

An Investigation into the Effect of Using Duolingo to Enhance Students' Vocabulary

Nguyen Thi Quyen^{1*}

¹ Foreign Trade University, Hanoi, Vietnam

* Corresponding author's email: k59.2014710086@ftu.edu.vn

*  <https://orcid.org/0009-0001-2176-6588>

 <https://doi.org/10.54855/acoj.251621>

®Copyright (c) 2025 Nguyen Thi Quyen

Abstract

This study aims to investigate the effect of using Duolingo to enhance students' English vocabulary. It focused on students in Hanoi who learn English as a second language. The researcher adopted a mixed method. For data collection, a questionnaire was administered to 163 students in Hanoi, and then the researcher conducted semi-structured interviews with 6 of them who learned English with Duolingo. Concerning data analysis, the computer program Statistical Package for Social Sciences (SPSS) is used to analyze the numerical data, and the interview results are used to support the analysis process. Overall, the study results illustrated that Hanoi students have positive attitudes toward using Duolingo to learn vocabulary. This indicates that the hypotheses of this study were accepted, suggesting that the Duolingo application can be utilized to enhance students' vocabulary. Despite several advantages such as progress tracking and interactive exercises, this application has some disadvantages that unsatisfied users' learning process, including the lack of depth and contextualization in certain vocabulary areas, and limited customization options. As a result, the researcher suggests that English teachers integrate the Duolingo application into the Teaching-learning process as it makes English learning more enjoyable and interesting. Moreover, Duolingo's designers should add more specialized vocabulary and offer customization options to broaden students' experiences.

Keywords: Duolingo, EFL, Vocabulary, Students

Introduction

Vocabulary is a fundamental aspect of language development and is crucial for success in reading, writing, listening, and speaking. Enhancing one's vocabulary and word knowledge can significantly affect students' ability to communicate and comprehend a foreign language. Fatima and Khan (2017) stated that vocabulary is the most crucial element of a language, enabling appropriate communication at different levels.

Besides, in the 4.0 technological era, mobile technologies and applications are becoming indispensable for learning, including foreign language learning. According to Ahmadi (2018), technology makes learning smooth, so we should consider using it as a support tool in learning. Furthermore, research on the effectiveness of state-of-the-art technologies for second and foreign language learning shows that these technologies and applications offer several benefits

for teaching and learning: promoting practices, delivering instructional content, and facilitating interactions (Zhang and Zou, 2022). The use of mobile applications in learning English contributes to the improvement of a student's cognitive capacity, their motivation to study both in formal and informal settings, and encourages personalized learning, while assisting underachievers in reaching their study goals (Kacatl and Klímová, 2019).

As a result, there are currently numerous applications to assist students in learning languages. Duolingo is a useful tool that provides learners with practical, systematic steps for learning a second language independently (Nushi and Egbali, 2017). In Vietnam, Duolingo is seen as an app for teaching and learning English. Over 75% of Vietnamese people who use Duolingo focus on improving their English skills through the platform (Ho, 2020). According to Huong and Long (2018), in Vietnam, the application of information technology in EFL (English as a Foreign Language) education has become a trend since 2008. In particular, Duolingo is among the five most widely used EFL software programs or websites for language learning. A recent study by Nghi and Thang (2024) also found that Duolingo was among the top two most commonly used language-learning apps among participants from public universities in Vietnam.

This study aims to build on these valuable findings, investigating how Duolingo can be optimally used to enhance students' vocabulary, considering factors such as engagement, learning patterns, and integration with classroom instruction. By investigating the use of Duolingo to enhance vocabulary, this paper can provide valuable insights into an accessible, affordable, and widely used language-learning tool and facilitate students' vocabulary learning. This research, if it finds that Duolingo is effective in building English vocabulary among Vietnamese students, could have significant implications for its adoption in school curricula and language-learning initiatives in Vietnam.

Literature review

Definition of Vocabulary

Several scholars offer different definitions of vocabulary. Hatch and Brown (1995) define vocabulary as a list or set of words for a particular language that can be used by individual speakers of the language. It is usually alphabetically arranged and explained in a lexicon. Neuman and Dwyer (2009) further define vocabulary as the words we must know to communicate efficiently, including those used in speaking (expressive vocabulary) and those understood in listening (receptive vocabulary). This suggests that having a broad vocabulary enhances an individual's conversational ability, and a person's vocabulary consists of a list of words they know how to use accurately. Furthermore, in a study by Diamond and Gutlohn (2006), they say that vocabulary represents the understanding of words and their meanings, which not only implies a definition but also implies how that word fits into the world. Vocabulary knowledge is not something that can ever be fully accomplished, it is something that can be broadened and deepened through a whole lifetime.

Hebert and Kamil (2005) define vocabulary as "the knowledge of meanings of words". The

word "vocabulary" has several different connotations. For example, teachers use the term "vocabulary" differently to describe different aspects of students' word knowledge. Some teachers use the term to refer to students' meaning vocabularies, which are words they understand as sight words. Other educators use it to describe students' listening vocabulary, which is the words they collect while listening. Meanwhile, content teachers use the term "academic vocabulary" to refer to words exclusive to a given subject. In this part, the term "vocabulary" means a deep understanding of words that goes beyond a simple dictionary definition, as it involves making connections between words, learning examples and non-examples of the word and related words, and using them accurately within the context of the sentence. In recent research, Resti (2023) states that expanding one's vocabulary is often considered crucial to learning a foreign language or improving proficiency in a fluent language. It is considered a key component that students must learn to excel in the four core skills: reading, speaking, writing, and listening. Therefore, vocabulary is the first step that helps students understand and apply English easily within communication and educational contexts.

Based on those claims, it can be observed that vocabulary is a list of words that an individual can use correctly in different contexts. It plays an important role in improving one's language proficiency. Although vocabulary is the foundation for expressing thoughts and ideas, it implies more than a mere definition. Therefore, learning vocabulary is a lifelong journey.

The Importance of Vocabulary

At the core of language acquisition, vocabulary serves as the building block upon which comprehension and expression are constructed. Research consistently demonstrates a strong correlation between vocabulary knowledge and reading comprehension abilities. Stahl and Nagy (2007) indicated that reading comprehension requires more than simply recognizing words and knowing their definitions, the readers must have sufficient vocabulary knowledge of the text to reach their full reading comprehension.

A rich vocabulary enables individuals to grasp written texts' complexities, enhancing their understanding and facilitating effective communication. Conversely, a limited vocabulary can significantly hinder comprehension and impede progress in literacy development. Furthermore, vocabulary knowledge is inextricably linked to cognitive abilities, such as reasoning, problem-solving, and critical thinking (Roche and Harrington, 2013). In other words, the more developed a learner's vocabulary knowledge the less effort she/he has to put into solving cognitive problems. As individuals expand their vocabulary, they gain access to a broader range of concepts and ideas, which in turn fosters deeper levels of understanding and analysis.

In academic settings, vocabulary proficiency is a crucial determinant of success across various disciplines. Researchers have identified a strong correlation between vocabulary knowledge and academic achievement, spanning subjects such as mathematics, science, and social studies (Townsend, Filippini, Collins, and Biancarosa, 2012). Students with a rich vocabulary are better equipped to comprehend and communicate complex concepts, follow intricate instructions, and grasp the nuances of subject-specific terminology.

In conclusion, vocabulary is a fundamental component of language proficiency that strengthens academic success, cognitive development. A rich vocabulary enhances comprehension and

expression and fosters critical thinking, problem-solving abilities, and overall intellectual growth. By prioritizing effective vocabulary instruction and employing research-based strategies, educators and individuals can unlock the transformative power of language and pave the way for personal and professional success.

Vocabulary Learning

Vocabulary learning refers to the process of acquiring new words and their meanings in a language. Researchers in the field of second language acquisition have identified and explored a variety of vocabulary learning strategies and approaches. Diamond and Gutlohn (2006) divided vocabulary learning into intentional and incidental vocabulary learning. Additionally, Decarrico (2001), provided explicit and implicit learning, which refers to similar definitions of intentional and incidental learning respectively. Thus, vocabulary acquisition can occur through two primary pathways: intentional and incidental learning.

Intentional vocabulary learning involves the conscious and deliberate effort to learn and remember new words through activities such as using flashcards, word lists, or mnemonics (Diamond, and Gutlohn, 2006). This explicit approach typically occurs in a classroom setting or through independent study and is often employed for the initial stages of word knowledge development to expand one's vocabulary breadth systematically. It allows learners to concentrate on specific vocabulary items, which they can repeatedly practice and reinforce through various activities and exercises. Intentional learning can be advantageous (KHOULOD, 2022).

Incidental vocabulary learning or accidental learning occurs when the learners focus elsewhere, such as on understanding a text or using language for communicative purposes (Decarrico, 2001). In other words, incidental learning is a naturalistic way of acquiring new vocabulary, it occurs indirectly and implicitly through repeated exposure to words in meaningful contexts. Learners who encounter new vocabulary within authentic contexts can infer word meanings from contextual clues, facilitating gradual and naturalistic vocabulary acquisition. The scientific research on vocabulary instruction reveals that most vocabulary is acquired incidentally through indirect exposure to words.

