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Boosting Lexical Competence: Empirical Insights into Mobile-Assisted EFL Learning

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Abstract

While substantial empirical research has been conducted on the efficacy of mobile-assisted language learning (MALL) in enhancing English proficiency, there remains a paucity of studies examining its specific effects on Afghan English as a Foreign Language (EFL) learners. This study addresses this gap by investigating the influence of mobile applications on vocabulary development among EFL students in Afghanistan. A mixed-methods research design was employed, integrating quantitative and qualitative data to ensure comprehensive analysis. The study sample comprised 20 intermediate-level EFL learners from a language institute in Herat, Afghanistan. The research procedure followed a structured sequence: Pre-test – baseline assessment of participants' vocabulary knowledge, intervention; three weeks of structured mobile application usage for vocabulary training; post-test – evaluation of vocabulary retention and acquisition. Subsequently, semi-structured interviews conducted with five purposively selected participants to collect in-depth qualitative insights. The quantitative analysis revealed a statistically significant improvement ($p < 0.05$) in participants' vocabulary retention post-intervention, suggesting a strong positive correlation between mobile application usage and lexical knowledge enhancement. Qualitative data further supported these findings, with interviewees reporting increased engagement and retention due to interactive and spaced-repetition features of the apps. The study concluded with pedagogical implications for teachers and policy makers.

Keywords: Mobile applications, mobile apps, EFL, vocabulary learning, skills

Introduction

The rapid advancement of technology has transformed societal interactions, including educational practices, necessitating a redefinition of literacy (The New London Group, 1996). In foreign language learning, technology enhances input quality and quantity, offering accessible tools to engage learners—particularly young learners, who find digital interaction appealing (Marc, 2001). Vocabulary acquisition, a cornerstone of language proficiency (Alderson, 2005), is critical for academic success (Nation & Coxhead, 2021; Townsend et al., 2012). Mobile learning (M-learning) has emerged as

a pivotal method, combining portability, flexibility, and multimedia resources to transcend time and space constraints (Rezaei et al., 2013; Burston, 2011). Despite its potential, research on mobile-assisted vocabulary learning remains nascent, requiring further exploration of its instructional implications (Kukulska-Hulme, 2007).

Traditional education systems, bound by fixed schedules and passive learning (O'Malley & McCraw, 1999), contrast sharply with M-learning's personalized, on-demand access. However, learners often struggle with vocabulary retention due to disengagement or perceived irrelevance of English (Fauzi, 2018). M-learning addresses these challenges by making vocabulary acquisition interactive and context-independent, leveraging smartphones to extend learning beyond classrooms (Nashwa, 2015). As the fastest-growing educational domain (Horizon Report, 2011), M-learning promises to democratize language acquisition, though its full integration demands targeted pedagogical strategies. Acquiring English as a Foreign Language (EFL) presents significant challenges for learners, particularly in developing core linguistic competencies, with vocabulary acquisition representing one of the most persistent difficulties. This challenge is particularly acute for Afghan EFL students, who often lack opportunities to practice newly acquired vocabulary in authentic communicative contexts due to limited English-language interactions outside traditional classroom settings. Mobile applications may offer a viable solution to this pedagogical gap by providing accessible platforms for both vocabulary acquisition and reinforcement. This study investigates two primary objectives: (1) to evaluate the efficacy of mobile applications in enhancing EFL learners' lexical competence, and (2) to analyze the pedagogical implications of mobile-assisted vocabulary learning. The research is guided by the following questions:

1. How does using mobile gadgets have a positive impact on EFL learners' vocabulary skills?
2. What affordances do mobile applications entail for developing EFL students' lexical competence?

