms (Gardner & Davies, 2014; Nation, 2001). Although Quizlet has become increasingly popular in language education, most existing research has focused on general English vocabulary or short-term lexical gains among EFL learners in informal or extracurricular settings (Dizon,

2016; Phi, 2016; Aksel, 2019). While several studies have highlighted its positive impact on learner motivation, vocabulary recognition, and autonomous learning (Nguyen & Le, 2023; Mykytka, 2023; Waluyo & Bakoko, 2021), there remains a significant gap in understanding its role in facilitating EAP vocabulary acquisition particularly in formal educational settings that require the development of academic language competence (Peacock & Flowerdew, 2001). Moreover, limited research has explored learners' and instructors' perceptions of using Quizlet within classroom-based EAP instruction or examined the contextual opportunities and challenges associated with its integration. To address these gaps, the present mixed-methods study investigates the effectiveness of Quizlet in enhancing EAP vocabulary knowledge among Cambridge students in Iran. It also examines the platform's long-term influence on learner motivation and engagement across diverse academic disciplines. Ultimately, this study aims to inform the design of more effective and contextually relevant technology-enhanced vocabulary instruction that aligns with the academic needs of EAP learners.

## 2. Literature Review

Quizlet was originated in 2005, Albany in California. It is specifically designed for the development of vocabulary knowledge of learners from all around the world (Phi et al., 2016). This web-based learning application allows learners to study via educational materials, such as flashcards, tests, and vocabulary game modes. Extra word sets, explanations, and descriptions are added and developed to this application through user-designed education modes. The main advantages of Quizlet are its significant ease of use and its excellent effect on self-learning through different learning methods and types that are available in its free version. This application can be installed on PCs and as a free mobile application for both the Apple IOS, Google and Android operating systems. The difference is that eight features (flashcards, write, learning mode, test, spell, match, gravity game, live) of this application are available on the website and five (flashcards, write, learning mode, match and test) are available in the mobile application. Each of these features gives various opportunities to the learners to facilitate their vocabulary learning. Quizlet has a special platform for General Certificate of Secondary Education/ International General Certificate of Secondary Education which is based on exam board specifications. The contents of the general certificate of secondary education / international general certificate of secondary education and many study sets are created by vetted expert teachers from various subjects. All the relevant subject contents such as biology, English and business studies are accessible which supports formative assessment and help teachers determine what the students know and what knowledge gaps they have. Academic vocabulary has been considered as one of the important components of English language skills and academic



JOURNAL OF FOREIGN LANGUAGE RESEARCH, Volume 15, Number 2, Summer2025, Page 135 to 156

achievement (Lesaux et al., 2014; Nation, 2001). EAP begins with learners' academic and professional needs and objectives; as a result, identifying students' goals and objectives is an important factor in designing EAP programs, materials, tasks and activities (Peacock & Flowerdew, 2001). Without appropriate and sufficient vocabulary knowledge, the students will have problems using English for written or oral communication in various academic or professional communication situations (Hamer & Rohimajaya, 2018; Waluyo & Bakoko, 2021). The more vocabulary they learn, the better they are at interpreting spoken and written language and the higher their capacity to participate in various communication and interaction situations (Schmitt, 2008). Technological advancements have had a significant impact on vocabulary learning strategies, especially in the field of English for Academic Purposes (EAP) in Iran, where aligning language instruction with subject-specific academic content remains a persistent challenge (Taherkhani, 2018). Digital tools such as Quizlet offer flexible and self-directed learning environments that can potentially bridge this gap by facilitating the acquisition of academic vocabulary in EAP. Although studies such as the research by AliAkbari and Matlabi-Zadeh (2023) have shown the effectiveness of Quizlet in improving receptive vocabulary learning among Iranian EFL learners, the specific application of this tool in EAP programs in Iran has not yet been thoroughly examined. At the global level, research suggests that Quizlet has the potential to enhance learner autonomy and engagement. For example, Crandall designed flashcards based on EAP academic word lists, which were praised for their easy accessibility and promotion of self-study, while Aksel (2019) reported increased engagement and notable improvement in vocabulary in EAP contexts, although some findings were not statistically significant. Barr (2016) and Kálecký (2016) noted that Quizlet promotes learner autonomy by enabling academic vocabulary study anytime and anywhere via mobile devices. Studies by Lees and McNee (2015) and Chien (2015) suggested improved test scores among Quizlet users, although such gains may reflect short-term memorization rather than sustained mastery of academic language essential in EAP. Nguyen and Le (2023) conducted an experimental study with 59 Vietnamese EFL students and found that the group using Quizlet performed significantly better than their peers, highlighting the tool's potential in advancing academic vocabulary learning. Similarly, Mykytka (2023) examined the perspectives of 30 Spanish undergraduate students and found that EAP learners had a positive attitude towards Quizlet's impact on vocabulary retention, learning motivation, and self-directed learning. In a related study, Yuksel et al. (2022) confirmed Quizlet's effectiveness in teaching technical vocabulary, which is a key component of EAP instruction. Although overall learner acceptance

appears positive, Pham (2022) identified limitations such as inaccuracies in spelling and definitions, as well as unnatural pronunciations, which may hinder effective learning in more rigorous academic settings. Supporting broader application of the tool, Setiawan and Putro (2021) reported improved vocabulary outcomes among Indonesian high school students using Quizlet, which aligned with the findings of Dizon (2016), showing that technology-based vocabulary instruction can outperform traditional methods. Additionally, Waluyo and Bakoko (2021) observed significant improvement among Thai learners of English at beginner levels after five weeks of Quizlet use. Phi (2016), through questionnaires and interviews with 210 Vietnamese students, also found increased learner motivation associated with vocabulary learning through Quizlet.

