



THE IMPACT OF DUOLINGO ON ENGLISH LANGUAGE SKILL DEVELOPMENT AMONG EFL STUDENTS IN SAUDI ARABIA

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Abstract:

This research investigated the influence of a language learning application, Duolingo, on the development of English language proficiency, particularly in reading and writing skills, among middle school students in Saudi Arabia. The study adopted a quasi-experimental design consisting of two groups: an experimental group and a control group. The sample consisted of 32 students who were purposively chosen from the research population. Both groups were required to take a pre-test prior to the experiment and a post-test after it. The experimental group used the Duolingo app (version 6.18.3) to help them learn. The assessment tool was created to measure how Duolingo affects students' reading and writing skills. The results showed that there were statistically significant differences in the post-test scores for reading and writing skills, with a significance value of (0.05) for both skills. The effect size was very high for reading skills (71%) and quite high for writing skills (36%). Based on these results, it is suggested that the Duolingo app be used more in the classroom, that teachers be trained on how to use it effectively in the classroom, and that students be encouraged to use it as an outside assessment tool.

Keywords: Duolingo application, EFL learners, reading skill, writing skill, interactive education

1. Introduction

In today's globalized world, being able to speak and write English well is more important than ever. It is the basis for success in all fields of study and for advancing one's career and communicating with people from other cultures. English learners must develop essential English skills that require improvement across students at different educational stages (Niah & Pahmi, 2019).

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Students need to be able to read in order to improve their understanding and critical thinking skills. It helps students learn, improve their language skills, and get better at dealing with problems they face in a variety of situations (Najat, 2021). Reading prepares people to interact with others and their culture, and it is a very important part of how they form their ideas and attitudes (Soman, 2010). On the other hand, being able to write well is an important way for students to communicate their thoughts, feelings, and parts of their identity. It also helps them develop the skills they need for school and other academic activities, which enables them to excel in many areas (Al-Busais, 2011). Thus, it is important to investigate the effective methods and tools that could develop these language skills.

Recent advancements in educational technology have provided innovative tools and resources that assist students both within and beyond the classroom, catering to various learning styles and aiding English language learners in effectively acquiring these skills (Bui, 2022). For example, mobile applications have been acknowledged for their capacity to improve language acquisition experiences (Ahmed *et al.*, 2022). Using mobile phone apps as educational resources is considered a better alternative to traditional methods because they enable students to learn on their own, which means they can do it anywhere and anytime, not just in the classroom. Kukulka-Hulme and Shield (2008) showed that technology, especially mobile apps, makes learning a language easier by giving students access to real-world materials. This boosts their motivation and reduces stress related to studying, keeps their attention, and lets them express their opinions without fear of being judged. Thus, the use of mobile applications is advised for English language learning (Ahmed *et al.*, 2022).

Professor Louis von Ahn and his student, Severin Hacker, at Carnegie Mellon University developed Duolingo, a popular language-learning app (Munday, 2016). It stands out because it uses speech recognition technologies and fun activities that make learning more enjoyable (Fatmawati *et al.*, 2022). Studies have shown that Duolingo's game-like design keeps people interested in learning, which helps them learn new words, improve their grammar, and get their pronunciation right, and it doesn't have any annoying ads (Sung, Chang, & Yang, 2015).

The Duolingo app stands out because of its teaching methods and its motivating educational framework, which combines lessons with fun games that make learning more interesting. It also uses sounds, sights, and interactive elements to cover vocabulary (Tiara, Rahman, & Handrianto, 2021). Moreover, the Duolingo app has tests that focus on the learners' weaknesses and language problems, based on the mistakes and errors they make. Duolingo has lessons and exercises that help students deal with these problems, which improve their language skills (Hernadijaya, 2020).

A number of studies have confirmed the effectiveness of the Duolingo application in improving learners' reading, listening, and comprehension skills (e.g., Smith *et al.*, 2024; Niah & Pahmi, 2019). Handini, Nurhasanah, and Panly (2022) indicated that using the Duolingo program helps students get better at several different English language abilities. Adawiyah (2022) asserted that Duolingo is an effective tool for improving students'

writing skills and recommended its implementation in English education. Since the application is free, students should seize the opportunity the app provides to continue their language studies (Dearestiani, Rohman, & Pane, 2023). Still, there is less focus on the effectiveness of the Duolingo application on English language ability in Saudi Arabia. Additional research is required to thoroughly assess the impact of Duolingo on English language proficiency in the Saudi context. This study seeks to fill this gap by analyzing the effectiveness of Duolingo on developing the writing and reading skills of middle school students in Saudi Arabia.

1.1 Statement of the Problem

Middle school students in Saudi Arabia encounter great challenges in developing their English language skills, especially reading and writing skills. As one of the researchers is a teacher in a middle school, through his experience, he has noticed that many students have difficulties in learning English, particularly in reading and writing skills; even students with a good level of English proficiency often make repeated mistakes in reading or writing. They find it difficult to read the text softly, don't understand what they read, or have different issues in writing; they can't even write simple sentences with correct instructions.

