Utilizing Anki to Enhance Vocabulary Acquisition among First-Year Students at a University in Hanoi

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ABSTRACT

Numerous studies have explored various aspects of integrating digital flashcards into English language teaching and learning. This study explores students' perceptions of Anki, a web-based flashcard program, and its influences on students' vocabulary acquisition. Using a mixed-method approach, the research involves the participation of 40 freshmen from two intact classes at the elementary level. Data were collected through pre-tests and post-tests, questionnaires, and interviews, and subsequently analyzed. The participants were given a pre-test before embarking on a three-week period of learning the Vocabulary List presented in Reading Explorer 1, 3rd edition, which serves as their textbook. The control group (n = 20) used paper flashcards, while the experimental group (n = 20) employed Anki flashcards. A post-test was carried out to compare the effectiveness of the two vocabulary methods. Afterward, participants completed a survey, and a subset of six individuals were interviewed to gather insights into their perceptions of Anki. The study findings revealed that while traditional flashcards and Anki contributed to improved vocabulary acquisition, the group learning with Anki outperformed the control group. Additionally, learners found Anki to be both useful and enjoyable, although user-friendliness was not considered a significant advantage based on their feedback. The findings are of great value in providing educators and students with a profound understanding of Anki's impact on facilitating learners' vocabulary learning.

Keywords: influence, perceptions, vocabulary learning, Anki flashcards

Introduction

As technology continues to advance rapidly, web-based learning tools have become indispensable components of language learning and teaching, particularly in vocabulary acquisition. The development of digital flashcards is regarded as a significant contribution of technology to the acquisition of L2 vocabulary. Researchers widely agree that digital flashcards

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enhance learning by facilitating information retrieval and improving retention (McLean, Hogg, & Rush, 2013; Spiri, 2014). Moreover, electronic flashcards often incorporate multimedia features, such as audio and animations, which enhance learner motivation and engagement (Allum, 2004).

Anki stands out among the various flashcard applications gaining prominence in L2 research, such as Quizlet and Memrise. This flashcard-based learning software employs spaced repetition to optimize vocabulary acquisition. Anki is used in this study because it addresses students' learning problems, such as ineffective memorization strategies and a lack of consistent review, by automatically scheduling review sessions at optimal intervals. This helps combat forgetting and reinforce long-term memory. Studies have highlighted Anki's effectiveness in promoting vocabulary acquisition and improving the retention of learned information (Altiner, 2011; Zare & Barjasteh, 2017). Its customizable and user-paced nature also supports individual learning preferences, making it a practical and effective tool for enhancing vocabulary retention. This study focuses on the use of Anki in the context of L2 vocabulary learning. It targets language learners who struggle with vocabulary retention and require consistent review. This study is significant because it addresses common vocabulary learning challenges by exploring the potential of Anki as a supportive learning tool. The findings may inform educators, learners, and curriculum designers about the practical benefits of integrating spaced repetition technology into vocabulary instruction.

Literature review

Vocabulary

Vocabulary forms the cornerstone of language proficiency, directly influencing a learner's ability to speak, listen, read, and write effectively (Richards & Schimid, 2002). Mastery of vocabulary enables students to easily grasp lessons presented by their teachers. According to Nation (2001), vocabulary encompasses all the words in a language and often includes words with meanings, especially those accompanying a textbook. Additionally, vocabulary acts as a vital link that binds stories, ideas, and content, facilitating learners' comprehension (Richards & Schimid, 2002). Schmitt (2019) also highlights the fundamental role of vocabulary in communicative competence, concluding that it appears to be a strong predictor of language proficiency.

Vocabulary learning

Laufer and Goldstein (2004) explain that a word consists of a combination of properties or features, and understanding a word involves multiple aspects. These include its spoken and written forms (i.e., pronunciation and spelling), its morphological structure (such as base forms and common derivations), its syntactic role in phrases and sentences, its meaning (including referential, emotional, and pragmatic aspects), its lexical relationships with other words (like synonymy, antonymy, and hyponymy), and its frequent collocations. Similarly, Nation (2001) presents a comprehensive framework for word knowledge, highlighting three key aspects: form, meaning, and use. Among these, use is crucial; however, without fully understanding a word's form and meaning, learners cannot use it correctly.

