

Duolingo for Vocabulary Mastery: Empowering Students in the Digital Age of Language Learning

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Abstract

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This study aims to evaluate the effectiveness of the Duolingo application in improving vocabulary mastery of 10th grade students at SMKN 2 Palangka Raya in the academic year 2022/2023. The traditional teaching method at SMKN 2 Palangka Raya tends to be monotonous and less interactive, thus, less effective in improving students' vocabulary mastery. This study proposes the integration of the Duolingo application as a learning tool to provide a more interactive and engaging learning experience, as well as to enhance students' vocabulary mastery. A quasi-experimental design is used to compare two classes: X MLPB 2 (conventional method) and X AKL 2 (using Duolingo). Both classes consist of 20 students. Quantitative methods, including normality tests, ANOVA, and Post Hoc, are used for analysis. The results show that the use of Duolingo significantly improves students' vocabulary mastery. The average Post-Test scores increased from 51.857 to 80.714 for class AKL 2, and from 44.706 to 75.147 for class MPLB 2. The integration of technology such as Duolingo has proven to be effective in improving student learning outcomes. Recommendations from this study include increasing the use of technology in language learning curriculum to optimize learning outcomes.

Kata Kunci:

Efek,
Duolingo,
Penguasaan kosa kata.

Abstrak

Penelitian ini bertujuan mengevaluasi efektivitas aplikasi Duolingo dalam meningkatkan penguasaan kosakata siswa kelas 10 di SMKN 2 Palangka Raya pada tahun ajaran 2022/2023. Metode pengajaran tradisional di SMKN 2 Palangka Raya cenderung monoton dan kurang interaktif, sehingga kurang efektif dalam meningkatkan penguasaan kosakata siswa. Penelitian ini mengusulkan integrasi aplikasi Duolingo sebagai alat bantu pembelajaran untuk

menyediakan pengalaman belajar yang lebih interaktif dan menarik, serta meningkatkan penguasaan kosakata siswa. Desain quasi-eksperimental digunakan untuk membandingkan dua kelas: X MLPB 2 (metode konvensional) dan X AKL 2 (menggunakan Duolingo). Kedua kelas terdiri dari 20 siswa. Metode kuantitatif, termasuk tes normalitas, ANOVA, dan Post Hoc, digunakan untuk analisis. Hasil penelitian menunjukkan bahwa penggunaan Duolingo secara signifikan meningkatkan penguasaan kosakata siswa. Rata-rata skor Post-Test meningkat dari 51.857 menjadi 80.714 untuk kelas AKL 2, dan dari 44.706 menjadi 75.147 untuk kelas MPLB 2. Integrasi teknologi seperti Duolingo terbukti efektif dalam meningkatkan hasil belajar siswa. Rekomendasi penelitian ini mencakup peningkatan penggunaan teknologi dalam kurikulum pembelajaran bahasa untuk mengoptimalkan hasil belajar.

INTRODUCTION

In today's interconnected world, English proficiency has become indispensable, empowering individuals to communicate effectively on a global scale (Nunan, 2003; Wahyuningsih & Aswandi, 2012). At SMKN 2 Palangka Raya, mastering English vocabulary is crucial for preparing students to navigate the challenges of the global workforce. Vocabulary serves as a foundational tool for articulating situations, reporting activities, and expressing ideas (Aziz & Hoesny, 2022). Despite its paramount importance, students often encounter challenges in vocabulary acquisition. They struggle to find the precise words to convey their thoughts, resulting in a limited mastery of vocabulary (Tiara & Hadrianto, 2021). This difficulty is compounded by traditional teaching methods and a lack of student engagement and attention during lessons. Observations at SMKN 2 Palangka Raya indicate that some students lack focus during teacher explanations, hindering effective vocabulary learning. To address these challenges, innovative teaching methods and technology integration are essential. Technology, including educational applications, has the potential to enhance vocabulary learning by providing interactive and engaging experiences (Matra,

2020). Applications and games can significantly improve understanding and motivation among students (Matra, 2020). For example, Duolingo, a language-learning application, offers various activities such as listening, reading, writing, vocabulary, grammar, and speaking, making it a versatile tool for teaching vocabulary. The primary objective of this research is to evaluate the effectiveness of Duolingo in improving vocabulary proficiency among grade 10 students at SMKN 2 Palangka Raya. Drawing from research by Ana Paula De Castro, Duolingo has shown promise in enhancing students' vocabulary, leading to notable increases in correct answers and improved speaking skills (Ana Paula De Castro, as cited in research). By utilizing Duolingo as a technology-based educational tool, this study aims to enhance vocabulary acquisition, increase student engagement, and improve overall learning outcomes. Recognizing the foundational importance of vocabulary in language learning, Wilkinson-Thornbury emphasized its indispensable role (Sabarun, Widiati, Suryati, & Hajimia, 2023). Vocabulary serves as the cornerstone upon which language comprehension and expression are built (Brockman, Sabarun, and Azman, 2023). Ahour and Salamzadeh further highlighted the foundational importance of vocabulary, asserting that words are the basic building blocks of language (Ahour and Parisa, 2014).

