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DeepL app: Effect on students' vocabulary mastery

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Abstract. In the digital era, improving English vocabulary acquisition through technology-based tools has become increasingly urgent to meet the demands of modern language learning and curriculum integration. The research group investigated the impact of the DeepL app on students' vocabulary acquisition, noting that this interactive educational tool can also enhance vocabulary skills. However, research specifically examining the effect of DeepL apps on vocabulary acquisition is limited. This study aims to investigate the extent to which DeepL apps influence English vocabulary acquisition. This study used a quasi-experimental approach, involving 36 grade 10 students at MA Miftahul Ulum in the academic year 2024/2025. The study was divided into two groups, an experimental group and a control group. Eighteen students from class X IPS 1 participated in the experiment, while eighteen students from class X IPS 2 were placed in the control group. Pre-tests and Post-tests, consisting of a total of 20 valid multiple-choice questions, were among the data collection instruments. To verify the hypothesis, the researcher employed the independent sample t-test tool in SPSS 26. The mean post-test score of the experimental class was 88.06, while that of the control group was 70.56. Furthermore, the independent sample t-test findings revealed that the significant value (sig.) exceeded 0.05, specifically 6.525 (6.525 > 0.05), indicating that the DeepL application positively impacted students' vocabulary acquisition. This study highlights the potential of the app-based learning tool DeepL in improving educational outcomes related to vocabulary.

Introduction

In this technological era, teachers realize the importance of utilizing technology, particularly Information and Communication Technology (ICT), as a valuable tool to enhance the learning process. ICT can enhance the quality of the learning experience, making it more engaging and interactive. By integrating technology into their teaching, educators can access a variety of resources and teaching methods that suit different students' learning styles. Technology also encourages students to learn independently and fosters their creativity in the learning process (Hayani et al., 2024; Mahdum et al., 2019). Furthermore, students need to become proficient in using technology to support their learning journey (Fajt et al., 2024; Gunawan et al., 2023). Teachers and students are encouraged to integrate ICT into the educational process in order to align with modern advances and promote educational development (Simangunsong et al., 2020; Rianyansa & Maisarah, 2024) Therefore, teachers are urged to incorporate technology into their teaching, particularly in English Language Teaching (ELT), to improve their students' English proficiency. These demands highlight the urgency of equipping students with sufficient English to engage

meaningfully in academic and real-world environments (Sofiana et al., 2024). These findings are in line with the objectives of the *Merdeka Curriculum*, which emphasizes student-centered and digital-based learning.

Learning utilizing digital technology is one form of learning that can be an effective medium in the teaching and learning process (Elmi et al., 2024; Hendra et al., 2025). In the 21st century, students - the new generation - are naturally active users of technology, and mobile phones have become an important part of their lives. They show great interest in operating their cell phones. Therefore, as facilitators, teachers should take advantage of this situation to promote the use of mobile phones as learning tools, primarily through translator platforms. DeepL Translate is one of the programs considered a quality machine translator. Google's multilingual machine translation service can be used to translate texts and documents. DeepL Translate can be used by students in a variety of ways to support vocabulary development (Kamaluddin et al., 2024). To improve their understanding, students can choose to include English content in assignments. This allows users to enter text more quickly and translate it manually by checking the dictionary for each word. Google created DeepL Translate software in 2000 as a multilingual translation tool.

DeepL Translate is more than just a dictionary; it is an entire language program. Its features include word definitions (which provide definitions, synonyms, and antonyms), usage examples (which provide context-based examples for better understanding). Among other differences, it is mentioned that DeepL makes challenging texts easier to understand and offers a broader range of verb tenses. Students claim that although DeepL does not translate every word, they still find the program useful as it helps them learn new words, understand word meanings, improve their language skills, and receive feedback. The main benefits of using DeepL are vocabulary acquisition, fast and accurate translation, and ease of access.