Recent studies have shown that language learners encounter several problems while learning vocabulary (Webb, 2020). Schmitt (2019) notes that learners may recall word meanings in passive contexts but fail to actively use them in speech or writing due to limited practice with collocations and syntactic patterns. It is also observed by Teng (2016) that students tend to

forget newly learned vocabulary quickly when they do not employ review strategies, such as spaced repetition, especially in traditional learning settings. While digital games offer a modern and engaging approach, particularly for non-English majors (Trinh et al., 2022), research indicates mixed perceptions: teachers worry about time and technology issues, while students, despite acknowledging their effectiveness, prefer occasional use. These findings suggest that vocabulary learning problems persist due to insufficient attention to the multifaceted nature of word knowledge and the lack of effective learning strategies to reinforce it.

Form

When it comes to word forms, learners must understand several key elements, including spelling, pronunciation, affixes, part of speech, and any irregularities. In fact, understanding these aspects is crucial for English learners to achieve a comprehensive understanding of the word. Additionally, it is crucial for learners to thoroughly grasp the grammar of new words. This involves grasping grammatical functions, the changes of words in different grammatical contexts, their regular or irregular forms, and singular and plural variations. Therefore, learners can ensure the correct use of grammar in various contexts.

Meaning

The denotative meaning of a word refers to its real meaning or what it appears to be in a dictionary. Contrastively connotative meaning is defined as the emotional or cultural significance that a word holds in various contexts. This kind of meaning is not always found in a dictionary. Moreover, in order to grasp the broader semantic network of a word, learners of English should also be aware of the connection of a word to other words, such as synonyms, antonyms, and translations.

Use

To fully grasp the use of a word, learners must be able to apply it accurately in various spoken and written contexts; otherwise, the word may lose its practical value. Effective use of a new word requires knowing how it collocates with other words. Therefore, learners need to study vocabulary within collocations and, if possible, commit them to memory. For example, we say “drive a car” but “ride a bicycle.”

In summary, vocabulary lessons should cover a word’s form, meaning, and usage. It is also vital to regularly revisit and practice vocabulary because, without consistent use, learners are likely to forget what they’ve learned, making the learning process ineffective.

Computer-based flashcard programs in language learning

As technology continues to advance rapidly, web-based learning tools have become indispensable components of language learning and teaching, particularly in vocabulary acquisition. The development of digital flashcards is regarded as a significant contribution of technology to the acquisition of L2 vocabulary, with mobile-based strategies gaining prominence (Ngo & Doan, 2023). Elgort and Nation (2010) suggest that using flashcards is an effective method for achieving significant success in acquiring second language vocabulary. Flashcards are typically designed as double-sided learning tools that enable learners to practice the form and meaning of new words by flipping between the front and back of the cards. Generally, one side contains the target word, while the other side displays its meaning. Learners can also personalize their flashcards by incorporating illustrations, phonetic transcriptions, or examples to improve their understanding of the word (Elgort & Nation, 2010).

Numerous researchers support flashcard programs for language learning, emphasizing their effectiveness. A key advantage is the history section, which tracks progress through statistics

or graphs, allowing learners to monitor and adjust their study habits (Nakata, 2011; Teng, 2016). Unlike traditional paper flashcards, digital flashcards offer features such as audio and visuals, which enhance vocabulary acquisition, boost motivation, and promote learner autonomy (Allum, 2004). Specifically, research on a popular digital flashcard platform reveals that its flashcard function is frequently utilized by EFL students (over 30%), with the platform being valued for its ease of use, customization options, and effectiveness in promoting independent vocabulary study (Nguyen, 2022).