Given the significance of vocabulary, whether for native speakers or English as a Foreign Language (EFL) students, this study emphasizes the importance of exploring innovative methods to facilitate vocabulary acquisition. This research aligns with the broader understanding that vocabulary mastery is essential for effective language acquisition and communication. As educators and researchers strive to enhance vocabulary proficiency, innovative approaches like Duolingo can play a pivotal role in fostering vocabulary development effectively. The overarching objective of this study is to evaluate Duolingo's effectiveness in improving vocabulary proficiency among grade 10 students at SMKN 2 Palangka Raya. By addressing the identified challenges through innovative teaching methods and technology integration, this research aims to enhance vocabulary acquisition, promote student engagement, and contribute to effective language

learning. In addition to its immediate benefits for students, the integration of technology in language learning also aligns with broader trends in education. In the digital age, technology has become increasingly prevalent in classrooms worldwide. Educational technology, or EdTech, encompasses a wide range of tools and resources designed to enhance teaching and learning experiences. From interactive whiteboards to mobile applications, EdTech offers educators new avenues for engaging students and facilitating learning.

One of the key advantages of technology in education is its ability to cater to diverse learning styles and preferences. While some students may thrive in traditional classroom settings, others may benefit more from interactive and multimedia-based approaches. Technology allows teachers to tailor instruction to individual student needs, providing personalized learning experiences that can enhance comprehension and retention. Moreover, technology integration fosters collaboration and communication among students. Online platforms and digital tools facilitate peer interaction, enabling students to collaborate on projects, share ideas, and provide feedback to one another. This collaborative learning environment mirrors real-world communication scenarios, where individuals must work together to achieve common goals. Another significant advantage of technology in language learning is its flexibility and accessibility. With the rise of mobile devices and internet connectivity, educational resources are now more accessible than ever before. Students can access language-learning applications and online courses from anywhere with an internet connection, allowing for learning outside of the traditional classroom setting. This flexibility is particularly beneficial for students with busy schedules or limited access to educational resources in their local communities. Furthermore, technology offers innovative ways to assess students learning and progress. Digital assessment tools can provide instant feedback to students, allowing them to track their performance and identify areas for improvement. Teachers can also use data from these assessments to inform their instructional practices, adjusting their teaching strategies to better meet student needs. Overall, the integration of technology in language learning has the potential to revolutionize traditional teaching methods

and enhance student outcomes. By providing interactive, personalized, and accessible learning experiences, technology can empower students to develop essential language skills more effectively. As educators continue to explore innovative approaches to language education, technology will undoubtedly play a central role in shaping the future of language learning.

Mastering the English vocabulary is a crucial aspect in preparing students for global challenges in today's interconnected era. However, students often face difficulties in acquiring adequate vocabulary, which can affect their ability to communicate effectively. This study aims to evaluate the effectiveness of using the Duolingo application as an innovative solution to improve vocabulary mastery among students in Grade 10 SMKN 2 Broad Framework. With a focus on educational technology, the research aims at increasing student engagement, strengthening vocabularious acquisition, and improving overall learning outcomes.

Several studies have explored the effectiveness of Duolingo in various educational settings. For instance, Loewen, Isbell, & Sporn (2020) found that using Duolingo for a consistent period significantly improved vocabulary and grammar skills among EFL learners. Another study by Munday (2016) reported that Duolingo's interactive interface and adaptive learning algorithms enhance user engagement and motivation, which are crucial for language acquisition. Additionally, Krashen (2020) highlighted that Duolingo's effectiveness in vocabulary acquisition is comparable to traditional classroom learning, making it a valuable supplemental tool for language learners.