Despite its widespread use, Quizlet presents notable limitations for EAP vocabulary learning. Its flashcard format often promotes rote memorization over deep, contextual understanding (Kaleckyi, 2016; Lees & McNee, 2015). While it may enhance receptive knowledge, it is less effective for productive skills essential in academic writing and speaking (Aliakbari & Motallebzadeh, 2023; Pham, 2022). User-generated content can be inaccurate or irrelevant for specific academic disciplines (Dizon, 2016; Setiawan & Wiedarti, 2020), and technical issues—such as inconsistent features and distracting ads—can disrupt learning. Moreover, benefits are often short-term, with limited evidence of lasting retention (Setiawan & Putro, 2021; Waluyo & Bakoko, 2021). Quizlet also lacks tailored support for key EAP needs like collocations and discipline-specific vocabulary (Yüksel et al., 2022). Thus, its role in EAP should be supplementary and paired with more rigorous instructional methods.

While the existing research provides valuable preliminary insight into students' perceptions regarding the use of Quizlet (Aksel, 2021; Pham, 2022 ; Phi, 2016; Skattenborg, 2020; Xodabande & Atai, 2020; Yüksel et al., 2022), specifically in enhancing students' motivation in learning (e.g. Dhillon & Murray, 2021; Setiawan & Wiedarti, 2020) and learning English vocabulary (e.g. Al-Malki, 2020; Bueno-Alastuey & Nemeth, 2022; Dizon, 2016; Mykytka, 2023; Setiawan & Putro, 2021; Solhi Andarab, 2019; Waluyo & Bakoko 2021), further understanding of Cambridge students' experiences and perspectives in learning EAP vocabulary items of their coursebook during real classroom practices is needed, which can be informative in designing the EAP courses and tasks as well as analyzing students' needs.

3. **Research Question**

**I. This study focused on the following three research questions:**

**1) To what extent does the use of Quizlet contribute in improving EAP students' vocabulary knowledge?**

**2) What are instructors and learners' perspectives regarding the use of Quizlet for improving EAP students' vocabulary knowledge?**

**3) What are instructors and learners' perspectives regarding the challenges and opportunities of learning EAP vocabulary through Quizlet?**

## 4. Methods

The study was conducted at the Pakistan Embassy International School and College of Tehran affiliated with Cambridge University, which follows the Cambridge International Education System (CIE). Participants included various groups of EFL and ESL students who, alongside their English courses, periodically participate in mock and real examinations in order to measure their receptive and productive skills by international examiners. All seventy students majoring in medicine and business at O Levels 1, 2, 3, and A2 participated in this study and followed the same learning procedure. The group learned how to use Quizlet in EAP vocabulary learning. Students' ages ranged between 15 and 18. *Oxford Progressive English subject* was the mandatory course book for all O levels (1, 2 & 3) despite students' majors; Both students of Medicine and Business at A level learned the EAP vocabulary items of their biology and business coursebooks.

This research is based on a mixed-methods approach, integrating both quantitative and qualitative methods to provide a comprehensive understanding of the issue from different perspectives (Hashemi & Babaii, 2013). The study employed an explanatory sequential mixed-method design (Creswell & Plano Clark, 2011), commonly used in applied linguistics research. All students in the selected Cambridge EAP program participated, and no control group was formed to ensure equal access to the Quizlet-based instruction. Although this limits causal inference, it strengthens the ecological validity of the study by reflecting authentic classroom conditions (Dörnyei, 2007; Mackey & Gass, 2015). It consisted of two distinct phases. In the first stage, the quantitative, numeric data were collected, using pre-test and posttest and a questionnaire. The pre and post-tests of 30 target EAP terms were randomly selected from the participants' coursebook. The tests involved two parts: The first part had 15 multiple-choice questions, in which test takers were requested to find synonyms for words; the second part involved 15 fill-in-the-blank questions with the correct words to complete specific definitions. The tests were administered before and after the experience of using technology in learning EAP vocabulary—Quizlet in this case—and the participants were given 40 minutes to answer the questions. Confirmatory factor analysis (CFA) was employed to establish construct validity, as recommended by Brown (2015). To assess the reliability of the instruments, internal consistency was evaluated using two widely recognized indices: Cronbach's alpha (Cronbach, 1951) and composite reliability (Hair et al., 2019). The results showed that both Cronbach's alpha and composite reliability values exceeded the recommended threshold of 0.70, indicating satisfactory reliability. Furthermore, all

item outer loadings were above 0.70, and the average variance extracted (AVE) for each construct was greater than 0.50, which confirms convergent validity (Fornell & Larcker, 1981). These findings collectively demonstrate that the measurement model possesses adequate reliability and convergent validity.

All the study sets were prepared by 240 high-frequency and important EAP vocabulary items. Students were instructed to read the texts or specific contents of the book and learn or review the EAP vocabulary items by Quizlet. Minimum collaboration time was set for the students, and in case of difficulties, they were supported by appointed tutors/instructors. Cambridge students used the eight above-mentioned features in Quizlet. Every week, the participants attended two 30-minute sessions for 12 weeks to learn new EAP vocabulary items and review previous ones. After each 25-30 minute lesson, they were asked to spend about 30 minutes reviewing and studying the vocabulary using Quizlet. This 12-week period corresponds to the typical duration of an academic quarter. During the 12-week learning period, students had the opportunity to study the vocabulary sets both individually and in pairs, using various Quizlet features and exercises collaboratively. In addition to vocabulary practice, they completed classwork and assignments—such as oral presentations, summary writing, comprehension questions, and fill-in-the-blank worksheets—to reinforce their learning and promote proper usage of the vocabulary in academic contexts. After 12 weeks of learning sessions, students took part in the post-test, and were informed that these tests and questionnaires were not going to affect their annual examination grades. Scores from the EAP vocabulary test, which were collected before and after the treatment, underwent statistical analysis using the Shapiro-Wilk test. The collected data underwent a comprehensive data analysis procedure, employing SPSS software. The pre and post-test scores were compared by a paired sample t-test. The Tukey test, also known as the Tukey's range test or Tukey's honest significant difference (HSD) test, is used to identify significant differences between multiple groups or treatments in this study.