The use of Anki as a learning tool

Anki, a free flashcard program by Damien Elmes, is available on computers, smartphones, and tablets. It allows users to create personalized flashcards, or "decks," and access numerous pre-made decks on various subjects. The interface mimics traditional paper flashcards, featuring a two-sided format—one side for the question and the other for the answer. Users can simply click a "Show Answer" button, with the question remaining visible until they do so.

Anki offers two main types of flashcards: recognition cards and recall cards. Recognition cards test learners' understanding by presenting a written segment of the target language. These cards are quicker to use, allowing learners to cover more material; however, they may not help learners effectively use the words in speaking or writing. On the other hand, recalling cards requires active recall, which is prompted by showing a definition or description, prompting learners to type the correct term.

One of Anki's most notable strengths lies in its use of a sophisticated spaced repetition algorithm, which adjusts the frequency of flashcard presentation based on the learner's performance. To be more specific, complex words are shown more frequently, while easier ones appear less often. This enables learners to improve their ability to remember and recall vocabulary effectively (Pyc & Rawson, 2007).

Numerous researchers have conducted their studies on how Anki affects vocabulary acquisition, and the results appeared to be positive. Altiner (2011) pointed out that the use of Anki is beneficial to students as it helped 13 intermediate-level students master at least half of the word list over three weeks. Although they found the app easy to use, they suggested adding multimedia elements, such as visuals and pronunciation, to enhance the learning experience. Zare and Barjasteh (2017) in their study involving 41 advanced-level students examined the impact of Anki on vocabulary enhancement. Through a pre-test and post-test study, the research demonstrated significant improvement in students' vocabulary over three weeks of studying with Anki, confirming its effectiveness in boosting vocabulary acquisition. Vu et al. (2024) reinforced this claim in the context of Vietnamese learners, highlighting that independent study with Anki led to substantial improvement in vocabulary retention. However, the existing literature review is mostly confined to the general use of Anki, rather than its specific application in learning vocabulary in English Language classrooms in higher education, particularly in the tertiary education setting in Vietnam. Therefore, to address this gap, the present research aims to shed light on students' perceptions of integrating Anki into English vocabulary learning at the tertiary level.

Research Questions

This study aims to explore whether Vietnamese students can enhance their vocabulary using Anki. To achieve this aim, the research addresses the following questions:

1. How does Anki influence the vocabulary acquisition of first-year students at a university in Hanoi?
2. What are the perceptions of first-year students regarding learning vocabulary with Anki?

Methodology

Setting & Participants

This study involves 40 students majoring in English at a university in Hanoi. These participants were in their first year and were selected from two classes taught by the researcher during a 10-week reading course, which met twice a week for 2 hours each. Each class consisted of twenty students and had similar proficiency levels. They are expected to reach the A2 level of the CEFR by the end of the academic year. The first class was the experimental group, which utilized Anki to learn vocabulary, whereas the second class was the control group, using traditional paper flashcards.

Study Design

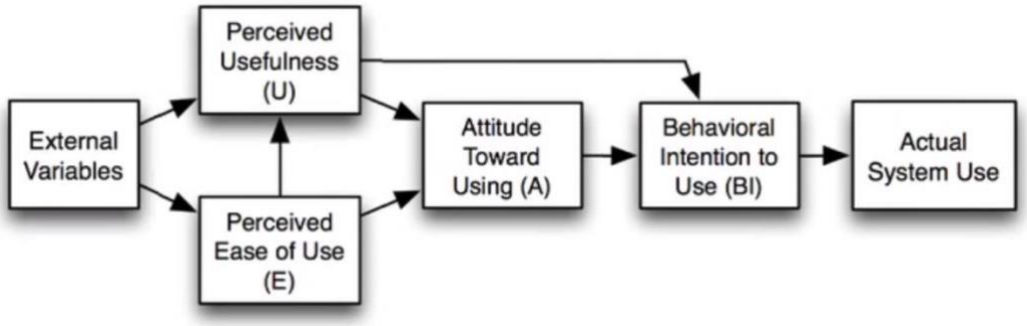
This study utilized mixed-method research. Quantitative data were collected through a pre-test and post-test with two classes: an experimental group using Anki and a control group using traditional flashcards. Both groups had a similar level of vocabulary proficiency before the treatment. Qualitative data were gathered through a Likert-scale survey and follow-up interviews to explore students' perceptions of the program.