Although DeepL is widely recognized as an engaging and interactive learning platform, some limitations and challenges may arise in its implementation in the classroom. DeepL sometimes experiences technical issues, such as connectivity problems or device and browser limitations, which may hinder student access (Ananda Sidiq, 2024; Hariroh et al., 2025). In addition, students are required to have access to digital devices such as laptops, tablets, or smartphones, which may not be equally available to all learners. Another challenge lies in the limited number of languages supported. Although constantly evolving, DeepL currently supports far fewer languages. Regional or minority languages are not yet available, so users from regions with less common languages cannot use it optimally. Another limitation is that Deepl can only translate text with a certain number of characters, and does not get full access to features such as advanced editing or translation of documents in .docx and .pptx formats. This can be a bottleneck for users who need large or professional translations. Due to the limitations of DeepL, schools should ensure students have access to digital devices and stable internet, especially in underserved areas.

Teachers need to choose the proper learning mode to reduce pressure and increase engagement, especially for students who may feel discouraged due to frequent difficulties in English learning. As stated by Santi et al. (2021), although DeepL may be initially confusing for users with limited English proficiency, guidance from instructors can ease the learning process. Like any new tool, it becomes more accessible with regular use. In addition, professional development for teachers is also important to support effective and meaningful integration into the learning process. Thus, infrastructural support and pedagogical readiness are essential to optimize the benefits of using DeepL in the classroom.

Several researchers around the world, including those in Indonesia, have conducted research on DeepL despite it being a new platform. Some researchers have examined the influence of Deepl

on writing mastery. A study on the impact of DeepL on students' writing mastery revealed that DeepL positively affected their writing skills (Bunga & Katemba, 2024). In addition, DeepL can significantly improve students' vocabulary acquisition while creating a fun and effective learning environment (Santosa et al., 2022). In addition, students showed a positive perception of using DeepL as a vocabulary learning media (Polakova & Klimova, 2023). Moreover, most of the existing research focuses on how DeepL affects teachers' evaluation practices. To this end, DeepL offers several tools that can be used with confidence, such as DeepL Write and DeepL Translation. The purpose of this study is to look at the advantages of using the translation and writing tools of the DeepL platform to help students find better vocabulary. This study offers important insights into maximizing the use of DeepL in educational settings by investigating the application of translation tools within the DeepL platform. This study examines the impact of DeepL on students' vocabulary skills, fills an important gap in the literature, and assesses its effectiveness in improving vocabulary skills through creative approaches and customized environments. The results give educators confidence to learn the benefits and best practices of incorporating DeepL as a translation tool into students' vocabulary improvement (Rosyada & Apoko, 2023; Santosa et al., 2022).

Several studies have examined DeepL with writing acquisition. Meanwhile, some features of DeepL can also be used to support students' vocabulary acquisition. The core of language acquisition is vocabulary, which is crucial for language learners (Adinda & Rahayu, 2023; Munawir et al., 2022). Understanding a language can be successful if it is discovered and understood. Therefore, when learning English, students should learn as much vocabulary as possible, as this will help them become skilled in the language. People with an extensive vocabulary are better able to express their thoughts, sentiments, emotions, and goals. For this reason, it is essential to become proficient in vocabulary (Azhar & Zia ul Haq, 2021; Zalukhu et al., 2023). In other words, the first thing students should master when learning a language is vocabulary. By building a strong vocabulary, they can learn vocabulary at its best. It is important to learn the vocabulary used in English textbooks. Without vocabulary, no one can understand or speak the language. Therefore, finding innovative tools like DeepL that support learning to improve vocabulary is essential for language teachers.

However, many students struggle to understand the meaning of vocabulary in English materials because conventional teaching methods are less interactive. Traditional learning methods that focus on theoretical instruction and repetitive exercises, without incorporating innovative strategies, often result in students' lack of motivation and difficulty in applying concepts to real-world communication. Conventional language teaching approaches have not effectively enabled students to achieve the expected level of English proficiency (Waode Hanafiah, 2022). Therefore, innovations in learning are needed to increase student engagement and motivation (Suhardita et al., 2024). This creates a need for alternative teaching methods that are student-centered and technology-driven (Sumandya et al., 2023).