While intentional methods provide concentrated vocabulary study, incidental learning brings reinforcement and enriches word knowledge through meaningful language use and exposure (Laufer, 2005). According to Alemi and Tayebi (2011), the words learned intentionally with a focus on meaning were the most important factor that improved students' vocabulary knowledge. Another research study by Glowacki, Lanucha, and Pietrus (2001) revealed that both direct, explicit vocabulary instruction and indirect, incidental exposure to new words can help students improve their overall vocabulary development.

Problems in Learning Vocabulary

Learning vocabulary can be challenging. As Diamond and Gutlohn (2006) put it, vocabulary knowledge includes more than a mere definition; it involves understanding how that word relates to and fits into the broader world and its contexts. Vocabulary acquisition is a lifelong journey of gradually gaining richer knowledge about words and their connections to the world around us. In particular, while students may be able to recognize a word in a written or spoken

form and think that they already "know the word", they may struggle to use that word appropriately in different contexts or pronounce it accurately.

The key aspects of vocabulary are essential components that contribute to a comprehensive understanding and effective use of words in a language. One critical aspect is meaning, which encompasses the denotative (literal) and connotative (associated) senses of a word (Nation and Nation, 2001). Another crucial aspect is spelling, which involves the correct orthographic representation of a word (Laufer, 1997). Pronunciation, which includes the accurate production of sound patterns and stress placement, is also a vital aspect of vocabulary knowledge (Schmitt and Schmitt, 2020). Furthermore, word use, encompassing pragmatic knowledge of appropriate contexts, collocations (word combinations), registers (variations based on formality), and idiomatic expressions, is another critical aspect of vocabulary proficiency (Schmitt and Schmitt, 2020). Additionally, grammar, length, and complexity can be challenges for some learners when it comes to acquiring new vocabulary (KHOULOD, 2022).

Definition of Duolingo

Duolingo is a free language-learning platform created by Luis von Ahn and Severin Hacker, two computer scientists passionate about language learning and crowdsourcing (Von Ahn and Hacker, 2011). After extensive testing and development, the Duolingo app and website were officially launched to the public in June 2012, offering English, Arabic, Spanish, French, Dutch, and other languages (García Botero, Questier, and Zhu, 2019). Today, Duolingo is the most popular language-learning platform and the most downloaded education app in the world, with more than 500 million registered users. As stated by Wilbert and Pakkeerappa (2016), Duolingo is one of the most popular learning media that is the future of language learning.

The iconic mascot of Duolingo is a friendly green owl named Duo (Chik, 2015) (Figure 1). Duo acts as a virtual learning companion, guiding users through their language lessons and celebrating their achievements. It is portrayed as a supportive and encouraging figure that motivates learners to keep practicing, yet it can be mildly menacing or comically threatening when users miss their daily lessons, adding a humorous element. By creating a memorable, lovable mascot, Duolingo has not only built a strong brand identity but also fostered an emotional connection with its users, making the language-learning experience more engaging and enjoyable.

Figure 1.

Duo the owl - The mascot of Duolingo



Source: Advertising week (2021)

Jašková (2014) stated that Duolingo provides global language education by allowing users to learn languages for free. The company's mission is to make education free, fun, and accessible to all through gamification techniques such as skill trees, progress tracking, and virtual rewards.

The Purposes of the Duolingo Application

Duolingo serves several core purposes in language education and cultural exchange. The primary purpose of Duolingo is to provide free, accessible language education to help students around the world learn foreign languages (Duolingo Help Center, 2022). By offering courses in over 40 languages through a gamified and user-friendly platform, this application aims to make language learning enjoyable and effective for learners of all ages and backgrounds. As Nagy, Herman, and Anderson (1985) state, acquiring vocabulary in a second language, particularly English, may be overwhelming. Using the interactive, fun application may motivate the student to embrace learning the vocabulary of a new language, specifically English words and phrases. As Putri and Islamiati (2018) put it, Duolingo employs gamification techniques, such as points, levels, leaderboards, and virtual rewards, to make language learning more engaging and addictive. This approach aims to motivate learners and make the educational process feel more like a game, thereby increasing retention and enjoyment.

Duolingo strives to make language vocabulary more enjoyable and impactful through games so that students feel motivated and want to learn consistently (Tiara, Rahman, and Handrianto, 2021). According to Liang (2018), the Duolingo language learning application offers a variety of exercises to its users, such as translation exercises, matching exercises, and listening exercises, ... De Castro, Da Hora, and Pinto (2016) indicated that Duolingo exercises can encourage learners to engage in the daily practice of a foreign language. Their research suggests that this application contributed to increasing the vocabulary, to improving pronunciation and simple grammatical structures.

Types of Duolingo Exercises

According to Nushi and Egbali (2017), there are several types of Duolingo application exercises, including translation, matching, pairing, listening, and speaking exercises. Every kind of exercise provides a different approach to a foreign language for learners, yet, they all focus on enhancing learners' language skills. Liang (2018) provided one more exercise: filling in the blank. In this exercise, students must choose the correct answer among two or three choices. Moreover, it is important to note that many other exercises have combined the above-mentioned ones, such as listening and then matching the word with its meaning in another language, etc.

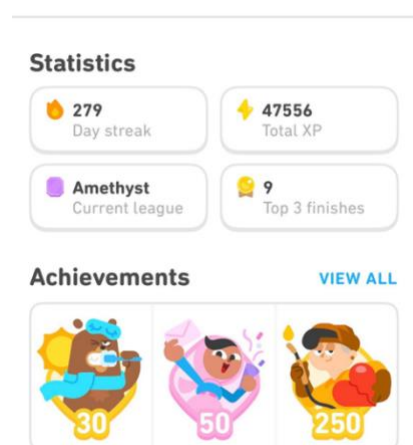
Overall, each lesson includes about fifteen questions and learners have a progress bar on the top of their screens. If their answer is correct, the bar will move forward, but if they get it wrong, the bar will remain in the same position. Then, Duolingo would point out the learners' mistakes and repeat the questions at the end of the exercises until the progress bar is completed. This way, learners can keep track of their vocabulary learning process and fix their mistakes in all exercises until they get the correct answer. As stated by Tiara, Rahman, and Handrianto (2021), students can engage in a learning experience focused on enhancing and building their proficiency with English vocabulary by using Duolingo.

Prominent Features of Duolingo

Duolingo facilitates a language learning process by providing users with a gamified learning experience (Putri and Islamiati, 2018) (Figure 2). By incorporating game-like elements such as experience points (XP), level progressions, and virtual rewards, the platform leverages gamification principles to transform the learning process into an interesting and rewarding experience (Munday, 2016). It brings learners a sense of playing a game with words and sentences rather than a mere language lesson. As a result, their learning experience becomes more enjoyable and addictive, cultivating their motivation, engagement, and long-term commitment.

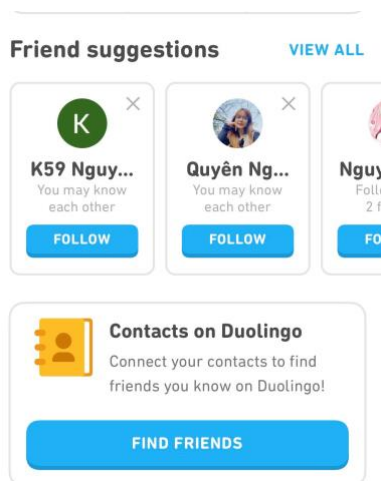
Figure 2.

Duolingo's gamification features



Source: Generated by the author (2024)

Moreover, Duolingo integrates elements of friendly competition, such as a leaderboard, to motivate learners and add a social element to the language-learning experience. Finardi, Leão, and Amorim (2016) found that this platform is also a social media that helps connect people learning languages (Figure 3), enabling them to compare their progress in the chosen language. Duolingo has leaderboards at different levels (Amin, 2021). It is divided into countries/regions that rank users based on the experience points (XP) they earn by completing lessons. Learners can compete to be at the top of these leaderboards; hence, this feature may foster their competition and motivation to practice consistently.

*Figure 3.**Duolingo's friend suggestions feature*

Source: Generated by the author (2024)

To summarize, Duolingo offers many outstanding features, including a gamified learning experience and friendly competition. These features effectively cultivate learners' motivation and engagement, leading them to consistently practice foreign languages. However, Duolingo has some limitations, such as a lack of interaction and contextualized language production (Finardi, Leão, and Amorim, 2016).

Review of Related Studies

In the international context, several studies have examined the use of Duolingo for educational purposes, focusing on its efficacy in enhancing students' vocabulary. A foundational study by Vesselinov and Grego (2012) provided early empirical evidence of Duolingo's effectiveness in enhancing language proficiency. The participants are all native English speakers who use Duolingo to learn Spanish. Though broad, their research touched upon vocabulary acquisition as a critical component of language learning, suggesting that regular engagement with Duolingo can significantly improve learners' vocabulary. However, the study also noted the need for a more targeted investigation into the specific vocabulary gains attributed to Duolingo use.

