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RESEARCH ARTICLE

The Effect of Using Duolingo on Developing EFL Students' Vocabulary and their Attitudes toward it

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ARTICLE INFO	ABSTRACT
	The current paper investigates the effect of using *Duolingo* application on developing students' vocabulary competence and exploring their attitudes toward it. 60 EFL male students studying at Al-Jazeerah Basic School during the academic year 2023/2024 participated in the study. The subjects were divided into two groups: an experimental group and a control group. The experimental group was taught via the instructional program, while the control group received instructions in accordance with the *Teacher's Book's* description of teaching methodology. The study followed the quantitative methodology while the data were gathered by analyzing the participants' answers to the pre-test and post-test as well as their responses to the questionnaire. It was found that the mean scores of the experimental group and the control group differed significantly in preference of the experimental group. Additionally, the results indicated that the participants had positive attitudes toward learning vocabulary using *Duolingo* application. The current study recommends overusing *Duolingo* application to ensure a better vocabulary competence for learners.

1. INTRODUCTION

Undoubtedly, English language is used in many, if not all, life sectors. It serves as the primary language for technology, business, science, politics, society, culture...etc. (Behroozi and Amoozegar, 2014). As a universal language, English is used by people from all over the world to communicate, build, and expedite relationships, Ramelan (1992). To generalize using English in many different sections of life and education, many institutions and individuals have started using many applications to facilitate learning and teaching English. Due to the importance of technology in the teaching process, teachers who teach English as a foreign language should depend on many E-learning platforms, and electronic applications to invest in the services that they provide to develop their students' linguistic competencies.

Sakkir & Syamsuddin (2023) supported this fact when they indicated that with the advancement of technology, a plethora of products have been created that aid in language learning for students. In addition to helping with Internet service priority and authentication, mobile devices can be used to mimic, visualize, and communicate with scientific systems, procedures, and models.

Language learning is a critical skill in our increasingly-interconnected-world. Proficiency in a foreign language is beneficial for communication, career opportunities, and cultural awareness. One of the essential components of language proficiency is mastering and learning vocabulary as a major section in learning any new language as it might help learners understand and interpret written and/or spoken texts in a foreign language. Drawing upon the same theme, Zahedi & Abdi (2012)

stressed the significance of learning new vocabulary, being a necessary skill for learning English as a foreign language.

The rapid change in the world, especially that of technology, E-learning platforms, and electronic applications related to education and training, has encouraged students and educators to invest in applications relevant to the same field in an attempt to enhance various educational outcomes. There are numerous applications that are available for learning different languages. Some of them are free which encourages learners to invest in the various services that these applications could present. Krivoruchko *et.al* (2015) agreed with this point of view when they stated that the use of Mobile Assisted Language Learning (MALL) facilitates the learning process for both teachers, and learners.

Malkawi, Rababah & Ta'amneh (2023) supported the previous fact as saying that E-learning platforms have become indispensable resources for English language instruction, particularly in the wake of the COVID-19 epidemic. They are also employed for feedback-giving, progress evaluation, and communication and interaction with pupils.

Some of these e-learning platforms and other applications provide extensive courses including all language skills, such as speaking exercises, vocabulary building, and grammar. Certain apps. concentrate on just one or two talents or skills. Making the most of your study time and mastering English speaking can be achieved by combining these apps.

Applications in the field of technology are numerous. Among these applications are those provided by the British Council, such as "MosaLingua", "Drops", "FluentU", and "Lingoda". Some of these applications are used to develop students' different skills and components of language such as speaking, reading, and writing. Other applications could provide valuable information about the best way to learn about the cultures of other countries. Among these applications that are widely used by students all over the world is *Duolingo*.

By definition*, Duolingo* is a well-known and extensively utilized smartphone application for language learning. It was founded by Luis Von and Serverin Hacker in 2011. *Duolingo* offers courses in a wide range of languages. Through interactive courses and exercises, users can develop their speaking, writing, listening, and reading skills. The site is a useful resource for language learners of all skill levels because of its well-known accessibility and user-friendly interface. In this context, Munday (2016) indicated that this website could provide different services for English native speakers and other learners in different countries. Hsu (2012) indicated that the students are best known by the term "digital natives" as they are fond of using their mobiles, laptops, or iPads, so they will not face difficulties in learning English via using different components of technology.

