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INCREASING ENGLISH VOCABULARY OF GRADE VIII STUDENTS THROUGH DUOLINGO APPLICATION

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Abstract

The purpose of this research is to determine whether the Duolingo application can enhance the English vocabulary of grade VIII students at SMPN 1 Sindue Tombusabora. This research focused on teaching concrete nouns and action verbs, including their spelling, meaning, and use in sentences. A quasi-experimental design was employed, involving two classes: an experimental class (VIII C) and a control class (VIII A), each consisting of 20 students selected through purposive sampling. Data collection was conducted using pretests and posttests to measure changes in vocabulary knowledge before and after the intervention. The experimental class utilized the Duolingo application, while the control class did not receive this treatment. After the posttest, the researcher used statistical analysis to evaluate whether there was a significant difference between the two classes. Based on the data analysis tests, the mean pretest score for the experimental class was 30.62, compared to 35.97 for the control class. After administering the treatment, the mean score on the posttest for the experimental class was 66.45, which is significantly higher than the mean score of 36.96 for the control class. Using a significance level of 0.05, the researcher found that the calculated t-value of 7.50 exceeded the t-value of 1.687 from the t-table. It indicates that the hypothesis was accepted. In other words, grade VIII students at SMPN 1 Sindue Tombusabora can increase their English vocabulary by using the Duolingo application.

Keywords: increasing; English; vocabulary; Duolingo; application

Abstrak

Tujuan dari penelitian ini adalah untuk mengetahui apakah aplikasi Duolingo dapat meningkatkan kosakata bahasa Inggris siswa kelas VIII di SMPN 1 Sindue Tombusabora. Penelitian ini berfokus pada pengajaran kata benda konkret dan kata kerja aksi, termasuk ejaan, makna, dan penggunaannya dalam kalimat. Penelitian ini menggunakan desain kuasi-eksperimental yang melibatkan dua kelas: kelas eksperimen (VIII C) dan kelas kontrol (VIII A), masing-masing terdiri dari 20 siswa yang dipilih secara purposif. Pengumpulan data dilakukan dengan menggunakan pretest dan posttest untuk mengukur perubahan pengetahuan kosakata sebelum dan sesudah intervensi. Kelas eksperimen menggunakan aplikasi Duolingo, sedangkan kelas kontrol tidak menerima perlakuan ini. Setelah posttest, peneliti menggunakan analisis statistik untuk mengevaluasi apakah ada perbedaan yang signifikan antara kedua kelas. Berdasarkan uji analisis data, rata-rata skor pretest untuk kelas eksperimen adalah 30,62, dibandingkan dengan 35,97 untuk kelas kontrol.

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Setelah pemberian perlakuan, nilai rata-rata posttest untuk kelas eksperimen adalah 66,45, yang secara signifikan lebih tinggi dari nilai rata-rata 36,96 untuk kelas kontrol. Dengan menggunakan tingkat signifikansi 0,05, peneliti menemukan bahwa nilai t hitung sebesar 7,50 melebihi nilai t tabel sebesar 1,687. Hal ini menunjukkan bahwa hipotesis diterima. Dengan kata lain, siswa kelas VIII di SMPN 1 Sindue Tombusabora dapat meningkatkan kosakata bahasa Inggris mereka dengan menggunakan aplikasi Duolingo.

***Kata Kunci**: meningkatkan; bahasa Inggris; kosakata; Duolingo; aplikasi*

1. Introduction

Vocabulary is an indispensable component of English language learning, serving as the foundational skill necessary for learners to progress in their proficiency in listening, speaking, reading, and writing. A robust vocabulary is paramount for achieving strong English competence, as it significantly contributes to effective communication for all language users. It underscores the critical importance of acquiring new words, enabling students to articulate their thoughts with greater precision and enhancing their overall communication abilities. Furthermore, a rich vocabulary is essential for developing cognitive academic language proficiency, which is vital for academic success. It emphasizes the importance of employing effective teaching strategies to enhance vocabulary acquisition among students (Susanto, 2021).

