



The Effect of Using ChatGPT as a Learning Technology on EFL Students' Vocabulary Mastery

Shahdid Siswanto^{1*}, Akhmad Ali Mirza², Zaitun Qamariah³

¹⁻³ English Education Study Program, Language Department, FTIK, Institut Agama Islam Negeri Palangka Raya, Indonesia

Email: shahdid.sst@gmail.com¹, akhmad.ali.mirza@iain-palangkaraya.ac.id²,
zaitun.qamariah@iain-palangkaraya.co.id³

Alamat: Jl. G. Obos, Menteng, Jekan Raya, Kota Palangka Raya, Kalimantan Tengah 73112

Korespondensi penulis: shahdid.sst@gmail.com

Abstract. Among the core components of learning a language is the vocabulary, which is necessary to learn English. Unfortunately, a lot of EFL students have trouble mastering vocabulary since it's hard to grasp and remember, they don't have enough exposure to it, they don't use effective learning methodologies, and there isn't enough interesting media. The main goal of this study to measure the effect of ChatGPT as a learning technology on EFL students' vocabulary mastery. This research employed quantitative research using a quasi-experimental research approach. The study was conducted in class XII of Madrasah Aliyah Darul Ulum Palangka Raya. The sample involved a total of 50 students consist of two classes, with class XII-A in total of 26 students as the experimental group and class XII-B in total of 24 students as control group. The learning module was created by the researcher, who also conducted the treatment and analyzed the results of the pre-test and post-test. The findings indicated that ChatGPT significantly affected students' vocabulary mastery. The statistical results showed a *t*-value of -4.233 and a *p*-value of 0.000 (< 0.05), which confirmed that ChatGPT had a significant effect. This suggests that integrating ChatGPT into English learning can enhance students' engagement, motivation, and independence in mastering vocabulary.

Keywords: Effect, ChatGPT, Learning Technology, Vocabulary Mastery.

Abstrak. Salah satu komponen inti dalam pembelajaran bahasa adalah kosakata, yang sangat penting dalam mempelajari bahasa Inggris. Sayangnya, banyak siswa EFL mengalami kesulitan dalam menguasai kosakata karena sulit dipahami dan diingat, kurangnya paparan, penggunaan metode belajar yang kurang efektif, serta kurangnya media pembelajaran yang menarik. Tujuan utama dari penelitian ini adalah untuk mengukur pengaruh penggunaan ChatGPT sebagai teknologi pembelajaran terhadap penguasaan kosakata siswa EFL. Penelitian ini menggunakan penelitian kuantitatif dengan pendekatan kuasi eksperimen. Penelitian dilakukan pada siswa kelas XII Madrasah Aliyah Darul Ulum Palangka Raya. Sampel berjumlah 50 siswa yang terdiri dalam dua kelas, yaitu kelas XII-A yang terdiri dari total 26 siswa sebagai kelompok eksperimen dan kelas XII-B yang terdiri dari total 24 siswa sebagai kelompok kontrol. Modul pembelajaran disusun oleh peneliti, yang juga memberikan perlakuan serta menganalisis hasil pra tes dan pasca tes. Hasil penelitian menjelaskan bahwa ChatGPT berpengaruh signifikan terhadap penguasaan kosakata siswa. Hasil statistik menunjukkan nilai *t* sebesar -4.233 dan nilai *p* sebesar 0.000 (< 0.05), yang membuktikan adanya pengaruh yang signifikan. Temuan ini menyiratkan bahwa integrasi ChatGPT dalam pembelajaran bahasa Inggris dapat meningkatkan keterlibatan, motivasi, dan kemandirian siswa dalam menguasai kosakata.

Kata kunci: Pengaruh, ChatGPT, Teknologi Pembelajaran, Penguasaan Kosakata.

1. INTRODUCTION

The era of globalization and the fourth industrial revolution has introduced new challenges and opportunities in the field of education, particularly in learning technology. According to Larsen-Freeman and Anderson (2011), technology offers educational tools and expands the learning environment for students. Eady and Lockyer (2013) added that technology has become an essential component in the educational process, starting from

planning to teaching and learning. One of the most recent innovations in this area is the integration of artificial intelligence, including a specific tool called ChatGPT.