Moreover, a recent study by Hernadijaya (2020) expanded the understanding of how Duolingo supports vocabulary learning through its gamification features, including an interactive visual interface. The author highlighted how these features potentially foster a more engaging and personalized learning experience, thereby facilitating deeper vocabulary acquisition. However, the study also raised questions about the depth of vocabulary knowledge acquired, pointing to the need for further research on how Duolingo can be integrated with other learning strategies to improve teaching and learning awareness. Finardi, Leão, and Amorim (2016) stated a more critical perspective, which investigated Duolingo's limitations in supporting advanced language learning. Findings from the research suggest that Duolingo promotes the growth of vocabulary and grammar skills. However, it emphasizes the importance of a nuanced approach to using

Duolingo, tailored to the learner's interaction needs.

A few related studies from Vietnamese researchers explore the use of Duolingo in language learning. Research by Huong and Long (2018) evaluated the efficacy of using EFL software programs as supplementary tools for learning English at universities in Vietnam. The researchers used quantitative and qualitative data to examine two popular EFL programs - Duolingo and Rosetta Stone- using. The findings indicated that these two platforms had some benefits, like providing engaging practice exercises and exposure to native pronunciation, suggesting that EFL software can be a useful supplementary tool when integrated with traditional classroom instruction by qualified teachers. However, many students and teachers felt the programs lacked sufficient grammar instruction, writing practice, and customization to the Vietnamese context.

The study by Nguyen and Vo (2021) surveyed students at Van Lang University in Vietnam about their use of mobile apps to learn English, focusing on developing speaking skills. It revealed that Duolingo is one of the most popular and highly effective applications for developing English speaking proficiency. However, the researchers found that Duolingo concentrated heavily on input-based activities such as reading, listening, and multiple-choice exercises. While the apps helped build foundational skills, students felt they were not sufficient for developing the advanced speaking proficiency required in academic and professional settings. They expressed a need for apps that provide more targeted speaking practice, feedback on pronunciation, and interactive speaking exercises.

Research Gap

While several studies have explored the use of Duolingo for language learning and its impact on vocabulary acquisition, there is a lack of research investigating the effect of using Duolingo specifically within the context of Vietnamese education. Most existing research has been conducted in Western or European contexts, which may not accurately reflect Vietnam's unique cultural, linguistic, and educational factors. In Vietnam, there are also a few studies on the use of Duolingo to learn language, but they focus mainly on listening and speaking skills, there is a lack of investigation on the effects of Duolingo on students' vocabulary enhancement.

Additionally, most previous studies have focused on Duolingo's general effectiveness in enhancing vocabulary, but few have examined specific strategies for teachers to optimize its integration into the language-teaching and learning process. Research is needed to investigate how Duolingo can be most effectively combined with traditional classroom instruction, supplementary materials, and other language learning resources to maximize its impact on vocabulary enhancement.

Furthermore, most studies have primarily relied on quantitative measures. However, there is a lack of qualitative research exploring students' attitudes, motivations, and experiences with using Duolingo for vocabulary acquisition. Understanding these subjective factors could provide valuable insights into this platform's advantages and disadvantages, and help find potential improvements needed to create a more engaging and effective learning experience.

By addressing these research gaps, this thesis can contribute to a more comprehensive understanding of how Duolingo can be effectively utilized to enhance vocabulary acquisition

among Vietnamese students, taking into account the unique cultural and educational context, as well as exploring optimal pedagogical strategies and qualitative experiences.

Research Questions

The main objective of this research is to enhance Hanoi students' vocabulary through the Duolingo application. To be more specific, the purpose of this study is to fully understand their opinions on using Duolingo and to elucidate the factors that motivate them to accept or reject this application as a tool to enhance their vocabulary. Furthermore, based on the results, the study aims to offer Duolingo's designers guidance to improve the quality of this application.

To fulfill the purpose of the study, the survey sought to answer the following research questions:

- 1: What are the advantages and disadvantages of using Duolingo in learning vocabulary?
- 2: Do students in Hanoi have positive or negative attitudes toward using Duolingo?

According to the mentioned questions, the researcher suggests the following hypotheses:

- 1: Using Duolingo has significant advantages and disadvantages in learning vocabulary
- 2: Students in Hanoi have predominantly positive attitudes toward using Duolingo to learn vocabulary.

Methods

Pedagogical Setting & Participants

The current study focuses on students in Hanoi. They are mainly students from two universities in the city center: Foreign Trade University (FTU) and the University of Transport and Communications (UTC), selected based on convenience sampling. For the interview, there are six students from these two universities, including three males and three females. All participants are native Vietnamese speakers and learn English as a second language. Hanoi students are considered to have a high demand for learning English to support their studies at school. Besides, these students are heavy users of cutting-edge technology; thus, using applications like Duolingo to learn foreign languages is likely to be popular among them. Therefore, they are believed to give us valuable information and ideas about the relationship between the Duolingo application and vocabulary learning, and how this application can enhance vocabulary acquisition.

Design of the Study

The present research paper aims to fully comprehend Hanoi students' opinions toward using Duolingo. It is following a mixed-methods approach, containing qualitative and quantitative data collection. One hundred and sixty-three (163) participants were involved in the study. For data collection, a questionnaire was administered to one hundred and sixty-three (163) Hanoi students, then, the researcher conducted semi-structured interviews with six (6) students who already joined the questionnaire survey and learned English with Duolingo, selected based on convenience sampling. Concerning data analysis, the computer program Statistical Package for Social Sciences (SPSS) is used to analyze the numerical data obtained from the close-ended

items of the questionnaire, and the interview results are used to support the analysis process.

Data collection procedure

The data were collected using a mixed method approach (qualitative and quantitative), including a survey and interviews. Accordingly, a questionnaire was created and administered to one hundred and sixty-three (163) students in Hanoi by using Google Forms. The questionnaire took two weeks to be distributed, and then the researcher spent one more week coding the collected data and converting them into relevant charts and tables on the computer program SPSS.

At the same time, the researcher conducted a semi-structured interview with six (6) students who already joined the questionnaire survey and learned English with Duolingo, selected based on convenience sampling. The semi-structured interview was carried out in Hanoi. Each interview lasted for around one hour, so the total interview time was around six hours. Each interview process with the participants was recorded and then transcribed into written form. The duration of this study was about one month and the researcher spent one more week analyzing this interview information. It is important to note that both qualitative and quantitative data were collected in Vietnamese due to different participants' English proficiency, then, they were carefully translated into English by the researcher.

Data collection instrument

The research questionnaire was created based on a previous study by Inayah, Yusuf, and Fibula (2020), which has a similar goal to examine students' attitudes toward using Duolingo in learning English. The questionnaire of their research was distributed to every student at Syiah Kuala University, Indonesia. This Southeast Asia country shares many similarities with Vietnam such as geographic location, cultural influences, and economic development. Furthermore, students in both countries learn English as a second language. Therefore, adapting this study's questionnaire is relevant and necessary. Because this finding was conducted four years ago, the researcher amended and supplemented more details that resonate with the development of Duolingo. The Likert scale is used to design relevant questions because they can provide highly reliable person ability estimates, the validity of the interpretations made from the data they provide can be established through a variety of means, and the data they provide can be profitably compared, contrasted, and combined with qualitative data-gathering techniques (Nemoto and Beglar, 2014). After having been completed, the questionnaire was administered to students in Hanoi by using Google Forms. Overall, it contains three sections. The first section includes specific questions investigating participants' general information (age, gender, mother tongue, the importance of vocabulary in learning English, problems when learners encounter new words, Duolingo experience time, and the frequency of using Duolingo). The second one asked about the advantages and disadvantages of using Duolingo, and the third section investigated students' attitudes toward using this application to enhance their vocabulary. Then, the computer program SPSS is used to code the collected data and convert them into relevant charts and tables to support the analysis process.

The researcher conducted a semi-structured interview to deeply investigate the Hanoi students' attitudes toward using Duolingo to enhance their vocabulary. Six students learning English with

Duolingo were chosen based on convenience sampling. There are three male and three female students who are studying at Foreign Trade University (FTU) and the University of Transport and Communications (UTC). There are eight (8) interview questions in which students are asked about their overall experiences and explain the reasons for their answers in the close-ended items of the questionnaire. The first four questions were about the advantages and disadvantages they encountered when learning vocabulary with Duolingo. The final four questions were about their attitudes toward using this application to enhance their vocabulary proficiency and integrating this platform into the teaching-learning process. The interviews with the participants were recorded using a smartphone to avoid inaccuracy in collecting and analyzing the data.

Results/Findings and discussion

Data analysis

The Advantages and Disadvantages of Using Duolingo in Learning Vocabulary

Table 1.