At SMPN 1 Sindue Tombusabora, the researcher noted that Grade VIII students encounter various difficulties related to mastering vocabulary, including challenges in remembering words and forming sentences. Traditional vocabulary instruction methods, including rote memorization and conventional reading exercises, have been shown to lack engagement and effectiveness for today's learners (Ahmed, 2016). Consequently, there is a pressing need to explore innovative teaching strategies that can motivate students and improve their vocabulary acquisition.

Students tend to learn best through enjoyable approaches, such as play (Parker et al., 2022). Learning through play is an effective strategy that enhances students' active engagement while fostering their cognitive, social, emotional, and creative skills. To facilitate enjoyable learning experiences, it is essential to use appealing learning materials and media. When teaching materials are engaging, students can grasp topics more easily and experience a positive learning environment (Sukristiningsih & Sahid, 2022). One method that can be used to support this is gamification. It involves using game-based learning techniques and integrating game design elements into non-game contexts to help students acquire knowledge and skills (Welbers et al., 2019). In education, gamification incorporates game elements into the design of learning experiences across different subjects. This approach not only makes learning more enjoyable but also encourages students to take an active role in their education (Gressick & Langston, 2017).

Gamification in the educational sector is frequently employed through game applications. One notable example is the Duolingo app. According to Wahyuningsih and Putra (2020), Duolingo combines lessons with gamified elements, making the learning process enjoyable and interactive. It effectively integrates audio, visuals, vocabulary, and grammar questions to engage students' interest in learning. Duolingo is a language-learning application that offers a wide range of materials, including nouns, verbs, and phrases, across multiple language options such as English, Arabic, Spanish, and French (Ajisoko, 2020). The app is designed to enhance students' motivation and achievement in language learning, particularly in English (Nushi & Eqbali, 2017). To support English learning, Duolingo includes features such as levels, points, leaderboards, progress bars, rewards, and ranks, all of which align with gamification principles (Al-Azawi et al., 2016).

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Additionally, a promising approach is to incorporate technology into language education, especially by utilizing language-learning apps. The Duolingo app, available for both iPhone and Android devices, has gained recognition as a highly impactful resource for enhancing vocabulary acquisition (Maru et al., 2025). According to Aulia et al. (2020), the use of the Duolingo platform has significantly impacted students' understanding of English vocabulary. Additionally, Tiara et al. (2021) notes that learners generally have a positive perception of Duolingo, appreciating its ease of use, relevant context, and engaging educational experience.

Based on the reasons above, the researcher assumes that the use of the Duolingo application can effectively increase students' English vocabulary. Therefore, the researcher is motivated to conduct this research with eighth-grade students at SMPN 1 Sindue Tombusabora, where many students still struggle with their vocabulary. The goal of this research is to determine whether incorporating Duolingo into the teaching and learning process will effectively enhance the English vocabulary of eighth-grade students at SMPN 1 Sindue Tombusabora.

2. Method

2.1 Research Design

This research adopted a quantitative approach, using a quasi-experimental design. According to Ghanad (2023), quantitative research involves collecting, analyzing, and interpreting numerical data to evaluate the hypotheses formulated in a study. Additionally, the quasi-experimental approach enables researchers to investigate the effects of an intervention on pre-existing groups (Mishra et al., 2019). The research involved two separate classes: one experimental class and one control class. Each group participated in both a pretest and a posttest to evaluate their vocabulary abilities. The experimental class received instructional support through the Duolingo application, while the control class employed traditional teaching methods. As noted by Pyrczak and Tcherni-Buzzeo (2018), experimental designs involve administering treatments to the experimental group, whereas the control group does not receive the treatment. This comparative framework, consistent with the approaches suggested by Arikunto (2013), facilitated a comprehensive evaluation of the intervention's effectiveness.