The increasing use of such applications could be attributed to the following reasons:

Technology has revolutionized language learning, offering flexible and accessible methods through mobile applications like Duolingo. These applications provide authentic resources to learners at various educational stages, enhancing their learning experience. In this context, Walker & White (2013) assured that technology and its applications have provided a chance of useful and authentic resources to learners at various educational stages.

The significance of vocabulary learning cannot be overstated for language learners, as it plays a direct role in their capacity to comprehend written materials like instructions, texts, and articles. Proficiency in vocabulary is essential for success in the workplace, in school, and in daily life. Because they contain meaning, mastering vocabulary is considered necessary for learners to build their linguistic abilities (Thornbury, 2022).

The Popularity of Duolingo: Duolingo is a popular language learning tool with interactive features, benefiting learners of all ages and backgrounds. It aids in developing linguistic abilities, and educators should provide practical support for effective language skill acquisition. Vesselinov & Grego (2012) indicated that when a student spends a good period using Duolingo, this will help him in developing his linguistic abilities. According to Harmer (2001) and Genclter (2015), educators are requested to provide practical support to engage their pupils in digital technology-based activities to effectively acquire language skills.

Duolingo enhances vocabulary learning through user-centered learning, demonstrating how technology can enhance language instruction and providing accessible language learning resources to learners. Putri & Islamiati (2018) mentioned that *Duolingo* could develop students' different skills and encourages them to learn a new language in an easy interactive way.

The importance of technology and other computer applications for curriculum, designers, and teachers. They can invest in the various services that they serve in developing their students' language skills. According to Halverson & Smith (2009), utilizing technology and its many uses facilitates and enhances learning.

Using Duolingo and other online mobile applications may increase the students' involvement and motivation. Students are fond of technology and its various applications, so they can use them to improve their linguistic abilities. In this regard, Cavus and Ibrahim (2009) assured that using mobiles in the learning process increases their engagement and motivation. Lusi (2012) indicated that students find it simpler to comprehend information when studying English using games on their mobiles.

The goal of the research is to further our understanding of how technology can be used to enhance language education and improve reading skills by looking at these components.

2. STATEMENT OF THE PROBLEM

As instructors of English language, in academic institutions, the researchers have noticed that many Jordanian students face a lot of challenges while participating in the exercises of the classroom or doing well in their exams, quizzes, or assignments due to the fact that they do not have that amount of vocabulary that can help them to get good grades in different English courses and different educational stages. Furthermore, Jordanian secondary and basic school students perform relatively poorly in different skills, which hinders the development of vibrant, interactive learning environments in the classroom (Smadi, 1986; Al-Dwiek, 2008; and Al-Zaid, 2008).

Inserting technology into learning is useful and important especially when teaching vocabulary. Traditional language education methods may not always provide learners with enough opportunities to practice and improve their reading comprehension skills, particularly in authentic and engaging contexts. Technology has transformed language education by providing learners with innovative and easily accessible tools. Among these tools, *Duolingo* has emerged as a popular language-learning app. known for its gamified and interactive approach. While *Duolingo* has been acknowledged for its effectiveness in various aspects of language learning, its impact on developing students' vocabulary learning is still being investigated.

3. PURPOSE OF THE RESEARCH

The purpose of the study is to present empirical proof of *Duolingo's* ability to develop students' vocabulary learning proficiency. Moreover, its purpose is to comprehend how students feel about using *Duolingo* for vocabulary learning and to what extent they are motivated to do so. It looks at ideas that might affect how contented students are with the vocabulary learning exercises on the app.

Furthermore, the findings may help stakeholders and English language teachers incorporate technology, like *Duolingo*, into language learning initiatives in an efficient manner. It offers information on how to use technology to improve vocabulary learning abilities.

Finally, this research advances the field of technology-enhanced learning in a larger sense. It looks at how some mobile apps can improve language instruction and make vocabulary learning exercises more fun and productive.

4. OBJECTIVES OF THE STUDY

The study seeks to achieve the following:

1. Determining if the experimental group's performance on the vocabulary exam differed significantly from that of the control group's students as a result of the teaching approach (the suggested instructional program and the traditional one).

