The Use of *Dall-E* Artificial Intelligence Platform for Enhancing Students' Vocabulary Acquisition

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Abstract

The use of technology in the field of English Language Teaching (ELT) has been valued giving positive results proven by scholars. However, among myriad research on the use of technology, little has been discussed on the influence of AI in expanding students' vocabulary acquisition. In contrast, previous researchers were limited to examining the effect of web-based 2.0 on several micro and macro skills. In fact, the use of Artificial Intelligence (AI) web-based platforms seems promising because of innovation. Therefore, this paper aims to examine the effectiveness of the *DALL-E* AI platform in increasing students' vocabulary acquisition. Experimental design was employed. This current research invited thirty-one senior high school students from one of the Islamic-based schools in Yogyakarta. Three treatments were conducted along with a pretest before the treatments and posttest after the treatments. A paired-sample t-test showed an increasing score mean from 56.35 in the pretest to 67.58 in the posttest. Apart from the mean results, the t-test revealed that there was a significant difference between the pretest and posttest mean, where the significance value was at .000. By finding this, the alternative hypothesis is accepted. In accordance with the result, it could be asserted that the DALL-E Platform could be employed by the teacher to expand the students' vocabulary acquisition.

Keywords: Experimental research; artificial intelligence; ELT; vocabulary acquisition.

INTRODUCTION

Vocabulary learning has become an interesting case as well as a problematic issue in English teaching and learning (ELT). It plays a major role in the success of English acquisition. Acquisitioning English vocabulary guarantees its learners to succeed in writing and speaking skills. Viera (2017) claimed that vocabulary assists students in comprehending written and spoken text. Brown and Lee (2015) supported that the mastery of vocabulary variety ascertains that writers are able to add richness to their writing. The consensus about the importance of vocabulary mastery was proved by

previous studies which had been conducted by researchers to enhance students' vocabulary mastery (Gushendra, 2017; Wardani, 2015). They primarily investigated how effective a teaching strategy is in students' vocabulary mastery.

In response to the rising concern that has been mentioned, the researchers intend to investigate Islamic boarding school students' vocabulary mastery by conducting observation and preliminary interviews. The result of observation and preliminary interview with the teacher indicated that the major problems in the research site were the lack of learning engagement and unaccomplished target learning, primarily in vocabulary mastery. It is also in line with the issue encountered by the Indonesian students, which is the lack of vocabulary mastery. For instance, Wardani (2015) asserted that students of vocational high schools lacked vocabulary, it affected their English performance as the target learning.

Moreover, this research investigates the lack of student engagement and vocabulary acquisition in language learning, a concern identified in preliminary interviews and various studies. The integration of technology, particularly artificial intelligence (AI), in language education has gained increasing attention. This study explores the effectiveness of AI in enhancing vocabulary learning, a topic also examined by other researchers. For example, Almutairi et al. (2020) proposed an AI-based framework to improve English language learning, while Junaidi et al. (2020) investigated AI applications in developing students' speaking skills, finding them effective. Despite these advancements, AI's role in vocabulary acquisition remains under-recognized. This study aims to assess the impact of AI on vocabulary mastery in language learning, specifically using the Dall-E platform.

Dall-E, an AI picture generator, converts words or phrases into representative images. This digital platform was created in 2021 by OpenAI. DALL·E is a neural network that creates images from text captions for a wide range of concepts expressible in natural language. It is a 12 billion parameter version of the Generative Pre-trained Transformer 3 (GPT-3) model trained to generate images from text descriptions using a dataset of text–image pairs. Its selection for this study is due to its free access and limited usage offers. This platform not only generates visual representations of text but also engages students' thinking skills to interpret meanings. The transformation of words into visual data is expected to strengthen memory retention. Vanichvasin (2020) highlights that visual media enhances memory, aiding in information retention and recall. These benefits underscore the potential of the Dall-E platform in language learning, prompting this research to explore its effectiveness in vocabulary acquisition.