With the increasing use of technology in education and the importance of teaching students vocabulary, Deepl has emerged as a potential alternative to help students understand vocabulary more engagingly and interactively. Thus, this study aims to analyze the effectiveness of DeepL in improving students' vocabulary acquisition and addressing learning challenges commonly encountered in the classroom. However, existing research on the impact of DeepL on improving writing skills is limited. English vocabulary acquisition is limited (Zuhriyah & Muhaimin, 2024). This study aims to investigate the effect of DeepL on vocabulary and assess its effect on students' vocabulary acquisition. Through this study, it is hoped that DeepL can serve as a practical and innovative solution to improve vocabulary teaching.

This study hypothesized that the use of DeepL in English language teaching can improve students' vocabulary mastery after the learning process. In addition, the study stated that students who were taught with DeepL showed better vocabulary mastery compared to those who were taught without it. This hypothesis is based on the assumption that interactive tools increase students' participation and recall of English vocabulary.

Given the limited number of studies focusing on the role of DeepL in vocabulary enhancement, especially in the context of junior high schools in Indonesia, this study seeks to fill the existing gap in the literature. While previous research has focused mainly on writing ability, this study extends the scope to vocabulary acquisition, a crucial yet often overlooked component of English language proficiency. By investigating how DeepL can be effectively implemented in Vocabulary lessons, this study contributes to the ongoing discourse on digital pedagogical innovation. It offers practical insights for English teachers adapting to the Merdeka Curriculum. The results of this study are expected to inform educators and policymakers about the potential of integrating digital applications such as DeepL to foster meaningful and student-centered learning in the English language classroom.

Method

This study employed a quasi-experimental approach, chosen for its ability to manipulate conditions in the teaching and learning process. This study employed a pretest-posttest control group design, comprising an experimental group and a control group. The experimental class was taught vocabulary using the application DeepL to collect data, while the control class received instruction through traditional methods.

This study targeted tenth-grade students at MA Miftahul Ulum Sukosono Jepara during the 2024/2025 school year, covering classes X IPS1 and X IPS2, with a total enrollment of 36 students. The selection of this population was based on the observation of low vocabulary proficiency among students, coupled with the prevalent use of cell phones, prompting an investigation into the potential of mobile devices as educational tools. For sample selection, the researchers applied Purposive Sampling. Selection of samples based on specific criteria determined by the researcher, for the study (Memon et al., 2025). So the researcher determined the X IPS1 class as the experimental group and the X IPS2 class as the control group. The researcher took the sample due to the low mastery of vocabulary.

Data collection involved administering a twenty-item multiple-choice questionnaire as a pre-test and post-test, with a particular focus on Degree Comparison, which is an adjective used to express the degree of comparison. Prior to administering this test to the sample group, a pilot test was conducted with 20 students from grade ten, who were excluded from the main sample. The validity of the pilot test items was evaluated using the Shapiro-Wilk Test method, which is used to determine whether the data is normally distributed or not, especially for samples of less than 50. This test compares the distribution of the sample data with a normal distribution and provides a significance value (p-value). If the p-value is greater than 0.05, then the data is considered normally distributed. It was set for a sample of 20 students at a significance level of 0.05; items ranked above this were considered valid. The pilot test results showed that the p-value was greater than 0.05, so the data was considered normally distributed.

Data analysis was conducted using SPSS 26, which was used to test quantitative data from pre-tests and post-tests to conduct hypothesis, homogeneity, and normality tests. While homogeneity tests often evaluate whether the data within a sample class is uniform or varied, normality tests are used to determine whether the data under study comes from a regularly distributed data set.