2.2 Population and Sample

The research focused on all eighth-grade students at SMP Negeri 1 Sindue Tombusabora, comprising a total of 68 students organized into three parallel classes. The decision to concentrate on this population stemmed from initial observations indicating a significant deficiency in vocabulary mastery among these learners. A purposive sampling method was used for participant selection. As noted by Etikan et al. (2016), this approach entails selecting participants. Mohapatra and Chamola (2020) sampling is a vital step in research where a representative group is chosen from the larger population to make inferences. In this research, Class VIII C, comprising 20 students, was selected as the experimental class, while Class VIII B, which also had 20 students, served as the control class. This deliberate selection aimed to ensure that the sample groups accurately reflect the population facing the identified vocabulary challenges.

2.3 Instrument of the Research

The researchers utilized a test as the measurement tool for their study. For precise measurement of vocabulary acquisition, the researchers designed and implemented a standardized vocabulary assessment aligned with students' proficiency levels. In developing the assessment, the researchers carefully selected words that aligned with the students' comprehension abilities. The evaluation consisted of a written test administered twice: first as a pretest and then as a posttest. Both the experimental and control groups completed the same test. The treatment phase began only after all participants from both groups had finished the pretests. Pretests are valuable for revealing students' existing knowledge and misconceptions, providing crucial insights into their comprehension levels

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before instruction begins (Pérez-Lemonche et al., 2019). After the treatment concluded, both groups took a posttest. Posttests are essential for evaluating the effectiveness of an intervention, as they measure outcomes after the treatment has been completed. Alessandri et al. (2017) highlight the significance of comparing post-intervention results with initial data to assess the intervention's effectiveness on participants. In this research, students completed a vocabulary mastery test that mirrored the pretest they had taken earlier. The test comprised 30 items, including multiple-choice questions, matching questions, fill-in-the-blank exercises, and anagram tasks.

2.4 Procedure of Data Collection

In this research, the investigators employed a testing approach that comprised both a pretest and a posttest. Schumacker and Holmes (2022) state that the pretest measures the initial skill levels of students, while the posttest evaluates the progress achieved following the intervention. The pretest was administered before the treatment, while the posttest was administered afterward. The intervention consisted of six sessions.

2.5 Technique of Data Analysis

The approach to data analysis involves specific methodologies used to examine and understand gathered data. As highlighted by Varghese et al. (2023), analyzing data is a crucial step for extracting valuable insights from raw information and enhancing decision-making across various fields. This process includes activities such as examining, cleaning, transforming, and modeling data to reveal meaningful information. The researcher conducted a statistical analysis of the test data based on the formula proposed by Arikunto (2013). First, the researcher computed the *individual score* of students' vocabulary using the formula proposed by Arikunto (2013) as follows:

$$\sum = \frac{x}{N} \text{ x } 100$$

Where:

$\sum$ = Standard score
x = Number of correct items
N = Maximum score

Having the students' individual scores, the researcher analyzed the group *mean score* on the pretest and posttest, applying the formula of Arikunto (2013) as shown below.

$$M = \frac{\sum x}{N}$$

Where:

M = Mean score
$\sum x$ = The sum of the score
N = Number of students

Then, to analyzed the *sum square deviation* score, the researcher used the formula proposed by Arikunto (2013) as follows:

$$\sum x^2 = \sum X^2 - \frac{(\sum X)^2}{N}$$
$$\sum y^2 = \sum Y^2 - \frac{(\sum Y)^2}{N}$$

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Where :

$\sum x^2$ = Deviation score of experimental class
$\sum y^2$ = Deviation score of control class
N = Number of students

Last, the researcher analyzed the data to find out the *significant difference* in both two groups by using the t-count formula as proposed by Arikunto (2013) as follows:

$$t = \frac{MX - MY}{\sqrt{\left(\frac{\sum x^2 + \sum y^2}{nx + ny - 2}\right)\left(\frac{1}{nx} + \frac{1}{ny}\right)}}$$

Where:

MX = Mean score of the experimental class
MY = Mean score of the control class
$\sum x^2$ = The total square of the experimental class
$\sum y^2$ = The total square of the control class
Nx = Total number of experimental class
Ny = Total number of control class

3. Results and Discussion

3.1 Result

In this research, the researcher presents data from the study to assess the improvement in students' vocabulary. Data collection took place in May 2025 for grade VIII students at SMPN 1 Sindue Tombusabora. During the data collection process, the researcher administered pretests and posttests in both the experimental and control classes. The researcher then calculated each student's score using the formula proposed by Arikunto (2013). Based on these results, the researcher computed the average scores of the tests for each class.

