

The Effect of Using the Duolingo Application in Enriching High School Students' Vocabulary Mastery

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Abstract

This research aims to find out the effect of using the Duolingo Application in enriching high school students' vocabulary mastery. The participants of this research were the eleventh grade at one private school in Riau province in the academic year 2024/2025. Using a pre-experimental method with a one-shot study case design. Sampling in this method uses a purposive simple, so this study involved a sample of 25 students who underwent treatment and a vocabulary test after using the Duolingo application. The results showed a significant increase in students' vocabulary mastery, with the average score increasing from 54.32 (pre-test) to 72.2 (post-test). Statistical analysis using a paired sample t-test showed a significance value of <0.001 , which confirmed the positive effect of the Duolingo app on vocabulary acquisition. This study highlights the Duolingo app as an effective digital tool to encourage vocabulary development, offering teachers and students a modern and interactive learning platform. Recommendations are given to integrate the app into classroom teaching to improve language learning outcomes.

Keywords: Duolingo Application; Vocabulary Mastery

INTRODUCTION

English, as a foreign language in many countries, including Indonesia, serves an essential role in both educational and professional spheres. In the workplace, English functions as an international communication tool, bridging interactions among people from diverse linguistic backgrounds. It is also widely used in technology and digital platforms. In the realm of education, English is often regarded as the language of instruction for understanding and conveying academic content. Therefore, language serves as a medium of communication and a channel for expressing thoughts, opinions, and arguments (Hualai, 2017 as cited in Keraf, 1994). One of the key components in learning any language is vocabulary. Vocabulary learning is an important part of learning a foreign language because the meaning of new words is very common (Yusda et al., 2020). Vocabulary must be taught to students because vocabulary is the most important element in English that students must understand and vocabulary plays an important role in all languages in the world without which it is impossible to understand each other (Suci, 2022). Vocabulary is a major concern in junior high school materials because vocabulary is a collection of several words that are combined, meaning or meaning. Successful communication or saying what you mean is dependent upon a good vocabulary base (Permatasari et al., 2022). Mastery of vocabulary is fundamental to developing the four core language skills: listening, speaking, reading, and writing. According to Muddin (2018), vocabulary encompasses knowledge of words and their meanings, and limited vocabulary can hinder students' ability to comprehend texts and communicate effectively. (Zamzami, 2019) emphasized that vocabulary plays an integral role in supporting all four English skills. For instance, in listening, a broad vocabulary helps learners understand conversations; in reading,

it aids comprehension; in writing, it enhances sentence structure and clarity; and in speaking, it improves fluency and coherence (Nagy, 2012; Sibold, 2011).

Despite its importance, many high school students still struggle with English due to their limited vocabulary. Based on researchers' experience at SMAN 2 Kubu Babussalam, few, if any, students were motivated to practice in English and often expressed confusion due to a lack of vocabulary. This issue is frequently rooted in conventional teaching methods that rely on passive learning and lack student engagement. Furthermore, the absence of appropriate media for vocabulary learning often leads to boredom and demotivation among students.

In response to these challenges, the integration of technology in education has emerged as a potential solution. With the increasing use of mobile devices, mobile learning (m-learning) offers a flexible and accessible alternative to traditional instruction. M-learning refers to learning that is not confined by time or space, supported by mobile and wireless technologies (Chen & Learning, 2013). It enables personalized, interactive, and collaborative learning experiences (Gafni et al., 2017). One widely used m-learning application is Duolingo, which applies gamification elements to language learning. Gamification incorporates game-like features in non-game contexts to enhance engagement and motivation (Giannetto et al., 2013). Duolingo presents users with interactive tasks and immediate feedback, making vocabulary learning more enjoyable and effective (Husnanissa, 2020). It also supports skills beyond vocabulary, including speaking, listening, and writing (Aulia, et al., 2020; Chen, 2016). Previous studies have reported that students respond positively to Duolingo, showing increased motivation and vocabulary acquisition (Anandra, 2024; Fatah, 2019). However, most of these studies have focused on junior high school or higher education contexts. Therefore, this study will be conducted in a senior high school because there are not many studies that have examined this level. Based on the description above, researchers are interested in conducting research with the title "The Effect of Using Duolingo Application in Enriching High School Students' Vocabulary Mastery".

METHOD

This study is quantitative research using a pre-experimental research design with a one-shot study case design approach to assess the effectiveness of the Duolingo application in improving vocabulary mastery. According to Creswell (2012), quantitative research is a method used to test objective theories by examining the relationship among variables. The use of a one-shot case study design is aligned with Campbell and Stanley (1963), who described this design as a single group being exposed to a treatment and then measured afterward to observe the effect.

