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Research Article

The Effectiveness of Using Mobile-Based Flashcard App on Iranian Intermediate EFL Learners' Vocabulary Learning and Retention

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ABSTRACT

The advent of technology and the internet has fundamentally transformed foreign language acquisition, particularly by enhancing the convenience of vocabulary learning. Consequently, mobile-assisted language learning (MALL) has garnered significant attention as a beneficial resource for language learners. In light of this, the present study aimed to examine the potential impact of utilizing a Mobile-Based Flashcard Application on the vocabulary learning and retention of Iranian EFL learners. This study employed a quasi-experimental design, with participants selected through convenience sampling. The participants were 40 intermediate EFL learners who were selected based on the Oxford Placement Test. Then, the participants were randomly divided into two groups of study namely experimental and control. The participant in the experimental group underwent an eight-session treatment including learning vocabulary based on using the Anki mobile App. In the control group, however, the participants gained new vocabulary by conventional methods. Upon completion of the treatment, an immediate and delayed post-test was administered to evaluate participants' vocabulary learning and retention. The findings of the study indicated that the use of the Anki mobile application led to a significant enhancement in learners' vocabulary acquisition and retention. The findings of this research highlight the potential of educational software, specifically the Anki mobile app, as a valuable tool for English instructors to enhance vocabulary learning.

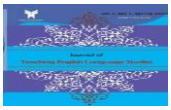
Keywords: Mobile-Assisted Language Learning (MALL), Mobile-Based Flashcard App, Vocabulary Learning, EFL Learners

1. INTRODUCTION

Vocabulary knowledge is a crucial component in the process of learning a second language (L2). Many researchers in the filed emphasized the impact of learning vocabulary on second language pedagogy and research (e.g., Cahyono & Widiati, 2015; Schmitt et al., 2017; Webb & Nation 2017). They highlighted on the vital influence of vocabulary for language use and communication. Webb and Nation (2017) examined the distinction between incidental learning in L1 and deliberate learning during L2 acquisition, highlighting the significance of vocabulary acquisition as a crucial aspect. Despite the fact that vocabulary mastery is a cornerstone for effective language communication, both students and educators encounter significant obstacles in the process of acquiring and teaching it (Kohnke et al., 2021; Hao et al., 2021).

To enhance the development of both general and academic vocabulary in EFL students, language instructors can leverage a diverse range of instructional strategies. The integration of technology, particularly through the ubiquitous presence of mobile phones, is currently transforming the educational landscape, leading to a paradigm shift in how language is taught and learned (Rizwan, 2021). According to Yang (2013), the advancement of technology, specifically mobile apps, has brought about a significant transformation in the process of learning and teaching. The integration of MALL techniques with traditional teaching methods presents a unique advantage. This combined approach fosters the acquisition of vocabulary, a critical aspect of foreign language learning (Isisag, 2012). The integration of tablets and smartphones into classroom settings for vocabulary learning has been motivated by different aspects, as pointed out by Leis et al. (2015). In contemporary education, instructors have access to a plethora of strategies and methods for teaching vocabulary, encompassing platforms such as Duolingo, game-based mobile applications, podcasts, flashcards, and even social media applications (Honarzad & Soyoof, 2020; Parsayi & Soyoof, 2018; Pratiwi et al., 2021; Putri, 2022; Quan, 2019; Soyoof et al., 2021; Soyoof, 2018; Soyoof, 2022; Zung et al., 2022). Quan (2019) argued that the utilization of mobile affordances enhances the practicality and accessibility of Data-driven Learning, a self-directed process for discovering how words are used in a real-life context, to the learners. The aforementioned attributes underscore the extent to which mobile technology has permeated human life and its considerable impact on the learning and teaching processes.

