

The Effect of the Duolingo Application on Students' Vocabulary Skills of Fifth Grade Students

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ABSTRACT

The main objective of this study was to investigate the effect of the Duolingo application on students' vocabulary skills, with specific attention to fifth-grade learners at UPT SPF SD Inpres Paccarakang. The research aimed to determine whether the use of Duolingo provides a significant contribution to the improvement of vocabulary skills compared to conventional teaching methods. This study employed a quantitative approach through a quasi-experimental design. The data were collected using pre-test and post-test instruments. The participants consisted of two fifth-grade classes, namely the experimental group, which learned with the help of the Duolingo application, and the control group, which was taught using traditional textbook-based instruction. Each group comprised 29 students. The findings confirmed that the students belonging to the experimental group experienced greater progress in vocabulary skills than those in the control group. The experimental group's average score increased from 43.28 to 85.55, while the control group's mean score rose from 51.21 to 81.38. A t-test analysis (Sig. 2-tailed = 0.045) confirmed that the difference between the groups was statistically significant, indicating that Duolingo positively affected students' vocabulary skills. The results of this research suggest that incorporating digital learning applications such as Duolingo into classroom practice can enhance students' vocabulary acquisition. This implies the importance of integrating technology in language education, as it offers valuable support for improving vocabulary skills at the primary school level.

Keywords: *Vocabulary skills, Teaching medium, Digital medium, Duolingo application.*

1) INTRODUCTION

The importance of English language skills can be seen from its role as one of the core subjects and the language of instruction in various academic references. Indah Marliana et al., (2024) said that mastering English as a second language allows students to access more sources of information and expand their communication networks. Many educational institutions also make English language skills one of the requirements in the selection or graduation process. Given its growing significance, effective English language skills from an early age need to be a concern.

Learning English from an early age is considered highly beneficial due to the cognitive, social, and linguistic advantages it offers during the critical period of development. According to Brown

(2007), children have a natural advantage in acquiring a second language compared to adults, and they are often seen as more successful in achieving fluency over time. In line with this perspective, Supriyanti (2012) reports that English learning in elementary school is essential for several reasons, including the widely accepted assumption that children outperform adults in acquiring a new language.

Grounded in the researcher's preliminary study at UPT SPF SD Inpres Paccarakang on April 28, 2025, the researcher carried out observations and conducted interviews with the teacher and fifth-grade students. All the questions asked were intended to gather information about the media used, the method used, and students' perceptions of learning English. Then, the researcher found that the students perceived English learning through textbooks as the primary learning medium. The vocabulary learning approach commonly applied was memorization, which proved less effective, as students tended to forget the words easily. This issue arises because vocabulary skills are more effective when students encounter new words in meaningful contexts (Anindya & Noverino, 2021).

Pamungkas et al., (2022) explain that the ability to master English vocabulary effectively is a fundamental indicator of success in language acquisition. Without sufficient vocabulary, students cannot speak or comprehend the target language. Hersalina (2021) also noted that students with a larger vocabulary tend to achieve higher proficiency in their language skills. Vocabulary limitations may prevent students from understanding spoken or written texts, as well as from expressing their ideas. Consequently, students with limited vocabulary are likely to face challenges across all four language skills, namely speaking, writing, listening, and reading, in the target language (Pahamzah et al., 2022).

Aldalur & Perez (2023) said that digital applications have become an increasingly prominent feature of modern education. As technology becomes more integrated into students' daily lives, educational applications offer a new approach to learning that is flexible and accessible. These applications are designed not only to deliver content but also to create interactive experiences that encourage active student engagement. Instead of relying solely on rote memorization or textbook exercises, digital tools enable students to engage with language in more interactive ways (Luo, 2023).

One of the digital applications that has been developed to help students learning the target language is Duolingo. Duolingo is specifically designed to facilitate vocabulary development and language practice in an engaging and accessible format. Earlier studies have indicated that the Duolingo application has a positive impact on vocabulary skills. Megawati et al., (2023) assert that the

Duolingo application makes the learning process more engaging for students, as it enables them to learn new words more easily through the use of appealing visual features that help clarify word meanings. Lestari (2022) also said that this application delivers lessons through game-based activities, which effectively enhance students' motivation and enthusiasm for learning.

2) METHODS

In conducting this study, the researcher utilized a quantitative research design. Quantitative research is a research approach that uses techniques for the process of gathering, analyzing, and interpreting data expressed in numbers (Alek, 2023). This approach is often used to examine hypotheses, measure variables, and identify patterns or relationships between variables in a phenomenon. The researcher adopted a quasi-experimental approach. This method aimed to identify cause-and-effect connections between variables. It involved comparing groups of people who varied based on a characteristic that cannot be controlled or changed, such as gender or age (Alek, 2023).