The second stage, in which qualitative data was collected, consisted of semi-structured interviews using convenience sampling, which involves selecting individuals who are readily available and willing to participate (Etikan, Musa, & Alkassim, 2016). This method was used to gain a more detailed understanding of students' perceptions and opinions, which are often elusive and dynamic in nature. Two experts in the field in Applied Linguistics validate the semi-structured interview questions, and the necessary adjustments in the wording and content of the questions have been done. The questions seek to find the answers regarding the specific technology-enhanced education employed in Cambridge International School, the students' self-perceived mental effort invested in doing

EAP vocabulary tasks, the students' collaboration and motivation in EAP vocabulary learning, challenges and obstacles in the student's learning, and new strategies in learning that addressed their needs and difficulty in EAP vocabulary item recognition compared to the previous conventional learning styles. Before conducting the interview sessions, the participants were informed about the purpose of the interview, and their consent was obtained. The participants were five instructors and twenty students, who took part in in-person interview sessions in English that lasted 15-20 minutes. All the intelligent verbatim transcriptions were analyzed thematically to identify common topics, ideas, or patterns to draw preliminary conclusions about participants' views, knowledge, or experiences about the use of Quizlet in teaching and learning EAP vocabulary items. According to Braun and Clarke (2006), a six-step thematic analysis process was followed: familiarization with the data, generating initial codes, generating themes, reviewing themes, defining and naming themes, and final report, writing up to avoid confirmation bias when formulating the analysis; in such a way, coding and organizing the codes into themes were performed, and the general and recurring themes and common patterns of the participants' responses, percentages, and frequencies were used for an accurate and better interpretation of the obtained results in order to draw conclusions from the interviews (Creswell, 2014).

## 5. Results

In this study, all completed results are presented in three sub-sections (1) Analysis of students' pre-tests and post-tests results, (2) Analysis of the questionnaire responses and (3) Analysis of the students' and instructors' interviews.

### 5.1. Analysis of Students' Pre-tests and Post-tests

As shown in Table 1, in Class A2 Biology, the average response to the pre-test was 17.03, while it was 24.56 for the post-test. Similarly, the mean response for Class A2 Business was reported as 16.06 for the pre-test and 24.043 for the post-test. For Class O1, the mean response was 14.89 for the pre-test and 23.900 for the post-test. Class O2 had a mean response of 16.09 for the pre-test and 19.79 for the post-test, while Class O3 had a mean response of 17.243 for the pre-test and 24.300 for the post-test. The relatively small improvement observed in Class O2, with a pre-test mean of 16.09 and a post-test mean of 19.79, attributed to several interrelated factors. The high standard deviation in the post-test scores (SD = 5.076) suggests considerable variability in students' performance, indicating that while some learners have improved significantly, others struggled to make meaningful gains. This inconsistency could be linked to lower levels of engagement or motivation in using Quizlet as a supplementary learning tool, possibly due to varying levels of digital literacy or interest in the platform. Additionally, the students' language proficiency levels or prior vocabulary knowledge have impacted

their ability to benefit from the intervention, resulting in smaller overall gains compared to other classes.

In the presented results, all the skewness and kurtosis values fall within the range of -2 to 2. This range suggests that the variables have relatively moderate levels compared to the normal distribution. The Table below gives information on the overall performance or level of knowledge of students before and after the intervention or assessment; all tests were out of 30 points, and the mean response is reported for the pre-test and post-test scores of each class.

**Table 1** ***Descriptive statistics for pre-test and post-test for each class***

| Class | Test | Mean | Sd | Minimum | Maximum | Skewness | Kurtosis |
|---|---|---|---|---|---|---|---|
| A2 Biology | Pre-test A2 Bio | 17.03 | 4.198 | 9 | 25 | -0.065 | -0.934 |
| | Post-test A2 Bio | 24.56 | 2.185 | 18 | 29 | -0.655 | 0.344 |
| A2 Business | Pre-test A2 Busi | 16.06 | 3.730 | 9 | 24 | -0.048 | -0.830 |
| | Post-test A2 Busi | 24.04 | 2.074 | 20 | 29 | -0.099 | -0.518 |
| O1 | Pre-test O1 | 14.89 | 2.966 | 10 | 23 | 0.420 | 0.217 |
| | Post-test O1 | 23.90 | 2.329 | 19 | 29 | -0.102 | -0.643 |
| O2 | Pre-test O2 | 16.09 | 3.635 | 7 | 24 | -0.103 | -0.503 |
| | Post-test O2 | 19.79 | 5.076 | 9 | 28 | -0.428 | -0.980 |
| O3 | Pre-test O3 | 17.24 | 3.398 | 10 | 26 | -0.180 | 0.024 |
| | Post-test O3 | 24.30 | 1.936 | 20 | 29 | 0.140 | 0.031 |

The Shapiro-Wilk test was conducted for the pre-test and post-test scores of each class, and the test statistics, degrees of freedom, and p-values are reported for both conditions in the table below (Table 2). For Class A2 Biology, the Shapiro-Wilk test statistic was 0.967 for the pre-test and 0.967 for the post-test. The corresponding p-values were 0.058 and 0.059, respectively. Similarly, for Class A2 Business, the test statistics were 0.975 for the pre-test and 0.964 for the post-test, with p-values of 0.177 and 0.139, respectively. In Class O1, O2 and O3 the presented results demonstrated that most of the p-values are greater than the conventional significance level of 0.05. Therefore, it can be inferred that the data sets fit the standard normal quantiles and the data in most cases do not



JOURNAL OF FOREIGN LANGUAGE RESEARCH, Volume 15, Number 2, Summer2025, Page 135 to 156

significantly deviate from a normal distribution.