The advantages of using Duolingo, descriptive statistics as per item

Items	Statement	Mean
AD1	Duolingo provides a wide range of vocabulary across different topics and contexts	3.7975
AD2	Duolingo's contextual learning helps me understand how words are used in real-life situations	3.7730
AD3	The interactive exercises in Duolingo make vocabulary learning more proactive and engaging	3.9509
AD4	The gamification features in Duolingo (points, levels, rewards, ...) motivate me to learn more vocabulary	3.9202
AD5	Duolingo's progress tracking helps me monitor my vocabulary learning journey	4.0736
AD6	Duolingo's notifications keep me motivated to learn vocabulary	3.7791

Table 2.

The advantages of using Duolingo in learning vocabulary

Advantages of using Duolingo in learning vocabulary					
	N	Minimum	Maximum	Mean	Std. Deviation
AD1	163	1.00	5.00	3.7975	.74668
AD2	163	1.00	5.00	3.7730	.84108
AD3	163	2.00	5.00	3.9509	.79972
AD4	163	1.00	5.00	3.9202	.87476
AD5	163	1.00	5.00	4.0736	.84297
AD6	163	1.00	5.00	3.7791	1.01242
Valid N (listwise)	163				

Source: Generated by the author (2024)

The descriptive statistics from Tables 1 and 2 above revealed six (6) distinct advantages of using Duolingo for vocabulary learning, based on responses from 163 participants. The responses were recorded on a 5-point Likert scale, where 1 indicates the lowest level of agreement (Strongly disagree) and 5 the highest (Strongly agree).

From the data, we can observe the following:

- The mean for all advantages ranged from 3.77 to 4.07, indicating a generally positive perception of these six advantages among participants.
- AD5 (Duolingo's progress tracking helps me monitor my vocabulary learning journey) received the highest mean of 4.07 ($M=4.07$), suggesting that participants tend to agree the most with this particular benefit of Duolingo (Process tracking).
- The standard deviation ranged from 0.75 to 1.01, indicating a moderate to high level of variability in the responses for each advantage.
- AD6 (Duolingo's notifications keep me motivated to learn vocabulary) had the highest standard deviation of 1.01 ($SD=1.01$), meaning the responses for Duolingo's notifications were more widely dispersed compared to the others.

Overall, participants tended to agree that Duolingo brought a lot of benefits to their vocabulary learning process, especially its progress tracking, gamification features, and interactive exercises.

Table 3.

The disadvantages of using Duolingo, descriptive statistics as per item

Items	Statement	Mean
DA1	Duolingo lacks depth in certain vocabulary areas (specialized vocabulary)	3.859
DA2	There is limited customization in Duolingo for selecting and ordering specific vocabulary to learn	3.859
DA3	Translation exercises in Duolingo may not be the most relevant way to learn vocabulary	3.485
DA4	Duolingo does not provide enough speaking practice for vocabulary enhancement	3.693
DA5	The vocabulary in Duolingo is too basic and not relevant for advanced learners	3.754
DA6	Duolingo's notification is not necessary and bothers me sometimes	3.411

Table 4.

The disadvantages of using Duolingo in learning vocabulary

Disadvantages of using Duolingo in learning vocabulary					
	N	Minimum	Maximum	Mean	Std. Deviation
DA1	163	2.00	5.00	3.8589	.71903
DA2	163	1.00	5.00	3.8589	.85978
DA3	163	1.00	5.00	3.4847	.84879
DA4	163	1.00	5.00	3.6933	.89809
DA5	163	1.00	5.00	3.7546	.96923
DA6	163	1.00	5.00	3.4110	1.05836
Valid N (listwise)	163				

Source: Generated by the author (2024)

Tables 3 and 4 above show the results for six (6) different disadvantages of learning vocabulary on Duolingo. It indicated that:

- The means for all disadvantages range from 3.41 to 3.86, indicating a moderate level of agreement among respondents regarding these six disadvantages of using Duolingo to enhance vocabulary.
- DA1 (Duolingo lacks depth in certain vocabulary areas (specialized vocabulary)) and DA2 (There is limited customization in Duolingo for selecting and ordering specific vocabulary to learn) had the highest mean of 3.86 (M=3.86), suggesting that students tend to agree the most with these two statements about the limitations of Duolingo.

- DA4 (Duolingo does not provide enough speaking practice for vocabulary enhancement) and DA5 (The vocabulary in Duolingo is too basic and not relevant for advanced learners) received quite high means of 3.693 and 3.754, respectively.
- DA3 (Translation exercises in Duolingo may not be the most relevant way to learn vocabulary) received a mean of 3.48 ($M=3.48$), which falls slightly above the midpoint of the scale 3 (Neutral). It showed that users may have a neutral answer to this disadvantage statement.
- The standard deviations ranged from 0.72 to 1.058, indicating moderate to high variability in responses to each disadvantage.
- DA6 (Duolingo's notifications are not necessary and sometimes bother me) had the highest standard deviation ($SD=1.058$), indicating that responses to Duolingo's notifications were more widely dispersed than those for the others.

Overall, although Duolingo brought many benefits, it was reported to have some limitations. In particular, they lack depth in certain vocabulary areas and limited customization in Duolingo for selecting and ordering specific vocabulary to learn... Comparing the means of advantages and disadvantages, the means for advantages (ranging from 3.77 to 4.07) were generally higher than the means for disadvantages (ranging from 3.41 to 3.86). This could indicate that students perceive more advantages than disadvantages in using Duolingo. The same results are proved in (3) Overall Evaluation.

Table 5.

Overall evaluation of using Duolingo, descriptive statistics as per item

Items	Statement	Mean
OE1	Duolingo has helped me expand my vocabulary	3.877
OE2	Duolingo helps me overcome my vocabulary learning problems (meaning, pronunciation, spelling, memorizing)	3.767
OE3	I find it easier to remember vocabulary learned through Duolingo	3.736
OE4	I can understand comprehensively the meanings of vocabulary from Duolingo and use them in different contexts	3.595
OE5	I feel more confident using new vocabulary learned from Duolingo	3.69

Table 6.

Overall evaluation of using Duolingo in learning vocabulary

Overall evaluation					
	N	Minimum	Maximum	Mean	Std. Deviation
OE1	163	1.00	5.00	3.8773	.72668
OE2	163	1.00	5.00	3.7669	.82829
OE3	163	1.00	5.00	3.7362	.85222
OE4	163	1.00	5.00	3.5951	.89331
OE5	163	1.00	5.00	3.6933	.87722
Valid N (listwise)	163				

Source: Generated by the author (2024)

The data from Tables 5 and 6 above revealed the results for 5 different statements about participants' overall evaluation of using Duolingo to learn vocabulary. From the data, we can observe that:

- The means for all evaluation statements ranged from 3.595 to 3.877, indicating a generally positive evaluation of using Duolingo among participants.
- OE1 (Duolingo has helped me expand my vocabulary) had the highest mean of 3.877 ($M=3.877$), suggesting that participants agreed most with this evaluation statement.
- The standard deviations ranged from 0.73 to 0.89, indicating moderate variability in responses to each evaluation statement.
- OE4 (I can understand the meanings of vocabulary from Duolingo comprehensively and use them in different contexts) and OE5 (I feel more confident using new vocabulary learned from Duolingo) had the highest standard deviation of 0.89, meaning the responses for these evaluation statements were more widely dispersed compared to the others.

Overall, the means for all evaluation statements fall within the positive range (above the neutral midpoint of 3 on the 5-point scale), indicating that participants favorably evaluated Duolingo. However, the variability in responses, as indicated by the standard deviations, suggests differences in individual opinions and perspectives among participants.

Table 7.

The efficiency level of using Duolingo, descriptive statistics as per the item

Items	Statement	Mean
EL1	How do you evaluate your English vocabulary before using Duolingo?	3.417
EL2	How do you evaluate your English vocabulary before using Duolingo?	3.736

Table 8.

The efficiency level of using Duolingo in learning vocabulary

Efficiency level					
	N	Minimum	Maximum	Mean	Std. Deviation
EL1	163	1.00	5.00	3.4172	.85213
EL2	163	2.00	5.00	3.7362	.63662
Valid N (listwise)	163				

Source: Generated by the author (2024)

Tables 7 and 8 above show the results for two questions that required participants to self-evaluate their English vocabulary level before and after using Duolingo. The responses were recorded on a 5-point Likert scale, where 1 represents the lowest level of vocabulary (Very poor) and 5 the highest (Very good).

- EL1 (How do you evaluate your English vocabulary before using Duolingo?) had a mean of 3.417 (M=3.417), which falls slightly above the midpoint of the scale 3 (Average). It indicated that participants perceived their English vocabulary level as somewhat above "Average" before using Duolingo.
- EL2 (How do you evaluate your English vocabulary before using Duolingo?) had a mean of 3.736 (M=3.736), which is closer to 4 (Good) on the 5-point scale. It suggested that, on average, participants perceived their English vocabulary level as tending towards "Good" after using Duolingo.