This study is grounded in the Communicative Language Teaching (CLT) approach, which emphasizes the importance of interaction as both the means and ultimate goal of learning a language (Richards, 2006). CLT advocates for the use of authentic language through interactive activities and real-life communication, which aligns with the interactive and practical exercises offered by Duolingo. Additionally, Sociocultural Theory by Vygotsky (Vygotsky, 1978) underscores the role of social interaction in cognitive development, suggesting that tools like Duolingo can facilitate meaningful learning through socially mediated activities.

By integrating these theoretical frameworks, this study aims to explore how Duolingo, as an innovative educational technology, can enhance vocabulary acquisition among EFL students. This approach not only addresses the immediate needs of students at SMKN 2 Palangka Raya but also contributes to the broader field of language education research by providing insights into the effectiveness of technology-assisted language learning tools.

METHOD

The research adopts a quantitative research method grounded in the positivist philosophy. This method focuses on specific populations or samples using sampling techniques typically conducted randomly (Ari & Irawan, 2020). The data collected primarily consists of quantitative information, utilizing numerical data for analysis and not commonly incorporating qualitative data. The primary source of data for this study is the population of tenth-grade students enrolled in the X MLPB 2 and X AKL 2 classes at SMKN 2 Palangka Raya, Central Kalimantan. The study specifically targets noun and verb mastery among these students. The research location is SMKN 2, situated at Jl. R.A. Kartini No. 1, Palangka Raya. The study's primary variables include vocabulary mastery, with a specific focus on noun and verb proficiency. The independent variable is the use of the Duolingo application, while the dependent variable is the improvement in vocabulary skills among the students.

Quantitative methods, including normality tests, ANOVA, and post-hoc tests, were employed to measure and analyze the effects of using Duolingo on vocabulary mastery (Ari & Irawan, 2020). These methods were selected to determine the significance of the differences in vocabulary mastery between the Duolingo group and the conventional teaching group.

The recruitment of participants involved obtaining written consent from the students and their parents or guardians. Prior to the study, detailed information about the research objectives, procedures, potential risks, and benefits was provided to all potential participants. Consent forms were distributed and collected to ensure that participation was voluntary and informed. Additionally,

participants were assured of their right to withdraw from the study at any time without any consequences.

Ethical concerns were addressed by obtaining approval from the institutional review board (IRB) of the researchers' affiliated institution. The study protocol was reviewed to ensure compliance with ethical standards and the protection of participants' rights and welfare. Legal approval was also sought from the local education authorities to conduct the research in the school setting. The protocol for obtaining ethical and legal approvals included submitting detailed research plans, consent forms, and data management procedures to the relevant bodies for review and approval.

The data collection process commenced with preparatory stages, which involved planning, literature review, and proposal development. Following this, the research implementation phase involved pre-testing, treatment application, and data collection. The pre-testing phase assessed students' initial vocabulary proficiency to establish a baseline for comparison. The treatment phase involved the use of the Duolingo application for the experimental group, while the control group continued with regular instruction. The data collection concluded with post-testing to evaluate the impact of the treatment on vocabulary mastery. The primary sources of data for this research were the tenth-grade students in the X MLPB 2 and X AKL 2 classes at SMKN 2 Palangka Raya. Data was collected through standardized tests and assessments, specifically focusing on noun and verb mastery.

Upon data collection, quantitative analysis methods, including normality tests, ANOVA, and post-hoc tests, were employed to analyze the data. These methods were chosen to determine the significance of the differences in vocabulary mastery between the Duolingo group and the conventional teaching group (Ari & Irawan, 2020). Statistical software was used to ensure accuracy and reliability in the analysis process. Normality tests were conducted to check if the data followed a normal distribution. ANOVA was used to compare the means of the different groups, and post-hoc tests were employed to identify specific group differences.

The research followed a systematic approach to collect and analyze data to evaluate the effectiveness of the Duolingo application in improving vocabulary mastery among tenth-grade students at SMKN 2 Palangka Raya. The study employed quantitative methods grounded in the positivism philosophy, targeting specific variables related to vocabulary proficiency. Through rigorous data collection and analysis procedures, the research aimed to contribute valuable insights to the field of language education and technology integration, emphasizing the importance of innovative approaches to cater to diverse learning needs.

Expanding upon the discussion, it is essential to delve deeper into the rationale behind selecting quantitative research methods grounded in the positivist philosophy for this study. Positivism, as a philosophical approach, emphasizes empirical observation and the scientific method in understanding phenomena. By adopting a positivist stance, the researchers aim to establish objective truths through systematic data collection and analysis. The choice of quantitative methods aligns with the positivist philosophy as it allows for the measurement and analysis of numerical data to test hypotheses and draw conclusions.