**Table 2** ***Shapiro-Wilk test***

| Class | Test | Statistic | df | Sig. |
|---|---|---|---|---|
| A2 Biology | Pre test | 0.967 | 70 | 0.058 |
| | Post test | 0.967 | 70 | 0.059 |
| A2 Business | Pre test | 0.975 | 70 | 0.177 |
| | Post test | 0.964 | 70 | 0.139 |
| O1 | Pre test | 0.969 | 70 | 0.078 |
| | Post test | 0.973 | 70 | 0.133 |
| O2 | Pre test | 0.984 | 70 | 0.533 |
| | Post test | 0.934 | 70 | 0.451 |
| O3 | Pre test | 0.971 | 70 | 0.110 |
| | Post test | 0.964 | 70 | 0.082 |

Table 3 demonstrates the effect of using Quizlet in EAP classrooms the result of pre-tests and post-tests have been compared and it can be inferred that for all classes, there is a significant difference between the mean scores of the EAP vocabulary pre-tests and post-tests. The p-values obtained from the paired samples t-test are less than 0.001, denoted as $P<0.001$, indicating a highly significant difference. For Class A2 Biology, the mean score for the EAP vocabulary pre-test was 16.010, with a standard deviation of 4.130. The mean score for the post-test increased to 24.300. The t-value of -14.314 and the significant p-value indicated a substantial improvement in the EAP vocabulary performance from the pre-test to the post-test. Similar patterns are observed for the other classes as well. Class O2, however, shows a different pattern. The pre-test mean score is 16.170, and the post-test mean score is 18.760. The t-value of -3.664 and the significant p-value indicated a slight improvement in EAP vocabulary performance, although the magnitude of improvement is relatively smaller compared to the other classes. In summary, the significant improvements in post-test scores in comparison to pre-test results across all classes indicate that Quizlet contributed meaningfully to students' academic vocabulary development. In more detail, the average gain in scores was substantial—ranging from about 6 to 8 points out of 30 in most classes—which shows not just minor progress but a clear shift in learners' vocabulary knowledge. For example, Class A2 Biology improved from a pre-test mean of 16.01 to 24.30, and Class O3 from 17.24 to 24.30. These results reflect a strong positive impact and suggest that students were able to retain and recall more vocabulary effectively after the intervention. The very low p-values ($p < 0.001$) confirm that these improvements were not due to chance, but rather were statistically significant and educationally



JOURNAL OF FOREIGN LANGUAGE RESEARCH, Volume 15, Number 2, Summer2025, Page 135 to 156

meaningful. Moreover, the consistency of improvement across diverse academic levels and majors—ranging from medicine to business—implies that Quizlet's flashcard-based system and interactive features can support vocabulary acquisition for different learner groups. However, the degree of effectiveness varied slightly by class. For instance, Class O2 showed the smallest improvement (from 16.17 to 18.76), which, while still statistically significant, suggests that factors like learner engagement, usage frequency, or even teaching strategies may influence outcomes.

**Table 3** ***Compare between EAP Vocabulary Pre-test, and Post-Test***

| Class | Test | Mean | Sd | T | df | Sig |
|---|---|---|---|---|---|---|
| A2 Biology | Pre test | 16.010 | 4.130 | -14.314 | 69 | P<0.001 |
| | Post test | 24.300 | 2.242 | | | |
| A2 Business | Pre test | 16.057 | 3.730 | -14.570 | 69 | P<0.001 |
| | Post test | 24.043 | 2.074 | | | |
| O1 | Pre test | 17.443 | 2.991 | -15.583 | 69 | P<0.001 |
| | Post test | 23.900 | 2.329 | | | |
| O2 | Pre test | 16.170 | 3.583 | -3.664 | 69 | P<0.001 |
| | Post test | 18.760 | 5.513 | | | |
| O3 | Pre test | 17.243 | 3.398 | -14.995 | 69 | P<0.001 |
| | Post test | 24.300 | 1.936 | | | |

The other measurement in the study was ANOVA to compare the results obtained in different classrooms. The table below (Table 4) clearly indicate that the use of Quizlet had a positive and statistically significant impact on EAP vocabulary learning across multiple classrooms. Prior to the Quizlet intervention, the average pre-test vocabulary scores ranged from 14.89 in classroom O1 to 17.24 in classroom O3, with an overall mean of 16.26. The ANOVA test yielded a p-value of 0.001, confirming significant differences in baseline vocabulary knowledge among the classrooms. Following the implementation of Quizlet as a vocabulary learning tool, there was a substantial improvement in post-test scores across all groups. The post-test mean scores ranged from 19.79 in classroom O2 to 24.56 in classroom A2 Biology, with an overall mean of 23.32. The post-test ANOVA returned a highly significant p-value of less than 0.001, demonstrating meaningful gains across the classrooms. Most notably, classrooms A2 Biology, A2 Business, and O3 showed the greatest improvement, each reaching mean scores above 24, while classroom O2 showed relatively weaker performance with a lower mean score and higher variability. The standard deviations in post-test results also decreased in most classrooms, suggesting that vocabulary learning became more consistent among students, except in classroom O2, where variability increased significantly. These findings suggest that



JOURNAL OF FOREIGN LANGUAGE RESEARCH, Volume 15, Number 2, Summer2025, Page 135 to 156

Quizlet is an effective tool for enhancing EAP vocabulary acquisition, particularly in classrooms where it was integrated consistently and perhaps supported by additional instruction or engagement. Overall, the data support the conclusion that the use of Quizlet in EAP vocabulary learning contributes to measurable and meaningful vocabulary gains.