Table 1 ***Pretest Mean Scores for the Experimental and Control Classes***

Class	Number of Students	Total Individual Score	Mean Score
Experimental class	20	612.4	30.62
Control class	20	719.4	35.97

Based on Table 1 above, the total individual score in the pretest for the experimental class is 612.4, with 20 students. This score is slightly lower than the total individual score in the control class, which is 719.4, also with 20 students. However, the mean score of the control class (35.97) is higher than that of the experimental class, which has a mean score of 30.62.

These initial results align with the initial problem identified in the background of this research and supported by previous studies. Researchers such as Suri et al. (2024), Mahfuza and Zulfitri (2023), and Utari (2023) have identified a common struggle with English vocabulary among junior high school students. The low pretest scores in both our experimental (mean 30.62) and control (mean 35.97) classes confirm the widespread vocabulary deficiency that these prior studies aimed to address. This consistent problem across different contexts underscores the necessity for effective interventions, such as the Duolingo application, to improve students' vocabulary mastery.

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Table 2 ***Posttest Mean Scores for the Experimental and Control Classes***

Class	Number of Students	Total Individual Score	Mean Score
Experimental class	20	1.329	66.45
Control class	20	739.3	36.96

The table above shows the results of the test after treatment. From this, it is evident that the mean scores of both classes increased. The difference in the pretest results before the treatment shows that the mean score of the control class was higher than that of the experimental class. However, after the treatment, the mean score of the experimental class (66.45) is now higher than that of the control class (36.96). The substantial increase in the experimental class's mean posttest score (from 30.62 to 66.45), in stark contrast to the minimal change in the control group (from 35.97 to 36.96), provides compelling evidence for the effectiveness of the Duolingo application.

The significant improvement in the experimental class's posttest is directly compared to the results of previous studies that also found Duolingo to be effective. The success of the Duolingo application in this research further supports the broader argument, as noted by Ahmed (2016), that integrating technology can significantly improve teaching methods and student engagement. The positive results observed here, mirroring those in other studies, underscore the potential of digital learning platforms like Duolingo to address traditional learning challenges and enhance language proficiency.

After calculating the mean scores for the pretest and posttest, the researcher proceeded to calculate the deviation and squared deviation to determine whether a significant difference existed between the results of the pretest and posttest in both classes. Below is a table outlining the deviation scores:

Table 3 ***Deviation Score in Experimental and Control Classes***

Class	Number of Students	Students Score		Deviation ($X_2 - X_1$)	Mean Deviation	Squared Deviation
		Pretest (X_1)	Posttest (X_2)			
Experimental class	20	612.4	1.329	716.6	35.83	29362.41
Control class	20	719.4	739.3	96.7	4.835	3283.57

After determining the deviations and squared deviations for both classes, the researcher calculated the *total sum of the squared deviations* for each classes. The researcher used the following formula proposed by Arikunto (2013).

a. Experimental Class

$$\sum x^2 = \sum X^2 - \frac{(\sum X)^2}{N}$$

$$\sum x^2 = 29362.41 - \frac{(716.6)^2}{20}$$

$$\sum x^2 = 29362.41 - \frac{513515.56}{20}$$

$$\sum x^2 = 29362.41 - 25675.77$$

$$\sum x^2 = 3686.64$$

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b. Control Class

$$\sum y^2 = \sum Y^2 - \frac{(\sum Y)^2}{N}$$
$$\sum y^2 = 3283.57 - \frac{(96.7)^2}{N}$$
$$\sum y^2 = 3283.57 - \frac{9350.89}{20}$$
$$\sum y^2 = 3283.57 - 467.54$$
$$\sum y^2 = 2816.03$$