2. Revealing the students' points of view toward the effectiveness of using *Duolingo* in developing their vocabulary learning.

By looking at these issues, the study hopes to advance knowledge of the potential of *Duolingo* and related language learning programs in enhancing vocabulary learning. It also hopes to provide creative solutions to language learning problems and get students vocabulary learning in a real-world setting while having fun.

5. SIGNIFICANCE OF THE STUDY

1. The papers' findings may prove useful to EFL instructors since they provide convincing proof of the value of utilizing different online applications to improve vocabulary learning and foster greater classroom engagement.
2. By offering them the most effective online applications that enhance students' vocabulary learning, the study's findings may benefit Jordanian and other EFL teachers.
3. The Ministry of Education, scholars, and policymakers may find the study's recommendations extremely helpful in determining the significance of these kinds of educational interactive applications for enhancing Jordanian students' vocabulary learning.

6. RESEARCH QUESTIONS

The current paper aims to respond to the following questions:

1. 1-To what extent does the use of *Duolingo* improve students' vocabulary learning?
2. 2- What are students' attitudes regarding the use of *Duolingo* for vocabulary learning in language learning?

7. LITERATURE REVIEW

7.1 Theoretical background

Applications for learning languages have grown in popularity as tools for people looking to learn a new language. These apps provide easy and accessible methods for language practice and learning at any time and from any location. Among these applications, *Duolingo* is one of the most popular and well-known. This review will examine language learning applications in general, with a particular emphasis on *Duolingo*.

Duolingo is a free application that can be used on computers or smartphones. It was founded by Luis Von and Severin Hacker in 2011 to present free education to the world. According to Munday (2015), *Duolingo's* goal is to make learning languages enjoyable. The application even offers a multi-skilled game-like activity. It ties lessons to a game that can increase enthusiasm for language learning. Enjoyably, *Duolingo* blends audio, visual, and question-based components related to grammar and vocabulary. Thus, it may have an impact on users' ability to speak English more fluently.

These applications for learning languages are suitable and useful for learners because of their:

1. Convenience and Accessibility: Language learning apps, available on various devices like smartphones and tablets, enable users to learn at their own pace and convenience, often being free and user-friendly.
2. Interactive Education: They are considered interactive applications that utilize gamified elements, quizzes, and exercises to engage and motivate students, presenting audio, visual aids, and multimedia content for improved learning experiences. This fact is supported by Larsen-Freeman & Anderson (2011) when they indicated that using different technological aids and applications facilitates language acquisition.
3. Diverse Language Options: Learners can choose from various languages like French, Italian, Russian, and Chinese. Chapelle (2003) indicated that technology can enhance their language proficiency.
4. Community and Social Elements: The incorporation of social features creates a sense of community by allowing users to interact with other students in different parts of the world. Wilbert et al. (2016) looked at *Duolingo* as an amazing, worldwide app for natural language communication. In addition, Forums and language exchange options offer chances for practical language practice which helps in developing students' skills.

Moreover, Carnerio & Simao (2011) looked at *Duolingo* as an interesting application that promotes peer-to-peer interaction and collaboration by allowing learners and their classmates and friends to challenge each other. *Duolingo* is considered a valuable and useful teaching and learning application because of the following:

Firstly, *Duolingo* uses a gamified strategy that makes learning a language enjoyable and addictive. After finishing tasks and lessons, learners receive virtual currency, prizes, and points. Chapelle (ipid) & Lan & Sie (2010) believed that using technology and its aids motivate learners to learn a new and foreign language.

Secondly, this application provides well-ordered classes as it presents lessons on different language skills and sub-skills, such as structure, and vocabulary, within an organized curriculum. In this context, Nushi and Eqbali (2017) stated that with the help of the language learning app *Duolingo*, students can independently acquire foreign languages by following easy and methodical steps.

Thirdly, to ensure a customized learning experience, the application modifies the exercises' difficulty in response to user performance.

Fourthly, the freemium model of the application makes language learning available to a wider audience. *Duolingo* is primarily free to use, with optional in-app purchases for additional features.