On the other hand, in the process of teaching and learning, the learning media plays a crucial role. According to Harmer (2002), the use of media is essential for achieving educational goals and should be varied. The advanced nature of technology nowadays is one way to ease the advanced media itself into adapting to teaching and learning vocabulary. In language education, advanced technologies and other educational resources have been incorporated into language teaching and learning to help students establish their vocabulary and grammar abilities (Shadiev et al., 2019 and Hao et al., 2021). Moreover, Barnes (2017) says the teaching method combined with new technology realizes the transformation of knowledge from theory to application, emphasizing the dynamic attribute of knowledge. It means that it considers key decision-making knowledge to be the object of knowledge acquisition and views knowledge as a functional model with a good

structure that can be clearly analyzed according to the type, mode, and structure of knowledge.

In the evolving landscape of English Language Teaching (ELT), innovative technologies like virtual reality (VR) and artificial intelligence (AI) are being increasingly integrated. A notable study by Lai and Chen (2021) compared the effectiveness of VR and PC-based visual novel games in vocabulary learning, shedding light on the potential of immersive technologies in language education. Their findings suggest that VR environments can significantly enhance vocabulary acquisition compared to traditional computer-based methods. Building on this, Tai et al. (2022) explored the impact of a VR application on adolescent EFL learners' vocabulary learning. Their study highlighted the engaging nature of VR in captivating younger learners, thereby facilitating better vocabulary retention and language skills. Moreover, Du and Han (2022) shifted the focus to teachers' perspectives, examining the factors influencing their adoption of AI-based applications in the EFL context. Their analysis using the analytic hierarchy process revealed critical determinants such as perceived usefulness, ease of use, and institutional support, which play a significant role in teachers' willingness to integrate AI tools into their teaching practices.

Furthermore, the aim of this research is to determine the workability of the DALL·E digital platform for increasing students' vocabulary acquisition. Therefore, by using the DALL·E picture generator, the researchers can build an environment in which the learning context, multiple vocabulary acquisition, and reflection of prior knowledge to learn new knowledge are supported. However, connecting learning analytics with digital platforms and natural language processing is quite a challenging task to work on. Commencing from the aforementioned intention, the researchers posed this research question: (1) Does the DALL-E AI picture generator develop students' English vocabulary acquisition? (2) Is there any significant difference in students' English vocabulary acquisition after the DALL-E AI picture generator is implemented?

In line with the research questions, the purpose of this study is (1) to reveal whether or not the DALL-E AI picture generator develops students' English vocabulary acquisition and (2) to find out whether there is a significant difference in students' English vocabulary acquisition after the DALL-E AI picture generator is implemented or not. In accordance with the research objectives, the researchers hypothesized that H1 is accepted that using the DALL·E picture generator is helpful for students to increase their vocabulary acquisition. In this research, the researchers applied and evaluated the DALL·E digital platform to facilitate the students' acquisition of a larger English vocabulary learning. It is likewise expected that the use of AI in vocabulary learning becomes one of the references to enhance English learning in wider scopes beyond vocabulary learning.

METHOD

This experimental study sought to assess the effectiveness of AI applications in English language teaching, especially in vocabulary enhancement. According to Creswell (2012), experimental research tests a notion to observe its influence on an outcome. The methodology involved a pre-test, treatment sessions with AI picture generators, and a post-test. The pre-test gauged initial student attributes, followed by treatment where students

and teachers were trained in using AI for vocabulary learning. The research also monitored changes in student participation during the treatment. The final post-test evaluated improvements in students' vocabulary mastery and classroom engagement.

Moreover, this research involved a class consisting of thirty-one students in grade 10th from an Islamic boarding school based in the Special Territory of Yogyakarta. In detail, they were divided into fourteen female students and seventeen male students from various English, parents, and cultural backgrounds. Related to English level, a preliminary study was conducted, which showed that their English proficiency level is recognized at A2 – B1 level based on the Common European Framework of Reference for Language (CEFR). In addition, to triangulate the result, an interview process to validate the statistical result. The researcher voluntarily invited four students randomly to be interviewed about the use of the AI Platform. They were asked about the perceived benefits, the challenges, and the possibilities of using an AI Platform in an ELT setting. They, then, were noted as P1, P2, P3, and P4.