While the field of vocabulary learning technology is constantly expanding, few studies have been investigated the effect of MALL on vocabulary learning. Language instructors and learners are faced with some difficulties due to time constraints in classes. This encourages language instructors and scholars to find a way to make learning more interesting. The use of technologies can be considered as one of the effective ways to assist language instructors in teaching vocabularies. Many scholars in the field have emphasized on the implementation of MALL in the classroom. The present study attempted to examine the effect of applying MALL on Iranian EFL learners' vocabulary learning. Despite the increasing popularity of cellphones in Iran, there is limited research on using mobile apps in EFL contexts. Taking into account the aforementioned aspects in relation to the importance of vocabulary acquisition and the subtle role that mobile apps can play in this field, the implementation of a mobile app, which



considers all these issues by educators, seems productive and promising. Thus, it is essential to use different tools for accelerating the learning process. Using different software programs such as Anki App may be effective in vocabulary learning. Therefore, the goal of this study was to examine the impact of applying Mobile-Based Flashcard App (Anki) in promoting Iranian EFL learners' vocabulary learning and retention. The current investigation aimed to address the following research question:

1. To what extent does incorporating the Mobile-Based Flashcard App (Anki) into vocabulary instruction impact Iranian EFL learners' learning and retention of new vocabulary?

2. LITRATURE REVIEW

2.1.Empirical Studies of Vocabulary Learning through Using MALL

The potential of MALL for learning new vocabulary has garnered significant research attention. Hashemifardnia et al. (2018) investigated the use of WhatsApp as a vocabulary learning tool for Iranian EFL learners. Their findings demonstrated statistically significant improvement in vocabulary knowledge among participants in the WhatsApp group compared to the control group. Similarly, Gurkan (2018) employed a qualitative approach, revealing that EFL learners found mobile-assisted vocabulary learning applications to be effective, motivating, and beneficial. Furthermore, Fageeh (2013) compared the vocabulary acquisition of EFL learners using mobile phone applications to a control group without access. The study found that learners using mobile apps exhibited superior performance. Similarly, in a meta-analysis conducted by Mahdi (2018), 16 different types of research were reviewed, all focusing on mobile-assisted vocabulary learning. This meta-analysis yielded moderate effect sizes, suggesting a positive impact of mobile learning on L2 vocabulary learning. The findings further indicated that adult learners tend to be more proficient users of mobile phones for vocabulary learning compared to young learners, thus benefiting more from this approach. Further research by Shahbaz and Ishtiaq Khan (2017) investigated the effectiveness of a self-designed mobile application for vocabulary learning among Chinese college students. The study employed a control group design, where the experimental group learned vocabulary using the "Word Learning-CET6 App" while the control group did not have access to such a tool. The results indicated that mobile-based vocabulary learning yielded comparable effects within the broader context of language learning, with the experimental group demonstrating statistically significant improvement compared to the control group. Ali and Mohamad Ghazali (2016) invistigated teachers' perspectives on the VocBlast app for technical vocabulary acquisition. Both studies suggest promise for MALL in these areas. Al Yafei and Osman's (2016) research examined mobile learning's impact on vocabulary retention, revealing no significant difference on the initial posttest but a significant advantage for the mobile learning group on the delayed posttest. These findings collectively highlight the potential of MALL for enhancing various aspects of L2 vocabulary acquisition.

2.2.Mobile-based Flashcards

The use of flashcard mobile apps for learning English vocabulary has been extensively researched, with numerous empirical studies examining their effectiveness. Azabdaftari and Mozaheb (2012) indicates that the customization features of flashcard apps, which allow learners to create their

own sets and tailor their learning experience to their specific needs, enhance vocabulary acquisition. Personalization ensures that learners focus on vocabulary that is most relevant to them, increasing the effectiveness of study sessions. In another study, Ashcroft et al. (2016) carried out a study to examine the efficacy of digital flashcards in comparison to traditional paper flashcards in facilitating English vocabulary learning among Japanese university students. The results indicated that students at lower proficiency levels showed significantly higher vocabulary gains when using digital flashcards compared to paper flashcards.