Furthermore, independent sample t-tests were conducted to determine if there was a statistically significant difference in vocabulary acquisition between students who received instruction through the DeepL app and those who did not.

Results and Discussion

To ascertain their starting level of language acquisition, the treatment and control groups took a pre-test before beginning the treatment. To assess the impact of DeepL Translator on their vocabulary, a post-test was administered. Table 1 explains the average score results.

Table 1. Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Pre-Test Experiment	18	40	75	53.33	10.981
Post-Test Experiment	18	75	100	88.06	7.696
Pre-Test Control	18	35	65	51.11	9.003
Post-Test Control	18	50	85	70.56	8.382
Valid N (listwise)	18				

Table 1 shows the average score for the experimental group. During the pre-test phase, the average rating was 53.33, while the control group's average rating was 51.11. After increasing their vocabulary, the experimental group received an average rating of 88.06 in the post-test phase, compared to 70.56 for the control group. High scores were obtained in both classes, based on the findings of the study. Nonetheless, the experimental class outperformed the control class in terms of scoring. Tests for homogeneity and normalcy were performed prior to hypothesis testing. The data on student learning outcomes were subjected to the Shapiro-Wilk normality test. According to the findings, the experimental class's pretest data normalcy test sig value was 0.113, which was higher than the significance level of 0.05. Similarly, the control class's pretest data had a normality test sig value of 0.257, which was higher than the significance level. This result suggests that the study's pretest data is regularly distributed. Additionally, both the experimental group's and the control class's sig values for the normality test of post-test data exceeded the significance level of 0.05, at 0.129 and 0.418, respectively. This demonstrates that the study's post-test data is likewise regularly distributed. It can be inferred from the normality test measurement requirements that the data has a normal distribution if the significance value is less than that of the control group.

Table 2. Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Class	Statistic	df	Sig.	Statistic	df	Sig.
Results	Pre-Test Eksperiment DeepL	.175	18	.151	.917	18	.113
	Post-Test DeepL	.186	18	.102	.920	18	.129
	Pre-Test kontrol	.196	18	.066	.937	18	.257
	Post-Test Kontrol	.143	18	.200*	.950	18	.418

*. This is a lower bound of the true significance.
a. Lilliefors Significance Correction

In order to ascertain whether the data from the experimental class and control class displayed similarities, researchers also performed a homogeneity test. If two data sets have the same variance, it can be ascertained using the variance homogeneity test. The data is regarded as having a

homogenous variance if the computed t value is less than the significance level of 0.05 for the t table value. On the other hand, the data is also regarded as homogeneous if the significance value is less than 0.05.

Table 3. Test of Homogeneity of Variance

		Levene Statistic	df1	df2	Sig.
Student Learning Outcomes	Based on Mean	.059	1	34	.810
	Based on Median	.027	1	34	.870
	Based on Median and with adjusted df	.027	1	32.484	.870
	Based on trimmed mean	.036	1	34	.850

The post-test results for the experimental class and the control class show the following significant values: 0.810 and 0.870, respectively, under the homogeneity test results. The data is homogeneous since these values are greater than 0.05, i.e., 0.810>0.05 and 0.870>0.05. As a result, the two classes that were used in this study can be regarded as homogeneous. After the normality and homogeneity tests are finished, it is discovered that the two classes have the same variance and are regularly distributed.

Additionally, because the data were uniformly distributed and homogeneous, hypothesis testing was carried out. The sample t-test, a descriptive statistical tool, was employed in this study to evaluate the hypothesis. This made it possible to carry on with the investigation in order to ascertain whether the two groups differed significantly.

Table 4. Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Student Learning Outcomes	Equal variances assumed	.059	.810	6.525	34	.000	17.500	2.682	12.049	22.951
	Equal variances not assumed.			6.525	33.755	.000	17.500	2.682	12.048	22.952

The outcomes of the experimental computations carried out during the post-test are shown in Table 4. The DeepL program significantly improves students' vocabulary acquisition, as evidenced by the post-test value of 6.525, which is higher than the critical value of 1.81402 at the 0.05 significance point, 33 degrees of freedom (df) were used in the computation.