Furthermore, to measure the impact of AI on students' vocabulary acquisition, this research utilized pretest and posttest methods. The tests were divided into three sections: meaning, synonym, and definition, each containing ten questions. In addition to the tests, interview and observation guidelines were developed. Interviews gathered insights on teaching and learning challenges, while observations recorded classroom activities during the treatment phase. For data analysis, a Paired sample t-Test, as described by Ross and Wilson (2017), was employed to compare pretest and posttest results. This analysis included a normality test to ensure data distribution, and the t-Test's significant value was used to determine if there was a substantial difference in vocabulary acquisition post-treatment.

FINDING AND DISCUSSION
Normality Test Result

The normality test is done on two obtained data, which are the pretest and posttest. The result of the normality test can be seen as follows:

Table1. One-Sample Kolmogorov-Smirnov Test for the Pretest

		All Class Pretest
N		31
Normal Parameters a,b	Mean	56.35
	Std. Deviation	16.658
Most Extreme Differences	Absolute	.123
	Positive	.123
	Negative	-.082
Test Statistic		.123
Asymp. Sig. (2-tailed)		.200c,d

The result of the normality test from the posttest was found to be normally distributed. The value of. Sig (2-tailed) was on .200, which was higher than 0.05. Also, the result of the mean in the posttest can be revealed with the mean of the posttest being 67.58. From this obtained result, there was positive progress seen from the mean in which

the mean was increased by 11 points from the mean results in the pretest. By showing those two normality test results, the data can be used to conduct a parametric test.

Table 2. One-Sample Kolmogorov-Smirnov Test for the Posttest

		All Class Posttest
N		31
Normal Parameters [a, b]	Mean	67.58
	Std. Deviation	12.963
Most Extreme Differences	Absolute	.112
	Positive	.112
	Negative	-.098
Test Statistic		.112
Asymp. Sig. (2-tailed)		.200 [c,d]

The normality test conducted on the posttest data indicated that the distribution of the results was determined to be in accordance with a normal distribution. The p-value, denoted as Sig (2-tailed), was seen to be 0.200, indicating a greater value compared to the predetermined significance level of 0.05. Additionally, the mean value of the posttest was found to be 67.58, which indicates the outcome of the mean in the posttest. Based on the acquired result, a notable improvement was observed in the mean score, with an increase of 11 points compared to the mean score achieved in the pretest. By presenting the outcomes of the two normality tests, the data may be utilized for the purpose of conducting a parametric test.

Homogeneity Test Result
Table 3. Test of Homogeneity of Variances

		Levene Statistic	df1	df2	Sig.
Score	Based on Mean	.603	1	60	.441
	Based on Median	.639	1	60	.427
	Based on Median and with adjusted df	.639	1	54.111	.428
	Based on trimmed mean	.640	1	60	.427

The outcome of the homogeneity test conducted indicated that the data exhibited uniformity. The computed result of 0.441 is above the significance level of 0.05. Therefore, it may be asserted that the data exhibits homogeneity. Given that the data exhibits characteristics of normal distribution and homogeneity, the collected data is suitable for parametric statistical analysis, specifically a paired-sample t-test.

T-test Result
        A paired sample t-test was utilized to recognize the significance of the mean result of the pretest and posttest. This test was implemented to find out whether the use of AI

significantly increased the students' vocabulary acquisition or not. Since the data were distributed normally and homogenous, doing this test was eligible. The result can be seen as follows:

Table. 4 Paired Samples Test

	Mean	Std. Deviation		Std. Error Mean	Lower	Upper	t		df	Sig. (2-tailed)
Pair 1	Pretest All Class - Posttest All Class	-11.226	10.327	1.855	-15.01	-7.438	-6.05		30	.000

The result of the t-test revealed that the value of Sig. (2-tailed) was .000, which was less than 0.05. The results of the action are measured from the difference in the average scores of pretests and posttest. Therefore, it can be asserted that the results are significantly different. The result of the t-test also implies that H1 is accepted, which means that the use of AI in students' vocabulary acquisition performed a significant decent effect. On the contrary, since the significant effect of the DALL-E platform can be determined, this means that the H0 is rejected.