The materials used in class were from Reading Explorer 1, equivalent to the A2 level of the CEFR. The lexical items included in the tests were randomly selected from this book and taught during the first semester. The pre-test consists of a vocabulary test with 25 words, presented in two tasks: matching words with corresponding pictures and writing the meanings of the given words. After 3 weeks, the experimental group was introduced to Anki, which provides two learning approaches (recognition and recalling cards). The recall card improved vocabulary retention and encouraged students to actively use the target words, rather than relying on passive recognition. The flashcards display Vietnamese definitions accompanied by images on their fronts. After looking at the attached image with the word definition, students were required to enter the word into the response box. They then clicked on the “Show Answer” button to check their response. The Anki intervention introduced in Week 4 was chosen to ensure that students were already familiar with the course content and traditional flashcards before transitioning to a new learning tool. After the treatment, both groups took a post-test with the same format as the pre-test. The tests were designed to be brief (approximately 10 minutes) to minimize disruption to regular lessons. The experimental group's Anki deck focused on recall-based learning to encourage students to actively use the vocabulary. In addition to the tests, a Likert-scale survey and interviews were conducted after the intervention to gather students' feedback on the program. The survey included one question about the type of device the students had used to learn Anki, with 12 items based on three criteria: usefulness, usability, and enjoyment. The survey items about usefulness and usability were adapted from the Technology Acceptance Model (TAM) proposed by Davis (1989). According to Davis, users' decisions to

adopt new technology are influenced by perceived usefulness (PU) and perceived ease of use (PEOU).

Figure 1.

Technology acceptance model (Davis et al., 1989)



Apart from this model, the researcher adapted and modified questions from a survey used in Ranalli's study (2009) to best align with the nature of the current study.

Table 1.

Subcategories in the survey

Usefulness	- The images helped me remember new vocabulary. - I learned a lot of new words by reviewing their meanings. - My vocabulary has grown since I began using Anki. - I believe Anki can support my future vocabulary development.
Usability	- Anki was simple to use. - I used "again", "hard", "good", and "easy" features in Anki to manage my vocabulary learning. - I did not experience any technical problems while using Anki.
Enjoyment	- Using Anki to learn vocabulary was enjoyable - Learning new words with Anki was inspiring. - I like using the gap-fill tasks when learning new words. - I would use Anki again in the future. - Tools like this should be included in language learning courses.

Data collection & analysis

This study aims to address two research questions: how Anki affects students' vocabulary learning and how students perceive the tool. Quantitative data were gathered from pre- and post-test scores with two separate groups. These test scores were analyzed using the SPSS program, employing a paired samples t-test to compare within-group differences and an independent-samples t-test to compare scores between two groups. Regarding the students' perceptions of Anki, the researcher analyzed data collected from a survey and interviews. Responses in the questionnaire were processed using frequencies of each item through the SPSS program. For the interview data, a qualitative coding method was employed. Since the second question focused on students' perception of Anki regarding its usefulness, availability, and enjoyment, the researcher organized the transcript and notes into these three themes. During

the review of the qualitative data, a color-coding system was used to highlight key words and phrases relevant to each category.

While reading through the transcript and notes, key words and phrases relevant to each category were highlighted in different colors. After that, all similarly colored data points were grouped into their respective themes (usefulness, availability, and enjoyment). These findings were then used to support survey results.

Results

Responding to the Research question 1

The central question guiding this research is how Anki use affects vocabulary learning in first-year students at a Hanoi-based university. Both groups of students took a post-test consisting of 25 questions, and the results were analyzed to assess the impact of Anki on vocabulary acquisition.