The t-value for the post-test was 6.526. To determine the t-value, 33 degrees of freedom (df) were used. 1.81402 is the t-value of the t-table at a significance level of 0.05. If the t-count value is moved to the t-table, the t-count exceeds the t-table. As evidenced by this, the experimental group's treatment affected the pupils' vocabulary acquisition. Stated otherwise, we reject the null hypothesis (Ho) and accept the working hypothesis (Ha). This demonstrates that the experimental and control courses differ significantly in their language mastery abilities. This demonstrates how using the DeepL program significantly enhances pupils' vocabulary mastery.

This significant difference supports the conclusion that DeepL is more effective in improving students' vocabulary acquisition compared to conventional teaching methods. The findings suggest that the integration of DeepL-based learning tools can improve student performance by providing a more interactive and engaging learning environment.

The findings suggest that DeepL provides students with a more engaging and interactive learning experience, leading to improved vocabulary acquisition. These results highlight the benefits of integrating technology and DeepL-based learning as a significant influence as a tool in English language teaching, particularly in terms of vocabulary development. As the most accurate translator among others, this software can help students translate and memorize words effectively, thereby expanding their vocabulary. In addition, interactive platforms like DeepL make the learning process more dynamic, reducing student boredom and encouraging consistent participation.

The results strongly indicate the effectiveness of DeepL as a digital-based learning tool to improve vocabulary acquisition, particularly among tenth-grade students at MA Miftahul Ulum Sukosono Kedung Jepara. The data showed a significant improvement in the experimental group's vocabulary skills after using DeepL, with the post-test mean score increasing to 88.06 from the pre-test score of 53.33. Furthermore, a substantial difference was observed between the post-test scores of the two groups, with the experimental group outperforming the control group. These findings highlight the positive impact of DeepL as an innovative resource for improving vocabulary in English Language Teaching (ELT). It shows that DeepL has the potential to address the gaps in vocabulary teaching with traditional methods through its interactive and student-centered approach.

One of the main reasons for the success of DeepL in this study is its capacity to increase engagement and interaction in the classroom. According to Desi et al. (2025) ; Surur et al. (2023), DeepL helps students build mental models, or schemas, by providing examples, definitions and relevant information about new words. This is in line with the findings of this study, where students in the experimental group showed greater improvement in vocabulary skills compared to their peers in the control group. Students can develop schemas about language use by using this software, and these models help in the understanding and application of new terminology. In addition, the engaging and interactive elements of the DeepL application can increase students' motivation to learn new words, which will improve their grades. The DeepL application can help students learn vocabulary more actively and interestingly, particularly when translating materials in a new language. This is in line with research findings Pramesti et al. (2023). This finding supports the statement made by Gunawan et al. (2023) that app-based vocabulary learning effectively captures students' attention and helps their educational development through active engagement. Therefore, these elements not only make the learning environment easier but also support the achievement of learning objectives through improving students' vocabulary (Pramesti et al., 2023).

Vocabulary, as explained by Rosyada & Apoko (2023) serves as the primary foundation in four language skills, namely listening, speaking, reading, and writing. Without an adequate understanding of vocabulary, one will have difficulty understanding texts, expressing ideas, and communicating effectively in English. The significant improvement in vocabulary acquisition among students using Deepl shows that the platform effectively supports this important aspect of language learning. By incorporating DeepL tool-based learning activities centered on the Degree Comparison material of Positive Degree, Comparative Degree, and Superlative, DeepL provides an engaging and structured approach to help master the vocabulary in this material. This method is in line with the findings of Nurmatova (2024) who noted that learning techniques using DeepL tools improve

vocabulary skills by integrating structured lessons with interactive elements. Such integration helps bridge the gap between theoretical knowledge and practical application.