Köse and Mede (2018) conducted a study in Turkey to examine the potential effects of a mobile flashcard application on the vocabulary development and motivational levels of EFL learners enrolled at a private university. The findings showed that the use of the mobile flashcard application significantly improved students' vocabulary acquisition. Additionally, the study indicated that students applying the app were more motivated and engaged in their learning compared to traditional methods. The spaced repetition feature of the app played a crucial role in enhancing vocabulary retention by providing systematic review intervals that helped solidify learning. Additionally, Yüksel et al. (2020) investigated the perceptions of EFL learners regarding the use of digital flashcards for vocabulary learning, specifically comparing their effectiveness against traditional wordlists for learning technical vocabulary. The findings revealed that students exhibited greater acquisition of technical vocabulary through the use of digital flashcards and maintained favorable attitudes towards their utilization. The study concluded that teacher-prepared digital flashcards could significantly enhance the acquisition of technical vocabulary. Similarly, Xodabande et al. (2022) conducted a year-long study with 55 Iranian high school students. This study compared the effectiveness of mobile application flashcards and paper flashcards for vocabulary acquisition. The results revealed that the students in the mobile application group demonstrated significantly higher gains in receptive vocabulary knowledge compared to the paper flashcard group. This finding further emphasizes the potential of digital tools in enhancing vocabulary learning outcomes.

In another recent study, Li and Hafner (2022) investigated the influence of mobile-assisted vocabulary learning (MAVL) on Chinese EFL learners, with a particular emphasis on both receptive and productive vocabulary knowledge. They conducted their research with 85 undergraduate students, dividing them into two groups: one using mobile-based flashcards and the other using traditional paper-based flashcards. The findings revealed that both methods effectively enhanced students' vocabulary knowledge. However, the mobile-based flashcards group showed significantly greater gains in both receptive vocabulary and productive vocabulary. This suggests that the interactive and flexible nature of digital flashcards offers a more effective approach for vocabulary acquisition compared to traditional methods it is also pertinent to highlight that language learners have the potential to enhance not only their vocabulary retention through mobile applications but also to cultivate their self-regulation abilities (Kondo et al., 2012). To investigate the utilization of digital flashcards by students within the context of self-regulated learning, Zung et al. (2022) found that students using digital flashcards showed significant improvements in both the retention and recall of vocabulary compared to those using traditional methods. The study attributed this success to the interactive features and accessibility of the mobile application, which allowed for more consistent and engaging study sessions. Additionally, students reported higher motivation and a more positive attitude towards learning when using the digital flashcards. Studies also highlight that mobile flashcard apps can increase learner engagement and

motivation. Jeong (2022) found that learners were more motivated and found the learning process less stressful when using mobile apps compared to traditional methods. The interactive features and gamified elements of these apps make learning more enjoyable and less monotonous, which can lead to higher levels of sustained engagement.

Overall, empirical studies support the efficacy of flashcard mobile apps in learning English vocabulary. Their effectiveness is enhanced by features like spaced repetition, customization, and interactivity, which cater to the cognitive and motivational needs of learners. While comparative studies suggest that these apps can outperform traditional methods, the overall success of vocabulary acquisition through flashcard apps also depends on user engagement, app design, and the integration of effective learning strategies.

3. METHODOLOGY

3.1. Research Design

This study employed a quasi-experimental methodology, utilizing a pre-test-post-test design to examine the effects of vocabulary learning and retention facilitated by the Anki App. Two groups of students were involved: an experimental group, which received vocabulary instruction via the Anki App, and a control group, which received conventional instruction methods. The independent variable under investigation was the utilization of the Anki App, while the dependent variable was the participants' vocabulary learning outcomes.