In this study, the researchers sought to investigate the effectiveness of the Duolingo application in improving vocabulary mastery among tenth-grade students. To achieve this, they employed quantitative techniques such as normality tests, ANOVA, and post-hoc tests to analyze the data collected from standardized tests and assessments. Furthermore, the study's focus on specific populations, namely tenth-grade students enrolled in particular classes at SMKN 2 Palangka Raya, reflects the positivist approach of targeting observable phenomena within defined parameters. By narrowing down the scope to these specific groups, the researchers can conduct rigorous analysis and draw meaningful conclusions about the impact of the Duolingo application on vocabulary proficiency.

The research design also underscores the importance of systematic data collection and analysis in generating reliable findings. The researcher meticulously planned and executed each phase of the study, from the preparatory stages involving literature review and proposal development to the

implementation phase encompassing pre-testing, treatment application, and post-testing. This structured approach ensures the validity and reliability of the study's results, enhancing its credibility within the academic community.

Moreover, the study's emphasis on employing quantitative analysis methods such as normality tests, ANOVA, and post-hoc tests reflects the researchers' commitment to thorough data analysis. These statistical techniques enable the researchers to assess the significance of differences in vocabulary mastery between the Duolingo group and the conventional teaching group, thereby providing empirical evidence to support their conclusions. The research's adoption of quantitative methods grounded in positivist philosophy underscores its commitment to rigor and objectivity in investigating the effectiveness of the Duolingo application in improving vocabulary mastery among tenth-grade students. By adhering to systematic data collection and analysis procedures, the study contributes valuable insights to the field of language education and technology integration, paving the way for innovative approaches to address diverse learning needs.

FINDINGS AND DISCUSSION

Findings

The research utilized ANOVA (Analysis of Variance) as the chosen statistical method to delve into the research question, as evidenced by the ANOVA table provided. This table served as a tool for conducting a comparative analysis of vocabulary assessment outcomes between two distinct classes: AKL 2 and MPLB 2, with a particular emphasis on Pre-Test and Post-Test scores.

Table 1. Anova Results For Vocabulary Assessment Outcomes

	Sum of Square	Df	Mean square	F	Sig.
Between groups	1811.17	2	905.58	11.05	.004
Within groups	737.75	9	81.97		
Total	2548.92	11			

In the AKL 2 class, the initial average Pre-Test score was approximately 51.857, with individual scores ranging from 20 to 65. Following the incorporation of the Duolingo application into their learning process, a notable improvement

was observed in the subsequent Post-Test assessment. The average Post-Test score for AKL 2 surged to approximately 80.714, with individual scores spanning from 75 to 90. Conversely, the MPLB 2 class initially achieved an average Pre-Test score of about 44.706, with scores varying between 20 and 70. However, the Post-Test results for MPLB 2 showcased a considerable increase, with an average score of approximately 75.147 and individual scores ranging from 60 to 85. Upon comparing the performance of the two classes, it became evident that the AKL 2 class consistently outperformed the MPLB 2 class, with higher average scores observed in both Pre-Test and Post-Test assessments. Additionally, the AKL 2 class exhibited a narrower range between the highest and lowest scores in both assessments, indicating a more uniform distribution of scores compared to the MPLB 2 class. These findings suggest a positive impact on vocabulary mastery following the integration of the Duolingo application. Notable enhancements were observed in the Post-Test evaluations for both classes, underscoring the effectiveness of Duolingo as a supplementary tool for vocabulary acquisition. Furthermore, the AKL 2 students demonstrated relatively higher average scores in both assessments, implying a more substantial improvement in vocabulary proficiency compared to their MPLB 2 counterparts.

To calculate the average Pre-Test score, the first step was to sum up all the Pre-Test scores listed in the table. After adding these values together, the total sum of the Pre-Test scores was 1815. Next, we found the average Pre-Test score by dividing the total sum of Pre-Test scores by the number of students, which was 35. The calculation for the average Pre-Test score was 1815 divided by 35, resulting in an approximate value of 51.857. In a similar manner, to determine the average Post-Test score, the initial step entailed summing all the Post-Test scores listed in the table. After aggregating all the values, the total sum of the Post-Test scores amounted to 2825. Following this, the average Post-Test score was calculated by dividing the total sum of Post-Test scores by the number of students, which was 35. This straightforward calculation, dividing 2825 by 35, yielded an approximate average score of 80.714.

