



The effectiveness of using duolingo as an interactive learning media

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ABSTRACT

Interactive learning media is a flexible approach that enables students to learn individually. Due to the wide range of interactive learning programs like Duolingo, teachers are increasingly relying on these platforms. This study utilizes an Experimental research methodology, which involves modifying or measurement of variables, the specification of the sample or population to be examined, the selection of a suitable sampling method, the selection of the necessary statistical test. The sample comprised 30 students from Muhammadiyah Istiqomah 1 Senior High School, who were selected using random sampling. The participant currently enrolled in language classes and should not have any previous experience with Duolingo. The study included pre-test and post-test measures, consisting of 4 sections derived from Duolingo, specifically targeting English language proficiency in speaking, writing, and reading. After implementing Duolingo as a new interactive learning tool, we conducted pre-test and post-test assessments to evaluate students performance. The researchers assessed the statistical significance of the result by employing T-test in SPSS. The result showed there was significantly increase in students vocabulary before and after Duolingo intervention as an Interactive learning media, the researchers also proved using Duolingo as an additional learning media was effective to helped students to improving their speaking skills.

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INTRODUCTION

The development of technology from time to time until present provides a novelty of learning methods that result in increasing students' performance by the effort of teachers in seeking various methods and learning media. The technology was modified to assist English language teaching methods. According to (Rita & Handrianto, 2021) technology plays a significant role in stimulating student activity. According to (Siang, Hasan, et al., 2019) technology can improve language acquisition by making it faster, more accessible, and less painful. It also allows for increased engagement in language review. Technology has brought a great deal of variety to English

language training. There are several situations where this variance can be observed, such as when teachers and students are looking for assignments or references, or when content is being displayed through technology. Its importance in the teaching and learning process has grown, especially when it comes to helping teachers make language learning more approachable for student (Pasaribu et al., 2020) One of many kinds of learning method is interactive learning media.

Interactive learning media is a learning method that allows students to learn independently (Sahronih et al., 2019), without having to study face-to-face with the teacher at school. Many teachers worldwide incorporate technology into the tutoring and literacy process because they believe technology is essential for providing students with a high-quality education (Lee & Nuruddin Hidayat, 2019) Interactive learning media utilizes technology and has several aspect that can attract students attention such as: gamification, simulation, virtual reality (VR) and multimedia element. (Falah et al., 2021).

Multimedia element is often used by teachers to be a learning media because it consist of a combination of various elements such as audio clips, videos, animation and simulation that make learning more fun. Currently we can find a lot of applications that can used as an interactive learning media, one of which is Duolingo (Mustafa et al., 2019) According to (Andriani, 2022) defines learning media as any tool that stimulates students' thoughts, feelings, attention, abilities, or skills to improve their learning experience.

Duolingo is a language learning website and applications that can used as an independent learning media (Ajisoko, 2020) as an interactive learning media it helped the teachers to use this application as an additional tool in daily learning as needed. Teachers need to use various teaching strategies and media to help students enjoy learning English, particularly when it comes to vocabulary mastery. Connolly et al. (Lovantika, 2022) Duolingo allows students to learn various languages as needed with powerful and interesting features such as providing more than 37,500 interactive exercises, 1,900 word and phrases and has a reminder feature, and various educational games

According to (Kusumadewi & Widyastuti, n.d.) in their research, which examined the effect of using Duolingo on student vocabulary through a true-experimental design, where the value were compared before and after the treatment, it was found that students using Duolingo approach showed a positive effect on vocabulary mastery compared to those using a conventional with pre-test measures, and it cannot determine which group responded more positively to the treatment. Conducting comparative studies with other languages learning application or methods to determined which yields the most significant improvement in vocabulary acquisition is crucial for several reasons.

Firstly, it provides valuable insight into relative effectiveness of different approaches, enabling educators and learners to make informed decisions about the most efficient and beneficial strategies for language learning. Secondly, such studies helped identify the unique features and strength of each method, facilitating the development of more targeted and personalized learning intervention.

Moreover, another research conducted by (Fitri et al., 2023) examined student performance after integrating Duolingo using quasi-experimental design. The study yielded similar result, showing a significant difference between the experimental class and the control class. Students who used Duolingo as an additional tool found it easier to achieve learning goals through daily practice and logging into Duolingo application. The study motivates other researchers to investigate deeper the roles of Duolingo application in the field.

Therefore, in this study, the researchers aimed to integrate Duolingo as an interactive learning media for 10th-grade students at SMA Muhammadiyah Istiqomah 1 to assess the effectiveness of using Duolingo in improving student performance in learning English. This was evaluated through pre-test and post-test assessment conducted after integrating Duolingo.