3.2.Participants

A sample of forty EFL learners was recruited from Private English Language Institute in Amol city, Mazandran province. To ensure homogeneity in English language proficiency within the study, participants were recruited based on their scores on the Oxford Placement Test. Following recruitment, learners were randomly assigned to one of two groups: Anki-based vocabulary instruction and traditional instruction group. The age range of the participants spanned from 16 to 21 years old. They were intermediate learners who were studying World English series. A convenience sampling method was employed, prioritizing accessible participants based on factors like location and availability.

3.3.Instruments

3.3.1. Oxford Placement Test

To assess participant receptive language proficiency level, this study employed the Oxford Quick Placement Test (Syndicate, 2001). This test evaluated three key areas: reading, vocabulary, and grammar. It consisted of sixty items divided into two parts. Part one comprised forty multiple-choice questions further segmented into four sub-sections. The first sub-section (questions one to five) specifically focused on grammatical knowledge related to prepositions. Questions six to twenty are in the cloze passage format and the learners selected one option out of three ones. Questions twenty-one to forty assessed the grammatical knowledge of the learners. There are two sub-sections in the second part of the test. For questions forty-one to sixty, measure vocabulary knowledge of the learners. The learners were given thirty minutes to response the questions. The results of test were classified according to the rubric rank of OPT.

3.3.2. Pre-test and Post-test

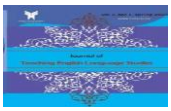
For both the vocabulary pre-test and post-test, twenty multiple-choice items were administered to the participants. While the content of the pre- and post-tests remained consistent, the order of items was varied to mitigate potential test-effect. The construction of the test adhered to two main criteria: (1) suitability for the participants' proficiency level, and (2) alignment with the vocabulary covered in the classroom for both groups. Specifically, the test was designed in accordance with the content outlined in the participants' course textbook, which primarily selected from the World English book. The difficulty level of both the pre-test and post-test was equivalent, tailored to intermediate English language learners. To ensure the reliability of the tests, a pilot study involving fifteen EFL learners was conducted. The reliability was assessed using Cronbach's alpha analysis, yielding a coefficient of r = 0.82, indicating satisfactory reliability. Additionally, to ascertain content validity, validation was sought through the consensus of two experienced English language teachers.

3.3.3. Anki App

Anki, a free and open-source flashcard application available on various platforms like Windows, Mac, Linux, and Android (Ankitects Pty Ltd, 2021), leverages the Spaced Repetition System (SRS) to optimize vocabulary learning and retention. This system strategically schedules review sessions, prioritizing more frequent revisits of new or challenging flashcards over familiar or simpler ones, thereby optimizing information retention. The researchers opted for Anki as the tool of choice for this study due to several factors. Firstly, Anki incorporates a built-in spaced-repetition engine, which aligns with the study's objectives regarding memory retention. Secondly, its widespread availability across various platforms and operating systems, coupled with its cost-free accessibility, ensures inclusivity and ease of use for participants. Additionally, Anki's ability to function seamlessly both online and offline across various devices is a noteworthy feature. Moreover, It is important to acknowledge that while Anki primarily functions as a flashcard application, alternative platforms like Quizlet offer a wider range of learning functionalities. These additional features, such as test mode, match mode, and gamification elements, can cater to different learning styles and preferences, potentially enhancing engagement and motivation for some learners. This expanded feature set positions these platforms beyond mere flashcard applications, potentially impacting the reliability of the present study (Waluyo & Bucol, 2021). Additionally, another notable consideration is that certain applications, like Quizlet, may provide extra features exclusive to premium subscriptions. For example, in the free version, users may be unable to incorporate images into flashcards (Pechenkin et al., 2018).