From the results above, it was evident that the squared deviation of the scores for the experimental group amounts to 3686.64, whereas the squared deviation for the control group was 2816.03. After obtaining these squared deviation scores, the researcher assessed the significance of the results by applying the t-count formula as outlined by Arikunto (2013). The presentation of the calculations was as follows:

$$t = \frac{MX - MY}{\sqrt{\left(\frac{\sum x^2 + \sum y^2}{nx + ny - 2}\right)\left(\frac{1}{nx} + \frac{1}{ny}\right)}}$$
$$t = \frac{35.83 - 4.835}{\sqrt{\left(\frac{3686.64 + 2816.03}{20 + 20 - 2}\right)\left(\frac{1}{20} + \frac{1}{20}\right)}}$$
$$t = \frac{30.995}{\sqrt{\left(\frac{6502.67}{38}\right)\left(\frac{40}{400}\right)}}$$
$$t = \frac{30.995}{\sqrt{(171.12)\,(0.1)}}$$
$$t = \frac{30.995}{\sqrt{17.112}}$$
$$t = \frac{30.995}{4.137}$$
$$t = 7.50$$

By obtaining a t-count value of 7.50, the researcher indicates that the results are statistically significant, suggesting that the use of the Duolingo application has a positive effect on improving students' English vocabulary. This result has important implications for prior studies that investigated the effectiveness of the Duolingo app. If previous studies reported mixed or inconclusive results regarding the app's effectiveness, the current research provides more substantial evidence supporting the app's role in vocabulary improvement. In summary, the significant t-count suggests that the results of this research may reinforce or challenge the conclusions of earlier studies, depending on their results.

Therefore, to determine whether the hypothesis is accepted or rejected, the researcher needed to test it based on the results of the data analysis. If the t-count exceeded the critical value from the t-table, then the hypothesis was accepted. This research indicated that the use of the Duolingo app had a significant effect on students' vocabulary improvement. Meanwhile, if the t-count was smaller than the critical value from the t-table, it indicated that the hypothesis was rejected. Consequently, this finding suggested that the use of the Duolingo app did not have a significant effect on students'

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vocabulary improvement. To determine whether the hypothesis was accepted or rejected, the researcher calculated the interpolation formula as follows:

$$\frac{a}{b} x\ c$$

Where :

a = the value of the amount of the students subtract with the df (30)
b = the value of the df (40) subtract with the df (30)
c = the value of value df (30) subtract with the value of df (40)

Degree of freedom (df) = Nx + Ny – 2
= 20 +20 -2
= 38 (between 30-40)

Level of significant = 0,05
30 = 1.697
40 = 1.684

a = 38 -30 = 8
b = 40-30 = 10
c = 30-40
= 1.697-1.684 = 0,013

$$\frac{a}{b} x\ c = \frac{8}{10} x\ 0{,}013$$
$$= 0.0104$$

$$\text{Df } (38) = 1.697 - 0.0104$$
$$\text{t-table} = 1.687$$

The results of the data analysis showed that the t-count is 7.50. Using a significance level of 0.05 and a degree of freedom (df = 38), the researcher found that the t-count of 7.50 exceeded the t-table value of 1.687. This result indicated that the research hypothesis was accepted. In other words, the Duolingo application effectively enhanced the English vocabulary of grade VIII students at SMPN 1 Sindue Tombusabora.

The results of this research are consistent with and further reinforce the conclusions of previous research on the efficacy of the Duolingo application in vocabulary acquisition. For instance, Suri et al. (2024) found that Duolingo effectively and enjoyably facilitated students in improving their vocabulary mastery. Likewise, Mahfuza and Zulfitri (2023) found significant differences in vocabulary proficiency among students using the Duolingo application compared to those who did not. Their research indicated that the app effectively enhanced vocabulary mastery, leading to improved test scores and overall language acquisition. Utari (2023) also demonstrated that Duolingo can enhance vocabulary among students, especially those in junior high school.

3.2 Discussion

This research aims to determine the effectiveness of the Duolingo application in enhancing the English vocabulary of Grade VIII students at SMPN 1 Sindue Tombusabora, with a specific focus on concrete nouns and action verbs. The initial pretest results indicated a significant vocabulary deficiency among students in both the experimental and control groups, with scores ranging from 6.6 to 66.6 in the experimental class and from 16.6 to 73.3 in the control class. These findings highlight a foundational vocabulary gap before any intervention.