**Table 4** ***ANOVA Test Results***

| | Class | Mean | Std. Deviation | Std. Error | P-value |
|---|---|---|---|---|---|
| Pre-test | A2 Biology | 17.03 | 4.198 | .502 | 0.001 |
| | A2 Business | 16.06 | 3.730 | .446 | |
| | O1 | 14.89 | 2.966 | .355 | |
| | O2 | 16.09 | 3.635 | .434 | |
| | O3 | 17.24 | 3.398 | .406 | |
| | Total | 16.26 | 3.684 | .197 | |
| Post-test | A2 Biology | 24.56 | 2.185 | .261 | <0.001 |
| | A2 Business | 24.04 | 2.074 | .248 | |
| | O1 | 23.90 | 2.329 | .278 | |
| | O2 | 19.79 | 5.076 | .607 | |
| | O3 | 24.30 | 1.936 | .231 | |
| | Total | 23.32 | 3.447 | .184 | |

In this mixed-methods design, the HSD test is used to identify significant differences between multiple groups as well as ANOVA to compare means. Based on the results shown in Table 5, the significant differences between the groups in terms of their performances can be observed. The table below presents the pairwise comparisons between the different groups (labeled as A2 Biology, A2 Business, O1, O2, and O3). For each comparison, the table provides the standard error and the level of significance (Sig.). Pre-test result comparison between the groups of A2 Biology and O1 indicated a statistically significant difference (Sig. = 0.005). On the other hand, class O1 and A2 Biology and O1 and O3 comparison indicated that the difference between these groups is statistically significant (Sig. = 0.005, Sig. = 0.001) respectively. While the comparison between Class O3 and O1 revealed a statistically significant difference (Sig. = 0.001). In summary, based on the Tukey test results, we can conclude that there are significant differences between the groups A2 Biology and O1, A2 Biology and O3, O1, and A2 Biology, and O3 and O1 in terms of the dependent variable. However, no other pairwise comparisons among the groups show statistically significant differences. The posttest pairwise comparison indicated that there are significant differences between the groups A2 Biology and O2, A2 Business and O2, O1, and O2, and O2 and O3 in terms of the dependent variable ($p < 0.001$). However, no other pairwise comparisons among the groups show statistically significant differences.

**Table 5** ***post-huc test (Tukey test)***

| Dependent Variable | (I) Group | (J) Group | Std. Error | Sig. |
|---|---|---|---|---|
| Pre-test | A2 Biology | A2 Business | .610 | .503 |
| | | O1 | .610 | .005 |
| | | O2 | .610 | .533 |
| | | O3 | .610 | .997 |
| | A2 Business | A2 Biology | .610 | .503 |
| | | O1 | .610 | .308 |
| | | O2 | .610 | 1.000 |
| | | O3 | .610 | .296 |
| | O1 | A2 Biology | .610 | .005 |
| | | A2 Business | .610 | .308 |
| | | O2 | .610 | .284 |
| | | O3 | .610 | .001 |
| | O2 | A2 Biology | .610 | .533 |
| | | A2 Business | .610 | 1.000 |
| | | O1 | .610 | .284 |
| | | O3 | .610 | .321 |
| | O3 | A2 Biology | .610 | .997 |
| | | A2 Business | .610 | .296 |
| | | O1 | .610 | .001 |
| | | O2 | .610 | .321 |
| Post-test | A2 Biology | A2 Business | .502 | .843 |
| | | O1 | .502 | .685 |
| | | O2 | .502 | <.001 |
| | | O3 | .502 | .986 |
| | A2 Business | A2 Biology | .502 | .843 |
| | | O1 | .502 | .999 |
| | | O2 | .502 | <.001 |
| | | O3 | .502 | .986 |
| | O1 | A2 Biology | .502 | .685 |
| | | A2 Business | .502 | .999 |
| | | O2 | .502 | <.001 |
| | | O3 | .502 | .931 |
| | O2 | A2 Biology | .502 | <.001 |
| | | A2 Business | .502 | <.001 |
| | | O1 | .502 | <.001 |
| | | O3 | .502 | <.001 |
| | O3 | A2 Biology | .502 | .986 |
| | | A2 Business | .502 | .986 |
| | | O1 | .502 | .931 |
| | | O2 | .502 | <.001 |

### 5.2. Analysis of Students' Questionnaire Responses

A 12-item questionnaire developed by Dizon (2016) was used to measure users' behavioral intention to apply technology. Table 6 presents the preferences of the participants for studying English academic vocabulary items with Quizlet, categorized by the device used: smartphones and computers. Out of the total number of participants, 81.4% (57 individuals) reported a preference for studying EAP vocabulary items with Quizlet via smartphones. On the other hand, 18.6% (13 individuals) indicated a preference for using computers for this purpose. This data suggests that a majority of the participants favored using smartphones over computers when it came to studying EAP terms with Quizlet. All students had the Quizlet application on a smartphone and used Quizlet's various menus optimally in their learning activities. However, not all students could access the Quizlet application during learning due to unstable internet network constraints. It can be said that in general, students preferred to use the Quizlet application with their mobile phones, as they were more accessible than their computers.

**Table 6** ***Frequency and Percentage of Q1***

| | Smartphones | | Computer | |
|---|---|---|---|---|
| I Did you prefer studying English vocabulary with Quizlet via Computer or smartphone? | n | % | n | % |
| | 57 | 81.4 % | 13 | 18.6 % |

The result presented in Table 7 provides information regarding the amount of time participants spent studying EAP vocabulary items with Quizlet outside of class. Among the participants, 31.4% (22 individuals) reported spending less than 20 minutes each week studying EAP vocabulary items with Quizlet. Additionally, 22.9% (16 individuals) dedicated between 20-40 minutes each week to their studies. Another 14.3% (10 individuals) reported spending between 40-60 minutes each week on their practices. Lastly, an equal percentage of 31.4% (22 individuals) reported spending more than 60 minutes each week studying EAP vocabulary items with Quizlet. These findings indicated a distribution of study time across various intervals, with a relatively even distribution among the different time categories. It suggests that participants had diverse study habits and allocated different amounts of time to their practices with Quizlet. Although Quizlet has been detected as one of the effective programs in teaching and learning EAP vocabulary items, the majority of the students spend less time practicing vocabulary at home; as a result, it might be suggested that instructors regularly assign Quizlet-based homework or tasks to increase the amount of time of studying with this application.