3.4. Procedures

The main purpose of the current study was to examine the impact of using Mobile-Based Flashcard App (Anki) on the on the vocabulary learning and retention of Iranian EFL learners. The Mobile App was carried out in a private language Institute in Amol city, Mazandaran Province. To conduct the study Anki software was used as a mobile app to learn vocabulary. In doing so, participants were randomly assigned to either the experimental group (n = 20) or the control group (n = 20). Over the course of the study's 8-week duration, students in both groups were tasked with learning new vocabulary items. The experimental group utilized the mobile application Anki for this purpose, whereas the control group relied solely on traditional methods. Anki, a customizable flashcard app, empowered learners in the intervention group to create personal study materials. Before each unit, a ten-minute "Goals" introduction ensured clarity on upcoming vocabulary. Anki's spaced repetition system strategically presented flashcards to prevent forgetting, promoting long-term knowledge beyond rote memorization. Learners could further enhance their understanding by incorporating images and audio recordings (with transcriptions) into their flashcards. This multimedia approach offered a progressive alternative to traditional methods. Following the goal-setting introduction, instructor meticulously



presented new vocabulary through spelling, pronunciation, examples, and contextualization. However, the control group employed conventional vocabulary learning methods provided by the instructor. These methods included using Persian equivalents, paper flashcards, lists of synonyms and antonyms, sentence construction, and dictionary lookups. Following the intervention, an immediate posttest assessed vocabulary learning. Finally, after two weeks, the delayed-posttest was administered to find out the impact of the ANKI application on the participants' vocabulary retention.

4. RESULTS AND DISCUSSION

To assess the effects of mobile-based flashcards (Anki) versus traditional methods on EFL learners' vocabulary learning, all participants completed a pre-test to ensure uniformity in their initial vocabulary knowledge. An independent-sample t-test was employed to compare the mobile flashcard group with the conventional teaching group. The analysis revealed no significant differences in scores between the mobile-based flashcards group (M = 10.32, SD = 1.92) and the traditional methods group (M = 9.84, SD = 1.87), ($t(38) = 0.931$, $p > 0.435$). The comparison between the mean scores revealed a minimal difference of 0.48 points between the two groups on the pretest. Thus, the groups were confirmed to be homogeneous. The pre-test results are presented in Table 1 and Table 2 below.

Table 1:
Descriptive Statistics of Pre-test

	group	N	Mean	Std. Deviation	Std. Error Mean
pretest	experimental	20	10.32	1.92	0.479
	control	20	9.84	1.87	0.458

Table 2:
Independent Sample T-test of Pre-tests

	Levene's Test for Equality of Variances		t-test for Equality of Means						
								95% Confidence Interval of the Difference	
	F	Sig.	T	df	Sig. (2-Tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Equal variances assumed	0.536	0.628	0.931	38	.435	0.440	0.646	-0.713	1.642
Equal variances not assumed			0.931	31	.435	0.440	0.646	-0.713	1.642

To examine the effectiveness of the Anki App, the post-test scores of both the experimental and control groups were analyzed. As a first step, descriptive statistics were calculated for these scores. Table 3 summarizes the average vocabulary scores for each group. The posttest vocabulary scores, revealing a higher mean for the Anki group (M = 16.62, SD = 1.21) compared to the conventional teaching group (M = 13.41, SD = 1.13). To statistically examine the effect of the Anki App on vocabulary learning, an independent-samples t-test was conducted.

Table 3:
The Descriptive Statistics of Post-tests

	group	N	Mean	Std. Deviation	Std. Error Mean
Posttest 1	experimental	20	16.62	1.21	0.342
	control	20	13.41	1.13	0.321

The t-test results (t (38) = 9.76, p < 0.002) revealed a statistically significant difference between the Anki and conventional teaching groups' posttest vocabulary scores (see Table 4). This finding suggests that the Anki app effectively promoted learners' vocabulary learning.