This study applied a quantitative research approach, implementing a quasi-experimental design to analyze the effect of the Duolingo application on students' vocabulary skills by collecting measurable data through pre-test and post-test. The design compared an experimental group, which received vocabulary instruction through Duolingo, with a control group that was taught using conventional textbook-based methods. Both groups were given a pre-test before the treatment and a post-test after the treatment to measure differences in vocabulary acquisition. The formula of the quasi-experimental research design was as follows:

Table 1: *The Research Design*

Experimental Class	Pre-test	Experiment Treatment (Using Duolingo)	Post-test
Control Class	Pre-test	No Treatment	Post-test

The research was conducted at UPT SPF SD Inpres Paccerrakkang, Makassar, with the population consisting of 120 fifth-grade students across four classes. From this population, two classes were selected purposively. Class V.D, consisting of 29 students, was designated as the experimental group, while class V.A, also consisting of 29 students, was assigned as the control group. The selection was

based on the average daily English test scores in order to create a meaningful contrast between the two groups.

A vocabulary achievement test served as the main research instrument. The test comprised 20 multiple-choice items, divided equally between nouns and adjectives. Both the pre-test and post-test were validated by English education experts and classroom teachers to ensure that the items were appropriate to the students' level and aligned with the learning objectives. Reliability was confirmed through internal consistency testing, with Cronbach's Alpha exceeding the acceptable threshold of 0.70, which indicated that the instrument was consistent and dependable.

The data collection consisted of three main stages. At the initial stage, a pre-test was administered to both the experimental and control groups in order to determine their baseline vocabulary proficiency. During the treatment phase, the experimental class received instruction through the Duolingo application in four sessions of around 60 minutes each, whereas the control class continued learning with traditional textbook-based activities. At the final stage, a post-test of comparable difficulty was administered to evaluate students' progress in vocabulary learning after the intervention.

The scores from the pre-test and post-test were then analyzed quantitatively using IBM SPSS Statistics 25. Descriptive statistics were applied to calculate mean values and percentages, and an independent samples t-test was performed to examine whether the differences between the two groups reached statistical significance at the 0.05 level. The results of this analysis demonstrated the extent to which the Duolingo application contributed to improving the vocabulary skills of fifth-grade students.

3) RESULTS AND DISCUSSION

Findings

The findings of this research were obtained from the analysis of the data collected through pre-test, post-test, and statistical testing. The results are presented in the following tables and explained briefly.

Table 1: *Pre-test Score Rate Percentage of Students*

NO	CLASSIFICATION	SCORE	EXPERIMENTAL CLASS		CONTROL CLASS	
			Frequency	Percentage	Frequency	Percentage
1	Excellent	96-100	0	0%	0	0%
2	Very Good	86-95	0	0%	0	0%
3	Good	76-85	0	0%	0	0%
4	Fairly Good	66-75	2	7%	1	3%
5	Fairly	56-65	1	3%	9	31%
6	Poor	36-55	16	55%	14	48%
7	Very Poor	0-35	10	34%	5	17%
TOTAL			29	100%	29	100%

The pre-test showed that 55% of the experimental group were in the “Poor” category and 34% in the “Very Poor” category, while in the control group, 48% were in the “Poor” category and 17% in the “Very Poor” category. This indicates that both groups mostly had weak vocabulary skills at the start.

Table 2: *Post-test Score Rate Percentage of Students*

NO	CLASSIFICATION	SCORE	EXPERIMENTAL CLASS		CONTROL CLASS	
			Frequency	Percentage	Frequency	Percentage
1	Excellent	96-100	4	14%	0	0%
2	Very Good	86-95	10	34%	9	31%
3	Good	76-85	9	31%	11	38%
4	Fairly Good	66-75	6	21%	7	24%
5	Fairly	56-65	0	0%	2	7%
6	Poor	36-55	0	0%	0	0%
7	Very Poor	0-35	0	0%	0	0%
TOTAL			29	100%	29	100%

The post-test revealed progress, with 14% of the experimental group reaching “Excellent”, 31% “Good”, and 34% “Very Good”. In contrast, the control group had 38% “Good” and 31% “Very Good”, but none in “Excellent”. This shows stronger gains in the experimental class.

Table 3: *Descriptive Analysis of Pre-test and Post-test*

Descriptive Statistics						
	N	Range	Minimum	Maximum	Mean	Std. Deviation
Pre-test Experiment	29	55	20	75	43.28	14.033
Post-test Experiment	29	30	70	100	86.55	9.268
Pre-test Control	29	40	30	70	51.21	11.153
Post-test Control	29	35	60	95	81.38	9.901
Valid N (listwise)	29					

The experimental group's mean increased from 43.28 to 86.55, while the control group rose from 51.21 to 81.38. The 5.17 higher mean in the experimental group highlights the effectiveness of Duolingo.