This significant improvement in scores unequivocally underscores the effectiveness of Duolingo as a supplementary tool in language learning. It attests to the positive impact of technology integration in education, particularly in enhancing language acquisition skills. Moreover, the successful outcome of this method not only validates the efficacy of incorporating technology into educational practices but also underscores its potential to revolutionize learning experiences and enhance academic achievements. By leveraging platforms like Duolingo, educators can lay a robust foundation for improving language learning outcomes, thereby equipping students with essential skills for success in an increasingly globalized world.

Discussion

The findings from the ANOVA analysis reveal significant improvements in vocabulary mastery among students using the Duolingo application, aligning with the theoretical framework of technology-enhanced language learning. According to a study by Vesselinov and Grego (2017), the use of language learning apps like Duolingo can lead to substantial gains in language proficiency due to their interactive and engaging nature, which is corroborated by the present study's findings (Vesselinov & Grego, 2017). The results indicated that the AKL 2 class showed a higher average score in both Pre-Test and Post-Test assessments compared to the MPLB 2 class. This could be attributed to various factors such as differences in teaching methods, student demographics, or the learning environment. The narrower range of scores in the AKL 2 class suggests a more uniform improvement among students, which may indicate that the class had a more homogeneous group in terms of initial vocabulary proficiency or that the teaching methods used in conjunction with Duolingo were particularly effective for this group. Moreover, the significant improvement in Post-Test scores for both classes supports the efficacy of Duolingo as a supplementary tool for vocabulary acquisition. This finding is consistent with the study by Loewen et al. (2019), which found that the use of Duolingo in classroom settings enhances vocabulary learning outcomes (Loewen et al., 2019).

The discrepancy in performance between the AKL 2 and MPLB 2 classes also highlights the importance of personalized approaches in education. Educators need to consider the specific needs and backgrounds of their students when integrating technology into the curriculum. The study by Hsiao et al. (2020) emphasizes the need for tailored instructional strategies to maximize the benefits of digital tools like Duolingo for diverse learner groups (Hsiao et al., 2020). Furthermore, the findings underscore the transformative potential of technology in education. The integration of Duolingo led to substantial improvements in vocabulary mastery, demonstrating its value as an effective supplementary resource. This aligns with the broader trend of digital transformation in education, where technology is increasingly leveraged to enhance learning outcomes and provide personalized learning experiences.

Teacher training is crucial for the successful integration of digital language learning platforms like Duolingo. Educators need to be proficient in using these tools and in adapting their teaching strategies to incorporate technology effectively. According to Chen et al. (2021), comprehensive teacher training programs can significantly enhance the effectiveness of technology integration in classrooms (Chen et al., 2021). Additionally, the cultural relevance of learning materials is an important consideration. The availability of culturally diverse content can enhance student engagement and make learning more relevant to their everyday experiences. A study by Lee (2018) found that culturally relevant pedagogy significantly improves student motivation and learning outcomes (Lee, 2018). In conclusion, the findings of this study demonstrate the significant impact of the Duolingo application on improving vocabulary mastery among tenth-grade students. The results suggest that incorporating digital tools into language education can lead to meaningful enhancements in student learning outcomes. However, the effectiveness of such interventions may vary across different student groups, underscoring the need for personalized and culturally relevant approaches in educational practice.

By leveraging technology and providing adequate training for teachers, educators can create more engaging and effective learning environments that cater

to the diverse needs of their students. Future research should continue to explore the impact of digital tools on language learning and investigate ways to optimize their use in various educational contexts. Teacher training plays a crucial role in integrating digital language learning platforms like Duolingo into the curriculum. Firstly, teachers need to gain a strong understanding of how to effectively use Duolingo as a supplementary tool in language learning. Training should encompass integrating the app into existing lesson plans, as well as leveraging its specific features to maximize student learning. Teachers also need training in monitoring student progress using the platform, analyzing generated data, and adjusting teaching to individual student needs. Moreover, training should also include aspects of creativity in using Duolingo. Teachers should be encouraged to tailor learning materials to their students' needs and interests, as well as to create engaging and interactive learning experiences using the platform. By having a deep understanding of how to use Duolingo effectively and creatively, teachers can become highly effective agents in reinforcing students' language mastery.