Table 4:
Independent Sample T-test of Post-tests

	Levene's Test for Equality of Variances		t-test for Equality of Means						
								95% Confidence Interval of the Difference	
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Equal variances assumed	0.036	0.729	9.76	38	0.002	3.17	0.321	2.276	3.437
Equal variances not assumed			9.76	22	0.002	3.17	0.321	2.276	3.437

To assess participants' vocabulary retention, a delayed post-test was administered two weeks after the instructional phase concluded. This delayed assessment aimed to gauge participants' ability to retain the learned vocabulary beyond the immediate post-test period. The independent-samples t-test was utilized as the statistical method for analyzing the delayed post-test scores. The outcomes of this analysis are outlined in Tables 5 and 6.

Table 5 presents the descriptive statistics for the delayed post-test scores. The mean score for the experimental group (M = 16.21, SD = 1.32) was higher than the control group (M = 12.76, SD = 1.27), reflecting a difference of 3.45.

Table 5:
The Descriptive Statistics of Post-tests

	group	N	Mean	Std. Deviation	Std. Error Mean
Posttest 2	experimental	20	16.21	1.32	0.236
	control	20	12.76	1.27	0.223

The independent-samples t-test results in Table 6 revealed a statistically significant difference (t (38) = 8.97, p < 0.000) in delayed post-test scores between the experimental and control groups, favoring the experimental group. The findings of the delayed post-test results revealed improvement among the participants who received Anki Flashcard Software instruction, suggesting a positive effect on vocabulary retention.

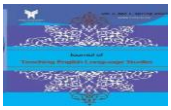


Table 6:
Independent Sample T-test of Post-tests

	Levene's Test for Equality of Variances		t-test for Equality of Means						
								95% Confidence Interval of the Difference	
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Equal variances assumed	0.028	0.689	8.97	38	0.000	3.30	0.308	2.231	3.414
Equal variances not assumed			8.97	38	0.000	3.30	0.308	2.231	3.414

This study aimed to investigate the potential impact of using the mobile flashcard application Anki on Iranian EFL learners' vocabulary learning and retention. The experimental group received vocabulary instruction through Anki, while the control group followed a traditional teaching method. The results revealed a statistically significant difference in vocabulary knowledge between the experimental and control groups after instruction, with the Anki group demonstrating superior performance. This aligns with previous research findings on the effectiveness of mobile application flashcards in enhancing vocabulary learning (e.g., Ashcroft et al., 2016; Azabdaftari & Mozaheb, 2012; Basoglu & Akdemir, 2010; Kose & Mede, 2018; Li & Hafner, 2022; Xodabande et al., 2022; Zung et al., 2022).

The main purpose of this study was the introduction of treatment program (e.g., Anki application) associated with the development of vocabulary and to look for its efficacy/if any on the learning vocabulary. The findings of the present study were in agreement with the earlier research (Ali & Mohamad Ghazali, 2016; Al Yafei & Osman, 2016; Başoğlu & Akdemir, 2010; Fageeh, 2013; Gurkan, 2018; Hashemifardnia et al., 2018; Mahdi, 2018; Shahbaz & Ishtiaq Khan, 2017). For example, Mahdi (2018) carried out a meta-analysis study focusing on mobile-assisted vocabulary learning. The findings of this study indicated the positive impact of mobile learning on L2 vocabulary acquisition. Moreover, the results of the study revealed that adult learners tend to be more proficient users of mobile phones for vocabulary learning compared to young learners.

Another goal of the present study was to found the impact of Anki Flashcards on EFL learners' vocabulary retention. The results suggest that the Anki Flashcard Software instruction positively impacted participants' long-term vocabulary retention, as evidenced by the significant difference in the delayed post-test and the improvement within the experimental group. Spaced repetition, a key feature of Anki, is based on the psychological principle that information is more effectively retained when reviewed at strategically increasing intervals. This method has been validated by multiple studies. For instance, Nakata (2011) found that Japanese EFL learners using spaced repetition software outperformed those using traditional study methods in both immediate and delayed vocabulary tests. This indicates that the spaced repetition facilitated by Anki not only aids in immediate learning but also contributes to long-term retention of vocabulary. The digital nature of Anki, which allows for the incorporation of audio and visual aids, provides a multifaceted approach to learning that can cater to different learning styles, further enhancing its effectiveness. Visual and auditory enhancements have been shown to aid in memory retention by creating more robust neural connections associated with the vocabulary items (Mayer, 2009). Additionally, Anki's ability to track learner progress and adjust the difficulty of