These issues have been confirmed by some research. For example, a study conducted by Khan and Ali (2010) revealed that many students do not dare to use English in class because they are afraid of the teacher, and many students are reluctant to practice both inside and outside the classroom for fear of being laughed at by friends. Additionally, a recent exploratory study conducted by Aljurijeer (2024) on many teachers confirmed that the main reason for the weakness in the English writing skills in the first grades is the weak curriculum in employing the writing skill. In addition, most teachers depend on the traditional teaching method rather than the strategies that depend on using technology tools. Therefore, it is essential to explore the effective tools that can help students improve their English skills.

Mobile phone applications, like 'Duolingo', can be an effective tool in improving language skills and stimulating learners, as many studies (e.g., Ajisoko, 2020; Bui, 2022) indicated that these applications enhance the motivation and interest of the students in learning the English language. Additionally, another study conducted by Kusuma, Rahmania, Imannisa and Hentasmaka (2024) suggested that teachers use Duolingo as an alternative app for out-of-class learning to enhance students' English Language skills.

Despite the general focus of the previous research on the impact of the Duolingo application, they have neglected its impact on writing and reading skills, especially in the Saudi context. As a result, the researcher noticed, during his job as a teacher, that many students in Saudi Arabia are unfamiliar with the Duolingo application. This is confirmed by the findings of Al-Hariri and Al-Hattami (2020), which revealed that many teachers and students in Saudi Arabia are not fully aware of the impact of these tools on language learning. Also, it aligns with the recommendation of many previous studies (e.g., Metruk,

2021; Al-Hariri & Al-Hattami, 2020) who recommended that further studies be conducted to investigate the impact of the Duolingo application on language learning.

Based on the previous discussion, there is still a clear research gap in relation to the impact of Duolingo on developing reading and writing skills. Also, there is a clear need for further investigation on the impact of the Duolingo application in the Saudi context. Additionally, as one of the researchers is an English language teacher who has personally benefited from the Duolingo application, the researchers are motivated to explore its potential to enhance the educational experience for middle school students in Saudi Arabia. Therefore, the research problem is identified by the main question:

- What is the impact of using the Duolingo application on English language reading and writing skills among middle school students in the Kingdom of Saudi Arabia?

1.2 Research Objectives, Questions, and Hypotheses

The main objective of the study is to explore the impact of the Duolingo application on English language skills among middle school students through exploring the impact of using Duolingo on the English reading and writing skills of middle school students in the Kingdom of Saudi Arabia. To achieve these objectives, the study posits the following research questions:

RQ1: What is the impact of using the Duolingo application on English reading skills among middle school students in the Kingdom of Saudi Arabia?

RQ2: What is the impact of using the Duolingo application on English writing skills among middle school students in the Kingdom of Saudi Arabia?

Moreover, to determine the impact of utilizing the Duolingo application in developing English language skills, the research will adopt the following hypotheses:

H1: There are no statistically significant differences at the level ($\alpha \leq 0.05$) between the mean scores of the experimental group and control group in the post - test of reading skill.

H2: There are no statistically significant differences at the level ($\alpha \leq 0.05$) between the mean scores of the experimental group and the control group in the post - test of writing skill.

1.3 Research Significance

This research is significant in that it focuses on middle school, which is an essential educational phase for learning any language. It explores the educational requirements of the use of technology tools and their impact on meeting the requirements of the learners and teachers. Furthermore, the study contributes to developing English learners' skills by providing evidence-based insight into the impact of the Duolingo application. This research will enable teachers, parents, and students to make informed decisions about language learning tools for themselves. It is expected that the research findings can inform the educational policies, curriculum development, and educational practices to adapt effective tools for learning a language. Additionally, the current research will bridge a gap in the literature as it is among the first studies that explore the impact of the

Duolingo application on reading and writing skills among middle school students, especially in the Saudi context. Finally, it is expected that the results of the current research will open a new gap in the literature, leading to the need for further investigation on the impact of the Duolingo application on other skills or other fields.

2. Literature Review

2.1 Reading Skills

The concept of reading has gone through many stages of development. Salman (2013) identified five stages. The first stage was limited to the recognition of symbols and pronunciation. This stage continued since the emergence of reading until the middle of the second decade of the twentieth century. The interest in teaching reading during this stage was focused on teaching students to read aloud and enabling them to develop pronunciation skills. The second stage began in the thirties of the twentieth century as a result of the research of psychologists who tended to develop reading comprehension skills, where reading was considered a process of thinking and reflection, so the focus at this stage was on teaching students silent reading skills. The third stage began in the forties of the twentieth century as a result of the Second World War. The attention during this stage was on the skills of criticism in reading as the concept of critical reading appeared. The fourth stage began in the fifties of the twentieth century as a result of the vacuum left by the use of modern machines in industry. It was necessary to search for a way of pleasure to spend leisure time, and then the concept of enjoyable reading appeared. The final stage began after 1957 when Russia launched the first satellite, and as a result, the United States of America attributed the systemic shortcomings of scientific progress to the failure to teach students the skills of innovation through reading, and then the emergence of the concept of innovative reading.