**Table 7** ***Frequency and Percentage of Q2***

| How much time did you spend studying English vocabulary with Quizlet outside of class? | Less than 20 minutes each week | | Between 20-40 minutes each week | | Between 40-60 minutes each week | | More than 60 minutes each week | |
|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | n | % | n | % |
| | 22 | 31.4% | 16 | 22.9% | 10 | 14.3% | 22 | 31.4% |

The result presented in Table 8 provides the frequency and percentage of responses for various statements related to the participant's experiences and perceptions of using Quizlet for studying EAP vocabulary items. Each statement is evaluated on a Likert scale ranging from "Strongly disagree" to "Strongly agree." Overall, the responses vary across the statements, indicating a range of perceptions and experiences with Quizlet. These results provide insights into the participants' attitudes towards Quizlet and its impact on their EAP vocabulary learning. Generally, a majority of participants leaned towards positive responses, with a significant number strongly agreeing or agreeing with the statements presented. This suggests that Quizlet was viewed favorably as a tool for improving academic vocabulary items, making learning easier, and being a useful resource in the process of vocabulary acquisition. The findings also highlight areas for improvement, as some participants expressed disagreement or uncertainty regarding certain aspects of Quizlet, such as its ease of use or its effectiveness in learning English vocabulary.

According to students' responses, it can be inferred that the majority of students (66%) agreed to use Quizlet in their learning and found it both useful and a facilitator in this process. 59 % of the responses were positive regarding the use of Quizlet in learning EAP vocabulary terms and the gamification features of this application made the process of learning much easier and improved their learning by making them more exposed to the new words in various forms and sentences and giving them the possibility of re-using them in different contexts.

Quizlet application initiates the use of technology in teaching and learning EAP vocabulary in Cambridge classes and students were willing to search for other applications to help them become skillful in finding various strategies for vocabulary learning. Students believed that Quizlet has enhanced their learning speed, as both the website and the mobile application were clear, understandable and user-friendly. They were optimistic about the future use of Quizlet in their studies, as they claimed that they intend to use this application in the future.

**Table 8*Frequency and Percentage of Q3***

| | Strongly disagree | | Disagree | | Not Sure | | Agree | | Strongly agree | |
|---|---|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | n | % | n | % | n | % |
| I was able to learn English vocabulary more quickly with Quizlet. | 12 | 17.1% | 6 | 8.6% | 9 | 12.9% | 6 | 8.6% | 37 | 52.9% |
| Using Quizlet improved my English Vocabulary. | 13 | 18.6% | 8 | 11.4% | 6 | 8.6% | 12 | 17.1% | 31 | 44.3% |
| Using Quizlet made it easier to learn English vocabulary. | 12 | 17.1% | 2 | 2.9% | 7 | 10.0% | 9 | 12.9% | 40 | 57.1% |
| I think Quizlet was useful in my class. | 6 | 8.6% | 9 | 12.9% | 8 | 11.4% | 10 | 14.3% | 37 | 52.9% |
| It was easy for me to study English vocabulary with Quizlet. | 8 | 11.4% | 6 | 8.6% | 8 | 11.4% | 14 | 20.0% | 34 | 48.6% |
| It was easy for me to become skillful at studying English vocabulary with Quizlet | 10 | 14.3% | 9 | 12.9% | 7 | 10.0% | 9 | 12.9% | 35 | 50.0% |
| Learning how to study English vocabulary with Quizlet was easy for me. | 13 | 18.6% | 7 | 10.0% | 2 | 2.9% | 15 | 21.4% | 33 | 47.1% |
| The Quizlet website and/or mobile app was clear and understandable. | 5 | 7.1% | 7 | 10.0% | 11 | 15.7% | 17 | 24.3% | 30 | 42.9% |
| I intend to study English vocabulary with Quizlet in the future. | 13 | 18.6% | 11 | 15.7% | 7 | 10.0% | 8 | 11.4% | 31 | 44.3% |
| If I am offered, I intend to study English vocabulary with Quizlet. | 12 | 17.1% | 8 | 11.4% | 7 | 10.0% | 13 | 18.6% | 30 | 42.9% |

### 5.3. Analysis of Students' and Instructors' Interview Responses

EAP vocabulary enhancement through technology in Cambridge school seems to have been useful in that many students emphasized the value of increased autonomy, noting that tools like Quizlet allowed them to study independently and manage their own progress, particularly before exams. This shift toward self-regulated learning is essential for academic success at higher levels. Students also appreciated the ability to set personal goals within the app, describing it as having a "personal vocabulary coach," which sustained their motivation over time. However, some expressed a desire for greater teacher involvement, suggesting that instructors create or verify study sets to ensure content accuracy and alignment with exam requirements. Another important theme was the cognitive benefit of multimodal learning; students found that engaging with vocabulary through a combination of visual, auditory, and written modes enhanced their memory and



JOURNAL OF FOREIGN LANGUAGE RESEARCH, Volume 15, Number 2, Summer2025, Page 135 to 156

understanding. Additionally, mobile accessibility enabled flexible, time-efficient study, making it easier to integrate vocabulary learning into busy schedules. Students also highlighted the potential for more personalized and meaningful learning by customizing flashcards with their own sentences and examples, particularly when related to their academic interests. Finally, the idea of incorporating social elements—such as classroom competitions or group challenges—was suggested to make learning more interactive and collaborative. These additional insights underscore the multifaceted benefits of integrating technology into EAP instruction, while also pointing to areas where pedagogical support and thoughtful implementation can further enhance its impact. The following interview extracts illustrate students' overall satisfaction with technology integration in vocabulary learning.