The population of this study was all eleventh-grade students at SMAN 2 Kubu Babussalam in the 2024/2025 school year, totalling 50 students divided into 2 classes. This study used purposive sampling because the sample was specifically selected based on certain criteria, namely, class XI-1 students, consisting of 25 students. They practiced using Duolingo for 5 learning sessions. The instrument used in this study is a test. The test was to determine the impact of using Duolingo after using Duolingo. The test conducted was a post-test. The pre-test was conducted before using Duolingo, whose scores were obtained from the teacher. The goal was to master student vocabulary. Meanwhile, the post-test was conducted after using Duolingo, which consisted of 35 questions. The results of the test were then analyzed using Microsoft Excel (2019) and Statistical Product and Service Solution (SPSS 27) software to see if Duolingo has an influence on students' vocabulary acquisition. The analysis focused on descriptive statistics to determine the mean score of students' vocabulary mastery after the treatment, as well as one-sample t-test to assess the significance of the improvement.

RESULTS AND DISCUSSION

Results

This section presents the results of the research conducted, focusing on the effect of using the Duolingo application in enriching students' vocabulary mastery.

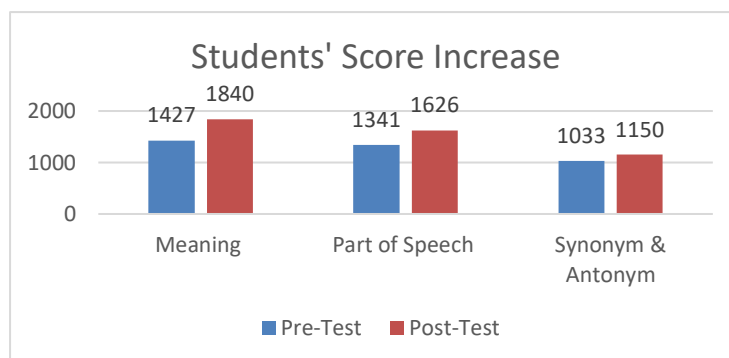
a. Pre-Test and Post-Test Scores

Table 1. Total of Students' Pre-Test and Post-Test

No	Respondent	Score	
		PRE	POST-TEST
1	S1	60	75
2	S2	55	77
3	S3	45	68
4	S4	58	68
5	S5	50	70
6	S6	62	80
7	S7	57	76
8	S8	56	70
9	S9	50	74
10	S10	48	68
11	S11	58	72
12	S12	61	77
13	S13	69	85
14	S14	50	70
15	S15	62	80
16	S16	48	74
17	S17	59	71
18	S18	53	63
19	S19	54	77
20	S20	56	63
21	S21	60	79
22	S22	40	65
23	S23	45	66
24	S24	50	72
25	S25	52	65
Total		1358	1805
Mean		54.32	72.2

Table 1. presents the average score of students' pre-test and post-test on the effect of using the Duolingo application on vocabulary mastery, and the table shows that there is an increase from the pre-test and post-test scores. so it can be concluded that there is a positive effect of using the Duolingo application, obtained from the post-test score of 72.2.

Figure 1. Student's Pre – test and Post test Scores By Each Indicator



The bar chart above presents the comparison between students' pre-test and post-test scores across three vocabulary aspects: Meaning, Part of Speech, and Synonym & Antonym. Among these, the "Meaning" aspect showed the most significant improvement. The pre-test score in the "Meaning" category was 1427 and increased to 1840 in the post-test, marking an impressive gain of 413 points. This was the highest increase among all three categories, indicating that students' understanding of word meanings was most positively impacted by the learning treatment. In comparison, the "Part of Speech" improved by 285 points (from 1341 to 1626), while "Synonym & Antonym" showed a smaller increase of 117 points (from 1033 to 1150). These results suggest that the learning intervention had the greatest effect on helping students comprehend word meanings, which may play a foundational role in improving overall vocabulary knowledge.

b. Normality Testing

This test is conducted before conducting a t-test to determine whether the data is normally distributed. In parametric statistics, a normal data distribution is an absolute requirement. The researcher used the Shapiro-Wilk normality test because the number of samples was below 100, namely 25 students, with the following decision-making criteria:

If the significance value (Sig) > 0.05 [data is normally distributed].

If the significance value (Sig) < 0.05 [data is not normally distributed].

Table 2. Result of Normality Testing

Variable (result)	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Post Test	.119	25	.200*	.976	25	.784

The result of the normality test is shown in Table 2, which shows that the significance level of the experimental class was 0.200 and 0.784. It means that the probability value (p) of the experimental class was higher than the degree of significance 5% ($\alpha = 0.05$). Therefore, it is concluded that the experimental class post-test data were normally distributed.