It is clear from the above that the concept of reading has evolved through the ages and historical eras, as it initially focused on learning pronunciation and recognizing letters and words, then evolved to include understanding and reflection skills, as reading became a process of thinking and analysis, and with the development of technology and the changes of societies, new concepts appeared in the field of reading such as critical reading, enjoyable reading and innovative reading.

Linguists and researchers have defined 'reading skill' from different perspectives. For instance, Rokhmah (2017) defines reading skill as the ability of the learner to understand and interpret the written text, including written symbols, understanding meaning, interpreting meaning, and implementing what has been understood. While Radi (2022) defines reading as an intellectual activity for the reader to acquire human knowledge from science, culture, art and beliefs. Also, Ferrer *et al.* (2011) define reading as a complex process of several sub-operations carried out by the reader to derive meaning. It depends on mental and sensory perceptions where the reader interprets the read material based on their background knowledge and previous experiences. In addition, Soman (2010) defines reading skill from a psychological perspective. He states

that reading is an operation controlled by two parts, the first part is psychology that is responsible for recognizing the letters 'symbols', their correct pronunciation, the speed of reading and the eye movement. While the second part is mental, which is represented in the vocabulary wealth, understanding the near and distant meaning in various contexts and distracts from the main idea of the text.

Reading performs significant functions in an individual's life. Al-Busais (2011) noted that the most prominent functions include discovery, in which reading allows readers to uncover new information and previously unknown ideas, enriching their general knowledge. It contributes to meeting many psychological needs of a person, such as the need to communicate with others, express oneself and feel independent. Moreover, reading helps relieve some psychological stress and tension, as the reader finds himself busy with what he reads, which keeps him away from emotions and pressures. Finally, it contributes to the development of the individual's tendencies and interests, fills his free time with what is useful and increases his enjoyment of what he reads. These functions are necessary for the learner's professional life and psychological process, as reading is not only limited to giving the learner and providing them with new information and ideas, but also providing them with the psychological needs they need, and working to relieve psychological stress and anxiety, by helping them communicate with others or their preoccupation and enjoyment of reading.

Reading skill is one of the most important language skills that a student should acquire. According to Soman (2010), reading is important for several reasons, including being a tool for intellectual communication and cultural exchange. It prepares the individual for social and cultural life and plays a vital role in the acquisition of ideas and attitudes. Furthermore, it is one of the means of scientific research, through which we can get an answer to any question. For students, reading is important as it helps in acquiring information, expanding their experiences, increasing their linguistic wealth, improves his ability to understand and criticize the read text and helps to find suitable solutions for the problems they face in different situations (Najat, 2021). Additionally, reading improves the thinking process at the various knowledge levels: remembering, understanding, applying and analyzing (Al-Ayasrah, 2011). Finally, reading is one of the main educational requirements for the study, as it contributes significantly to achieving the student's school success and forming successful social relations, and the student cannot continue his studies without being proficient in the skill of reading, so it is one of the priorities of education in the early stages (Al-Maghraoui, 2017).

2.2 Writing Skills

Writing is one of the four core language skills used to express ideas, opinions, thoughts and feelings in written form. According to Harmer (2011), writing is a way of producing language and expressing ideas, feelings, and opinions. It can also be defined as "*the skill related to the child's learning to write letters and words and distinguish between them in shape when written by composition or by drawing*" (Ibn Amr & Taba, 2022, p. 190). It is defined as the learner's ability to write and translate their ideas in sound and error-free terms as

much as they are compatible with their linguistic abilities, and then train them to write in a style, with a degree of artistic beauty appropriate to them, and accustom them to choose the appropriate words, collect ideas, classify and sequence them, and link them (Abdel Fattah, 1999).

Writing is a complex process that consists of many cognitive and metacognitive activities, like planning, organizing, outlining, brainstorming, drafting and revising. Cognitive aspects of writing have received particular attention, as investigators have attempted to understand the thought process underlying the composition of students (Flower & Hayes, 1981). Writing means the non-spoken written 'expression' that differs from oral expression, which is the use of written symbols in the formulation of thoughts, feelings, or emotions that transform the mind (Gad, 2005).

Writing skills have many important functions for the learner. As noted by Al-Busais (2011), writing is a way to express thoughts and feelings in an organized and systematic way, which helps develop critical thinking and logical analysis. It contributes to developing the learner's ability to analyze the topics and ideas they read, which enhances their ability to deal with complex topics. Furthermore, it helps the learner enhance their ability to communicate effectively with others, whether through written messages or social posts. Through writing, learners are taught how to organize their thoughts clearly and systematically, which contributes to enhancing their ability to think creatively and solve problems.

Writing is an important skill. Its importance stems from the fact that it helps learners meet many of their needs. According to Al-Busais (2011), these include growing academic needs related to learning and study, as well as the need for writing skills that enable learners to succeed in their subjects and perform effectively in written tasks. It also helps them meet the increasing need to express their thoughts, identity, feelings and emotions. They may find pleasure in writing diaries or pursuing writing as a hobby. Furthermore, writing is an effective tool for social communication and constructive interaction with society. Many functional writing activities are communication-based, and as individuals expand their social relationships and interactions over time, they require skills that support the development of their expressive language.