Finally, *Duolingo* incorporates user feedback and industry advancements into its regular updates to features and content. The platform uses cutting-edge technology to improve the educational experience.

To sum up, Apps. for language learning, like *Duolingo*, have completely changed how people approach learning a language. These applications enable learners to start their language-learning journeys with flexibility and enthusiasm thanks to their interactive and user-friendly features. The role of language learning apps is expected to grow in importance as technology advances, contributing to the global removal of language barriers.

7.2 Empirical studies

Astarilla (2018) examined the students' attitudes about using *Duolingo* in learning English for university students in Indonesia. A mixed-method approach was used for data collection. A questionnaire was distributed to 135 university students, 30 of them were also interviewed to ensure their positive attitudes toward the application. The results revealed the positive perceptions of students towards using *Duolingo* to support them in mastering English. Students believed that it was a motivating and easy mean that provided an enjoyable and interesting way of learning.

Irawan, Wilson, & Sutrisno (2020) carried out research on the impact of *Duolingo* on vocabulary acquisition in English. To collect the needed data, 10 participants were tested. According to the data, the application received a score of 73,8%, which indicates that learning materials using *Duolingo* can be used, particularly for students who struggle with in learning English.

Delvanny (2022) tried to gather empirical data regarding how using *Duolingo* affects students' vocabulary learning. A quasi-experimental design was employed. Students from SMP 4 Siak Hulu's seventh grade participated in this study during the 2022–2023 school year. *Duolingo* was used to teach the experimental group. Whereas the control group followed the traditional method. Multiple-choice pre- and post-tests made up the research instrument. The results showed that seventh-grade learners may benefit from using Duolingo in terms of their vocabulary.

Novitasari & Purnamaningsih (2022) studied learners' attitudes about using *Duolingo* as a medium used in learning English at Junior High School students in Karawang. For data collection, the researchers distributed a questionnaire using Google Forms to the participants. The results showed the participants had positive attitudes towards using *Duolingo*. Students considered *Duolingo* as an easy and effective means of learning English.

Sakkira & Syamsuddina (2023) conducted a study to ascertain how students felt about *Duolingo* when it came to picking up vocabulary in English. 32 seventh-graders, from SMPN 1 Pangkajene, participated in this study in the academic year 2022–2023. To conduct the study, descriptive

quantitative methods were employed. The results pointed out that using Duolingo had a positive effect on learning new words. Moreover, the students' enthusiasm for learning vocabulary increased.

Nasrul & Fatimah (2023) conducted a study to measure the effect of *Duolingo* on increasing the student's motivation to learn new vocabulary. The sample of the study consisted of twenty-two students. Two instruments were used to conduct the study; a vocabulary test and a questionnaire. The findings indicated that using Duolingo had a great impact on increasing their motivation.

Permatasari & Aryani (2023) examined learners' attitudes about using *Duolingo* in learning English for college students in Indonesia. The researchers used a qualitative method in data collection by using a questionnaire to collect data from 50 students in various Indonesian universities. The results showed that *Duolingo* was an effective means of learning English due to its convenience and ease of access. It was easy to use the application by students at any time and place; thus, it was very beneficial in improving the four language skills.

The studies reviewed above implemented different ways to examine the effectiveness of using *Duolingo*. Each study used one method for achieving the goals of the study. However, all of them agreed on its great role in vocabulary development. On the other hand, the current study employed different approaches in investigating the effectiveness of *Duolingo* on developing students' vocabulary competence and their attitudes toward it. Two instruments were used to conduct the study (A test and an attitudinal questionnaire) compared with the previous studies either they used a test or just a questionnaire to collect the needed data.

The benefits expected from the previous studies

The studies that the researchers provided had a variety of goals, but they were all closely related to the topic of this study. For instance, Sakkira & Syamsuddina (2023) just wanted to find how learners felt after using *Duolingo* through an inquiry form. On the other hand, Nasrul & Fatimah (2023) conducted their study to measure the effect of *Duolingo* on the students' motivation to learn English and vocabulary. In addition, Irawan, Wilson, & Sutrisno (2020) tried to measure the effect of the application on the learners' vocabulary acquisition. Delvanny (2022) investigated how using the *Duolingo* could develop learners' vocabulary by employing a quasi-experimental design.