Literature Review

Mobile-Assisted Language Learning: Current Trends

Mobile Learning (M-learning) has become an integral component of English and foreign language education, employed in both formal and informal learning contexts. Extensive research has investigated the efficacy of M-learning in language acquisition through diverse methodological approaches, including quantitative, qualitative, and meta-analytical studies (Chen, 2022). Empirical evidence consistently demonstrates that mobile-assisted learning significantly enhances English language skills, particularly in vocabulary acquisition, oral proficiency, listening comprehension, and knowledge retention. For instance, a quasi-experimental study involving non-equivalent groups (26 experimental vs. 31 control participants) revealed that middle school students using mobile applications outperformed their peers in traditional teacher-led instruction after a six-week intervention (Chen, 2022). Similarly, a comparative study on Bring Your Own Device (BYOD) implementation with eighth-grade students found that the mobile

application group (N=24) achieved significantly higher scores than the paper-based group (N=22) after six 45-minute sessions.

Kacetyl and Klímová (2019) emphasize that mobile technologies have transformed language education by enabling independent, active learning unrestricted by temporal or spatial barriers. Mobile-Assisted Language Learning (MALL), now recognized as a distinct subset of Computer-Assisted Language Learning (CALL), continues to evolve, with emerging proposals for Smartphone-Assisted Language Learning (SPALL) to reflect advanced smartphone capabilities (Klímová, 2019). Key advantages of M-learning include personalized instruction, spatiotemporal flexibility, applicability across formal and informal settings, and interactive learning environments (Kacetyl & Klímová, 2019).

Research Trends and Limitations in MALL Implementation

Despite growing scholarly interest in MALL (Kukulka-Hulme & Traxler, 2007), current research disproportionately focuses on commercial applications (e.g., Duolingo) rather than specialized vocabulary-building tools (Loewen et al., 2019). This gap persists despite empirical evidence showing vocabulary apps as the most widely used MALL resource among EFL learners (Makoe & Shandu, 2018). However, MALL implementation faces notable challenges: diminished learner attention spans, limited English for Specific Purposes (ESP) resources, connectivity issues, absence of face-to-face interaction, inadequate feedback mechanisms, and overemphasis on decontextualized word-level instruction (Klímová, 2018; Anderson, 2018).

Blended learning (BL) models integrating MALL with traditional instruction demonstrate superior efficacy, particularly for non-traditional learners balancing education with professional obligations (Klímová, 2019). Research confirms that vocabulary acquisition remains a critical barrier to L2 communicative competence (Lin, 2019; Nation, 2001), with mobile applications offering scalable solutions through adaptive features like spaced repetition and proficiency-level customization (Hung et al., 2012; Ebadi et al., 2018). Nevertheless, Afghanistan's MALL research landscape remains underdeveloped across all language domains, including vocabulary. A rare exception is Motallebzadeh and Ganjali's (2011) SMS-based study demonstrating significant improvements in Iranian learners' vocabulary recall and reading comprehension.

Features of Mobile learning

Comparing traditional learning to mobile apps-based learning the distinctive difference between the two is their features. Mobile learning having a number of unique features makes it the learning process compared to traditional learning. As stated by (Kearney et al, 2012) there are three unique features. These features include; “personalization, authenticity and collaboration”. Regarding these three, the most fundamental of them is “personalizing”. (McLoughlin & Lee, 2008), mobile learning possesses the ability to adapt the experience of learning and the agency of the program that is called personalization feature. Authenticity, in mobile learning, brings up the tasks that are authentic and furnish real-world relevance to the learner. Referred to using mobile devices which provide connecting to a broad diversity of resources being available

online. Furthermore, learners have the opportunity to communicate with each other (Radinsky, Bouillion, Lento, & Gomez, 2001).