Table 2.

Paired sample statistics of pre-test and post-test of students

		N	Mean	Std. Deviation	Std. Error Mean
Experimental Group	Pre-test	20	7.4750	1.31264	.29352
	Post-test	20	8.9000	1.03364	.23113
Control group	Pre-test	20	7.0500	1.17988	.26383
	Post-test	20	7.6500	1.13671	.25418

As shown in Table 1, the experimental group exhibited a statistically significant change from the pre-test to the post-test, with a score increase from 7.475 to 8.9, respectively. The average score increased by about 1.5 points, indicating improvement. To determine if the difference was statistically significant, a paired-samples t-test was conducted, and the results are presented below.

Table 3.

Comparison between pre-test and post-test results

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Experimental Group	Pre-test – Post-test	-1.42500	.61291	.13705	-1.71185	-1.13815	-10.398	19	.000
Control group	Pre-test – Post-test	-.60000	.57583	.12876	-.86950	-.33050	-4.660	19	.000

As shown in Table 2, the difference was significant ($p < 0.001$). It can be inferred that Anki usage helped learners of the experimental group develop their vocabulary.

Regarding the control group's results, the post-test results (M = 7.65) slightly exceeded the pre-test results (M = 7.05), indicating improved performance on the vocabulary test.

Table 4.

Independence Sample Tests

		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
Changes in students' test scores	Equal variances assumed	.078	.782	4.387	38	.0001	.82500	.18805	.44432	1.20568
	Equal variances not assumed.			4.387	37.853	.0001	.82500	.18805	.44427	1.20573

An independent sample t-test was carried out to examine the differences in post-test performance between these groups. The results indicated a noticeable difference between the mean scores of the experimental group (M = 8.90, SD = 1.03) and the control group (M = 7.65, SD = 1.14), with a statistically significant difference, t(34) = 4.387, p = 0.001. The findings imply that the use of Anki has a beneficial impact on students' vocabulary learning.

Responding to the Research question 2

Usefulness

The students rated the effectiveness of Anki by judging whether the illustrations and meanings for target words were helpful or not, and then they provided an overall assessment of its usefulness.

Figure 2.

Students' Perceptions about the usefulness of Anki

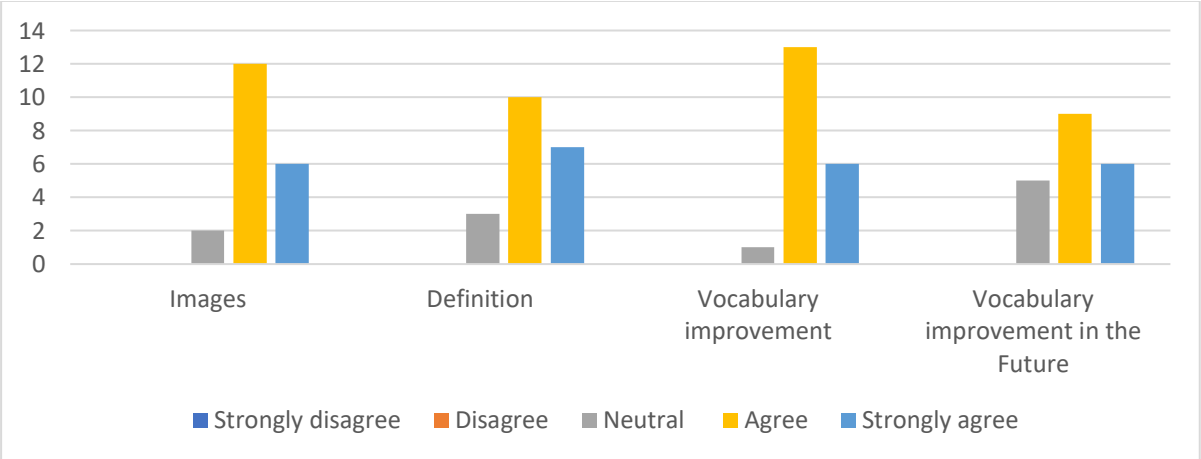


Figure 2 shows that students considered both images and definitions effective, but 12 students strongly preferred the visual aids associated with the words, slightly outnumbering the 10 students who preferred the definitions.