However, the current study differs in its objectives as well as its tools. This study is different in its purposes as it examines the effect of using *Duolingo* on developing participants' vocabulary and their attitudes toward it. Two instruments were used to conduct the study compared with the previous studies that either used a test or just a questionnaire to collect the needed data.

8. METHODOLOGY AND SCOPE OF THE STUDY

8.1 The participants

The study involved 60 male EFL students in the seventh grade at Al-Jazeera Basic School for Boys. They were conveniently selected to take part in the study. The learners were assigned randomly into two groups. Each group consisted of thirty students. One pre-test was given to each group. The study lasted for six weeks. The experimental group was taught by the teacher in accordance with the instructional program, while the control group received instruction in accordance with the Teacher's Book's description of teaching methodology.

The distribution of the sample study

Group	Experimental group	Control group
No. of students	30	30
Total	60	

8.2 Design of the study

A quasi-experimental research design was used in this work. It was straightforward to select a control group of thirty students and an experimental group of thirty students were conveniently chosen to take part in the study.

8.3 Variables of the Study

1. The teaching approach, which included both the traditional method of instruction and the interactional instructional program, was the independent variable.
2. The vocabulary test mean scores of the participants served as the dependent variables.

8.4 Instruments

8.4.1 The vocabulary pre-posttest.

The test was designed by the researchers. It consisted of three parts. The first section consisted of 10-word choice sentences, the second part consisted of 5 matching sentences, and the last section consisted of 5 multiple choice sentences.

8.4.2 The attitudinal questionnaire

It was designed by the researchers after reviewing the relevant literature and then establishing its validity and reliability. It was presented in both Arabic and English. This questionnaire was designed to find out how the students of the experimental group felt about the effect of Duolingo in developing their vocabulary competencies. It consisted of 15 statements in its final version and after modifying it according to the bits of advice and the suggestions of the validation jury. The offered assertions, which ranged from 5 to 1 (Strongly Agree, Agree, Undecided, Disagree, and Strongly Disagree), were asked to be answered by the participants.

8.5 Validity and reliability of the instruments

8.5.1 Validity

A panel of university professors with expertise in curriculum and instruction, measurement and evaluation, and linguistics reviewed and examined the instruments as well as the instructional content to determine their suitability for the study in order to establish their validity. Their astute comments, adjustments, and suggestions were taken into consideration.

8.5.2 Reliability

To ensure the reliability of the instrument, the internal consistency of respondents' answers in the pilot study was tested using Cronbach's alpha coefficient for all the sections of the vocabulary test as well as the Attitudinal Questionnaire. The findings are presented below.

Table 2: Cronbach's Alpha coefficient for all the sections in the vocabulary test

N	Section	No. of Items	Cronbach's Alpha
1	Word choice	10	0.84
2	Matching	5	0.85
3	Multiple choice	5	0.87
Overall		20	0.85

Table 2 shows the Cronbach's Alpha coefficient, for the twenty items in the vocabulary test. It was found 0.85 which means that there was an internal consistency in the data.

Table 3: Cronbach's Alpha coefficient of the attitudinal questionnaire

N	Domain	Cronbach's Alpha
1	STUDENTS' QUESTIONNAIRE	0.87

Cronbach's Alpha coefficient, for the fifteen items of the attitudinal questionnaire, was calculated and it was found 0.87 which is an acceptable percentage to start distributing the attitudinal questionnaire among the participants after completing the experiment.

8.5.3 Data analysis

The researchers used a quantitative methodology. Different statistical analyses, such as means, standard deviations, and t-tests, were used to analyze the received data from the participants.

9. RESULTS AND DISCUSSION

9.1 Findings related to the first research question.

To answer the first research question "To what extent does the use of Duolingo improve students' vocabulary learning?", means and standard deviations of the students' achievement in the vocabulary pre- and post- tests were calculated due to the teaching strategy (The use of Duolingo vs. the conventional way).

A vocabulary pre- test was administered to both groups to ensure group equivalence before subjecting the participants to any teaching intervention. Means, standard deviations, and t-tests were used to find out if there were any significant differences between both groups of the study, as shown in the table below.