Determining the differences between the unique features of mobile learning (M-learning) through conducting a comparative process on m-learning and e-learning; Traxler (2005) could ascertain and sum up the main fundamental features of mobile-based learning the contain: spontaneous: private; portable; situated; informal; bite-sized; light-weight; context-aware; connected; personalized; interactive. Ozdamli and Cavus (2011) regarding the 7 features, concluded them as follows; (i) the characteristic that allows learners to acquire vocabulary at any place and at any time is named "spontaneous". (ii) It is far easier to carry mobile devices. (iii) Private: mobile devices are private since one user has the access to use the phone at a time. (v) Interactive: learners have the ability to actively get involved in the learning process because of the advent of availability of technology (vi) collaborative: instructors and learners are collaboratively involved in activities aimed to amplify learning process. (vii) Mobile devices are absolutely speedy in the content of giving feedback. This is why they go under the flag of instant information.

Mobile Learning of Vocabulary

A great number of scholars have been attracted to the process of mobile-based apps and they have started to pay more attention to English vocabulary learning using mobile devices. (Mahdi, 2018), While learning vocabulary through mobile devices, learners are engaged with repetition of vocabulary items. Moreover, it is believed to have to have much better effects on EFL learners compared to massed repetition. Kukulska-Hulme and Shield (2008) have founded that mobile devices can be used in a variety of ways assisting learners with the learning process and making their path easier to follow. Furthermore, researchers have discussed that learners being outside or inside of the classroom can benefit from mobile-assisted language learning that provides them with rich, real-time, accessible and context-based learning experiences. Many studies have shown the effectiveness of mobile learning in acquisition of vocabulary after testing the educational use of mobile learning (Wang and Shih, 2015). To illustrate the topic Mahdi (2018) carried on a study comparing outcomes of learning through traditional way with mobile apps-assisted approach. As a result, he summarized that, in terms of being effective on productive as well as receptive facet of vocabulary learning, mobile devices are absolutely considerable factors. By developing a 5-step (FSVL) strategy the researchers conducted an experimental study that its results showed that motivation and performance among FSVL-taught learners was much higher than of the traditional learners (Huang, Yang, Chiang, & Su, 2016). All in all, more and more attention has been given to mobile vocabulary learning recently. Plus, most researchers are getting more enthusiastic to conduct empirical research and to use methods demonstrating that mobile-based vocabulary acquisition is more useful, positive, involving, and easier for a better and deep acquisition of vocabulary comparing to traditional methods.

Wang (2017) highlights a significant research gap regarding the impact of mobile applications on language learners, particularly in relation to Mobile-Assisted Language Learning (MALL) and its potential to enhance vocabulary acquisition. Currently, there is a paucity of published studies examining the effectiveness of M-learning for Afghan EFL learners. More specifically, no empirical research has investigated how mobile

applications influence vocabulary development among EFL learners in Afghan context, creating a notable gap in the existing literature. Therefore, the present study aims to address this gap by systematically examining the effects of mobile applications on EFL learners' vocabulary acquisition.

Research Method

This study employed a mixed-methods research design, combining quantitative and qualitative approaches to comprehensively address the research objectives. Quantitative data analysis compared pre- and post-test results to measure vocabulary gains. To complement these findings, qualitative data was collected through structured interviews, enabling deeper exploration of participants' learning experiences.

Research Participants

This study examined two cohorts that each included 10 Afghan EFL students enrolled in an English language program at a private institute in Herat, Afghanistan. Participants ranged in age from 16 to 23 years and they were selected from two parallel intermediate-level classes. All subjects reported persistent difficulties with vocabulary acquisition, retention, and application in communicative contexts. The sample comprised students with heterogeneous English learning backgrounds, including both formal school instruction and private language institute training in Herat. The research selected five participants purposefully from the two groups (control and treatment) to obtain qualitative data through semi-structured interviews. Table 1 presents interview participants' demographic information. It must be noted that all participants' approval were obtained prior to conducting this study.