Duolingo was launched in November 2011 by Louis Von Ahn and Severin Hacker. The Duolingo program creates a world free of cost and without language boundaries. Duolingo's mobile version lacks certain features compared to the regular version. More than 30 million people have registered on it. Interactive multimedia implies a form of media that includes a controller that allows the user to operate and make choices for the subsequent actions. Interactive multimedia seeks to provide information in an engaging, captivating, comprehensible, and obvious way. (Kustyarini et al., 2020).

Interactive learning media can be operated using personal computers, laptops, and Androids, in which students can interact directly with the computer, allowing them to freely choose the material they want to study in the media, making this media an engaging learning media to use in subject theory (Rahmat et al., 2020) In this study, the researchers decided to intervene with Duolingo because this application offers various features for foreign language learning at different levels. This aligns well with the learning goals, which allows the assessment of students' improvement in vocabulary knowledge through Duolingo. The students are expected to enhance their English vocabulary knowledge and their English skill learning English requires four basic language skills: hearing, reading, writing, and speaking (Upa et al., 2021). According to (Hawara & Yunita, 2019) these four abilities are crucial for enhancing English language proficiency.

Through daily practice on the Duolingo application. This improvement can be observed in the scores obtained in both the pre-test and post-test to reassure the differences before and after (Upa et al., 2021) treatment. In this context many teachers have already used the media in teaching and learning process, but forget to enhance vocabulary learning (Fitria et al., 2023) state based on their research, the purpose of this study is to determine students' perceptions of using Duolingo to improve English speaking skills, as well as to investigate which aspects can be improved by students when learning using the Duolingo application.

The study's findings show that 90% of students believe that learning through the Duolingo application helps them improve their English speaking skills. New media of learning English has been created. One of them uses apps that can be downloaded and installed through smartphone. The application is called Duolingo (Ajisoko, 2020). This study used two different kinds of instruments. These are a test and a questionnaire.

The purpose of the exam is to determine the influence of using Duolingo, while the questionnaire aims to assess learners' perception following their use of Duolingo. The assessments consist of both pre-test and post-test evaluations. Prior to utilizing Duolingo, the pre-test was finished (Ajisoko, 2020) The study revealed that almost all of the learners achieved significant improvements in their post-test scores compared to their pre-test scores. The post-test data indicated an improvement in the learners' scores.

The average score of the post-tests is higher than that of the pre-test (57.45 > 79.15), indicating an improvement in learners' understanding of vocabulary. The improvement has a significance level of 0.687. The results indicated a significant enhancement in students' scores following extensive utilization of Duolingo. ((Ajisoko, 2020). Unfortunately, the study's scope is limited to a specific group of learners at Borneo University of Tarakan, and the findings may not be universally applicable to all English language learners.

(Yundayani et al., 2023) said by applying Duolingo can boost the vocabulary awareness of learners and enhanced skill of student while for beginner-level learners Duolingo, it significantly showed students excitement and attraction to Duolingo and help students reduce their learning frustration because the content they served is easy to understand, and every student have the same opportunity to practice the material. This study using quantitative approach, pre and post-test instrument also t-test for investigating the significant and the data normality. However, this study was short (six meetings in three weeks), so it might not give a complete understanding of the long-term effects of using Duolingo to improve vocabulary. And another limitation in this study is using

multiple-choice tests before and after the study might not show the full range of language skills, and it might missed qualitative aspects of learning.

Furthermore, (Kakerissa et al., 2022) state after conducting their research "Using Duolingo Interactive Learning Media on The Mastery of German Vocabulary", using Duolingo for learning German vocabulary through interactive media has a positive effect. This is backed by questionnaire results, which highlight the benefits of Duolingo in terms of its intended use, user groups, features, convenience, cost, and accessibility. But the disadvantages of this research is the study only focused on the impact of Duolingo on vocabulary mastery and did not explore other aspects of language learning, such as grammar or speaking skills. Learning a foreign language using Duolingo offers a unique experience. To ensure learning success, all learning systems should include established methodological characteristics.

The emergence of new media for learning English, particularly through smartphone applications like Duolingo (Ajisoko, 2020) has sparked interest in investigating its effectiveness, particularly among high school students in Samarinda. Ajisoko's study utilized tests and questionnaires to gauge the impact of Duolingo on learners' vocabulary mastery and their perceptions of the application. The pre-test and post-test results revealed a significant improvement in students' vocabulary scores after using Duolingo extensively, indicating its potential for enhancing language learning outcomes.