The increase in the mean from 3.417 to 3.736 after using Duolingo revealed a positive shift in participants' perceptions of their English vocabulary level, moving from slightly above average to closer to "Good".

- The lower standard deviation for EL1 (M=0.637) compared to EL2 (M=0.852) suggests that participants' responses were more consistent and clustered around the mean after using Duolingo.

Overall, based on the descriptive statistics and the context of the 5-point scale, it appears that participants perceived an improvement in their efficiency level after using Duolingo, with their ratings shifting from slightly above average towards the "good" end of the scale.

Table 9.

Effect of using Duolingo to learn vocabulary on other language skills

Overall, how do you think using Duolingo to enhance vocabulary has impacted your language skills?

		Responses		Percent of Cases
		N	Percent	
\$Impacts ^a	Improved reading comprehension	106	31.2%	65.0%
	Enhanced writing skills	58	17.1%	35.6%
	Better understanding of spoken language	97	28.5%	59.5%
	Improved ability to communicate effectively	79	23.2%	48.5%
Total		340	100.0%	208.6%

Source: Generated by the author (2024)

Table 9 shows the frequency of responses for each language skill impacted by using Duolingo to enhance vocabulary. The most frequently chosen option was “Improved reading comprehension” with 106 responses (31.2% of the total), accounting for almost a third of the participants. “Better understanding of spoken language” was the second most common choice with 97 responses (28.5%). “Improved ability to communicate effectively” and “Enhanced writing skills” each received 79 (23.2%) and 58 (17.1%) responses, respectively. Overall, the results indicated that reading comprehension improved the most among participants, followed by understanding of spoken language and communication efficiency. There were also considerable responses for enhancing writing skills.

Students’ attitudes towards using Duolingo to enhance their vocabulary

Table 10.

Students’ attitudes toward using Duolingo, descriptive statistics as per item

Items	Statement	Mean
AT1	I find learning vocabulary on Duolingo interesting and enjoyable	3.859
AT2	Duolingo outweighs the traditional methods (offline classes, books, ...) in offering a good opportunity to learn vocabulary	3.712
AT3	I love it when my teachers integrate the Duolingo application into the Teaching-learning process	3.693
AT4	I would recommend Duolingo to others for vocabulary-learning purposes	3.945

Table 11.

Students' attitudes towards using Duolingo to enhance their vocabulary

Students' attitudes towards using Duolingo to enhance their vocabulary					
	N	Minimum	Maximum	Mean	Std. Deviation
AT1	163	1.00	5.00	3.8589	.77680
AT2	163	1.00	5.00	3.7117	.87998
AT3	163	1.00	5.00	3.6933	.98339
AT4	163	1.00	5.00	3.9448	.84803
Valid N (listwise)	163				

Source: Generated by the author (2024)

Tables 10 and 11 above present the results for four statements that aimed to investigate participants' attitudes toward using Duolingo to enhance their vocabulary. The responses were recorded on a 5-point Likert scale, where 1 represents the most negative attitude and five the most positive. It indicated that:

- The means for all attitude statements range from 3.693 to 3.945, suggesting a generally positive attitude toward using Duolingo for vocabulary enhancement among students.
- AT4 (I would recommend Duolingo to others for vocabulary-learning purposes) had the highest mean of 3.945 ($M=3.945$), indicating that students tend to have the most positive attitude toward recommending this app to others.
- The standard deviations ranged from 0.777 to 0.983, indicating a moderate level of variability in the responses for each attitude statement.
- AT3 (I love it when my teachers integrate the Duolingo application into the Teaching-learning process) had the highest standard deviation of 0.983, indicating that responses to integrating Duolingo into the Teaching-learning process were more widely dispersed than those for the other options.

Overall, the means for all attitude statements fall within the positive range (above the neutral midpoint of 3 on the 5-point scale), indicating a favorable attitude among students toward using Duolingo for improving their vocabulary.

Table 12.

Future intention of using Duolingo to learn vocabulary

Do you plan to continue using Duolingo to learn vocabulary in the future?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Definitely	106	65.0	65.0	65.0
	Not sure	52	31.9	31.9	96.9
	No	5	3.1	3.1	100.0
	Total	163	100.0	100.0	

Source: Generated by the author (2024)

Table 12 above shows respondents' future intention to use Duolingo to learn vocabulary. We can easily observe that a significant proportion (65%) of participants chose “Definitely”, which meant they would continue learning vocabulary on Duolingo in the future. Almost a third (31.9%) answered “Not sure”, and a very small number (3.1%), corresponding to 5 people, decided not to use this app as a vocabulary learning tool ultimately.

The advantages and disadvantages of using Duolingo in learning vocabulary, and users' suggestions

According to the analysis findings of participants' perspectives, the Duolingo application was considered a useful tool for learning English vocabulary. It aligns with KHOULOD (2022), who argues that Duolingo may be a beneficial tool for pupils to efficiently learn vocabulary, and that integrating the Duolingo application effectively enhances students' vocabulary acquisition.

Firstly, the survey responses highlighted that student primarily used Duolingo to improve their vocabulary, pronunciation, and listening skills. During their time with Duolingo, many participants reported positive experiences; they felt funny, enjoyed it, and were more confident using learned words and phrases in daily conversations. Some interviewees confessed that the integration of progress-tracking (streak, XP, ...) and gamification elements (badges, leaderboards, ...) is the main reason they study daily. These results were linear with the interview answers:

“I think Duolingo's gamification features are very funny and helpful. The difficulty level is increased. I feel proud of myself and become more motivated when unlocking new levels... I can learn vocabulary effortlessly...” (P1, P4)

“I am impressed the most with the progress tracking. The leaderboard and streak are the main reasons I spend time learning daily because I do not want to lose my streak and get out of the top.” (P2, P5)

“I love the interactive exercises on Duolingo. It helps me imitate the intonations of characters proactively and feel more confident using these sentences in my daily conversations.” (P3)

It can be understood that the game features create enjoyment points in the learning environment. These findings align with previous research on the motivational and engaging aspects of gamified language learning apps (Flores, 2015). Other interviewees recommended that the gamification features should be improved or changed sometimes to keep users motivated:

“After a couple of months using Duolingo, I see that gamification features and vocabulary learning methods are still the same, and I feel it is quite boring.” (P6)

Interestingly, the perceived effectiveness of Duolingo varies by learners' English proficiency levels. Beginner learners (who self-evaluate their English proficiency at about 5/10, mostly based on their university results) generally reported more positive experiences, citing Duolingo's ability to broaden their vocabulary and introduce communicative sentences. In particular, they reported that they can gradually gain knowledge from simple topics on Duolingo, such as introducing themselves and ordering food. In contrast, advanced learners (who self-evaluate their English proficiency at 8/10 or higher, mostly based on their university results) claim that this platform helps them review basic vocabulary rather than expand their use of advanced and academic words. This result differs from a recent study by Tran (2024),

which found that AI applications are effective at providing exposure to and a deep understanding of academic vocabulary through correction and feedback techniques.

“As a beginner, Duolingo helps me broaden my vocabulary. I could learn about simple topics... It’s easier to learn step by step like that.” (P6, P4)

“Duolingo helps me review the basic words more than learn new vocabulary. Actually, there are many simple words that advanced learners still make mistakes when using them... I often review them on Duo.” (P1, P3)

“... Although I chose lessons for advanced learners, I could hardly encounter vocabulary in an advanced context.... It may not be suitable for those who want to learn advanced knowledge.” (P2, P5)

The results indicate that Duolingo may be better suited for initial vocabulary acquisition than for advanced-level vocabulary development.

In particular, Duolingo’s notifications received different perspectives from participants. Many people find these notifications interesting and helpful, and they serve as a reminder that learning on Duolingo has become part of their daily routine. On the other hand, some reported that Duolingo’s notifications are not appropriate and can be ignored when using phones for other purposes. Interviewees also had different perspectives on this feature:

“Duolingo’s notifications are very helpful for me as they remind me to learn every day. For example, “Hi! I miss you...”. I mean, that’s funny.” (P2, P4)

“The notification is unnecessary for me. I often learn on the app proactively and may not need a tool to remind me; I already have enough notifications in a day.” (P1, P6)

“...Sometimes, it’s helpful. But sometimes, it’s not necessary. When I am using my phone for other purposes, and the notifications interrupt me, I will ignore it.” (P3, P5)

Therefore, most of the interviewees suggested that they would like to edit the time frame of those notifications so that they could fit their daily schedule.