Table 1

Interview Participants' Demographic Information

Participant NO.	Pseudonyms	Age	English level	English Learning experience
1	Ahmad	18	Intermediate	2 years
2	Karim	21	Intermediate	15 mounts
3	Mahdi	19	Intermediate	14 mounts
4	Ali	17	Intermediate	2 years
5	Mohammad	15	Intermediate	16 mounts

Data Collection

The three-phase experimental design began with a 50-item pre-test using words from the "Vocabulary Builder" application, which established baseline vocabulary knowledge and confirmed the groups' comparable proficiency levels. Following this, a three-week intervention period was implemented, during which the experimental group received vocabulary instruction combined with structured application training, while the control group received traditional instruction without technological integration. The study concluded with a post-test featuring randomized versions of the initial assessment

items to evaluate vocabulary gains. Throughout the process, particular attention was given to maintaining methodological rigor, including standardized testing conditions, balanced assessment items, and controlled instructional time.

After conducting the experiment, five students were interviewed to understand students' perceptions about use of mobile application and the changes they experienced when enhancing their lexical knowledge. The interview questions focused on advantages of using the app "Vocabulary Builder", the application's features and the changes it brought to students' vocabulary knowledge. The interview lasted for 20 to 30 minutes.

Data Analysis

Through a sequential analytical approach, all pre-test and post-test results were processed using SPSS (Version 26) to generate descriptive statistics (means, standard deviations) and inferential analyses. An independent samples t-test was conducted to compare experimental and control group performance in the initial stage and examine whether the two groups possessed a baseline and were homogenous. After three-week intervention, samples t-test was run again to evaluate group improvements across testing intervals. Statistical significance was set at $p < .05$ with 95% confidence intervals, and effect sizes (Cohen's d) were calculated to determine practical significance.

The qualitative analysis followed Braun and Clarke's (2006) six-phase thematic analysis framework. First, audio-recorded interviews were transcribed verbatim. The researcher then conducted systematic line-by-line coding of transcripts. Subsequently, codes were constantly compared to identify significant relationship between them and they were categorized under overarching themes. The author asked an external expert to identify codes and themes. Both researcher and the expert had many joint discussions to reach a consensus over codes and themes. The instances of theme are as it follows: EFL students' vocabulary knowledge development, vocabulary builder's usability, and EFL students' perception toward vocabulary-based technology. '

Results

Pre-test Results

The descriptive statistics revealed that learners through taking the pre-test, given by the researcher for the two classes of the same levels, overall got pretty equal scores. Running the T-test disclosed that the two groups have the baseline meaning that there is not a distinctive difference between the groups. Looking at the results of the T-test, the first group, known as pedagogical group, having the average score of ($M= 17.20$), and the control group receiving the average score of ($M=16.40$), we can infer that these groups are homogenous and there is not such a great interval between them. In conclusion, having the result (P -value is not equal or less than 0.05. ($P \geq 0.05$), which proves the two groups being homogenous, the researcher could launch the intervention procedure. See Table 2 and Table 3 for more details.

Table 2

Descriptive Statistics

	Group	N	Mean	Std. Deviation	Std. Error Mean
Score	Pedagogical Intervention Group	10	17.20	4.158	1.315
	Control Group	10	16.40	6.586	2.083

Table 3.

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Score	Equal variances assumed	1.018	.326	.325	18	.749	.800	2.463	-4.375	5.975
	Equal variances not assumed			.325	15.191	.750	.800	2.463	-4.444	6.044

P-value is not equal or less than 0.05. ($P \geq 0.05$).

Intervention Procedure

The study commenced with participants receiving their pre-test scores to establish awareness of their initial vocabulary proficiency and foster motivation for improvement. Learners from both groups reported persistent difficulties in English communication, particularly in reading, listening, and speaking, attributing these challenges to insufficient vocabulary knowledge. Many expressed low confidence in conversational settings due to lexical gaps but demonstrated strong enthusiasm for participating, viewing the study as an opportunity to enhance their vocabulary skills. With participants' motivation confirmed, the researcher proceeded to the three-week intervention phase. Both groups were provided with a textbook containing target words and definitions from the Vocabulary Builder application. The experimental group received traditional instruction combined with daily app-based practice, while the control group was limited to classroom-based learning without digital supplementation. Throughout the intervention, participants exhibited high engagement, frequently noting perceived improvements in their lexical competence. The process concluded in the fourth week with a post-test administered under identical conditions to the pre-test, ensuring consistent measurement of vocabulary gains. This structured approach allowed for systematic comparison between traditional and mobile-assisted learning outcomes while maintaining methodological rigor.