Additionally, improving writing skills is an important educational requirement for all learners, especially in the early stages of education, alongside other basic skills such as reading or speaking. Weakness in these skills may persist into advanced stages of education. As cumulative skills are acquired gradually, any deficiency in their development may affect the acquisition of more advanced skills. Therefore, improving these skills appropriately supports learners' ability to express their identities, enhances their cognitive and psychological development, and enables effective psychological and social communication.

2.3 Duolingo Application

Duolingo for Schools is a version of Duolingo designed with a dashboard that allows the teacher to create classrooms and assign homework, and to track students' activity. It

provides many features that allow teachers to integrate it into many instructional tasks (Trace Millar, 2022).

Duolingo is a self-paced language learning application that offers lessons organized by level and skill categories, such as phrases, adjectives, and food-related vocabulary. These skills are largely presented in a linear sequence; the learner is supposed to move from one skill to another just after finishing the earlier lessons. If the learner doesn't complete a lesson, they will not be able to move to the next (Saniyah, 2023). Duolingo is considered one of the world's largest online language learning platforms. It applies scientific principles and adaptive learning strategies to make language learning more effective and enjoyable. The application received various awards, including Apple's iPhone App of the Year in 2013, as well as Google Play's Best of the Best in 2013 and 2014. (Guide for Leaders in Education, n.d.). According to Halimi (2020, p. 23), Duolingo "*is an educational tool that can be integrated in the classrooms in order to provide a new learning experience for students, and it is based on quality content, feedback, and motivation*". Similarly, Muharral (2023) defines Duolingo as "*a free language-learning application to ease the process of learning the English language, and supported by a very advanced technology currently, the young learners who want to learn English with practical and fun applications might use Duolingo to practice English*" (p. 5).

According to the above definitions, the Duolingo application can be considered a smart mobile application that provides English language learning engagingly and enjoyably. Thus, the Duolingo application is important for students to learn languages, increasing their motivation and making language acquisition easier.

As evident in the literature, the Duolingo application can be an effective tool for enhancing various English skills. It can significantly improve students' English vocabulary acquisition (Apoko, Dunggio, & Chong, 2023; Irzawati, 2023). It also improves students' grammar and listening proficiency and increases their motivation and interest in learning, as reported by Rosyidah, Laksmi and Anugerahwati (2023). It provides students with a relaxing and enjoyable learning environment that helps them observe and practice various language skills without relying solely on traditional instructional materials (Hazar, 2022).

Designed with many personalization and gamification features, such as 'ranking', 'points', 'hearts', 'daily reviews' and 'rewards', the Duolingo application improves learners' motivation and attitudes towards language and promotes self-directed learning (Saniyah, 2023). This is supported by many studies (e.g., Rosyidah *et al.*, 2023; Sakkir & Syamsuddin, 2023; Azhima & Halim, 2024), which indicate that gamification features, such as points, levels, and leaderboards, motivate and encourage students to continue practicing and improving their language skills. Finally, the application encourages effective language practice beyond the classroom and strengthens students' motivation to learn English (Indrawan, Daristin, & Laili, 2023).

3. Methods

The researchers implemented a quasi-experimental approach using the two-group design, which includes two groups: an experimental group using the Duolingo application and a control group based on traditional methods. With a pre-test and post-test to investigate the impact of the Duolingo application on English language reading and writing skills development. This design was used to make a casual comparison between the two groups before and after the intervention, which can lead to trustworthy results.

3.1 Research Population and Sample

The population consisted of all middle school students in Yazid ibn al-Akhnas schools in Al- Kamil governorate. The research sample was selected from the population and consisted of 32 middle school students who were purposefully selected from the research population and divided equally into two groups, with 16 students in the experimental group and 16 students in the control group. They were divided according to grade level: 9 students from the 1st grade and 9 students from the 2nd grade, which represents (28%) from the full sample, for each grade. The 3rd grade had 14 students, representing (44%) from the full sample.

3.2 Research Tool

To investigate the impact of the Duolingo application on reading and writing in English, the researchers designed a test from the lessons that the Duolingo application provided, particularly from parts one and two at level one. The test consisted of (20) items, which measured the two targeted skills: reading (10 items), writing (10 items). The test was applied twice, before and after the experiment.

3.2.1 Reliability and Validity of the Test

To verify the reliability and validity of the test, the researchers used three reliability and validity procedures. First was the Face Validity, in which the researchers presented the test to a group of 6 experts in curriculum and teaching methods; they were asked to provide their opinions and feedback about the tests, the clarity of the questions, their suitability for the students' level and their linguistic and grammatical accuracy. Second was Test – Re- test Reliability, which was used to verify the reliability of the test and to assess its consistency over time; the researchers conducted a pilot test on 15 students. Then, after two weeks, the researchers reapplied the same test on the same sample. Then, the Pearson correlation coefficient was calculated. The results of the Pearson correlation were 0.82 and 0.76 in reading and writing, indicating that the test has a good validity value and is suitable for what it is designed for as well. Finally, Cronbach's alpha method was used to ensure the reliability of the test; the researchers used this method during pilot testing. Table 1 presents the Cronbach's alpha results of the pilot testing.