*Sam: "Technology usage was a great idea in our class, most of the teachers in our school do not have enough time to introduce new websites or applications to us so that was a great merit if I improve my EAP terms during my studies it helps me for my future carrier."*

*Areej: "Technology is indeed a great guidance in learning and I do believe that it can expand our knowledge more than the conventional method of studying, we all need to know about the latest learning materials and facilities which are beneficial for us."*

*Sange: "All we know are some PDF materials that normally teachers introduce us, we usually search for past paper questions for the examinations but introducing an application and applying it in the classroom was a new practice method. Our Cambridge teachers can introduce the latest and updated materials, websites, and applications like Quizlet to assist us in our studies but emphasizing EAP vocabulary knowledge was completely a new idea."*

*Joey: "We normally do not integrate technology in learning as we have a short period of time and of course using this application could help us to learn in a much more fun way after the back-to-back classes and normal routines of reading and writing*."

*Hana: "As we are studying in an international school and we need to follow Cambridge curriculum, knowing about the latest teaching contents, tasks and exercises which equip us with new skills are mandatory. We all are going to take part in international exams as Cambridge examiners are going to evaluate our work and examinations, therefore, it is great to support all of us."*

*Tudor: "I'm fully satisfied with out new way of learning. I feel more confident and flexible with my studying, I can practice English anywhere and anytime, compete with my friends and save a lot of time."*

*Hanio: "Knowing EAP terms let us to be competent in English. Technology supports us for doing class activities and master other skills."*

*Aylin: " Using technology and quick feedback helped us to recognize our*

*weaknesses and mistakes throughout the learning process."*

*Onayi: " New technology could address Cambridge students learning needs by teaching them not only EAP vocabulary items which we have focused on during our treatment sessions but also by learning new concepts in different fields."*

*Chris: "Technology made learning the most difficult aspects of vocabulary much easier, and I believe I can remember them better now."*

*Jawaria: "Quizlet application was a big fun besides learning, the various parts for IGCSE and GCSE contents is beneficial for revision and reinforcement."*

*Arfa: "It motivates learning and it boosts our short- or long-term memory to remember and retain the concepts better."*

On the other hand, instructors believed that technology-enhanced education structured the EAP vocabulary learning tasks and could help in shaping students' learning style and time management skills; Quizlet can also reduce the stress and the difficulty of students' lesson after numerous back-to-back classes.

*Dr.Ali: "Quizlet could improve the Cambridge student's receptive knowledge such as recognizing the word in its written and/or pronounced form as well as productive knowledge like spelling the word. We all know that reviewing vocabulary might be a boring activity in that learners don't always find the time or motivation, therefore this tool provided an opportunity for the students to memorize new words and phrases efficiently in an engaging way."*

*Dr.Camelia: "I observed the students' talent in problem solving and they helped and supported each other in this simple learning process. Quizlet has had plenty of vocabulary tasks that enable our Cambridge students to keep in touch with other learners and even follow the Cambridge curriculum. Some features like short clips and videos helped the students to comprehend the meaning of the words faster and easier."*

*Dr.Omid: "The result of the pre and post-tests and what we have observed in the class showed great efficiency in learning especially in terms of collaboration and engagement. It could visualize learners' interactions and promote meaningful practices."*

*Dr.Annie: "Technology can help students save time, manage their activities and tasks more effectively, and facilitate collaboration and communication among them."*

*Dr. Zahid: "Cambridge students do lots of activities like giving speeches, lectures, writing essays, and doing different projects but the majority of them do not pay attention to academic vocabulary quite often as the majority of the examination portions are reading and writing parts. The inclusion and expansion of new technology encourage interaction, and collaboration and lead to building confidence in learning. This application provided opportunities for meaningful repetition of the target vocabulary items"*

However, some students who were not familiar with this application and were not interested in learning with technology mentioned that they became aware of EAP vocabulary importance were able to try new ways of learning.

*Minjung: "I am not a techy person; I normally do not use any learning application but I became familiar with EAP and found that I am weak in its usage in speaking and writing."*

*Rayan: "As a person who does not use technology in learning and normally follows our conventional approach of memorization, I found it useful but for a short period, especially, when the lesson gets dull and unexciting."*

*Tudor: "Using Quizlet opened up opportunities to change our routines and made us more aware of the importance of EAP terms and their usage*."

*Arfa: "Comparing the pre-test and post-test, I can see that I answered the questions and completed the Quizlet tasks faster than before I became familiar with EAP vocabulary."*

*Viol: "We became aware of EAP vocabulary terms and the use of technology helped me in learning"*

*Arsalan: "We were not aware of EAP terms before this practice, but Quizlet supported us in learning and reinforcing what we had learned through different types of quizzes and tests."*

From the other aspect of this research, students mentioned that they would love to experience new technologies as their instructors do not commonly spend time on teaching through technological tools.

*Onayi: "We must use English, right, if we know our EAP technical terms, learning would be easier besides comprehension and communication."*

*Amtul: "We do not have enough time during our class period to accomplish the tasks and also our teachers scarcely use technology or other extra materials in teaching the new concepts"*

*Suzi: "I can speak English but it is difficult for me to use the EAP terms in writing I could learn the spelling form of EAP vocabulary items."*

***Lara:*** *"Before using Quizlet, vocabulary learning was boring. Now, it feels like a challenge I enjoy and I would like to try some other applications in my learning."*

***Adnan:*** *"I can still remember the EAP words we learned weeks ago because of the repetition features."*

The study demonstrated that Quizlet significantly enhanced EAP vocabulary acquisition, with mean post-test scores increasing from 16.26 to 23.32 across five classrooms, particularly in A2 Biology, A2 Business, and O3. However, Classroom O2 showed a comparatively lower impact, with a modest mean score of 19.79 and the highest variability (SD = 5.076), indicating uneven outcomes. This reduced effectiveness appears linked to multiple factors, including students' lower digital literacy, inconsistent use of the tool by instructors and users due to time or curriculum constraints, and weaker

foundational vocabulary knowledge. Qualitative feedback supported these findings, highlighting increased motivation and learner autonomy in most classrooms but also noting challenges such as limited time for activity implementation, inaccuracies in some user-generated content, limited support for reading and writing tasks, and distracting advertisements. These findings, consistent with earlier studies (Sanosi, 2018; Setiawan & Wiedarti, 2020), suggest that Quizlet's success depends not only on its features but also on effective, context-sensitive implementation and student readiness.