“I hope I could set the time for these notifications so that it suits my timetable and would not bother me during the day...” (P1, P3, P4, P5)

“Sure, editing a time frame of notifying myself is a great idea.” (P2, P6)

Moreover, the descriptive statistics revealed some limitations and concerns regarding Duolingo's approach to vocabulary instruction. Participants noted a need for more depth and contextualization in certain vocabulary areas and limited customization options for selecting and ordering specific vocabulary to learn. Moreover, the vocabulary is repeated several times from lesson to lesson, which is not necessary for users. This finding is consistent with Finardi, Leão, and Amorim (2016). All six interviewees had the same answer for these limitations of Duolingo:

“I encountered vocabulary about communication more than specialized ones. As a student whose major is Electronics and Telecommunication, I can hardly learn any academic vocabulary on Duo.” (P5, P6)

“Duo repeated words I already remembered too many times and that made me feel bored. The same examples are also repeated in one lesson. (P2, P3)

“I would like to choose and add some words that I want to practice more in a sheet, like a daily note, to learn what I want. That’s more realistic.” (P1, P4)

Besides, there is also an overemphasis on literal, word-by-word translations that may not reflect

natural language use in daily life. As stated by Milyarni, Mortini, and Mayasari (2021), the translation exercises used in this platform are word-for-word and/or literal translation.

“For me, the translation exercises are contrived rather than reflecting how people truly communicate.” (P1, P4)

“I often get confused when it comes to translation exercises. They require me to fill in correctly every single word and it seems unnatural.” (P2, P3, P5, P6)

These limitations suggest that while Duolingo can be effective for introducing and practicing basic vocabulary, it may need to provide more flexible nuances in translation and contextual usage of more advanced or specialized vocabulary.

Furthermore, in terms of speaking exercises, respondents said they rarely practice these exercises, which means their speaking skills and pronunciation can hardly be improved through this application.

“I think the sentences on Duo are too short for practicing speaking skills. Besides, it’s hard to pronounce a vocabulary without its English transcription.” (P5, P6)

“I think Duolingo’s lessons require only a little time to complete. The speaking exercises come up only two or three times. I can rarely practice speaking skill.” (P2, P4)

This result is not consistent with the previous research by Jiang, Rollinson, Chen, Reuveni, Gustafson, Plonsky, and Pajak (2021), in which the result suggested that Duolingo is effective at teaching speaking in addition to listening and reading. [Nguyen \(2024\) also suggested that AI tools are effective in enhancing learners’ pronunciation, fluency and autonomy.](#) Besides, respondents also suggested adding English transcription vocabulary for accurate pronunciation. There is one more limitation that prevent participants from learning on this application daily. They argued that because of learning on smartphones, they were often distracted by social media notifications or people’s chats, and forget their lessons (Inayah, Yusuf, and Fibula, 2020). All of the interviewees reported the same problem when they use electronic devices to learn language.

“...I find it hard to stay focused on learning when using my phone. I am often interrupted by Instagram notifications or people’s chat and forget my learning.”

Students’ attitudes towards using Duolingo to enhance their vocabulary

Despite these above-mentioned limitations, the overall attitude toward using Duolingo for vocabulary learning was favorable among the participants. Many expressed a preference for Duolingo over traditional methods, citing its accessibility, engaging features, and self-paced nature.

“Duolingo is a better choice compared to some traditional. I do not have to prepare learning materials, which is really difficult to control the quality without teachers’ help.” (P1, P2, P4)

“For me, Duolingo brings more benefits than limitations. As a beginner, I have learned a lot of vocabulary and communication sentences on Duolingo. It’s also free and accessible...” (P6)

“...My vocabulary is improved significantly... if possible, I would like to practice with articles or other sources of news (newspaper, books, ...) on Duolingo instead of a single

sentence.” (P3, P5)

Interviewees also suggest that reading skills can be learned through paragraphs and related articles, or books rather than a single sentence.

Participants indicated a willingness to continue using Duolingo for vocabulary learning, suggesting a sustained interest in the app as a supplementary resource. The finding of this investigation complements those of earlier studies (Inayah, Yusuf, and Fibula, 2020; KHOULOD, 2022). The pre-and post-survey data on participants' self-perceived English vocabulary levels revealed a positive shift, with participants reporting an improvement in their vocabulary knowledge and reading comprehension after using Duolingo. This positive change, combined with the favorable attitudes toward the app, suggests that Duolingo can be an effective tool for enhancing vocabulary acquisition when used in conjunction with other learning methods (Ajisoko, 2020).

“Before using Duolingo, my English vocabulary is quite poor. After almost 6 months of learning Duo, it has changed positively to a decent level... I did some tests on Google, and the results were better.” (P2)

“Yes, I will learn vocabulary with Duolingo to reach a good level of vocabulary. Then, I better find other sources to dig deeper into more advanced and academic knowledge.” (P1, P5)

“Absolutely, I will continue learning vocabulary with Duolingo, not only English but also the other languages.” (P3, P4, P6)

Participants also expressed interest in integrating Duolingo into formal teaching-learning processes, suggesting that instructors consider incorporating the app as a complementary resource to traditional classroom activities. However, careful consideration should be given to addressing Duolingo's limitations and ensuring a balanced approach that combines the app's engaging features with more contextualized and in-depth vocabulary instruction (Munday, 2016).

“It is a good idea. It can motivate me and my friends to learn English at school and make our learning even more interesting.” (P2, P3, P5)

“As I said before, the Duolingo features are not improved significantly. If my teacher integrates this app, it will work in a short time. But there must be something new on Duo to reach a long-run efficiency.” (P6)

“Duolingo is fun, cool. Using this application may be very effective for teaching children as they will absolutely be attracted by gamified exercises.” (P1, P4)

Recommendations for Duolingo designers

Through the qualitative and quantitative results, Duolingo is considered to have a positive effect on enhancing students' vocabulary. Participants also expressed interest in integrating Duolingo into formal teaching-learning processes. The research result revealed that progress tracking is the most effective feature that helps users monitor their vocabulary learning journey and compete with their peers. Along with that, the interactive exercises and gamification features

also motivate students to learn vocabulary proactively. However, the qualitative indicated that users were often distracted by social media notifications as they learned on their smartphones. Moreover, the result showed that Duolingo lacks depth in certain vocabulary areas (specialized vocabulary) and there is limited customization in Duolingo for selecting and ordering specific vocabulary to learn. The perceived effectiveness of Duolingo seemed to vary based on the learner's English proficiency level. In particular, the qualitative result indicated that beginner learners generally reported more positive experiences, advanced learners claim that this platform helps them review basic vocabulary rather than expand advanced and academic words. Moreover, there is also an overemphasis on literal, word-by-word translations and a few speaking practices for vocabulary enhancement.

Based on the findings, it is suggested that Duolingo's designers should prioritize providing contextualized vocabulary practice that presents words in meaningful contexts and collocations, rather than solely focusing on isolated vocabulary items or overemphasis on literal translations. Furthermore, Duolingo should aim to integrate vocabulary into natural conversations that reflect authentic language use, moving away from an overreliance on literal, word-for-word translations. This could involve creating exercises that incorporate vocabulary into natural conversations, sample passages, or situational dialogues. Additionally, offering customization options would greatly benefit learners, especially those at higher proficiency levels. Participants shared that they hope to be able to select specific vocabulary lists, topics, or target proficiency levels they want to focus on. This would allow advanced students to review basic vocabulary before expanding to more complex words and expressions, addressing the concern that the current app is better suited for beginner vocabulary acquisition. Designers can also add more advanced vocabulary sets, divided by major for students to choose for themselves.

To promote comprehensive language development, Duolingo needs to significantly improve its speaking practice components. Participants reported rarely utilizing the app's speaking exercises, hindering their ability to improve pronunciation and contextual usage. Incorporating varied speaking activities, such as repeat after me, open-ended responses, or conversational prompts, could help strengthen this area. Participants also suggested that their reading skills could be improved if Duolingo added a wide range of articles, books, or newspapers that present vocabulary in different contexts. They would like to refine the notification system by giving them more control over the timing and frequency of notifications, as some found the current notifications disruptive or ill-timed. Designers can also integrate a feature that blocks notifications from other applications while using Duolingo to prevent users from being distracted during the learning process.

To better position Duolingo as a supplementary tool in formal language education, designers should explore ways to integrate the app into language curricula through collaboration with educators. Continuously gathering feedback through user research, especially from learners across diverse proficiency levels and backgrounds, will be crucial for identifying areas of improvement and generating new feature ideas. Finally, partnering with linguists, language teachers, and materials developers would ensure that the vocabulary content and exercises align with current best practices in language pedagogy.

Recommendations for educators

The quantitative result revealed a favorable attitude among students toward integrating Duolingo into a formal educational setting. However, interviewees shared that educators should approach this integration thoughtfully and carefully consider how to address the above-mentioned limitations. Duolingo should be utilized as a supplementary tool to complement and reinforce vocabulary learning from primary classroom materials and teacher-led activities, not as the sole method of vocabulary instruction. Teachers need guidance on how to use the app effectively, including setting achievable goals, managing pacing, and aligning with in-class vocabulary targets.