Developing vocabulary is crucial for language learners, particularly foreign language students (Siang, Hasan, et al., 2019) Similarly, (Yundayani et al., 2023) found that Duolingo not only boosted learners' vocabulary awareness but also increased student engagement and reduced frustration, especially for beginner-level learners. However, the short duration of their study limited insights into long-term effects, and reliance on multiple-choice tests may have overlooked qualitative aspects of learning. Moreover, (Kakerissa1 et al., 2022) highlighted the positive impact of Duolingo on German vocabulary mastery but noted the need for broader exploration beyond vocabulary acquisition, such as grammar and speaking skills. Conducting experimental research on the use of Duolingo among high school students in Samarinda is imperative to assess its efficacy comprehensively, considering factors like learning duration, proficiency levels, and holistic language development. Such studies can inform teachers and policymakers about the potential of integrating Duolingo into language learning curricula, thus improving educational outcomes for students in Samarinda and beyond.

This research theoretically implied as a contribution for future research reference regarding to the use of Duolingo as an interactive learning media and provides actionable insight for the teacher, student, and the institution to considering the potential of Duolingo as an interactive learning media transform using digital tools and move from traditional learning to build a new, engaging, and enjoyable learning environment.

The objective of the research is to find out whether there is improvement after integrating Duolingo in student performance and score using pre-test and post-test instrument.

RESEARCH METHODOLOGY

This study used quasi-experimental framework and quantitative technique. In this study the researchers use quasi-experimental framework to explore the influence of independent variable on dependent variable. Quasi-experimental design is chosen when random assignment is not feasible or ethical, yet researchers aim to establish causal connections between variables. The aim of this study is to assessing the effectiveness of intervention Duolingo by comparing their score before and after the treatment. Therefore, the design is appropriate for this study. The data collection technique in this research is conducting the pre-test to evaluate student English proficiency and post-test after intervention the Duolingo application to comparing the means score calculated the

statistical significance using the analysis tool that is the Statistical Package for Social Sciences (SPSS) 29 for windows. The participant of this study were selected using a random sampling technique to ensure every student had an equal opportunity to be chosen and this technique help in reducing bias. The sample of this study consist 30 student. All the sample is a student from grade 10th that were in average age from 17-19 years old. The intervention of Duolingo was conducted over a two-month period. The students were asked to download the application in their own phone and start using Duolingo, answer all the question, quiz, and exercises that consist speaking, listening, and reading also writing skills for every 15-30 minutes at the end of the meeting in every English class in twice a week. At the end, some of student will also explain what did they learn from Duolingo in every meeting.

RESULTS AND DISCUSSIONS

Throughout the intervention, the student at Muhammadiyah Istiqomah 1 Senior High School were asked to take a pre-and post-test to assess their vocabulary competency in English. They had been using the Duolingo application for the previous two month. In this opportunity, the students had to answer four sections of a question that were taken from Duolingo. The researcher using t-test to calculated the statistical data. In this section. The researchers showed student pre-test and post-test score.

Table 1. Students pre and post test score

Participant Initials	Pre-Score	Post-Score
AA	71	75
AH	74	78
AF	80	85
AN	70	76
AH	83	86
AF	84	89
HM	81	82
IL	74	85
MR	70	73
MF1	86	90
MA1	71	86
MF2	93	95
MH	86	88
MI	83	90
MN	82	89
MN2	73	85
MR1	60	78
MR2	70	86
SF	64	78
NR	76	83
K	76	89
SM	88	88
MA2	80	89
NA1	76	76
AF	89	94
LN	86	92
SO	60	80
SS	64	76
WA	73	78

The table above showed students pre-test and post-test scores before and after the Duolingo intervention. the highest score for the pre-test was 93, achieved by only one student, while the lowest score was 60, reached by two students and the rest of participant scoring below

the minimum score. The researchers calculated the mean score, which showed that the mean score of pre-test was 76.65. there were significant differences between the student pre-test and post-test score. The highest post-test score was 95, the lowest was 73, and the mean score was 84.

Table 2. Mean score pre-post test

N	MEAN	STD. DEVIATION	STD. ERROR MEAN
PRE	76.6552	8.71893	1.61906
POST	84.1034	6.16062	1.14400

There was a mean score difference before and after the Duolingo intervention in students' pre-test and post-test scores. Before examining the students' pre-test and post-test scores to assess the effectiveness of using Duolingo as an interactive learning medium with paired Sample T-Test, the researchers conducted a test of normality to assess the normality of the data.

Table 3. Normality test result

Statistic	df	Sig.	Statistic	df	Sig.
PRE .098	30	.200	.971	30	.579
POST .149	30	.097	.974	30	.149

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

a. Lilliefors Significance Correction

The table above showed the result of the Shapiro-Wilk test. It showed that our p-value was higher than 0.05, at 0.05. there was insufficient evidence to indicate any major deviation of the data from a normal distribution. Thus, the researcher deduced that the data followed a normal distribution. This result also showed that the sig. value for both the pre-test and post-test was 0.579 and 0.149, respectively which more than 0.05. Therefore, the researcher implied that the data were homogenously distributed.