> *[S18] I like the use of images. They were eye-catching. I'm able to understand word meanings through visual cues.*
>
> *[S6] Although the images were generally helpful, a few caused confusion. Sometimes I had to rely on the definitions.*

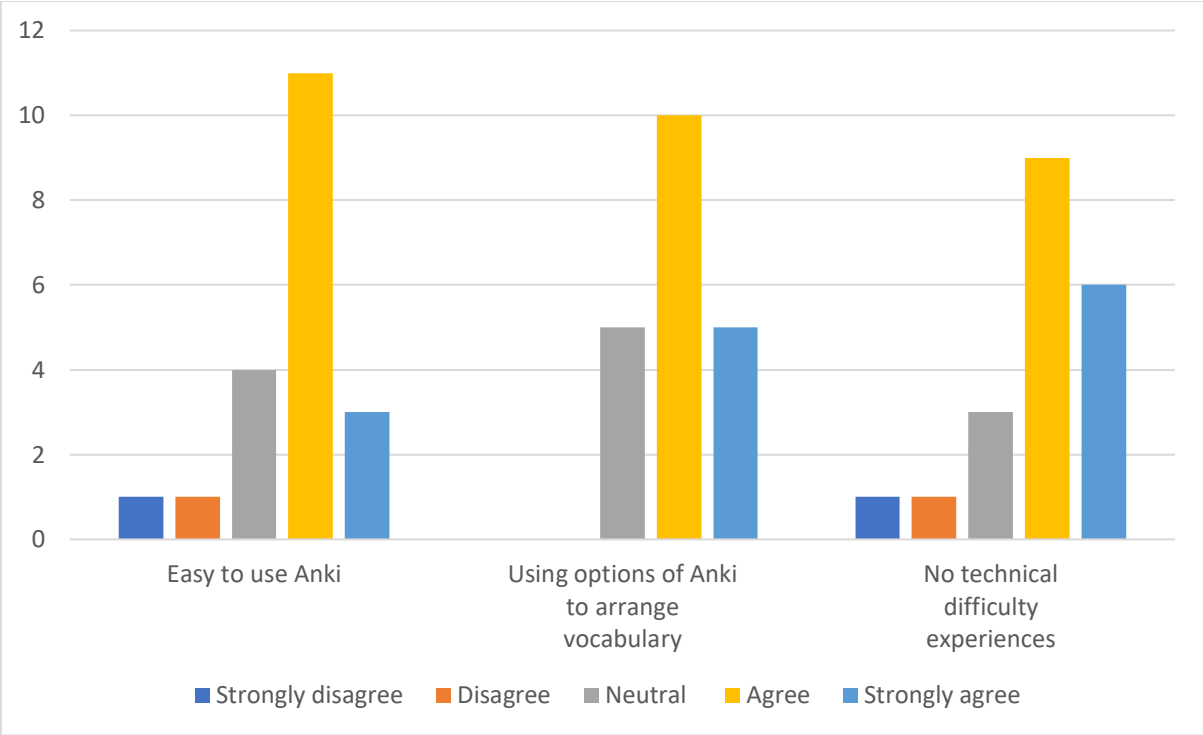
Additionally, most students agreed that Anki helped expand their A2 vocabulary, with 13 selecting "agree" and six choosing "strongly agree." Interviews further confirmed their positive attitudes through positive comments.

> *[S7] This Anki deck improved my A2 vocabulary by allowing me to review words repeatedly, helping me remember them better.*

Usability

Figure 3.