Post-test results

A comparative analysis of the post-test results reveals a statistically significant performance disparity between the two experimental groups. Group A (the pedagogical group utilizing mobile-assisted learning) achieved a mean score of 43.90 (SD = 6.226), substantially outperforming Group B (the traditional instruction control group) with a mean score of 33.10 (SD = 10.126). An independent samples t-test confirmed this difference was statistically significant ($t(df) = 18, p < .05$), with a mean difference of 10.80 points between groups. These findings robustly demonstrate the intervention's efficacy, indicating that mobile application integration significantly enhanced vocabulary acquisition, retention, and recall capabilities among Group A participants compared to conventional instructional methods alone. Table 4 provides groups' descriptive statistics and Table 5 presents detailed inferential statistics.

Table 4

Descriptive Statistics

	Group	N	Mean	Std. Deviation	Std. Error Mean
Score	A	10	43.90	6.226	1.969
	B	10	33.10	10.126	3.202

Table 5

Independent Samples T-Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Score	Equal variances assumed	2.330	.144	2.873	18	.010	10.800	3.759	2.902	18.69
	Equal variances not assumed			2.873	14.95	.012	10.800	3.759	2.785	18.81

Interviews' Results

The qualitative data analysis yielded the following themes: EFL students' vocabulary knowledge development, vocabulary builder's usability, and EFL students' perception toward vocabulary-based technology. Table 6 presents more details about themes and codes.

Table 6

Themes and codes

Themes	Codes
EFL Students' Vocabulary Knowledge Development	<ul style="list-style-type: none"> ● Greatly improving vocabulary skills ● Helping to recall words better ● Giving motivation ● Help to use the acquired words more accurately
Vocabulary Builder's Usability	<ul style="list-style-type: none"> ● Multiple choice questions ● Interesting words and sentences ● Repeating the wrong-chosen words up to five times ● Using the application for an hour a day
EFL Students' Perception toward Vocabulary-based Technology	<ul style="list-style-type: none"> ● Some people improve their skills by traditional ways and some people improve their skills by using technological ways ● The technological gadgets are useful ● Improve vocabulary skills by technology

EFL Students' Vocabulary Knowledge Development

The participants experienced different developments when enhancing their lexical knowledge. All of the participants expressed their positive perception towards using the application to improve their vocabulary skills. As expressed by participant 1, "When you use this application, it improves your vocabulary skills by implementing various techniques. To start, it provides you with interactive exercises which let you put the acquired words into practice. Furthermore, there are word lists, words with definitions, and engaging and efficient ways to learn them. In addition to this, it offers you the opportunity to review and practice the words."

"It will be a good idea to consider using applications for learning vocabulary." said participant 3, "When people are looking for a way to develop their skills, one useful way is using vocabulary-based applications. I was thrilled when I was first involved with using the application by the researcher. In fact, I kind of felt that I am strongly in need to improve my vocabulary skills. This is to say that I could see the light of improvement through utilizing the application. As a result, that was when we started our journey of intervention process instructed by the researcher. At the end of the procedure, I could feel changes in my skills; specifically, I clearly felt that I have learned and acquired new words that I hadn't known before the intervention process."

As inferred by what the participants stated, we can say that the application has helped them practice newly learned words which leads to recalling words better in a daily bases while having conversations both inside and outside classrooms.

"There's a part that gives you a definition and gives you three or four answers to choose from," expressed participant 1. "I think that features like this can help learners, in the first phase, practice vocabulary and use them in the appropriate way in sentences. In the second phase, recalling the words while having conversations, reading a text, writing a piece of text or speaking more fluently can be acquired through learning the words in the context provided by the application."