Table 4. T-test result 95% confidence interval of the difference significance

t	df	One-Sided p	Two-Sided p	Mean Difference	Lower	Upper
47.345	30	<.001	<.001	76.65517	73.3387	79.9717
73.517	30	<.001	<.001	84.10345	81.7601	86.4468

The table above showed the results of the paired sample t-test. There was a significant increase in the mean value from the pre-test result to the post-test result, rising from 76.65 to 84.10. The table also showed that the sig. value of this result was <0.001. The sig. (2-sided pv) was 0.001, as shown in the data above, which contained the results of the paired sample t-test. In accordance with the two-tailed significance criterion, the null hypothesis (Ho) was rejected in favor of the alternative hypothesis (Ha). The value of 0.000 was less than 0.05. This indicated that the Duolingo media application was successful in enhancing students' comprehension of vocabulary.

In this study, the researchers used paired sample t-test to compare the mean scores of students' pre-test before the Duolingo intervention and post-test after the Duolingo intervention for 30 participants in 10th grade at SMA Istiqomah 1 over the past two months, using SPSS 29 to calculate the data statistically. In this experimental class, the researchers guaranteed that all participants received equal access to Duolingo therapy for 30 minutes at the end of each meeting. The students grew increasingly enthusiastic as they discovered the various aspects of the Duolingo application, such as interactive games, which provided support and assistance in their mastery of

English vocabulary throughout lectures. The researchers observed a consistent increase in the students' daily score on Duolingo over the last two months. Additionally, the researchers noted a noticeable improvement in the students' speaking skills on a daily basis in the classroom.

Duolingo had fun and attractive visual features that made students more interested in learning and helped them master vocabulary more easily (Kustyarini et al., 2020). Based on the t-test results, the data showed that statistical analysis using paired sample t-test demonstrated the effectiveness of the Duolingo application during the treatment period.

(Irwit Santi et al., 2023) said by applied Duolingo can boost the vocabulary awareness of learners and enhanced skill of student while for beginner-level learners Duolingo, it significantly improved student excitement and attraction to Duolingo and helped students reduce their learning frustration because the content they served is easy to understand, and every student has the same opportunity to practice the material.

This statement was proved by the researchers after Duolingo intervention, Duolingo can be applied in easier way and more understandable for the students who still at the beginner-level in the classroom, it really helped students to relaxed after study but still assure the students to practice their English vocabulary knowledge without any pressure at the end of the meeting. The researchers analyze the data to prove that the Duolingo can boost student vocabulary awareness and the data showed there is increasing statistical significance post test data from this study, with t ($df = 28$) and a p-value or sig (2-tailed) of 0.001, which was less than $\alpha = 0.05$ (5%). This indicated that the alternative hypothesis (H_a) was accepted and the null hypothesis (H_0) was rejected. It was demonstrated that the utilization of the Duolingo application significantly enhanced students' proficiency in vocabulary.

In a previous study (Khumatus Sholikhah, 2022) conducted similar research using Duolingo as an interactive learning media but employed different methods and results, using two sample groups: an experimental class that used Duolingo as an additional tool and a control class that did not use Duolingo. The results showed an increase in the mean score for students in the experimental class (87.86) compared to the control class (78.57). According to (Ishak Yuwono, 2022.) The research findings also revealed an increase in the vocabulary aspect.

The findings revealed that students' scores went up significantly after using the Duolingo app to learn English. Using a similar methodology, the Duolingo app was found to be useful for teaching vocabulary. This study aims to demonstrate an alternative approach using Duolingo as an interactive learning tool to improve students' English vocabulary, based on two pieces of research. The researchers utilized a single sample group to assess the difference in mean scores prior to and following the implementation of the Duolingo intervention. The results revealed that the average score after the test was higher than the average before to the test. This strategy has shown effectiveness in improving students' language skills.

CONCLUSION

The implementation of Duolingo as an interactive learning media at Muhammadiyah Istiqomah 1 Senior High School for 30 students in grade X proved beneficial for enhancing student vocabulary knowledge after being applied properly for two consecutive months. By using Duolingo, the students enjoyed learning English for 30 minutes at the end of each class. The students were very interested, and it significantly increased their enthusiasm for learning English because Duolingo is a gamified e-learning application that is fun to use that affected the increase in their academic score, it provides empirical proof from these research claims and confirms the findings of the previous study mentioned that conducting research of Duolingo to give the positive impact and enhancing students learning performance. Each course is presented through diverse lessons. In these lesson, there are different games allowing users to apply their knowledge using words, voice,

pictures, matching, repetition, writing, filling the blanks, and much more. According to the findings of this study, the researchers concluded that Duolingo has a huge impact on increasing student English vocabulary knowledge in a fun and easier way.

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