The results are to find whether the hypothesis is accepted or not, and to find whether the treatment has a significant effect on the students' vocabulary mastery. Researchers use SPSS to examine the hypothesis.

c. Hypothesis Test

Table 3. Result of Paired Sample Test

		Paired Differences					Sig. (2- tailed)		
		95% confidence							
		Std. Deviation	Std. Error Mean	Interval of the difference		t			df
				Lower	Upper				
Pair 1									
Pre –	-2.000	2.630	.526	-3.086	-.914	-3.802	25	<.001	
Post-test									

Based on the paired sample test output table above, a Sig. (2-tailed) value of <0.001, which is less than 0,05, was obtained. Therefore, H_0 is rejected and H_a is accepted. This indicates there is a significant effect of using the Duolingo application in teaching vocabulary of the second-year students of SMA N2 Kubu Babussalam.

Discussion

Language is important in human life because, without language, human beings will not be able to communicate properly (Ibda, 2019). In Indonesia, English is the first foreign language that became the subject in school, which should be learned by students in formal education from the lowest to the highest level, and it is also examined in the national examination (Hamied, 2012; Sulistiyo, 2016). To learn a language, we need to master vocabulary. Vocabulary learning is an important aspect of learning a foreign language. Students will improve rapidly if they learn more words and expressions (Matra & Kunci, 2020).

Mastery of English vocabulary is essential in the current era of globalization. Many media can be used to improve students' vocabulary learning outcomes, one of which is the Duolingo App (Kusumadewi & Widyastuti, 2018). Duolingo can be said to be a popular technology application in English language learning. Duolingo is an application designed to help students learn languages easily and in fun, so that students do not feel they are learning, but rather having fun with the application (Ambara et al., 2019). Based on the test above, it turns out that there is a difference between learning outcomes using conventional methods and learning outcomes using the Duolingo App method on students' mastery of English vocabulary. The test results of students after getting the Duolingo Android App vocabulary learning media are much better than the test results of students who use conventional learning media. The study supported earlier research by Suwandi (2020), who discovered that the Duolingo app helped pupils' vocabulary grow. Students who received instruction via the Duolingo app were able to improve their performance and became more engaged and motivated in the process of learning.

In the context of English language learning, vocabulary is a crucial element that supports the development of reading, writing, speaking, and listening skills. The findings of this study confirm that integrating technology into learning, such as through Duolingo, can be an effective solution to overcome the limitations of traditional teaching methods, which are often perceived as boring and lacking in active student engagement. These results align with Amalia's (2020) research, which found that students who used Duolingo achieved better vocabulary outcomes compared to those taught using conventional methods. With its engaging gamification features, Duolingo creates a motivating learning environment that encourages students to continue learning both inside and outside the classroom. This study also supports Muddin's (2018) findings, which stated that Duolingo's gamified approach can increase students' motivation and engagement in vocabulary learning. In addition, (Bustillo et al., 2017) demonstrated that the use of mobile applications like Duolingo significantly improved students' English competence, particularly in the area of vocabulary. Thus, this study reinforces previous findings, indicating that Duolingo is an effective tool for enhancing vocabulary acquisition. Although this study successfully demonstrated the effectiveness of Duolingo, several limitations must be acknowledged. First, the study used a one-shot case study design without a control group, limiting the ability to directly compare the results with other teaching methods. Future research is recommended to apply an experimental design involving a control group to strengthen the validity of the findings. Another challenge encountered during the research was the restriction that students were not allowed to bring smartphones to school every day. Additionally, some students did not own smartphones at all. It is therefore recommended that teachers utilize the school's computer laboratory facilities to ensure equal access. Moreover, during the first classroom implementation of Duolingo, slow internet connectivity caused disruptions in time management. Students with faster connections were able to complete tasks more quickly, creating inequality in participation. Addressing such technical and access-related issues is essential for the optimal integration of technology-based learning tools like Duolingo in schools.

CONCLUSION

This study aims to determine the effect of using the Duolingo application in enriching the vocabulary mastery of high school students. Based on the findings and data analysis, the conclusion of the study shows that the use of the Duolingo application has a positive effect on improving the vocabulary mastery of grade 2 students at SMAN 2 Kuba. This can be seen from the results of the average score of students before and after using Duolingo increased. The paired sample test showed very significant results, with a very low significance value, leading to the rejection of the null hypothesis (H_0) and the acceptance of the alternative hypothesis (H_a). This confirms that the Duolingo application has a significant effect on students' vocabulary mastery, as evidenced by the increase in scores from the pre-test to the post-test. Therefore, the use of Duolingo affects students' vocabulary mastery. This shows that Duolingo can be used as an effective tool to improve vocabulary mastery. Therefore, it is recommended that educators use the Duolingo app as a tool in vocabulary teaching. Future research can explore the long-term effects of consistent use of Duolingo and its applicability across different language skills or student groups.

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