Table 1: Cronbach's Alpha results for the reliability of the test

Part	Number of items	Cronbach's alpha
Reading	10	0.89
Writing	10	0.88

According to Table 1, the value of Cronbach's Alpha was 89% and 88% for reading and writing tests, respectively. This value indicates high reliability for the test and confirms its suitability for the current research objectives.

3.3 Data Analysis

Data analysis was performed by using the SPSS package version 26, and followed various steps to attain the results.

3.3.1 The Sample Equivalence

To ensure that there are no external factors that might affect the results, the researchers distributed the sample into two groups according to their performance in the first term of the academic year 2024 -2025. The following table presents their results.

Table 2: The mean scores of the academic achievement

Group type	Number	Mean	Sd. Deviation
Experimental	16	27.9357	6.893135
Control	16	26.8125	6.5809

The results presented in Table 2 show that the mean of the experimental score was 27.9357, while the mean of the control group was 26.8125. These results indicate a high degree of similarity in the participants' academic achievement and guarantee the equivalence before the intervention.

3.3.2 The Pre-Test Scores

To ensure that there is no effect of the students' pre – experience on the final results, the researchers depend on the results of the pre – test of the sample before the intervention. To do that, the researcher assessed the independent simple t- test on the pre – test scores. Table 3 presents the results.

Table 3: Independent simple t- test for the English skill in the pre - test

Skill	Group Type	N	Mean	Std. Deviation	T. Value	Sig. (2-tailed)
Reading	Experimental	16	4.81	1.424	2.412	0.33
	Control	16	3.63	1.36		
Writing	Experimental	16	2.56	1.153	1.987	0.58
	Control	16	3.5	1.506		

Table 3 shows that there are no statistically significant differences between the experimental and control groups in the pre-test. As the Sig. (2-tailed) for all the reading and writing skills were > 0.05. These results indicate that both groups started at a similar

level, confirming that any differences observed in the results of the post-test can be attributed to the use of the Duolingo application.

4. Results

The first hypothesis States ‘there are no statistically significant differences at level ($\alpha \leq 0.05$) between the mean scores of the experimental group and control group in the post-test of the reading skill’. To test this hypothesis, the independent simple t- test was conducted in the pre-test for the reading skill. The results are presented in Table 4.

Table 4: Independent samples t- test for reading skill in the post-test

Test Type	Group Type	N	Mean	Std. Deviation	T. Value	Sig. (2-tailed)
Post-test of reading skill	Experimental	16	8.06	0.772	8.637	0.000
	Control	16	4.88	1.258		

Table 4 presents the results of the independent samples t- test that was used to evaluate the impact of the Duolingo intervention on the development of reading skills. The results indicate that there are statistically significant differences between the experimental group, which was taught using Duolingo and the control group, which was taught using the traditional teaching method. The p-value = (0.000) is less than the significance level of 0.05, indicating that the difference between the two groups is statistically significant.

Based on these results, the null hypothesis is rejected, and the alternative hypothesis is accepted, which states that there are statistically significant differences between the mean scores of the experimental group (which used the Duolingo application) and the control group (which used the traditional teaching method) in the post-test of reading skill. Furthermore, the mean value indicates that the statistically significant difference is in favor of the experimental group, which obtained a higher mean value (8.06) compared to the control group (4.88). These results indicate that the Duolingo intervention was effective in developing reading skills. In addition, the impact size of the Duolingo application on the development of the students’ reading skills was calculated using eta squared value ($\eta^2 = 0.071$), which falls within the category of a very large effect size according to Chohan’s criteria. This indicates that 71% of the variance in the dependent variable (reading skills) can be interpreted by the independent variable (the Duolingo intervention). This demonstrates the strong effectiveness of the Duolingo application in developing reading skills.

The second hypothesis states ‘There are no statistically significant differences at level ($\alpha \leq 0.05$) between the mean scores of the experimental group and the control group in the post - test of writing skill’. To test this hypothesis, the researchers assessed the independent simple t- test for the post-test of writing skill. The following table presents the results.

Table 5: Independent samples test for writing skill in the post-test

Test	Group Type	N	Mean	Std. Deviation	T. Value	Sig. (2-tailed)
Post - test of writing	Experimental	16	7.1875	1.167	4.132	0.03
	Control	16	5.375	1.31		

Table 5 shows that the significance value (0.030) is less than the alpha level of 0.05. Based on these results, the null hypothesis was rejected, and the alternative hypothesis was accepted, which states that there are statistically significant differences between the mean scores of the experimental group (which used the Duolingo application) and the control group (which used the traditional teaching method) in the post-test of writing skills.