The results of this study underscore the importance of integrating technology into vocabulary teaching, as highlighted by Sari et al. (2024). The notable progress of the experimental group demonstrates how digital tools such as DeepL can effectively overcome the challenges associated with traditional teaching methods, such as a lack of engagement and limited practice opportunities. The larger standard deviations in the experimental group's post-test scores indicate that, although most students benefited from using DeepL, individual learning styles and levels of engagement influenced varying degrees of improvement. This shows the importance of differentiated teaching even when using the same digital tools.

Previous research has mainly focused on the impact of DeepL on students' writing ability. Birdsell (2022); Ningrum & Rita (2020) reported significant improvements in students' writing vocabulary skills through the use of DeepL. This study extends the applicability of DeepL for vocabulary skill improvement, demonstrating its versatility as a learning tool. While vocabulary serves as the foundation of language, grammar provides the structure needed to organize these elements into coherent and meaningful expressions (Desi et al., 2025; Rista Harimurti, 2021). By effectively utilizing DeepL for grammar instruction, this study illustrates the relationship between vocabulary and learning and writing skills, showing how the platform can help in various aspects of language acquisition.

The positive impact of DeepL in this study has several implications for English Language Teaching (ELT), particularly in the Indonesian context. Firstly, this study shows that digital platform-based learning. DeepL can be a viable alternative to traditional teaching methods, especially for English subjects that are often perceived as difficult. By incorporating translation tools such as DeepL, teachers can create a more engaging and fun learning environment that encourages active participation and reduces anxiety related to vocabulary learning. This approach can help change students' perception of English lessons from a difficult task to a fun and achievable goal.

Second, the findings emphasize the importance of adapting teaching methods to align with students' interests and technological habits. As noted by (Ata, 2021; Lestari et al., 2022), creating an engaging learning environment naturally matches students' interactive and social behaviors, making it a suitable medium for pedagogy. The positive outcomes observed in this study indicate that incorporating digital DeepL media into ELT not only improves learning outcomes but also fosters positive attitudes towards language learning. This adaptation is important to ensure that learning remains relevant and meaningful in a technology-driven era.

Finally, this study shows that DeepL can help address educational challenges in schools with limited resources. Being free and easy to use, DeepL provides an affordable solution for schools that lack traditional teaching tools. This aspect is crucial in Indonesia, where gaps in educational resources can complicate teaching and learning efforts. Therefore, DeepL offers not only pedagogical value but also practical benefits in improving access to quality learning materials.

Conclusion

This study shows that the use of DeepL, a digital-based translation tool platform, significantly improves students' vocabulary acquisition, especially in the continuous tense (Degree Comparison). Findings from the independent sample t-test showed a considerable increase in the experimental group's vocabulary improvement. Meanwhile, an independent sample t-test comparing the post-test scores of the experimental and control groups revealed a marked difference with a mean

difference. These results confirm that DeepL has a positive impact on vocabulary learning outcomes. However, this study has some limitations. One significant limitation is that the sample was restricted to tenth-grade students from one school, which may limit the applicability of the findings to other contexts. In addition, this study only focused on three specific tenses and did not explore the effectiveness of DeepL for other grammar topics. Technical limitations, such as the need for a stable internet connection, may also hinder the use of DeepL in the classroom. Given these findings, it is recommended that teachers integrate DeepL as an interactive teaching tool to increase students' motivation and understanding of vocabulary. To maximize the benefits of using DeepL, technology readiness, including access to adequate devices and a stable internet connection, is important. Furthermore, teachers can utilize DeepL to customize their teaching methods to suit students' diverse learning styles. Future researchers should extend the study to examine how DeepL can be effective in teaching other vocabulary topics. More studies conducted at different levels of education and in different locations are needed to determine whether these findings can be applied in a broader setting. In addition, future research could investigate how DeepL affects students' motivation, teamwork, and attitude towards learning English.

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