The cultural relevance of Duolingo material also needs to be seriously considered. The availability of materials covering various cultures and social contexts can enhance student interest and engagement in learning. Additionally, considering students' local culture is important to ensure that language learning is not only academically effective but also culturally relevant and applicable in students' everyday contexts. A student-centered approach to using Duolingo can also help strengthen the relationship between language learning and students' life contexts. Teachers should encourage students to use Duolingo outside the classroom as an additional tool to deepen their understanding of the target language. Thus, language learning not only occurs in the classroom but is also integrated into students' daily lives, reinforcing their language skills holistically. Overall, teacher training and cultural considerations are two important aspects to be considered in integrating digital language learning platforms like Duolingo into the curriculum. By strengthening teacher competence and ensuring the cultural relevance of learning materials, the effectiveness of the platform in enhancing students' language proficiency can be optimized.

CONCLUSION

The integration of Duolingo as a supplementary tool in AKL 2 and MPLB 2 classes aimed to address concerns regarding the vocabulary mastery of tenth-grade students at SMKN 2 Palangka Raya. Traditional teaching methods had shown limitations in effectively engaging students and enhancing their vocabulary skills, prompting the exploration of digital solutions like Duolingo. The study's findings revealed a significant positive impact of Duolingo on vocabulary enhancement among students across both classes. Notably, the AKL 2 class, which initially exhibited higher proficiency, demonstrated substantial improvement, underscoring Duolingo's effectiveness in further elevating vocabulary skills. This suggests that digital language-learning platforms can serve as valuable adjuncts to traditional teaching methods, offering interactive and adaptable features that cater to diverse learning needs.

To maximize the benefits of integrating Duolingo or similar digital tools, it is crucial for educators to tailor activities or tasks to students' initial abilities and subject matter. Providing media-based materials that resonate with students' environments can make English learning more engaging and relatable. This study emphasizes the importance of regularly practicing vocabulary to enhance language acquisition and proficiency. A rich vocabulary enables students to comprehend reading materials, engage in conversations fluently, and effectively express ideas both verbally and in writing.

However, the study is not without limitations. Firstly, the focus was primarily on short-term vocabulary gains without considering the long-term retention and overall language proficiency. Secondly, the study was limited to a specific demographic, which may affect the generalizability of the findings to other student populations. Additionally, the study did not deeply explore the specific features of Duolingo that contributed most to the vocabulary improvements or the challenges encountered during implementation.

The implications of this study are twofold. Firstly, it emphasizes the importance of incorporating digital language-learning platforms like Duolingo to

supplement traditional teaching methods, especially in enhancing vocabulary skills. Secondly, it highlights the need for educators to adapt teaching strategies to cater to students' diverse learning needs and initial proficiency levels. This study's findings reinforce the potential of digital language-learning platforms to positively influence language learning outcomes.

This study focuses on the short-term impact of using Duolingo on vocabulary mastery among tenth-grade students at SMKN 2 Palangka Raya. However, it is important for future researchers to investigate the long-term effects of Duolingo usage on students' language proficiency. Therefore, future research can provide a deeper understanding of how the long-term use of digital language learning platforms like Duolingo can affect students' overall language abilities. Additionally, this study highlights the importance of effectively integrating digital language learning platforms into the curriculum. Further research could delve into detail on how this integration can be done more deeply, including effective teaching strategies and necessary curriculum adjustments.

In conclusion, the integration of Duolingo proved to be an effective approach to enhancing vocabulary mastery among tenth-grade students at SMKN 2 Palangka Raya. Educators are encouraged to leverage such tools, ensuring that activities are tailored to students' initial abilities and subject matter, thereby making English learning more engaging and effective. Regular practice and the incorporation of relatable, media-based materials can further enhance vocabulary acquisition and overall language proficiency. Embracing digital tools like Duolingo can contribute significantly to optimizing language learning strategies and meeting diverse learning needs within educational settings.

By expanding the discussion, we can delve deeper into various aspects of integrating Duolingo into the curriculum, such as the specific features of the platform that proved most beneficial, the challenges encountered during implementation, and strategies for overcoming them. Additionally, exploring the long-term effects of using Duolingo on students' language proficiency and retention would provide valuable insights for educators and researchers alike.

Furthermore, discussing potential areas for future research, such as comparing the

effectiveness of different digital language-learning platforms or investigating the impact of Duolingo on other aspects of language learning, could inspire further exploration in the field. Overall, by expanding upon the findings and implications of the study, we can provide a comprehensive analysis that contributes to the ongoing discourse on optimizing language education through digital tools like Duolingo.

Thus, further studies can provide broader insights into the potential and effectiveness of using digital tools in language education contexts. This will provide a stronger foundation for educators and researchers to design better and more effective language learning strategies in the future.

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