Students' Behavior Development

The researchers performed observations to illustrate behavior and changes that could occur throughout activities. In addition, to study the growth of students' vocabulary acquisition abilities, the t-test was organized as evidence of statistical data. The researchers discovered changes in student conduct where they were more engaged in studying at this time. Participant 1 (P1) noted an increase in personal engagement and participation in class discussions, suggesting a move away from passive learning:

> *"I noticed I talk more in class. We all do. Instead of just taking notes, we're sharing ideas about the words and pictures. It's a lot more engaging than the usual way we learn vocabulary."* [P1]

In the classroom, engagement occurs not just between teachers and students but also between other students. According to these observations, students queried and debated the meaning of a language represented by an illustration more. (P4) noted:

> *"I used to be quite passive, but the images from Dall-E made me curious. I started debating with others about what each image could mean. It feels more like a group activity now."* [P4]

Furthermore, the discussion went well, as seen by the students debating the AI platform's outcomes. They quarrel with one another, and the class grows more animated. Previously, researchers observed repetitive learning in which contact happened only in two directions, namely between the teacher and the students. However, the employment of AI in learning gives a breath of fresh air for student communication. They were seen conversing with friends, and the ratio of teacher-student contacts against student interactions favored peer talks as [P2] and [P3] stated:

"Before, I mostly just listened in class. Now, with Dall-E, I find myself asking more questions and discussing with my classmates. It's more interactive and fun." [P2]

"Earlier, it was just the teacher talking, but now we all talk and share. Discussing the AI images makes us think more creatively and helps us remember the words better." [P3]

The use of the Dall-E AI platform in vocabulary learning has led to a notable shift in classroom dynamics, fostering greater student engagement and interaction. Participants reported increased curiosity and participation with a move from passive to active learning. The AI-generated images stimulated discussions, debates, and peer-to-peer conversations, breaking the traditional teacher-centric model. This approach not only made learning more enjoyable but also enhanced creative thinking and memory retention. Overall, integrating AI tools like Dall-E in language education appears to positively impact student behavior, transforming the learning process into a more collaborative and interactive experience.

Possibilities in Utilizing AI Platform in ELT Setting

In discussing the potential of using an AI platform in an ELT setting, the participants' responses collectively suggest that while the platform introduces innovative and engaging methods of learning, it also presents certain challenges.

Participant 1 and Participant 2 both express enthusiasm about the fresh approach and visual learning aspects, highlighting the platform's ability to enhance class engagement and aid in understanding new vocabulary.

"The AI platform brings a fresh approach to learning. It's engaging and has visibly increased class participation, which is vital for language development." [P1]

"It helps us visualize and understand new words better. The visual aspect of learning through AI is really helpful." [P2]

Moreover, Participant 3 extends this by appreciating the innovation the platform brings to vocabulary lessons.

"I find the platform's approach to visual learning quite innovative. It adds an interesting dimension to our vocabulary lessons." [P3]

However, Participant 4 adds a critical perspective, pointing out the technical challenges encountered. This underscores the necessity for readiness and adaptability among both teachers and students to fully leverage the potential of AI in language education.

"The AI platform makes learning more interactive and fun. However, we faced some technical issues, so I think both students and teachers need to be well-prepared to use it effectively." [P4]

The usage of AI platforms in the ELT field appears to be promising. It provides students with the ability to engage in learning experiences with fresh nuances. Under the notion of visual learning, this additional nuance is offered by leveraging visuals created by the AI platform to forecast the meaning of a word. Not only that, but class participation has increased, which is a positive indicator of the progression of English learning. P1 and P2 agreed that using this AI platform helps students to feel the intricacies of new learning and

relationships amongst students well. They did, however, highlight some of the difficulties encountered. Therefore, the readiness of teachers and students is needed in the application of the AI platform in the ELT environment.