When it comes to English as foreign language, Vocabulary becomes an important role in English language learning, as it become the very foundation the development of reading, writing, listening, and speaking skills. As stated by Alqahtani (2015), the most proficient students in the classroom are usually those with the most extensive vocabulary. However, many EFL students have to grapple with difficulties in understanding and memorizing vocabulary due to scarce of learning media that they can use, monotonous teaching methods, and lack of engagement. These obstacles contribute to students' struggles in expressing ideas and comprehending English texts (Haji, 2022).

Many of previous studies has discussed the potential of ChatGPT in English language learning. However, some studies were limited to theoretical discussion or library research, which created a gap between research findings and actual classroom practice. Therefore, this study seeks to fill that gap by exploring the empirical effect of using ChatGPT as a learning technology on EFL students' vocabulary mastery.

In the end, the goal of this study is to examine whether the use of ChatGPT can improve vocabulary mastery among EFL students, particularly those at Madrasah Aliyah Darul Ulum Palangka Raya. One research questions were addressed: is there any significant effect of using ChatGPT as a Learning Technology on EFL Students' Vocabulary mastery? The findings are expected to provide insights and practical solutions for students and educators in enhancing vocabulary learning through AI-based tools.

2. REVIEW OF LITERATURE

A. The Definition of Artificial Intelligence

Department of Management Information Systems, College of Business Administration of Taif University defines Artificial Intelligence as one of the tools that can be applied for educational process. Due mostly to technological advancements, artificial intelligence has gotten more prevalent in education in recent years, suggesting that technology can be implemented to enhance research and learning (2023).

By utilizing Artificial Intelligence, educators can design learning experiences that suit the individual necessity of each student for learning English. This will increase the effectiveness of learning and allow students to learn more efficiently (Maynastiti et al., 2020). Nowadays, Artificial Intelligence also serves as a fundamental medium of

communication and expression in various fields, including education, art, design, science, medicine, communication, entertainment, and beyond.

B. Definition of Learning Technology

Technology utilized for learning is referred to as learning technology. Technology-assisted learning involves a method where teachers, students, and devices are used to solve learning challenges. This procedure is executed with intention and control (Rusdiyah, 2021). The main goal of learning technology is to improve the utilization of technology to establish educational experiences that are engaging, interactive and customized to students' needs.

However, Application of learning technology may differ depending on context and student needs (Masita, 2020). Overall, learning technologies holds a crucial role in modern era of education by expanding access to learning resources, encouraging active student engagement, and creating an environment of continual learning and innovation.

C. Teaching English using ChatGPT

The quick growth of Artificial Intelligence technologies has major implications for teaching and learning as well. Education is predicted to change as a result of Artificial Intelligence-supported instruction (Zawacki-Richter et al., 2019).

Below are several practical approaches that educators can use to teach English using ChatGPT:

- 1). Teachers can facilitate interactive and real-time dialogues between students and ChatGPT. This allows students to practice vocabulary in meaningful conversations, which supports contextual learning and improves retention.
- 2). ChatGPT can generate vocabulary lists, example sentences, and thematic texts tailored to the learners' level and interests. Teachers may instruct students to use the prompt on ChatGPT to create materials on specific topics, such as business, travel, or academic English. Avoid including prompts that are overloaded with information, use jargon or vague terms, are too open-ended, and do not include clear instructions/boundaries (Akin, 2023).
- 3). Vocabulary learning can be made more engaging through AI-generated games and quizzes. Teachers can prompt ChatGPT to create word-matching games, cloze tests, or flashcard-style quizzes that offer instant feedback to students.

4). Learners can use ChatGPT to practice using new vocabulary in various sentence structures. ChatGPT can provide immediate suggestions, correct errors, and offer synonyms or alternative phrasing to enrich students' lexical repertoire.

5). Students can be assigned creative writing tasks such as composing dialogues, stories, or short essays using target vocabulary. ChatGPT can assist by offering prompts, reviewing drafts, and suggesting improvements.