Moreover, regularly monitoring student progress in Duolingo is crucial for identifying areas requiring additional support, especially in advanced vocabulary and contextual usage, to ensure students' comprehensive knowledge. Classroom activities should be designed to build upon and reinforce the vocabulary practiced in Duolingo through writing assignments, discussions, or role-plays that emphasize contextual application. To reduce students' smartphone distractions during learning, teachers should set clear expectations and rules for app use during class time. They can incorporate app activities into lesson plans, allowing students to use the apps in a structured, focused manner during class and to designate specific "app time" or break periods when students can use learning apps without disrupting lessons. Traditional resources such as dictionaries and vocabulary notebooks are also highly recommended to supplement Duolingo vocabulary, further deepening students' understanding through definitions, examples, and context. It also helps reduce distractions compared to learning full-time on online platforms.

Above all, educators must emphasize a balanced approach, making clear that while Duolingo offers engaging vocabulary practice, it should be combined with other comprehensive methods for comprehensive vocabulary development. During the application, teachers should encourage students to share their experiences, feedback, and suggest any needed adjustments to enhance the integration of Duolingo into the learning process. Through careful guidance, progress monitoring, and a balanced, multi-faceted approach, educators can leverage Duolingo's engaging features to enhance vocabulary learning while ensuring robust, contextualized instruction.

Discussion

The findings of this study offer meaningful insights into the effectiveness and user perception of Duolingo for vocabulary acquisition among university students in Hanoi. Overall, the results support the idea that Duolingo can be a beneficial supplementary tool, particularly for beginner learners. This reinforces the first hypothesis that using Duolingo offers both significant advantages and disadvantages in vocabulary learning, and the second hypothesis that students in Hanoi generally have a positive attitude toward using the app.

Consistent with prior studies such as Khoulod (2022) and Ajisoko (2020), the results demonstrated that Duolingo's gamification features, including streaks, leaderboards, and progress tracking, played a key motivational role. These features encouraged students to engage with the app regularly and made the vocabulary learning experience more enjoyable.

Participants frequently mentioned feeling more confident and motivated, which aligns with Flores (2015), who highlighted the importance of enjoyment in mobile-assisted language learning (MALL).

Moreover, learners emphasized Duolingo's interactive exercises as helpful in reinforcing vocabulary and improving basic listening and pronunciation skills. However, while previous research by Jiang et al. (2021) concluded that Duolingo was also effective in developing speaking skills, this study presented a contrasting result: participants rarely used the speaking functions and felt they were insufficient. This may be due to the short duration and limited depth of Duolingo's speaking exercises, as well as the lack of English transcriptions for pronunciation support. Therefore, this discrepancy suggests that the app may not yet be suitable as a primary tool for speaking development, especially in academic contexts.

Another noteworthy finding relates to learner proficiency level. Beginner students reported greater vocabulary gains and greater satisfaction than advanced learners, who found the content too simple and lacking in academic or specialized vocabulary. This nuance has also been noted in studies by Finardi et al. (2016), who pointed out that while Duolingo is useful for general vocabulary development, it may fall short in providing content for advanced or professional language needs. This finding suggests that the app's one-size-fits-all model may not effectively serve learners across a broad spectrum of abilities.

Interestingly, although participants had overall positive attitudes, they also expressed frustration with repetitive content, literal translation exercises, and limited control over vocabulary selection. These limitations were echoed in Milyarni, Mortini, and Mayasari (2021), who critiqued Duolingo for its emphasis on word-for-word translation, which may not reflect authentic communication. Learners in this study wished for greater customization, the ability to create personal vocabulary lists, and more contextualized practice — suggestions that reflect a growing demand for learner-centered digital tools.

The issue of notification design also highlighted differing learner preferences. While some found reminders helpful and motivating, others considered them intrusive. This contrast indicates a need for personalized notification settings, aligning with current trends in adaptive learning technologies that emphasize flexibility and learner autonomy.

Finally, despite Duolingo's strengths, some students reported difficulty maintaining focus due to distractions from social media while learning on their smartphones. This concern, discussed by Inayah et al. (2020), points to a broader challenge of digital learning environments — the need for tools that minimize distraction while maximizing learner engagement.

In summary, while the study confirms many of Duolingo's strengths — especially for beginners — it also identifies areas requiring improvement. These findings suggest that although Duolingo is not a standalone solution for vocabulary acquisition, it can be effectively integrated into classroom instruction when paired with teacher guidance, curriculum alignment, and enhanced app features.

Limitations of the research and suggestions for further studies

The study was conducted using the features and capabilities of Duolingo that were available at the time of the research. As the app continues to evolve and introduce new updates or functionalities, the findings may only partially reflect the current or future effectiveness of the app for vocabulary learning. Despite the limitations, the study suggests that further research should examine the implications of this continuous improvement. Although Duolingo can be an engaging and accessible supplementary resource, its true potential can be unlocked through strategic integration and a balanced approach, complemented by teacher guidance. Therefore, future research is necessary to investigate more specific strategies for effectively integrating Duolingo into formal language curricula and its impact on long-term vocabulary retention and transfer to real-world language use. Furthermore, the research focuses on only two universities in central Hanoi; thus, additional studies that include a diverse sample of participants are essential to yield more valuable information.

Conclusion

This study examined the effect of using the popular language-learning app Duolingo to enhance vocabulary among students in Hanoi. Through a mixed-methods approach combining quantitative surveys and qualitative interviews, valuable insights were gained regarding the app's potential benefits, limitations, and implications for Duolingo's designers and educators. Duolingo has proven to offer prominent features that benefit users' learning process, including progress tracking, gamification, and interactive exercises. However, the study also highlighted several limitations and areas for improvement. Participants noted a lack of depth and contextualization in certain vocabulary areas, limited customization options, and an overemphasis on literal translations that may not reflect natural language use. This indicates that hypothesis 1 (That Using Duolingo has significant advantages and disadvantages in vocabulary learning) was accepted.

Moreover, the findings revealed a positive overall attitude toward using Duolingo for vocabulary learning. Students appreciated the app's accessibility, engaging features like gamification elements, and self-paced nature. Additionally, there was a favorable shift in participants' self-perceived English vocabulary levels after using Duolingo, suggesting its potential effectiveness as a supplementary resource. This indicates that hypothesis 2 (Students in Hanoi have predominantly positive attitudes toward using Duolingo to learn vocabulary) was accepted, suggesting that the Duolingo application can indeed be utilized to enhance students' vocabulary learning outcomes.

Interestingly, the perceived effectiveness of Duolingo also varied based on learners' proficiency levels. In particular, beginner students reported more positive experiences compared to advanced learners. Despite the limitations, participants expressed a willingness to continue using Duolingo for vocabulary learning and an interest in integrating the app into formal teaching-learning processes. Therefore, Duolingo can be a complementary resource when used in conjunction with other traditional learning methods and under the guidance of language educators.

Moving forward, it is recommended that Duolingo's designers address its limitations by

providing more contextualized vocabulary practice, offering customization options for proficiency levels and content selection, improving speaking exercises, refining notification settings, and integrating natural conversations that reflect authentic language use. Additionally, the app should be supplemented with comprehensive learning resources and avenues for better integration into formal language curricula.

For educators considering incorporating Duolingo into their teaching practices, a balanced approach is advised. Duolingo should be used as a supplementary tool to complement and reinforce vocabulary learning from primary classroom materials and teacher-led activities. Guidance on effective app usage, progress monitoring, and the design of classroom activities that reinforce and contextualize the vocabulary learned through Duolingo are essential.

In conclusion, this study contributes to investigating the potential and limitations of Duolingo and Hanoi students' attitudes toward using this application to enhance English vocabulary. While Duolingo shows promise as an engaging and accessible supplementary resource, its true potential can be unlocked through strategic integration, continuous improvement, and a balanced approach with educators' guidance.

References

- Ahmadi, D. M. R. (2018). The use of technology in English language learning: A literature review. *International journal of research in English education*, 3(2), 115-125.
- Ajisoko, P. (2020, April 8). *The Use of Duolingo Apps to Improve English Vocabulary Learning*. Learning & Technology Library (LearnTechLib).
<https://www.learntechlib.org/p/217084/>
- Alemi, M., & Tayebi, A. (2011). The Influence of Incidental and Intentional Vocabulary Acquisition and Vocabulary Strategy Use on Learning L2 Vocabularies. *Journal of Language Teaching and Research*, 2(1), 81-98. <https://doi.org/10.4304/jltr.2.1.81-98>
- Amin, S. N. (2021). Gamification of Duolingo in Rising Student's English Language Learning Motivation. *Lingua Scientia Jurnal Bahasa*, 13(2), 191–213.
<https://doi.org/10.21274/ls.2021.13.2.191-213>
- Brown, G. and Yule, G. (1983), Discourse analysis. Cambridge: Cambridge University Press, 1983. Pp. xii + 288. - M. Stubbs, Discourse analysis. Oxford: Basil Blackwell, 1983. Pp. xiv + 272. *Journal of Linguistics*, 21(1), 241–245.
<https://doi.org/10.1017/s0022226700010161>
- Chik, A. (2015). Recreational language learning and digital practices: Positioning and repositioning. In *Discourse and Digital Practices* (pp. 112-129). Routledge.
- de Castro, A. P., da Hora Macedo, S., & Pinto Bastos, H. P. (2016). Duolingo: An Experience in English Teaching. *Journal of Educational & Instructional Studies in the World*, 6(4), 59.
- Decarrico, J.S., 2001. Vocabulary learning and teaching. *Teaching English as a second or foreign language*, 3, 285-299.
- Diamond, L., & Gutlohn, L. (2006). Teaching vocabulary. Retrieved from the Reading Rockets website: <http://www.readingrockets.org/article/teaching-vocabulary>.