These differences are in favor of the experimental group, which obtained a higher mean score (7.187) compared to the mean score of the control group (5.375). This result demonstrates the impact of the Duolingo intervention on students' writing skills. In addition, the impact size of the Duolingo intervention on the development of the students' writing skills was calculated using eta squared value ($\eta^2 = 0.36$). This value falls within the category of a large effect size, indicating the strong effectiveness of the Duolingo application on the development of the students' writing skills. It suggests that approximately 36% of the variance of the dependent variable (writing skills) can be interpreted by the independent variable (the Duolingo intervention).

5. Discussion and Conclusion

The results of the first research question, which examined the impact of the Duolingo application on reading skills, demonstrated statistically significant differences between the experimental group, which used the Duolingo application, and the control group, which was taught the same lessons using traditional methods. The significance value (0.000) was smaller than the proposed alpha level ($\alpha = 0.05$). The statistical differences are in favor of the experimental group, which obtained a higher mean score ($M = 8.06$) compared to the control group ($M = 4.06$). Moreover, the effect size was very large (71%), as indicated by the eta squared value $\eta^2 = (0.71)$. This finding confirms the very high ability of the Duolingo application in improving the students' reading skills. The researchers attribute these results to the exercises that the Duolingo application provides, which require the learner to reread the text as many times as possible to understand the text, and this is a main condition for the reader to move to the next task or skill. This aligns with Sanayah's (2023) statement that personalization and gamification are central motivation features of Duolingo, such as 'ranking', 'points', 'hearts', 'daily reviews' and 'rewards'. These features improve learners' motivation and attitudes towards learning, which, in turn, improve their reading.

Furthermore, these findings are supported by the results of several previous studies that investigated the impact of the Duolingo application on developing reading skills, such as Smith *et al.* (2024), whose results showed that Duolingo users who completed basic-level content showed clear improvements in reading and listening.

The results of the second research question revealed the impact of Duolingo on students' writing skills. It demonstrates statistical differences as the sig. value was (0.000); this value is much smaller than the predetermined value ($p = 0.05$). These differences were in favor of the experimental group, which obtained a higher mean score (7.1875) compared to the control group (5.375). The effect size was remarkable (36%) as the Eta squared value ($\eta^2 = 0.36$), reflecting the impact of Duolingo on improving the ability for students to form correct sentences and increase their writing fluency. These results can be attributed to the many different exercise types that Duolingo provides to learners, such as translation exercises, which require learners to translate sentences from English to Arabic and vice versa, dictation exercises that require learners to listen to a sentence and then write it, and word order exercises that require learners to reorder words to form full and correct sentences. This result is also confirmed by Alrwyah's (2025) study, which indicates that Duolingo can increase students' confidence when applying written rules and improve their accuracy in writing sentences.

This finding is similar to the results of many previous studies that dealt with the impact of Duolingo on developing writing. For example, a study conducted by Habibie (2020) revealed that Duolingo can be effective in boosting learners' motivation to learn English, especially for beginners. Additionally, studies such as Budiani (2020) and Smith *et al.* (2024) revealed that students using Duolingo showed higher writing competency and improved productive skills and the ability of the students to form sentences with correct grammar.

Based on the above discussion, the findings of the current study confirm the positive impact that Duolingo has on developing students' reading and writing skills. These results suggest that teachers should use Duolingo as a complementary learning tool in their classrooms. The application could also be used as a self-learning tool that provides learning in a fun and enjoyable way. Therefore, Duolingo could be a powerful alternative or complement to traditional education.

Several factors limit the generalizability of the findings of this study. First, the sample consisted of only 32 students from Yazid ibn al-Akhnas schools in Al-Kamil Governate in Saudi Arabia, which restricts the degree to which the results can be generalized to other populations. Second, the study relied solely on quantitative methods for data collection and analysis. Furthermore, the study examined the impact of the Duolingo application on only two language skills, reading and writing, excluding listening and speaking.

Taking these limitations into consideration, future research could investigate the impact of Duolingo on other language skills across different educational contexts, both in Saudi Arabia and internationally. Future research is also encouraged on the impact of the Duolingo intervention on language development from the perspectives of both teachers and students, using mixed-methods approaches to gain deeper insights.

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Conflict of Interest Statement

The authors declare no conflicts of interest.

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References

- Abdel Fattah, H. (1999). *The Origins of Teaching Arabic Between Theory and Practice (Upper Basic Stage)*. Dar Al-Fikr for Printing, Publishing and Distribution, Amman, Jordan.
- Adawiyah, S. (2022). *The effect of mobile-assisted language learning using Duolingo apps in improving students' writing skills: A quasi-experimental study on the seventh grade of Mts Negeri 2 Garut*. Uin Sunan Gunung Djati Bandung. Retrieved from <https://digilib.uinsgd.ac.id/63725/>
- Ahmed, A., Hassan, I., Pallathadka, H., Keezhatta, M. et al. (2022). *Mall and EFL learners' speaking: Impacts of Duolingo and WhatsApp applications on speaking accuracy and fluency*. Education Research International, 2022, 1-10. <https://doi.org/10.1155/2022/6716474>
- Ajisoko, P. (2020). The use of Duolingo apps to improve English vocabulary learning. *International Journal of Emerging Technologies in Learning (IJET)*, 15(7), 149-155. <https://doi.org/10.3991/Ijet.V15i07.13229>