flashcards based on user performance ensures that the material remains appropriately challenging, preventing both boredom and frustration. This adaptive learning approach is supported by Pavlik and Anderson (2008), who found that adaptive learning systems like Anki optimized the timing of reviews to maximize learning efficiency and retention.

Another significant advantage of Anki is the use of example sentences in vocabulary learning significantly accelerates both the acquisition and retention of new words. This approach leverages context and practical usage, which enhances understanding and memory retention through several mechanisms supported by empirical research. According to Nation (2001), contextualized vocabulary instruction aids in deeper processing and better retention compared to learning words in isolation. When learners encounter a new word within a meaningful sentence, they can infer its meaning from the surrounding context, which aids in more robust memory encoding. Using example sentences helps learners understand the nuances and connotations of words. For instance, words with multiple meanings or those that change meaning based on context become clearer when seen in different sentences. This aligns with Schmitt's (2010) findings, which suggest that repeated exposure to words in varied contexts significantly enhances vocabulary comprehension and retention. By encountering a word in different sentences, learners can better understand its various meanings and uses. Creating and using example sentences can transform passive learning into active learning. When learners generate their own sentences, they are actively applying new vocabulary, which reinforces learning through practice and production. Learners actively engage by constructing or interpreting sentences, reinforcing learning through production and retrieval practice (Roediger & Butler, 2011). This multifaceted approach integrates grammar, syntax, and semantics, mirroring real-world language use for well-rounded learning (Hulstijn & Laufer, 2001; Folse, 2004).

Overall, empirical studies consistently support the effectiveness of Anki Flashcards in enhancing vocabulary learning and retention among EFL learners. The spaced repetition system, multimedia integration, customization options, and adaptive learning features collectively contribute to its efficacy. Incorporating Anki into vocabulary instruction can provide a robust, evidence-based method to improve both immediate vocabulary learning and long-term retention.

5. CONCLUSION

This study examined the potential of Anki mobile applications to enhance EFL learners'' vocabulary learning. Results suggest that integrating Anki into vocabulary instruction improved the retention of new vocabulary for the experimental groups, highlighting the potential benefits of technology in education. The study further suggests that utilizing new mobile applications like Anki provides EFL learners with enhanced opportunities to learn vocabulary. The statistically significant advantage of the Anki group might be attributed to increased peer interaction, implying that the combination of learner interaction and technology use contributes positively to vocabulary learning outcomes. The results of the present study may be useful for language learners, language teachers, and curriculum developers. Anki flashcards leverage spaced repetition, a technique that presents information at increasing intervals to combat forgetting. This method significantly enhances long-term vocabulary retention, making it a valuable tool for both teachers and students. Pedagogically, this implies that incorporating Anki into the curriculum can help students retain vocabulary more effectively over time. Anki allows learners to create and customize their own flashcards, adding images, audio, and example sentences. This personalization caters to individual learning preferences and needs, which can increase engagement and motivation. For teachers, this means they can stimulate learners to take ownership of their learning process, fostering a more learner-centered approach. As educational technology evolves, curriculum developers must stay informed about new tools and methodologies. Incorporating Anki and similar technologies into the curriculum ensures that educational practices remain current and effective.

In conclusion, the integration of Anki flashcards into English language classrooms offers numerous pedagogical benefits, from improved vocabulary retention to personalized learning experiences. For curriculum developers, Anki presents an opportunity to design more effective, flexible, and inclusive educational programs that harness the power of technology to enhance learning outcomes.

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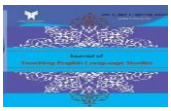

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