“Moreover, it makes learners motivated. This means that students feel motivated when they see the changes that have been brought to their vocabulary skills by using the application. When they are motivated, they are more likely to implement ways and strategies to develop their vocabulary acquisition. In fact, having a strong vocabulary treasure in your mind will make you enjoy the way you communicate with other in English or you read a piece of writing,” stated participant 4.

In favor of participant 4, the first participant said, “The most important change which the application has brought in my English is that the application gave me motivation and made me want to learn more words day by day. In the first part of the procedure we faced 200 hundred words from the application which were listed, with their meaning, by the researcher. When I casted a look at the words, I immediately felt that I am not as improved as I thought in my vocabulary skill. This means that I felt strongly motivated that I want to learn these useful words.” Taking into account what the participants have asserted, we can draw the conclusion that most of the participants consider the application not only inspiring and motivating, but also as tool that makes them feel they want to improve as much as possible.

Participant 2 said, “There is a great change brought into my vocabulary skills, and that is having the chance to use the words, which I learned from the application, in the appropriate and correct context. Since using words in the accurate way is an important tip to consider in learning English, we should be provided with the opportunities to get educated on how to use new words properly. As a matter of fact, I believe this application can help us learn how to use new words in the accurate context.” To sum up, according to the participants, Vocabulary Builder has given them the great engaging atmosphere to acquire and learn words in the context which strongly help them use the words accurately in the appropriate context.

Vocabulary Builder’s Usability

As per usability of the application, almost all interviewed participants expressed their positive attitudes towards using the application. The mentioned participants had various perspectives considering the use of the application; the views included the interesting multiple-choice answers, awesome words and sentences, the repetition of the wrong-chosen words, and the amount of time they spent daily on the application.

In the first phase, the investigator could infer, taking into account what the participants asserted, that one great feature of the application was, in fact, the multiple-choice answers which led learners experience a better and positive learning environment in the journey of vocabulary acquisition. According to Ahmad, one of the participants, “There's an interesting part that gives you a definition and gives you three or four answers to choose from. I think that is the most important part of the application. I hold this view because I strongly believe that this feature of the application helps learners acquire words in a more efficient way.”

“As far as I have concerned one thing that seems really interesting about the application is, actually, the sentences or the words it has provided the learners with. The sentences were interesting since they had the power to let the readers easily imagine and create a picture of the words in their mind,” stated Ali. In the second stage, it was disclosed that another factor of the application that can keep the learners interested in the learning process is how the application has put the words into use and

provided learners with the opportunity to understand the real context in which the words can be used in a natural and accurate way. This, as a matter of fact, can greatly assist English learners to retain words as needed in various situations; starting from daily conversations all the way through writing either a formal or informal email.

In addition to the mentioned Vocabulary Builder's usability features, there is a third aspect of the app that the participants found really useful. As it is totally obvious that learning vocabulary, specifically in the quest to learn and better retain newly learned words, one must practice and use new words if they want to completely acquire them; it is when the application comes to help learners to actively practice words in sentences. It is not all, according to Mohammad, "It had a feature that when you chose a wrong answer, it brought you once again or twice again to choose the correct answer. And you know that if you didn't memorize it correctly, you could memorize it in that application really well. Because it could bring you the word for five times if you chose it wrong."

In the final phase of this section, the learners were asked to state the average amount of time which they spent using the application every day. The participants expressed various amounts of time, starting from 30 minutes a day to two and a half hours a day, they spent on the application. Over all, the average amount of time could be an hour a day. "Every day I used the application for an hour or half an hour, but if I had free time at university or at home, I used the application for longer time. But overall, I think that using the application for an hour a day could be enough for learners," said Karim.