Furthermore, researchers agreed that this AI platform had potential in the ELT setting. With this AI platform, the visual learning technique can be easily deployed and utilized. However, challenges cannot be avoided. As a result, preparedness is required to overcome some of the problems that will be encountered, such as setting accounts, analyzing images, and evaluating images so that they may be used to forecast vocabulary and enhance the quantity of student vocabulary.

Discussion

The aforementioned interpretations of the findings can be asserted that the use of AI platforms to expand students' vocabulary mastery has fulfilled the ideas of vocabulary teaching proposed by Brown and Lee (2015). It covered at least two models of vocabulary teachings. The first is assisting students to learn vocabulary in a contextual manner where students are capable of learning a new word by seeing and relating the context and the visualizations of a word emerging in the AI platform (Da Silva et al., 2021). The second is engaging students in unplanned vocabulary teaching and learning. It can be noticed that which the students were assigned to predict the meaning of a low-frequency word in several types of sentences composed by the teacher or students directly. By exposing students to adequate amounts of exposure, the strength of students' memory would retain longer. Besides the conformity to the models proposed by Brown and Lee (2015), the advantage of using an AI platform for vocabulary teaching is the occurrence that the AI platform will generate the inserted word into visual representations that will allow students to proceed stronger and longer remembering of a new word (Vanichvasin, 2020).

Recalling the results from interview sessions, the increasing engagement of students during the learning process also resonated with the research done by Sawang et al. (2017). They noticed that students' engagement during the learning process under the use of technology was significantly increased. It was also updated by Raes et al. (2020), who found that technology had a positive influence on maintaining student engagement. By finding so, the researchers emphasized that the use of the DALL-E AI platform was positively impacting students' engagement within the learning process.

Another result also confirmed that AI could help students develop their critical thinking. It showed that students developed their critical thinking by discussing and predicting the visual generated by the AI (Futami et al., 2022). Shakirova (2007) agreed with this result, finding that the implementation of technology could positively impact critical thinking skills. Stating so, emphasizes the importance of critical thinking which can be boosted by using AI.

Last, regarding the challenges, the researchers believe that the challenges in using AI as well as web 2.0 are inevitable. The documented challenges were the results of AI, where the inconsistency still appeared. As mentioned by Vincent-Lancrin and Vlies (2020) the trustworthiness resulting from AI is still included as the challenges that may be faced in its implementation. Therefore, teachers' guidance is needed to maintain the results and the goal of the learning process when AI is being implemented.

CONCLUSION

The study aimed to evaluate the effectiveness of the DALL·E picture generator in enhancing students' English vocabulary acquisition. Results indicated a significant improvement in vocabulary learning, confirming the research hypothesis (H1) that the DALL·E platform aids in vocabulary acquisition. The implementation of the Dall-E AI platform in vocabulary learning significantly enhanced classroom dynamics by promoting active student engagement and interaction. Students transitioned from passive to active learning, with increased participation in discussions stimulated by AI-generated images. This shift fostered a more collaborative and creative learning environment, breaking away from traditional teacher-centric methods.

The study also highlighted potential challenges, including technical issues and the necessity for readiness among both educators and students to effectively utilize the AI platform. Despite these challenges, the overall response was positive, indicating that the AI platform holds promise in enriching ELT settings. It underscores the need for preparedness in overcoming technical barriers and supports the integration of innovative visual learning techniques to enhance language acquisition.

The AI platform's integration into ELT demonstrates considerable potential in enhancing vocabulary learning and student engagement. It fosters a more interactive learning environment and encourages diverse perspectives through discussions. However, the successful implementation of such AI tools in education requires addressing technical challenges and ensuring both students and teachers are prepared to navigate the platform effectively. Additionally, the AI's capability to generate contextually relevant visuals is crucial for optimal learning outcomes. The study highlights the transformative impact of AI in education while also acknowledging the need for continuous adaptation and support for its effective utilization.

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