D. The Importance of Vocabulary

As a component of languages, vocabulary must be studied and taught. Vocabulary mastery is really important. Vocabulary is important to learn in addition to learning vocabulary and can also expand our language knowledge (Sari et al., 2023). Even if someone has never studied English language structures, they can communicate with a native speaker if they can employ a sufficient number of word combinations.

Conversely, if someone knows how to use grammar but has a limited vocabulary, they will be incapable of communicating clearly (Muñoz, 2014). This indicates that one way to improve English proficiency is through vocabulary. It is easier for students to study and learn when they have a rich vocabulary. Without a strong vocabulary, students may encounter some difficulties in their study.

A rich and diverse vocabulary empowers individuals to learn language effectively, understand complex concepts, and navigate the intricacies of language in diverse contexts. In view of the vocabulary that has a vital part in foreign language learning, mastery in this field ought to be developed and maintained. Otherwise, students vocabulary mastery will be limited, which will make it harder for them to grasp the language's abilities.

E. The Definition of Vocabulary Mastery

The capacity to know, comprehend, and master vocabulary refers as vocabulary mastery. According to Cahyono & Widiati (2015), many of the foundational elements for how effectively students read, write, talk, and listen are included in vocabulary, which is a component of language proficiency. As stated by Asyiah (2017), vocabulary is considered a crucial element that significantly impacts individuals' ability to communicate. Mastery refers to a deep understanding or achieving a specific level of comprehension of certain material, while competence indicates the capacity to utilize what has already mastered. It can be inferred the

vocabulary mastery is an essential ability for students to comprehend effectively and convey messages using the words they have acquired.

F. Related Studies

There are many studies related to this research, particularly in using ChatGPT on vocabulary learning. Lei (2022) provided experimental evidence of Artificial Intelligence superiority in vocabulary acquisition among high school students, Oktadela et al. (2023) highlighted how Chatbots increased learning motivation in Indonesian elementary schools and Kim (2018) further supported these findings, showing chatbots' positive impact on Korean EFL students' vocabulary retention and learning perceptions. The similarity with this study is the research method that employs quantitative methods with quasi-experimental approach. The difference lies in research location and samples.

3. RESEARCH METHOD

In this study, the researcher employs quantitative research with quasi-experimental approach. The main purposes of quantitative research is to quantify the final results of the process of gathering and analyzing data (Clark et al., 2021). Because this study is an quasi-experimental, it requires two group that consist of experimental group and control group. To identify the result of effectiveness of using ChatGPT then a pre-test and post-test will be carried out to obtain quasi-experimental results between before and after receiving treatment in the experimental group and the control group. The setting of this study was in Madrasah Aliyah Darul Ulum Palangka Raya on October-November 2024. Purposive sampling was utilized in this study by selecting samples based on specific criteria. Therefore, class XII A was chosen as the experimental group and class XII B as the control group. then a pre-test and post-test will be carried out to obtain quasi-experimental results between before and after receiving treatment in the experimental group and the control group. Moreover, test and documentation are used as the instrument to collect the data. Finally, data analysis methods employs descriptive statistics and paired sample t-test.

4. RESULTS AND DISCUSSION

This chapter consists of result, and discussion by described students' data of vocabulary mastery before and after using ChatGPT as a Learning Technology. This research was conducted using quantitative method analysis and quasi-experimental

approach. The sample of this study was 50 students taken from class XII A consisted of 13 male and 13 female students and XII B consisted of 12 male and 12 female students at Madrasah Aliyah Darul Ulum Palangka Raya in 2024. The instrument of this research was vocabulary test which consisted of 30 multiple choice questions for pre-test and post-test. Documentation was also used as an instrument in the form of photographs of students' and researchers' activities during the learning process as well as students' work.