- Al-Ayasrah, W. (2011). *Experimental and creative thinking*. Amman: Dar Osama Publication and distribution.
- Al-Busais, H. (2011). *Developing reading and writing skills: Multiple strategies for teaching and evaluation*. The Syrian General Book Organization.
- Al-Hariri, M., & Al-Hattami, A. (2020). The impact of using mobile learning applications on students' academic achievement in Saudi Arabia. *Turkish Online Journal of Educational Technology*, 19(1), 190-205.
- Al-Maghraoui, O. (2017). Reading and writing difficulties and their relationship with academic achievement towards a modern approach. *Journal of the College of Basic Education for Educational and Humanity Sciences*, 9(35), 18-27. Retrieved from <https://becj-iq.org/view.php?id=62&lang=English>
- Aljurijeer, S. (2024). Reasons for weak reading skills in English among elementary school students from the perspective of English teachers in elementary schools in Riyadh. *Journal of Curriculum and Teaching Methodology*, 3(11), 97-106. <https://doi.org/10.26389/AJSRP.E080724>
- Alrwyiah, M. (2025). Duolingo app's impact on teaching English: Students' perspective, Al Sulayyil case study. *International Journal of Education and Social Science*, 7(3), 37-49. Retrieved from <https://iigdpublishers.com/article/721>
- Apoko, T., Dunggio, A., & Chong, S. (2023). The students' perceptions on the use of mobile-assisted language learning through Duolingo in improving vocabulary mastery at the tertiary level. *English Review: Journal of English Education*, 11(1), 17-26. Published on <https://doi.org/10.25134/erjee.v11i1.7069>
- Azhima, F., & Halim A. (2024). The integration of Duolingo in classroom setting: A case study of its impact on English language learning. *Riwayat: Educational Journal of History and Humanities*, 7, 877-890. <https://doi.org/10.24815/jr.v7i3.39326>
- Budiani, I. (2020). The effect of Duolingo on the writing competency of the tenth-grade students of SMK N 1 Sukasada in academic year 2017/2018. *Journal Pendidikan Bahasa Inggris Indonesia*, 8(1), 21-30. <https://doi.org/10.23887/jpbi.v8i1.3155>
- Bui, T. (2022). English teachers' integration of digital technologies in the classroom. *International Journal of Educational Research Open*, 3. <https://doi.org/10.1016/j.ijedro.2022.100204>
- Dearestiani, Y., Rohman, A., & Pane, W. S. (2023). Improving students' speaking skills by using Duolingo application. *Inquest Journal*, 1(2), 155-162. <https://doi.org/10.53622/ij.v1i02.179>
- Fatmawati, I., Sudirman, A., & Munawaroh, T. (2023). The effect of using Duolingo application towards students' grammar mastery in simple present tense. *Journal of English Pedagogy and Applied Linguistics*, 3(2), 77-85. <https://doi.org/10.32627/jepal.v3i2.576>
- Ferrer, M., Chebaani, F., Ayala, E., & Tomás, A. (2011). Reciprocal teaching and self-monitoring of strategy use: Effects on reading comprehension. *Psicothema*, 23(1), 38-43. Retrieved from <https://www.psicothema.com/pii?pii=3847>

- Flower, L., & Hayes, J. (1981). A cognitive process theory of writing. *College Composition and Communication*, 32(4), 365-387. <https://doi.org/10.58680/ccc198115885>
- Gad, M. (2005). Written expression skills and attitude towards it among first grade preparatory students. *Journal of Educational Sciences*, Institute of Educational Studies, Cairo University.
- Guide for Leaders in Education. (n.d.). Educational leadership guidelines and best practices. Retrieved from <https://www.educationguide.org/leaders>
- Habibie, A. (2020). Duolingo as an educational language tool to enhance EFL students' motivation in writing. *British (Journal Bahasa Dan Sastra Inggris)*, 9(1), 13-26. <https://doi.org/10.31314/british.9.1.13-26.2020>
- Halimi, M. (2020). *The influence of using Duolingo application on the students writing skill of the eleventh grades at SMK Muhammediyah sekampung east lampung*. State institute for Islamic studies of metro.
- Handini, B., Nurhasanah, N., & Panly, F. (2022). The effect of artificial intelligent technology used (Duolingo application) to enhance English learning. *ELLITE: Journal of English Language, Literature, and Teaching*, 7(2), 86-94. <https://doi.org/10.32528/Ellite.V7i2.8354>
- Harmer, J. (2011). *How to teach writing*. Longman, Pearson Education.
- Hazar, E. (2022). Learning a brand-new language through Duolingo: A case study of a gifted student. *African Educational Research Journal*, 10(2), 447-453. <https://doi.org/10.30918/aerj.104.22.079>
- Hernadijaya, N. (2020). The use of Duolingo application to enhance English vocabulary of junior high school. *RETAIN: Journal of Research in English Language Teaching*, 8(2), 17-24. Retrieved from <https://ejournal.unesa.ac.id/index.php/retain/article/view/33055>
- Ibn Amr, J., & Taba, B. (2022). *Language skills of the kindergarten child in light of some personal variables*. Horizons Fakoria Magazine.
- Indrawan, F., Daristin, P., & Laili, E. (2023). The influence of Duolingo application to EFL classroom students' motivation in learning English. *Journey: Journal of English Language and Pedagogy*, 6(3), 626-633. <https://doi.org/10.33503/journey.v6i3.3695>
- Irzawati, I. (2023). The integration of Duolingo into EFL learning. *Esteem Journal of English Education Study Programme*, 6(2), 328-337. <https://doi.org/10.31851/esteem.v6i2.12317>
- Khan, N., & Ali, A. (2010). Improving the speaking ability in English: The students' perspective. *Procedia – Social and Behavioral Sciences*, 2(2), 3575–3579. <https://doi.org/10.1016/j.sbspro.2010.03.554>
- Kukulka-Hulme, A., & Shield, L. (2008). An overview of mobile assisted language learning: From content delivery to supported collaboration and interaction. *ReCALL*, 20(3), 271–289. <https://doi.org/10.1017/s0958344008000335>
- Kusuma, D., Rahmania, I., Imannisa, C., & Hentasmaka, D. (2024). The effectiveness of Duolingo as technology-based instructional media in learning English speaking.