Table 4: Means, standard deviations, and t-test results of the experimental and control groups on the vocabulary pre-test

GROUP	N	Mean	Std. Deviation	t	df	Sig. (2-tailed)
Experimental	30	12.30	1.535	-1.611	58	.113
Control	30	13.00	1.819			

The pre-test results for both groups' student means are almost equal, as shown in Table (4). This suggests that prior to the trial, the two groups were equal. The fact that the experimental group's mean is 12.30 and the control group's mean is 13.00 further demonstrates that there was no statistically significant difference between the means of the two groups on the vocabulary pre-test.

Table 4 indicates that there is no statistically significant difference in the students' mean results on the vocabulary pre-test. It indicates that the students' mean results on the vocabulary pre-test appear to be equivalent for the two groups. The researchers computed the means and standard deviations for the two groups in order to conduct more studies. As can be seen in the table below, the t-test was also employed to determine if the experiment had any significant effects on the students' results within the study groups.

Table 5: Means, standard deviations, and T-test results of the experimental and control groups on the vocabulary post-test

GROUP	N	Mean	Std. Deviation	t	df	Sig. (2-tailed)
Experimental	30	17.07	1.081	9.258	58	.000
Control	30	14.13	1.358			

Table 5 demonstrates that the usage of Duolingo is responsible for statistically significant variations in the students' vocabulary post-test results (at α=0.05). The experimental group's pupils outperformed the control groups, as the table demonstrates. This discrepancy might be linked to the pupils' increased vocabulary acquisition through the usage of Duolingo. On the other hand, the control group children who followed the Teacher's Book's instructions and got traditional training performed worse on the post-test. The type of program being utilized may be the reason for the control group's improvement. Students used Duolingo in a way that made them enthusiastic to learn and remember new vocabulary items because of its stimulating character (Nasrul & Fatimah, 2023) and this contributed significantly to the learning process.

 Besides, Duolingo uses a gamified strategy that makes learning a language enjoyable and addictive (Carnerio & Simao, 2011; Chapelle (ipid) & Lan & Sie, 2010) which may be another reason for this development in the control group.

9.2 Findings related to the second research question.

To answer the second question "What are students' attitudes regarding the use of *Duolingo* for vocabulary learning in language learning?", means and standard deviations of the participants' attitudes toward the use of *Duolingo* were calculated and arranged in descending order according to their means as shown in Table 6.

The interpretation and analysis of the findings of the questionnaire, the students in the experimental group seemed to have a favorable attitude regarding using *Duolingo* to acquire vocabulary. Table 6 presents the findings.

Table 6: Means and standard deviations of experimental group students' attitudes toward the use of Duolingo for vocabulary learning

Rank	No	Item	Mean	Std. Dev.	Rank
1	1	I need extra effective learning applications to use in learning English such as Duolingo.	4.63	.765	High
2	12*	I see that Duolingo is NOT useful in learning vocabulary.	4.40	.932	High
3	7	I comprehend the content displayed on Duolingo because it offers clear-cut materials, questions, and information.	4.30	1.022	High
4	11	Duolingo is easy to use, even for beginners, so I didn't find it difficult to use.	4.30	.837	High
5	15*	I do not advise my classmates to use Duolingo as it does not help me in learning vocabulary effectively.	4.27	.785	High
6	5	I like Duolingo because it offers a variety of activities to learn vocabulary in an interesting way.	4.23	1.073	High
7	4	I use Duolingo since it complements my learning style in learning vocabulary.	4.20	.887	High
8	14*	I think that Duolingo is a complex learning platform.	4.20	.961	High
9	6	Duolingo is fun for me because it offers sufficient conversational and useful practice to learn vocabulary.	4.17	.950	High
10	13*	I think that Duolingo is a waste of time as it does not improve my vocabulary.	4.10	1.094	High
11	2	I'm excited to use the fascinating learning technologies that Duolingo offers.	4.07	1.015	High
12	9	I must concentrate on honing the necessary skills, and Duolingo offers the necessary tools.	4.07	1.112	High
13	3	I see that Duolingo is an effective resource for learning vocabulary.	4.03	.928	High
14	10	Because Duolingo makes learning vocabulary more enjoyable and engaging, I like to use it.	3.80	.997	High
15	8	The activities of Duolingo are my favorite because they encourage imaginative, unique, and self-sufficient responses.	3.73	1.230	High
		Total score	4.17	.428	High