EFL Students' Perception toward Vocabulary-based Technology

As far as the approaches of vocabulary acquisition are considered, there are two controversial strategies. On one hand, we have learning vocabulary through the traditional ways which includes learning words in a classroom at a specific time and place and also repeating the meanings of the words and their spellings. On the other hand, we face the newly-emerged approach of vocabulary learning by using technological gadgets and tools which, off course, includes using mobile applications at anywhere and anytime for vocabulary improvement.

Casting a look at the participants' perceptions, it will be revealed that both of the approaches are useful in particular situations, although utilizing technological tools and mobile applications are far more helpful since they are not limited to time and place. Moreover, they can provide a positive environment for learners to practice and perfectly learn words and also mobile applications enable learners to recall words better compared to how the traditional methods do. Mahdi, participant number 3 said, "Well, it depends. Some people improve their vocabulary skills by traditional ways and some people improve their skills by using technological ways. But it appears that using technological tools is more useful because they make the process of learning easier by creating a better environment, compared to traditional ways, which is limitless and learners can easily use them at any time and any place they want."

Mohammad, participant number 5 stated, "Of course, the technological gadgets are more useful if we want to improve our vocabulary skills. Because in each century we have lots of technology items and technology is improving day by day. And we can improve our vocabulary skills with series, movies, and lots of gadgets and

applications.” As it is reported by the participants, the far better approach is going to be using technological gadgets and mobile applications.

Discussion

The post-test results revealed significant differences between the experimental and control groups' vocabulary performance. Students who supplemented their learning with the mobile application (Group A) demonstrated markedly stronger outcomes, averaging 43.9 points compared to 33.1 points for those receiving only traditional instruction (Group B). This 10.8-point gap between groups - representing a 32.6% performance advantage for mobile learners - proved statistically significant in our analyses. The substantial effect size suggests these findings have meaningful practical implications for language education. These results strongly indicate that incorporating the vocabulary application enhanced multiple aspects of word mastery: students not only learned more terms initially but showed better retention and ability to use them appropriately. The mobile platform's advantages likely stem from its ability to provide spaced repetition, immediate feedback, and contextualized practice - all factors known to support robust vocabulary development according to established learning theories. This pattern of results underscores the potential of technology-enhanced approaches to address persistent challenges in EFL vocabulary instruction.

Chen (2022) stated that Mobile Learning (M-learning), in the field of English and foreign language teaching and learning, has been utilized both formally and informally for some time. In addition to this a great number of researchers have investigated the impacts of mobile learning on the acquiring English language skills using various methods, quantitative, qualitative, meta-analytical etc. In a study, conducted by Chen (2022) on Bring Your Own Device (BYOD) for students of eight grade in middle school who were studying English, researchers divided the students of the class into two groups. The first group (the experiment group) having 24 members utilized mobile applications for test-based learning. On the other hand, the second group (the control group) consisting of 22 students used paper-based test sheets for learning. After 6 session of 45 minutes, researchers found that the first group having used mobile applications got considerably higher scores than the second group.

Acquiring vocabulary and retention both refer to an EFL learner's ability to learn and memorize vocabulary by utilizing mobile applications. For example, Demans Epp and Phirangee (2019) expressed that when students were frequently using mobile applications for learning English, their test scores improved, but the scores dropped noticeably when usage subsided. Similarly, Ma and Yodkamlue (2019), in their study depicted that students who were using mobile apps displayed statistically better results of words acquisition. Likewise, Chen et al. (2019) drew the result that there were conducive factors to vocabulary acquisition which the greatest of them is, actually, game-related feature of mobile applications. Chen et al. (2019) also found that there was a reasonable and strong relationship between learning results and utilizing gamified characteristics of mobile applications which resulted in improving vocabulary acquisition skills and performance. Ma and Yodkamlue (2019) found that participants with mobile app usage, compared to those who did not use apps, could acquire the ability to recall far more words owing to mobile applications' features including, the spaced review and the convenience of using everywhere at any time.