- JEELL: Journal of English Education, Linguistics and Literature*, 10(2), 71-86. Retrieved from <https://ejournal.stkipjb.ac.id/index.php/jeel/article/view/3498>
- Metruk, R. (2021). The use of smartphone English language learning apps in the process of learning English: Slovak EFL students' perspectives. *Sustainability*, 13(15), 8205. <https://doi.org/10.3390/su13158205>
- Muharral, R. (2023). The use of Duolingo application to improve students' speaking skill (Unpublished bachelor's thesis). Universitas Islam Negeri Ar-Raniry, Banda Aceh, Indonesia. Retrieved from <http://repository.ar-raniry.ac.id/id/eprint/29556>
- Munday, p. (2016). The case for using DUOLINGO as part of the language classroom experience. *RIED*, 19(1), 83-101. <https://doi.org/10.5944/ried.19.1.14581>
- Najat, H. (2021). *The effect of reading skill on the formation of the queen of learners in the primary stage*. India Pens.
- Niah, S., & Pahmi. (2019). The utilization of Duolingo to improve the speaking and listening skills of junior high school students in Pekanbaru. Proceedings of the International Conference of CELSciTech 2019 - Social Sciences and Humanities Track (ICCELST-SS 2019). <https://doi.org/10.2991/iccelst-ss-19.2019.12>
- Radi, T. (2022). *Language skills and ways to develop them*. Algeria: University of Larbi Ben Mehdi - Oum El Bouaghi.
- Rokhmah, N. (2017). *The effectiveness of mind mapping in improving reading skills at the State Islamic Secondary School Gudang*. Universitas Islam Negeri Maulana Malik
- Rosyidah, U., Laksmi, E., & Anugerahwati, M. (2023). Gamification in Duolingo app on improving English listening proficiency of junior high school students. *English Franca: Academic Journal of English Language and Education*, 7(1), 119-132. <https://doi.org/10.29240/ef.v7i1.5377>
- Sakkir, G., & Syamsuddin, N. (2023). Students' perceptions of Duolingo mobile-assisted language learning (MALL) in learning English vocabulary. *EduLine: Journal of Education and Learning Innovation*, 3(3), 381-388. <https://doi.org/10.35877/454ri.eduline1970>
- Salman, H. (2013). *The effect of e-learning on reading skills and innovative thinking among fifth grade primary students*. University of Baghdad.
- Saniyah, S. (2023). Duolingo and learner autonomy: Investigating the role of personalization and gamification in promoting self-directed language learning. *ENJEL: English Journal of Education and Literature*, 2(2), 141-147. <https://doi.org/10.30599/enjel.v2i02.529>.
- Smith, B., Jiang, X., & Peters, R. (2024). The effectiveness of Duolingo in developing receptive and productive language knowledge and proficiency. *Language Learning & Technology*, 28(1), 1-26. <https://doi.org/10.64152/10125/73595>
- Soman, A. (2010). *Methods of teaching Arabic. (First edition)*. Amman: Zahran Publishing House.
- Sung, Y., Chang, K., & Yang, J. (2015). How effective are mobile devices for language learning? A meta-analysis. *Educational Research Review*, 16, 68-84. <https://doi.org/10.1016/j.edurev.2015.09.001>

Tiara, A., Rahman, M., & Handrianto, C. (2021). The students' perception about use of Duolingo application for improving English vocabulary. *International Journal of Education, Information Technology, and Others*, 4(4). Retrieved from <https://jurnal.peneliti.net/index.php/ijeit>

Trace Millar. (2022). Duolingo for schools. Retrieved from <https://blog.duolingo.com>.