A. Results

1) Normality Test

To find out if the collected data was regularly distributed or not, the normality test is utilized. A reliable and efficient normality test technique for small sample sizes is the Shapiro-Wilk method. This test is frequently applied to small samples, defined as fewer than or equal to fifty samples. According to the criteria, if the significance value is more than 0.05, the data are considered regularly distributed. The normality test yielded the following table:

Table 1. Tests of Normality

Result	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Pre-test class A	.163	26	.072	.946	26	.190
Post-test class A	.136	26	.200	.945	26	.174
Pre-test class B	.161	24	.109	.956	24	.355
Post-test class B	.207	24	.009	.946	24	.220

The sig. value of class A (experiment) in the Shapiro-Wilk for pre-test is 0.190 while the sig. value for pre-test of class B (control) is 0.355. So, from this calculation, the sig. value of two class is greater than 0.05, which meant that the pre-test score of two groups normally distributed. Furthermore, it can be seen that the sig. value for post-test of class A (experiment) is 0.174 while the sig. value for post-test of class B (control) is 0.220. So, from this calculation, the sig. value of two class is greater than 0.05, which meant that the post-test score of two classes normally distributed.

2) Homogeneity Test

The criteria of homogeneity test were if the significance (sig.) value were higher than 0.05, it meant the data variances were homogeneous. for the homogeneity test, using only post-test learning outcomes. The following table shows the results of the data homogeneity test:

Table 2. Homogeneity Test

		Levene Statistic	df1	df2	Sig.
Result of Post-Test	Based on Mean	1.401	1	48	.242
	Based on Median	1.210	1	48	.277
	Based on Median and with adjusted df	1.210	1	46.838	.277
	Based on trimmed mean	1.372	1	48	.247

From the calculation above, the sig. value is 0.242. The value was greater than 0.05, because the value > 0.05 , it can be said that the post-test of experiment and control classes are homogeneous.

3) Descriptive Statistics of Paired Sample T-Test

Table 3. Descriptive Statistics of Paired Sample Test

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pre-Test-ClassA	63.96	26	5.674	1.113
	Post-Test-ClassA	71.58	26	9.981	1.957
Pair 2	Pre-Test-ClassB	66.29	24	7.821	1.597
	Post-Test-ClassB	63.83	24	7.435	1.518

Before the treatment, the average score of 26 students in Class A was 63.96, with a standard of deviation of 5.674 and a standard of error of 1.113. After the treatment using ChatGPT, the average score increased to 71.58, indicating a positive effect, although the standard deviation rose to 9.981 and the standard error to 1.957. Meanwhile, the average score of 24 students in Class B before the treatment was 66.29, with a standard of deviation of 7.821 and a standard of error of 1.597. After treatment, the score decreased to 63.83, showing that the treatment did not result in improvement. The post-treatment standard deviation decreased to 7.435, and the standard error became 1.518.

4) Result of Paired Sample T-Test

Table 4. Paired Sample Test

		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df
r 1	PrePostExperiment	-7.61538	9.17421	1.79921	-11.32093	-3.90984	-4.233	25
r 2	PrePostControl	2.45833	9.77121	1.99454	-1.66768	6.58435	1.233	23

Based on the Paired Samples Test, Class A (experimental class using ChatGPT) showed a statistically significant difference in scores with a p-value of 0.000 (<0.05), a t-value of -4.233, and a mean difference of -7.615. This indicates a significant change after the treatment. In contrast, Class B (control class using conventional method) did not show a statistically significant difference, with a p-value of 0.230 (>0.05), a t-value of 1.233, and a mean difference of 2.458. The comparison between both classes shows that the use of ChatGPT had a stronger and more statistically significant impact on vocabulary mastery than the conventional method. Although Class A experienced a decrease in mean score, the change was significant, while the slight increase in Class B was not. This result suggests that ChatGPT has a more substantial influence on EFL students' vocabulary mastery, though the direction of the effect requires further analysis.

B. Discussion

The purpose of this study was to find out whether there's a significance effect of using ChatGPT as a learning technology on efl students' vocabulary mastery at MA Darul Ulum Palangka Raya. The data is taken from 26 students of experiment and 24 students from control classes. From the result analysis of SPSS 25 program, it can be seen that Class A (experimental) which used ChatGPT as learning technology, the test results showed a statistically significant difference with a t value = -4.233 and p-value = 0.000 ($p < 0.05$). Although there is a decrease in the mean score of -7.615, with a standard deviation of 9.174, these results indicate that the use of ChatGPT has a significant effect on changes in efl students' vocabulary mastery.