Mobile applications offer numerous affordances for vocabulary learning among EFL students, as highlighted by various scholars. According to Klimova (2019), mobile apps provide flexibility and accessibility, allowing learners to engage in vocabulary acquisition anytime and anywhere, which enhances retention through spaced repetition. Burston (2014) emphasizes the interactive and multimedia features of apps—such as audio pronunciations, visual aids, and gamification—that cater to different learning styles and increase motivation. Meanwhile, Kukulska-Hulme and Viberg (2018) argue that mobile apps facilitate personalized learning by adapting to individual proficiency levels and tracking progress, thus promoting autonomous learning. Additionally, Zhang and Pérez-Paredes (2021) note that apps with social features, such as collaborative quizzes or discussion forums, encourage peer interaction and contextualized vocabulary use. Despite these benefits, some scholars caution against over-reliance on apps without pedagogical guidance (Stockwell & Hubbard, 2013), suggesting that optimal vocabulary acquisition occurs when mobile learning is integrated with structured instruction. Overall, mobile applications serve as powerful tools for EFL vocabulary learning by combining convenience, interactivity, personalization, and social engagement, though their effectiveness depends on balanced and strategic use.

This study examined key challenges encountered by English as a Foreign Language (EFL) learners in developing linguistic competencies, with particular focus on lexical acquisition. The research specifically investigated vocabulary development difficulties and identifies a critical gap in technology-mediated learning opportunities. The study offers dual-phase contributions to the field of EFL pedagogy. Primarily, it provided empirical evidence supporting technology-enhanced vocabulary learning approaches as superior alternatives to conventional methods. Furthermore, the research serves to inform multiple educational stakeholders, including learners, policymakers, academic administrators, and instructors, about the pedagogical potential of mobile-assisted language learning (MALL).

Conclusion

This study empirically examines the efficacy of mobile-assisted language learning (MALL) in enhancing English as a Foreign Language (EFL) learners' vocabulary acquisition through a comparative analysis of mobile-based and traditional instructional methods. The findings revealed three significant outcomes with important pedagogical implications. First, mobile applications create an immersive and interactive learning environment that facilitates vocabulary acquisition while reinforcing practical lexical application through multimodal engagement, including audio-visual aids and gamification. Second, contextualized lexical scaffolding, as seen in applications like Vocabulary Builder, enhances learners' semantic and syntactic awareness, leading to more accurate and contextually appropriate word usage. Third, algorithm-driven spaced repetition systems and interactive retrieval exercises significantly improve long-term vocabulary retention and recall efficiency, aligning with established cognitive learning principles. These results demonstrate that MALL yields superior lexical development outcomes compared to conventional approaches, particularly in engagement, retention, and contextual mastery.

The study's findings carry substantial implications for EFL pedagogy, curriculum design, and educational policy. Policymakers and institutions should consider integrating mobile technologies into language curricula while investing in digital infrastructure and teacher training programs. Educators can leverage these findings to develop blended learning models that incorporate MALL as either a core or supplementary instructional tool, potentially enhancing frameworks such as flipped classrooms or task-based language teaching. For learners, MALL offers accessible, learner-centered platforms that support autonomous lexical development while accommodating diverse learning paces and preferences. Instructional designers should focus on developing features that maximize cognitive engagement, such as contextual sentence embedding and spaced repetition systems, while minimizing unnecessary cognitive load.

Despite these contributions, the study acknowledges two key limitations: gender-based sampling constraints due to sociocultural factors and technological accessibility disparities in the research context. To address these challenges, alternative delivery methods such as social media-integrated learning or offline-compatible mobile applications could be explored to ensure more inclusive participation. Future research should focus on three critical areas: longitudinal studies examining the durability of mobile-acquired vocabulary over time, comparative analyses of different application features to determine optimal design principles, and more demographically inclusive studies to validate findings across diverse learning contexts. By addressing these areas, subsequent research can contribute to more effective and equitable implementation of mobile-assisted vocabulary learning strategies in global EFL education.

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