Students' Perceptions about the Usability of Anki



As shown in Figure 3, students had varied opinions on the ease of use of Anki. The majority of students had no trouble utilizing the four options in Anki for vocabulary organization, likely due to prior instructions from the teachers. Similar feedback was also gathered during the interviews.

> *[S18] Fortunately, using Anki was not difficult for me. I initially assumed it would be challenging because the instructions were written in English, but it turned out to be absolutely simple. After my teacher guided me on how to use it, I can use it confidently.*

However, two students found it quite challenging when they encountered technical difficulties and were unable to resolve them.

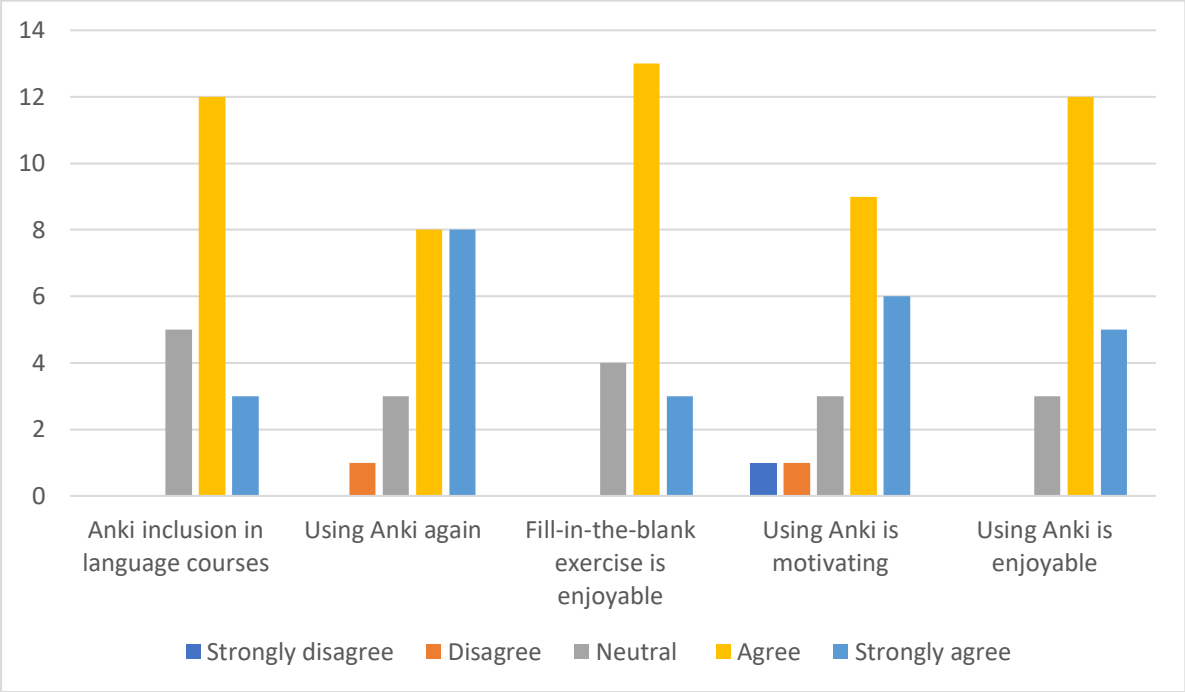
[S6] I didn't know how to use it correctly; it kept informing me about the error, the cause of which I did not know. I always had to ask my teacher for help.

[S15] I kept trying to set up the app, but I got stuck in many steps.

Enjoyment

Figure 4.

Students' attitudes towards enjoyment



The final aspect the researcher investigated was how much students preferred using Anki. Sixteen out of twenty students expressed an interest in fill-in-the-blank exercises. Interviewees reported that they enjoyed this exercise because it helped them remember word spellings.

[S13] Anki offers a fun quiz so I could check my memory of word spelling.

However, fewer students reported feeling motivated by using the application compared to those who enjoyed the exercises.

[S5] Studying every day diminished my enthusiasm. The tasks became repetitive, and I disliked that greatly.