In class B (control), which did not use ChatGPT, the results showed a statistically insignificant difference with a t-value = 1.233 and p-value = 0.230 ($p > 0.05$). Although there is an increase in mean score of 2.458 with a standard deviation of 9.771, this change is not substantial enough to be considered statistically significant. This shows that conventional learning method without ChatGPT does not provide a significant change in efl students' vocabulary mastery.

In addition, to find out that the experiment class that was treated using ChatGPT has an improvement on students' vocabulary mastery compared to the control class was not given treatment. It can be seen from the average or mean scores. The mean score of experiment class was given treatment using ChatGPT is 71.58 and the mean score of control was not given treatment is 63.83. It indicates that the average score of experiment class is higher than of the control class. So, it means that the using of ChatGPT has a significant effect on efl students' vocabulary mastery of twelve-grade.

The findings of this study reveal that using ChatGPT significantly improves EFL students' vocabulary mastery. This aligns with Lei (2022), who found that AI-assisted teaching enhances foreign language vocabulary acquisition compared to conventional methods. Both studies used a quasi-experimental design; however, Lei's research was conducted in a general high school setting, while this study focuses on EFL students in a specific religious school context at MA Darul Ulum Palangka Raya.

Similarly, Kim (2018) demonstrated that chatbots positively impacted Korean EFL students' vocabulary skills and learning perceptions. While Kim's research explored chatbots in general, this study narrows its focus to ChatGPT, highlighting its specific capabilities in fostering vocabulary mastery.

Furthermore, Oktadela, Elida, and Ismail (2023) emphasized the role of AI chatbots in increasing students' interest and motivation in learning English. Unlike their community service-based study with elementary school students, this research targets twelfth-grade EFL learners, offering insights into AI's effectiveness for older students in a formal educational context.

The other previous research, Alsadoon (2021) showed that chatterbots improved vocabulary acquisition and offered conversational practice, with tools like dictionaries being the most effective. In contrast, this study focuses on the overall impact of ChatGPT, integrating it as a comprehensive learning tool rather than examining individual features. Fannoni et al. (2023) investigated DALL-E AI, focusing on visual aids for vocabulary acquisition. While their study highlights visual engagement, this research explores ChatGPT's text-based, conversational approach, demonstrating its effectiveness in improving vocabulary mastery and providing engaging learning experiences.

The differences in participants, tools, and research settings make this study unique, as it specifically examines the use of ChatGPT in an Islamic high school context. This contrasts with studies conducted in general high schools, elementary schools, or with alternative Artificial Intelligence platforms. Overall, this study supports previous research, showing that the experimental group (mean = 71.58) significantly outperformed the control group (mean = 63.83). These results highlight the transformative role of Artificial Intelligence tools like ChatGPT in modern EFL education. Future research could explore its application in other language skills and its long-term impact.

5. CONCLUSION AND SUGGESTION

A. Conclusion

This study investigated whether ChatGPT has a significant effect on EFL students' vocabulary mastery. The results show that ChatGPT significantly improves vocabulary mastery, as evidenced by the higher mean score of the experimental group (71.58) compared to the control group (63.83). The statistical analysis confirms this finding, with a t-value of -4.233 and a p-value of 0.000 ($p < 0.05$). Therefore, it can be interpreted that the use of ChatGPT as a learning technology has a significant positive effect on EFL students' vocabulary mastery at Madrasah Aliyah Darul Ulum Palangka Raya.

B. Suggestion

The suggestion was given to students, teachers, and future researchers. For students, to become more active and think critically by incorporating ChatGPT into their study routines also gain broader knowledge from what they read.

For teachers, teachers can play their role in improving students' vocabulary mastery by exploring various learning tools. Teachers can use ChatGPT to integrate teaching practices as a supplementary tool to enhance the vocabulary learning also make learning more engaging and effective.

Lastly for future researchers, from this research the researcher suggested to other researcher to consider examining the effectiveness of ChatGPT in comparison with different kinds of Artificial Intelligence. One of the weaknesses of this study is that the instrument that used is only tests and documentation. The researcher also suggest that future researcher can use additional instrument such as questionnaires and

can use different methods to investigate more deeply how vocabulary mastery taught in the class.