- Duolingo Help Center (2022) *What is Duolingo?, About Duolingo*. Available at: <https://support.duolingo.com/hc/en-us/articles/204829090-What-is-Duolingo> (Accessed: 12 June 2024).
- Fatima, B., & Khan, I. A. (2017). Crucial importance of vocabulary in the process of second language learning: an exploratory study. *European Journal of Education Studies*, 3(6), 501-517. <https://oapub.org/edu/index.php/ejes/article/view/767>
- Finardi, K. R., Leão, R. G., & Amorim, G. B. (2016). Mobile assisted language learning: Affordances and limitations of Duolingo. *Education and Linguistics Research*, 2(2), 48-65.
- Flores, J. F. F. (2015). Using gamification to enhance second language learning. *Digital Education Review*, (27), 32-54.
- Glowacki, D., Lanucha, C., & Pietrus, D. (2001). Improving Vocabulary Acquisition through Direct and Indirect Teaching (Master's research project). ERIC. <https://eric.ed.gov/?id=ED453542>.
- Hatch, E., & Brown, C. (1995). *Vocabulary, semantics, and language education*. Cambridge University Press, 40 West 20th Street, New York, NY 10011-4211 (hardback: ISBN-0-521-47409-4; paperback: ISBN-0-521-47942-8)..
- Hernadijaya, N. S. (2020). The use of duolingo application to enhance junior high school student's English vocabulary. *RETAIN*, 8(2), 17-24.
- Ho, V. (2020). Localization in educational mobile games: Multiple case studies of educational mobile games in the emerging market, Vietnam (Master's thesis, Aalto University School of Business, Finland). Aalto University. <https://urn.fi/URN:NBN:fi:aalto-202005243194>
- Huong, P. T. T., & Long, N. V. (2018). How effective are EFL software programs for English learning in Vietnamese higher education context. In *proceeding: 2nd International Conference on Social Sciences, Humanities, and Technology (ICSHT 2018)*. Global Academic Excellence (M) Sdn. Bhd (pp. 248-255).
- Inayah, N., Yusuf, Q., & Fibula, N. (2020). Exploring undergraduate students' perception toward the use of Duolingo in learning English. *Humanities & Social Sciences Reviews*, 8(3), 76-85. <https://doi.org/10.18510/hssr.2020.839>
- Jašková, J. (2014). *Duolingo as a new language-learning website and its contribution to e-learning education* (Doctoral dissertation, Masarykova univerzita, Pedagogická fakulta).
- Jiang, X., Rollinson, J., Chen, H., Reuveni, B., Gustafson, E., Plonsky, L., & Pajak, B. (2021). How well does Duolingo teach speaking skills. *Amazonaws. com. Northern Arizona Univ.[Online]*. Available: <https://duolingo-papers.s3.amazonaws.com/reports/duolingo-speakingwhitepaper.pdf>.
- Kacetl, J., & Klímová, B. (2019). Use of smartphone applications in English language learning—A challenge for foreign language education. *Education Sciences*, 9(3), 179.
- Souiki, K. (2022). *An investigation into the effect of using Duolingo application to enhance students' vocabulary* (Master's thesis, Mohamed Khider University of Biskra). http://archives.univ-biskra.dz/bitstream/123456789/27104/1/SOUIKI_KHOULOD.pdf

- Laufer, B. (1997). What's in a word that makes it hard or easy? Some intralexical factors that affect the learning of words. In N. Schmitt & M. McCarthy (Eds.), *Vocabulary: Description, Acquisition and Pedagogy* (pp. 140–155). Cambridge University Press.
- Laufer, B. (2005). Focus on form in second language vocabulary learning. *EUROSLA Yearbook*, 5(1), 223-250. <https://doi.org/10.1075/eurosla.5.11lau>
- Liang, L. (2018). *Exploring language learning with mobile technology: A qualitative content analysis of vocabulary learning apps for ESL learners in Canada* (Master's thesis, The University of Western Ontario (Canada)).
- Masrai, A. (2019). Vocabulary and reading comprehension revisited: Evidence for high-, mid-, and low-frequency vocabulary knowledge. *Sage Open*, 9(2), 1-13. <https://doi.org/10.1177/2158244019845182>
- Milyarni, F. D., Mortini, A. V., & Mayasari, S. (2021). Translation Exercises of English To Indonesian in Duolingo Application. *The Journal of English Literacy Education: The Teaching and Learning of English as a Foreign Language*, 8(2), 150-163.
- Munday, P. (2016). The case for using DUOLINGO as part of the language classroom experience (Duolingo como parte del curriculum de las clases de lengua extranjera).
- Nagy, W. E., Herman, P. A., & Anderson, R. C. (1985). Learning words from context. *Reading research quarterly*, 20(2), 233-253.
- Nagy, W., & Townsend, D. (2012). Words as tools: Learning academic vocabulary as language acquisition. *Reading research quarterly*, 47(1), 91-108.
- Nation, I. S. P. (2001). Learning vocabulary in another language. Cambridge University Press. <https://doi.org/10.1017/CBO9781139524759>
- Nemoto, T., & Beglar, D. (2014, November). Likert-scale questionnaires. In *JALT 2013 conference proceedings* (Vol. 108, No. 1, pp. 1-6).
- Neuman, S. B., & Dwyer, J. (2009). Missing in action: Vocabulary instruction in pre-K. *The reading teacher*, 62(5), 384-392.
- Nghi, T. T., & Thang, N. T. (2024). Challenges and Drawbacks of Smartphone-Based Language Learning for Vietnamese EFL Learners in Higher Education Settings: Perspectives on Mobile Apps and Curriculum Design. *Journal of Language Teaching and Research*, 15(2), 428-435.
- Nguyen, H. A. (2024). *Harnessing AI-based tools for enhancing English speaking proficiency: Impacts, challenges, and long-term engagement*. *International Journal of AI in Language Education*, 1(2), 18–29. <https://doi.org/10.54855/ijaile.24122>
- Nguyen, T. N. Q., & Vo, N. T. T. (2021). The need of applying English learning apps to help Van Lang University students improve their spoken English performance. *AsiaCALL Online Journal*, 12(2), 72-86.
- Nushi, M., & Egbali, M. H. (2017). Duolingo: A Mobile Application to Assist Second Language Learning. *Teaching English with Technology*, 17(1), 89-98.
- Putri, L. M., & Islamiati, A. (2018). Teaching listening using Duolingo application. *Journal of English Education*, 1(4), 460.
- Roche, T., & Harrington, M. (2013). Recognition vocabulary knowledge as a predictor of academic performance in an English as a foreign language setting. *Language Testing in Asia*, 3, 1-13.

- Schmitt, N., & Schmitt, D. (2014). A reassessment of frequency and vocabulary size in L2 vocabulary teaching. *Language Teaching*, 47(4), 484-503.
- Stahl, S. A., & Nagy, W. E. (2007). Teaching Word Meanings. In *Routledge eBooks*.
<https://doi.org/10.4324/9781410615381>
- Townsend, D., Filippini, A., Collins, P., & Biancarosa, G. (2012). Evidence for the importance of academic word knowledge for the academic achievement of diverse middle school students. *The Elementary School Journal*, 112(3), 497-518.
- Tran, K. Q. (2024). *The effects of integrating artificial intelligence into learning academic vocabulary among master's in English studies students*. *International Journal of AI in Language Education*, 1(1), 1–19. <https://doi.org/10.54855/ijaile.24111>
- Vesselinov, R., & Grego, J. (2012). Duolingo effectiveness study. *City University of New York, USA*, 28(1-25).
- Ward, N. (1988). Issues in word choice. In *Coling Budapest 1988 Volume 2: International Conference on Computational Linguistics*.
- Wilbert, J. K. W., WANG, Y., HE, M., LI, L., Wang, D., Li, X., ... & Torracco, R. J. (2016). Duolingo as a Bilingual Learning App: a Case Study. *Journal of Knowledge Management*, 2(2), 1-18.
- Zhang, R., & Zou, D. (2022). Types, purposes, and effectiveness of state-of-the-art technologies for second and foreign language learning. *Computer Assisted Language Learning*, 35(4), 696-742. <https://doi.org/10.1080/09588221.2020.1803367>.

Biodata

I am Nguyen Thi Quyen, a graduate student at Foreign Trade University, Hanoi, Vietnam, and my major is Business English. Currently, I am working as a teaching assistant at an interlevel school in Hanoi. I have more than 2 years of experience working as an English tutor.

Email: K59.2014710086@ftu.edu.vn