[S15] I only used Anki because my teacher asked me to. I didn't feel significantly more motivated by Anki compared to conventional learning methods.

In addition, students were surveyed on whether they intended to use Anki in the future. 80% agreed that they would continue using it. However, the remaining participants, who were unwilling to use it again, found the deck not user-friendly due to the complexity of creating high-quality Anki flashcards.

Finally, varied opinions exist on whether Anki should be integrated into language courses. Students who were interviewed said that while some may not enjoy it, others could benefit, and suggested Anki should be seen as an additional tool for vocabulary practice, alongside traditional methods like writing words in a notebook. Interviewed students expressed concerns

about using Anki in courses, including the cost of the mobile version for iOS users and the need for laptops or desktops.

Discussion

The findings of this study are consistent with previous research that highlights the effectiveness of Anki in enhancing vocabulary learning. In a study conducted by Altıner (2011), university students were also encouraged to use Anki to learn academic vocabulary over several weeks. The analysis revealed statistically significant vocabulary gains, with students reporting that Anki's repetition and multimedia elements supported long-term retention. Similarly, Mujahidah et al. (2024) implemented AnkiApp with junior high school students and observed a remarkable improvement in post-test scores compared to pre-test scores, with the mean rising from 26.6 to 68.4. The paired-samples t-test confirmed the significance of this increase, suggesting that frequent exposure and self-paced review in AnkiApp contributed to better vocabulary learning.

In addition, the findings of this study on students' perceptions of Anki's usefulness, usability, and enjoyment also align with previous research. Zare and Barjasteh (2017) also identified Anki as a valuable tool for vocabulary learning. Learners in their study showed a strong appreciation for certain features, such as example sentences and visual aids. Similarly, participants in the present study favored images over definitions, noting that visuals supported their understanding of word meanings more effectively. However, some students still relied on definitions when images caused confusion. In terms of usability, most students in this study found Anki to be easy to use, particularly after receiving guidance from their teacher. A small number, however, encountered technical issues that they could not resolve independently. Despite generally positive feedback, Zare and Barjasteh (2017) reported similar usability challenges. Regarding enjoyment, many students in the current study preferred Anki's interactive exercises, such as fill-in-the-blank tasks, which improved their spelling. However, others felt that daily practice became repetitive, reducing motivation. This response is consistent with Altıner's (2011) study, in which students enjoyed the learning format but reported boredom due to the repetitive nature of the activities. These findings collectively support the conclusion that Anki is a helpful and user-friendly vocabulary learning tool, although its impact and perceived effectiveness may vary depending on usage context and learner preference.

Conclusion

The research findings lead to several conclusions. First, with respect to Anki's impact on vocabulary development, comparing students' scores before and after the intervention reveals that Anki is a useful tool for learners to expand their vocabulary range and improve acquisition. In terms of learners' opinions of this digital program, most participants recognized its usefulness and enjoyment. However, some learners stated that using it was not friendly for beginners and did not provide high motivation.

The study has a few limitations that should be considered. First, the participants were elementary-level learners and novice users of digital flashcards. Therefore, this representative sample could reflect a group of beginners in the language. Additionally, the study employed intact groups instead of random sampling, which limited the generalizability of the findings to a larger population. Second, the intervention happened in only three weeks, which was too short to allow for extended review and retention. Finally, the study only measured receptive vocabulary knowledge. Schmitt (2010) explained that to fully understand learners' vocabulary

skills, it is essential to consider various aspects of word knowledge, including word formation, semantic relationships, and contextual usage.

The study also provides several pedagogical recommendations for language teaching and learning. Since Anki is found to be both useful and enjoyable for learning L2 vocabulary, it is recommended for use by language learners. Teachers can incorporate Anki as either a mandatory classroom activity or an optional source for independent study. Additionally, educators can utilize it as a valuable tool to enhance students' vocabulary retention and acquisition within their courses.

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Biodata

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