REFERENCES

- Alqahtani, M. (2015). The importance of vocabulary in language learning and how to be taught. *International Journal of Teaching and Education*, 3(3), 21–34. <https://doi.org/10.20472/TE.2015.3.3.002>
- Alsadoon, R. (2021). Chatting with AI bot: Vocabulary learning assistant for Saudi EFL learners. *English Language Teaching*, 14(6), 135–144. <https://doi.org/10.5539/elt.v14n6p135>
- Asyiah, D. N. (2017). The vocabulary teaching and vocabulary learning: Perception, strategies, and influences on students' vocabulary mastery. *Jurnal Bahasa Lingua Scientia*, 9(2), 293–318. <https://doi.org/10.21274/lis.2017.9.2.293-318>
- Cahyono, B. Y., & Widiati, U. (2015). The teaching of EFL vocabulary in the Indonesian context: The state of the art. *TEFLIN Journal*, 19(1), 1–17. <https://doi.org/10.15639/teflinjournal.v19i1/1-17>
- Clark, T., Foster, L., Sloan, L., Bryman, A., & Clark, T. (2021). *Bryman's social research methods* (6th ed.). Oxford University Press.
- Department of Management Information Systems, College of Business Administration, Taif University, & Alzahrani, L. (2023). Analyzing students' attitudes and behavior toward artificial intelligence technologies in higher education. *International Journal of Recent Technology and Engineering (IJRTE)*, 11(6), 65–73. <https://doi.org/10.35940/ijrte.F7475.0311623>
- Fatika Nurmala Sari, F., Nirwanto, R., & Qamariah, Z. (2023). Using flashcard media to increase students' vocabulary mastery. *Sinar Dunia: Jurnal Riset Sosial Humaniora dan Ilmu Pendidikan*, 2(2), 174–185. <https://doi.org/10.58192/sidu.v2i2.827>
- Haji, A. R. (2022). Improving students' vocabulary by using visual media at SMP Negeri 10 Makassar. *Acta Psychologia*, 1(2), 73–83.
- Kim, N.-Y. (2018). Chatbots and Korean EFL students' English vocabulary learning. *Journal of Digital Convergence*, 16(2), 1–7. <https://doi.org/10.14400/JDC.2018.16.2.001>

- Larsen-Freeman, D., & Anderson, M. (2011). *Techniques and principles in language teaching* (3rd ed.). Oxford University Press.
- Lei, H. (2022). High school students' foreign language vocabulary acquisition in the era of artificial intelligence. In *Proceedings of the 2021 International Conference on Education, Language and Art (ICELA 2021)*, Sanya, China (pp. 582–585). <https://doi.org/10.2991/assehr.k.220131.121>
- Masita, M. (2020). Teaching vocabulary using blended learning method. *Ethical Lingua: Journal of Language Teaching and Literature*, 7(1), 128–135. <https://doi.org/10.30605/25409190.143>
- Maynastiti, D., Serevina, V., & Sugihartono, I. (2020). The development of flip book contextual teaching and learning-based to enhance students' physics problem solving skill. *Journal of Physics: Conference Series*, 1481(1), 012076. <https://doi.org/10.1088/1742-6596/1481/1/012076>
- Muñoz, C. (2014). Exploring young learners' foreign language learning awareness. *Language Awareness*, 23(1–2), 24–40. <https://doi.org/10.1080/09658416.2013.863900>
- Oktadela, R., Elida, Y., & Ismail, S. (2023). Improving English vocabulary through artificial intelligence (AI) chatbot application. *Journal of English Language and Education*, 8(2), 63–67.
- Rusydiyah, E. F. (2021). *Teknologi pembelajaran: Implementasi pembelajaran era 4.0* (Cet. 2). UIN Sunan Ampel Press (SAP).
- Zawacki-Richter, O., Marín, V. I., Bond, M., & Gouverneur, F. (2019). Systematic review of research on artificial intelligence applications in higher education: Where are the educators? *International Journal of Educational Technology in Higher Education*, 16(1), 39. <https://doi.org/10.1186/s41239-019-0171-0>