Following the treatments, a posttest revealed a remarkable improvement in the experimental group's average score, rising from 30.62 to 66.45, while the control group's score changed minimally from 35.97 to 36.96. This significant difference supports the findings of previous research, such as

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Mahfuza and Zulfitri (2023), who reported that Duolingo users showed enhanced vocabulary proficiency compared to non-users. The engaging design and interactive features of Duolingo likely contributed to this improvement, aligning with Ahmed (2016) assertion that interactive tools can enhance student engagement and motivation. Moreover, the results are consistent with Suri et al. (2024) and Utari (2023), who also found that Duolingo effectively facilitates vocabulary acquisition among students. These consistent findings across multiple studies strengthen the credibility of Duolingo as a valuable educational resource.

However, the research faced practical challenges, such as the absence of personal smartphones among several students, which occasionally hindered focus and contributed to a noisy classroom environment. This barrier to technology integration underscores the necessity for accessible learning media, as highlighted by Maru et al. (2025). Despite these challenges, the significant improvement in students' scores indicates that the Duolingo app is an effective tool for vocabulary instruction, fostering enthusiasm and enjoyment in learning, as noted by Alqahtani (2015). Additionally, the research's narrow focus on concrete nouns and action verbs may limit the generalizability of the findings to other types of vocabulary. For future research, it is advisable to include a wider variety of vocabulary types, such as adjectives and adverbs, to assess Duolingo's effectiveness across diverse linguistic categories. Additionally, exploring alternative access solutions, like classroom tablets or offline versions of the app, could help address issues related to device accessibility for students.

4. Conclusion

In conclusion, the results clearly show that the Duolingo application can substantially enhance the English vocabulary of eighth-grade students at SMPN 1 Sindue Tombusabora. Consequently, these results are expected to assist teachers, students, and researchers in developing engaging and enjoyable tools for vocabulary acquisition in English classrooms. For students, it not only improved their vocabulary mastery but also increased their active participation and motivation during the learning process. For English teachers, implementing this application can provide an alternative approach to creating a more dynamic and impactful classroom atmosphere, especially in teaching vocabulary. Additionally, this research serves as a valuable resource for other researchers exploring innovative and interactive methods for vocabulary instruction. Overall, the encouraging outcomes of this research reinforce the belief that vocabulary education should be both enjoyable and meaningful.

This research concludes that the Duolingo application is an effective tool for enhancing English vocabulary acquisition among eighth-grade students at SMPN 1 Sindue Tombusabora. It can be demonstrated that the experimental group, which incorporated Duolingo into their vocabulary instruction, showed a statistically significant increase in their post-test scores compared to the control group, which received traditional instruction. Therefore, it means the hypothesis of this research is accepted. In other words, applying the Duolingo application can enhance the English vocabulary of the grade VIII students at SMPN 1 Sindue Tombusabora.

Despite the promising results of this research, several challenges emerged during the use of the Duolingo app. Many students lacked basic vocabulary skills, which caused them to rely frequently on dictionaries during their lessons. Moreover, restricted access to smartphones compelled some students to share devices, which detracted from their concentration and overall learning experience. As a result, the classroom atmosphere grew chaotic during Duolingo sessions, which may have diminished learning effectiveness. These issues indicate that while Duolingo proves beneficial, teachers should engage in meticulous planning and provide support when implementing the app in their classrooms. In summary, the analysis and discussion validate that this learning approach acts as a powerful instructional tool, helping both students and teachers improve vocabulary acquisition. This research indicates that utilizing the Duolingo app can significantly enhance students' English vocabulary.

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For future research regarding the use of Duolingo in language teaching, it is suggested to investigate the long-term retention of vocabulary acquired through Duolingo, explore its effectiveness across different age groups and proficiency levels, and examine the impact of integrating Duolingo with other instructional strategies to mitigate challenges such as limited smartphone access and classroom management during app-based activities.

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