Table 4: *Normality Test*

Tests of Normality						
Class	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Pre-test Experiment	.104	29	.200*	.960	29	.336
Post-test Experiment	.129	29	.200*	.938	29	.087
Pre-test Control	.150	29	.092	.945	29	.134
Post-test Control	.134	29	.194	.936	29	.079

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

The normality test yielded significance values of 0.200 for both pre-test and post-test scores. The analysis of the experimental group's initial and final test data produced significance levels of 0.336 and 0.087, respectively. When the significance value is greater than 0.05, it suggests that the data originate from a normally distributed population. Conversely, if the value is below 0.05, the data are considered not to come from a normal distribution. Since all values were above 0.05, the data were normally distributed and suitable for parametric analysis.

Table 5: Homogeneity Test
Test of Homogeneity of Variance

		Levene Statistic	df1	df2	Sig.
Vocabulary	Based on Mean	.015	1	56	.904
Achievement	Based on Median	.014	1	56	.906
Test Result	Based on Median and with adjusted df	.014	1	54.853	.906
	Based on trimmed mean	.016	1	56	.899

The homogeneity test produced a Sig. value of 0.904 (>0.05). If the significance level is greater than 0.05, it implies that all data groups share homogeneous variances. Conversely, when the significance level is below 0.05, the groups are considered to lack homogeneity of variance. Based on the test of homogeneity, it is evident that there was no significant contrast in variance observed between the two groups. In other words, the data were considered homogeneous, and the assumption of equal variances was fulfilled. Therefore, it is valid to continue with further statistical analysis using parametric tests to determine the effectiveness of the treatment.

Table 6: Independent Samples t-test
Independent Samples Test

Independent Samples Test									
	Levene's Test for Equality of Variances		t-test for Equality of Means					95% Confidence Interval of the Difference	
	F	Sig.	t	df	Sig. (2- tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Equal variances assumed	.015	.904	2.054	56	.045	5.172	2.518	.127	10.217
Equal variances not assumed			2.054	55.757	.045	5.172	2.518	.127	10.218

The independent t-test result showed Sig. (2-tailed) = 0.045, which was less than 0.05. The analysis confirmed that there was a statistically notable variation between the two groups. The mean difference was 5.172, with a 95% confidence interval ranging from 0.127 to 10.217. These findings suggest that the Duolingo application showed a beneficial and significant effect on students' vocabulary skills.

Discussion

The findings of this study revealed a substantial improvement in students' vocabulary skills after the implementation of the Duolingo application. Prior to the treatment, both groups demonstrated relatively weak vocabulary proficiency, with the majority of students categorized as "Poor" or "Very Poor." This trend highlights a broader issue in EFL contexts, where limited exposure to English vocabulary and the reliance on conventional teaching methods often result in insufficient language development. This aligns with Damayanti & Rachmawati (2022), who emphasized that a lack of engaging materials and monotonous teaching practices can undermine motivation and hinder progress in vocabulary learning.

Following the intervention, a clear distinction emerged between the two groups. The experimental class, which utilized Duolingo, achieved a higher proportion of students in the "Good," "Very Good," and "Excellent" categories compared to the control class. This outcome suggests that the integration of multimedia elements, such as text, audio, and visuals, combined with gamification features such as rewards and levels, provided meaningful support for vocabulary retention and application. These results are consistent with Mayer's Multimedia Learning Theory, which posits that meaningful learning occurs when information is processed through both verbal and visual channels simultaneously (Mayer, 2024). The experimental group's superior outcomes reflect how Duolingo successfully operationalizes this theory.

Comparisons with previous studies further strengthen the significance of these results. Risky's study reported similar findings, showing that students taught with Duolingo achieved higher vocabulary scores than those taught with textbooks. Likewise, Purwanto & Syafryadin (2023), highlighted the motivational benefits of Duolingo, suggesting that engagement plays a critical role in vocabulary development. Setiawati (2023) also documented notable vocabulary gains with university students, reinforcing the idea that Duolingo is effective across educational levels. What sets the present study apart, however, is its focus on elementary-level learners, an age group often overlooked in digital

learning research. The positive outcomes here indicate that even young learners can benefit from Duolingo's interactive, multimedia-based approach.

Although both groups improved, the control group showed progress that was less pronounced and failed to reach the "Excellent" category. This may indicate that while traditional textbook learning can reinforce basic vocabulary, it lacks the dynamic features necessary to push learners toward higher levels of proficiency. Another notable trend was the reduction in standard deviation in the experimental group, suggesting that Duolingo not only improved overall scores but also helped equalize students' performance, potentially reducing learning gaps within the class.

4) CONCLUSIONS

Drawing from the research findings, the conclusion suggests that the integration of Duolingo contributes positively to enhancing students' vocabulary skills, with the experimental class showing greater improvement than those taught through traditional textbook-based methods. Its interactive and game-based features effectively engage students, provide structured and repetitive vocabulary exposure, and deliver immediate feedback to support vocabulary skills. The outcomes of the statistical test verified the presence of a meaningful difference between learners who engaged with Duolingo and their counterparts who did not, reinforcing its effectiveness as a technology-based learning tool. Therefore, Duolingo can be considered an innovative and relevant alternative for vocabulary learning at the primary school level, especially in creating a fun and independent learning atmosphere.

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