*negative item. code reversed

Table 6 shows that Item (1) "I believe that I need extra Effective learning applications in learning English such as *Duolingo*" receives the highest mean (4.63) regarding the degree of agreement. This result may be attributed to the interesting and enjoyable nature *Duolingo* which promotes peer-to-peer interaction and collaboration by allowing learners and their classmates and friends to challenge each other as Carnerio & Simao (2011) and Chapelle (ipid) & Lan & Sie (2010) stated

The table points out that item (12) " I see that *Duolingo* is NOT useful in learning vocabulary", and after reversing its code, came in the second rank with a mean (4.40) and this indicated that the participants in the experimental group looked at *Duolingo* as a useful and interesting online application to develop their vocabulary through responding to different online vocabulary exercises about different topics in different authentic contexts. This is because using *Duolingo* helps students independently acquire foreign languages by following easy and methodical steps, (Nushi and Eqbali, 2017).

Item 8 "The activities of *Duolingo* are my favorite because they encourage imaginative, unique, and self-sufficient responses." was ranked last with a mean (3.73). This table also shows that the Mean of means for all items is (4.17) which is considered high according to the following scale that was used by the researchers as shown in Table 7 below.

Table 7: Classification of Items on the Likert Scale

Degree	Range	Rank
High	3.67 - 5	1
Moderate	2.34 - 3.66	2
Low	1 - 2.33	3

Source: (Iriqat, 2016, p.)

10. CONCLUSION

The purpose of this study was to find out how much vocabulary acquisition by Jordanian EFL students is impacted by Duolingo. Additionally, it looked into how the students felt about using it. The post-test results demonstrated the experimental group's better performance. The experimental group's scores showed a statistically significant difference (at α = 0.05) from the other groups, suggesting that Duolingo helped students learn more vocabulary. The results of this study confirm those of earlier studies on the impact of Duolingo on vocabulary acquisition (Irawan, Wilson, & Sutrisno, 2020; Delvanny, 2022; Sakkira & Syamsuddina, 2023; Nasrul & Fatimah, 2023). This is because students have the opportunity to practice vocabulary and acquire awareness of it through a variety of real-world activities.

 Students reflected positive attitudes concerning using Duolingo as an additional tool for enhancing their vocabulary repertoire. Students found Duolingo as an easy and always available means to practice language. The gamified aspect of the application provided joy and enthusiasm which made learning fun and effective. The results of this study go in complete harmony with some previous studies that showed the learners' positive attitudes toward using *Duolingo in teaching* (Astarilla, 2018; Novitasari and Purnamaningsih ,2022; Permatasari &Aryani, 2023)

This study provides EFL instructors with pedagogical options for presenting vocabulary in and out of the classroom. Language instructors are recommended to make use of Duolingo the way it is used in this study. The researchers also present some recommendations to the Ministry of Education, researchers, and EFL teachers. For example, the researchers suggest that EFL teachers should use a variety of online applications to develop students' different skills as using such applications will definitely encourage students to master English skills in an interactive, enjoyable, and interesting way.

Moreover, the researchers suggest that future experimental studies, including other applications such as MosaLingua, Rosetta Stone, and Drops in teaching English as a foreign language, should be conducted in different contexts. Lastly, the study's practical significance demonstrated that the use of Duolingo had a significant impact on the participants' vocabulary development. Finally, the results of the study pointed out that the respondents had a positive attitude toward learning.

11. LIMITATIONS OF THE STUDY

As this research is limited in scope and sample to examining the effect of one mobile phone application (viz., *Duolingo*) out of many applications available to students on one aspect of language learning (viz. vocabulary) and their attitudes towards it of a convenient sample of 60 seventh grade students at one school. Further research may examine other applications on other aspects of language learning such as grammar or other language skills in various levels of students. This research is further limited in the period which was over six weeks. Furthermore, this study included an attitudinal questionnaire of fifteen items. Further investigations may use a more detailed questionnaire to form a clearer perspective not only on students' attitudes but also on teachers' attitudes about the used application or other applications.

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