## 6. Discussions

Quizlet has been introduced in Cambridge school as a supportive tool to teach EAP vocabulary. A substantial improvement in the EAP vocabulary performance from the pre-test to the post-test has been observed by comparing the t-value and the significant p-value, therefore the findings provide evidence of the effectiveness of the intervention program in enhancing EAP vocabulary skills among the students. The results of this study confirm previous research conducted by Nguyen and Le, (2023); Mykytka, (2023); Pham, (2022); Nguyen et al., (2022); Setiawan and Putro, (2021) and Styaningrum et al., (2021) in terms of the use of Quizlet in developing students' English vocabulary knowledge, although they are contrary with the study conducted by Kálecký (2016). The use of Quizlet features allows students to have a wide range of vocabulary learning experiences; results revealed that most of the students treated Quizlet as an effective language learning tool in recalling definitions, synonyms, and pronunciations, which confirms the study conducted by Kose et al (2016). According to the results of pre-tests and post-tests, it can be inferred that students at lower levels could achieve higher vocabulary scores. Therefore, Quizlet application can be considered a practical and effective teaching instrument for both instructors and students for improve students' EAP vocabulary knowledge, results which are in line with Sanosi (2018).

Quizlet provides progress in EAP vocabulary learning by moving the student from simple drills in classroom, to more complex questions that require diligent searching or remembering and receiving immediate feedback, supporting students to recall the incorrect alternatives and correct answers more easily. This allowed instructors to track and observe the positive progress of the class in vocabulary acquisition, which aligned with the study of Dewi & Rahma (2022). Students' involvement in the task-fulfilling activities on Quizlet enhanced their learning and at the same time, improved their collaboration and willingness to learn from each other, problem-solving, and autonomy in learning, all of which are among the most important 21st century competencies that must be learned by students for successful academic and professional development, which is in line with the studies conducted by Wang et al. (2023) and Wang (2014).

Moreover, results indicate that instructors as well as students, have a positive view towards the efficiency of Quizlet regarding frequent and repeated exposure to new words and motivating activities, which is in line with Skattenborg's (2020) study. Quizlet appears to be an effective tool for formative assessment, as it helps instructors identify gaps in teaching and learning while proposing appropriate solutions. By stimulating learning, Quizlet can enhance students' social skills and foster independence in goal-setting. Additionally, integrating Quizlet into vocabulary learning can create an engaging learning environment, and increase classroom participation which are in agreement with the studies of Avisteva & Halimi (2021) and Oksana et al. (2022).

Quizlet's success in supporting Cambridge students' acquisition of EAP vocabulary items can be attributed to several key features. Its interactive flashcards combine visual and auditory elements, enhancing memory retention by engaging multiple senses (Plass et al, 1998). The platform offers varied practice modes, including matching games, quizzes, and spelling activities, which cater to diverse learning styles and sustain motivation (Nation, 2001). Immediate feedback enables learners to promptly identify and correct errors, reinforcing accurate understanding of essential EAP terms critical for academic success (Shute, 2008). Furthermore, Quizlet's self-paced format fosters learner autonomy, allowing Cambridge students to customize practice according to individual needs and schedules (Little, 1991). The accessibility of the online platform encourages consistent vocabulary review beyond classroom time, important given the rigorous demands of the Cambridge curriculum (Schmitt, 2008). Finally, its user-friendly design facilitates seamless integration into teaching routines, supporting instructors in enhancing EAP vocabulary instruction (Stockwell, 2010).

Despite yielding promising results, this study presents several limitations relevant to EAP vocabulary instruction for Cambridge students. The absence of a control group complicates attributing vocabulary gains specifically to Quizlet, an important factor given the rigor of the Cambridge curriculum. Moreover, the study did not assess long-term retention or the transfer of vocabulary knowledge to authentic academic contexts. Individual learner differences—including proficiency levels, learning styles, and technology familiarity—were not considered. Additionally, digital equity issues, such as unequal access to devices and reliable internet outside the classroom, pose significant challenges in diverse Cambridge settings. Addressing these gaps in future research is essential to optimize the integration of Quizlet and similar technologies in EAP vocabulary teaching within the Cambridge framework.

To effectively support EAP vocabulary development within the Cambridge curriculum, instructors should integrate Quizlet purposefully by aligning its use

with specific learning objectives and offering guidance on its features to accommodate varying student needs. Schools can enhance impact by ensuring equitable digital access, providing targeted teacher training, and encouraging collaborative creation of subject-specific vocabulary sets. At a broader level, organizations such as Cambridge International could contribute by curating high-quality, curriculum-aligned study materials and establishing best-practice frameworks for technology use in language instruction. These coordinated efforts would help maximize the pedagogical value of Quizlet while promoting consistency and equity across educational contexts.

## 7. Conclusion

In conclusion, the study demonstrated that Quizlet can significantly enhance EAP vocabulary acquisition among Cambridge students by increasing motivation, engagement, and learner autonomy. Its interactive features, multimodal learning tools, and self-paced structure were particularly effective in supporting the retention and application of technical academic vocabulary. However, the findings must be interpreted with caution. The participants in this study were Cambridge international school students with relatively strong general English skills, which may have made EAP vocabulary learning easier for them than for students with lower proficiency levels. This limits the generalizability of the results to broader educational contexts in Iran or similar settings. Additionally, while the results are promising, further research is needed to explore the use of other educational technologies for EAP vocabulary learning, guided by thorough needs analyses and tailored to diverse student profiles. Expanding future studies in this direction will help ensure that digital tools like Quizlet are effectively and equitably integrated into EAP instruction, particularly in preparation for Cambridge examinations.

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