THE IMPACT OF AI CHATGPT APPLICATION ON ENGLISH STUDENT'S ACADEMIC WRITING PRODUCTIVITY AND QUALITY

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Abstract

This study aims to assess the impact of using ChatGPT on the productivity and quality of students' writing. This study used a mixed-methods qualitative and quantitative method involving 10 English study program students from three universities. Data were collected through writing assignments and questionnaires, and analyzed using descriptive statistical tests, paired sample T-tests, and Pearson Correlation. The results showed a significant increase in the number of words written and the efficiency of time spent on assignments after using ChatGPT. In addition, the use of ChatGPT was also associated with an increase in the quality of writing, especially in grammar and fluency. This study concluded that ChatGPT was effective in increasing the productivity, efficiency, and quality of students' writing, although it is necessary to be aware of the potential for dependency that can reduce the development of students' critical thinking skills.

Keywords: *Artificial intelligence, productivity*

INTRODUCTION

The integration of artificial intelligence (AI) in education has brought about a fundamental shift in the way students learn and teachers teach. This technology enables a more efficient, adaptive and personalized learning process, making it one of the most important innovations in the digital age (Susilo, 2024). In the context of language acquisition, AI plays a major role in supporting students in mastering reading, writing, speaking, and listening skills through an approach tailored to individual needs (Arya & Verma, 2024).

AI technology also provides flexibility to teachers in designing learning programs (Romero, 2024). By leveraging AI-based tools, teachers can provide immersive and engaging learning experiences. One example of an AI tool that has come under the spotlight is ChatGPT, which is designed to assist users with text-based tasks. The application has shown its

potential in helping users complete a variety of academic needs, particularly in writing (Gultom et al., 2024).

ChatGPT offers highly relevant functions to support English language learning, especially at the university level. Students often face major challenges when it comes to composing academic assignments that require critical, logical and structured thinking skills (Bachtiar, 2024). This is where ChatGPT can help them by providing relevant suggestions and ideas to kick-start the writing process.

ChatGPT's brainstorming capabilities really help students overcome deadlocks in formulating ideas (Romero-Rodríguez et al., 2023). Often, students have difficulty determining topics or developing main arguments in their writing. By utilizing this application, they can get input that triggers creativity, making the writing process easier and faster.

Apart from helping in brainstorming, ChatGPT also plays an important role in drafting and refining written drafts (Dewi, 2024). This tool can provide suggestions on how to organize ideas logically, construct cohesive paragraphs, and improve sentence structure. This capability is very useful for students who want to improve their academic quality, especially in assignments that require strong and coherent argumentation.

On the technical side, ChatGPT offers features to correct grammar, word choice, and spelling. This allows students to focus on the content of their writing without being distracted by technical errors that can reduce the quality of the writing. This accuracy also gives students confidence in completing their assignments.

However, despite its many advantages, the use of ChatGPT in education also poses certain challenges. One of them is the potential dependence of students on this tool.(Azmi et al., 2024). If not used wisely, students may miss the opportunity to develop critical thinking skills and independent writing abilities.

In addition, there is concern that the use of ChatGPT may reduce originality in student writing. Some educators may question the extent to which the ideas generated truly reflect students' thinking. Therefore, it is important for educators to provide guidance on the ethical and productive use of ChatGPT in the learning process.

Despite the challenges, ChatGPT remains a very potential tool if used strategically. In the context of English language learning, this application can serve as a companion tool that supports students in developing their writing skills (Hoa & Khoa, 2024). With proper guidance, students can use these tools to accelerate

their learning process without sacrificing the quality or integrity of their academics.

Despite widespread enthusiasm for AI applications, studies that systematically assess its impact on students' writing processes are limited. Existing research often emphasizes technical capabilities over pedagogical outcomes, leaving a gap in understanding its practical implications in educational contexts.

Previous research by (Fuchs, 2023) highlighted the integration of artificial intelligence (AI) tools, including ChatGPT, in modern learning. The main focus of the study was on increasing student engagement in the learning process. However, the study focused more on the technical capabilities of AI without providing in-depth insights into its impact on student writing productivity.

Another study conducted by (Song & Song, 2023) explored the role of AI in improving writing skills, especially in the context of language learning. The researchers concluded that AI greatly assisted students in overcoming initial writing obstacles, such as brainstorming ideas and composing initial drafts. However, this study paid little attention to the aspect of evaluating the quality of the writing produced by students.

As for the research conducted by (Zhou et al., 2024) have examined the relationship between digital tool use and student productivity. The results showed that digital tools can accelerate the writing process, but have mixed effects on creativity. These findings provide an empirical basis for exploring how ChatGPT can improve efficiency without sacrificing the quality of student writing.

Unlike previous studies, this study emphasizes the productivity and quality aspects of students' writing, providing a comprehensive analysis of the role of ChatGPT as a teaching and learning tool. Based on the above explanation, the purpose of this study is to assess the impact of using ChatGPT on students' writing productivity, evaluate the impact of using ChatGPT on the quality of students' writing, and identify students' perceptions of using ChatGPT in the writing process.

Artificial Intelligence

Artificial Intelligence (AI) has become a revolutionary innovation that has transformed many aspects of life, including education. AI refers to technologies that enable machines to mimic human abilities in completing tasks that require intelligence, such as understanding natural language, recognizing patterns, and making decisions (Jai Chaudhary et al., 2024). According to (Adiguzel et al., 2023), AI provides tremendous potential in various sectors, one of which is education. With the

ability to perform complex analysis, AI can help improve the efficiency and effectiveness of the learning process.

In the context of education, AI is applied to create more adaptive and personalized learning environments. This technology allows the creation of systems that can adjust teaching materials according to the needs of each student, providing a more effective learning experience. As explained by (Rachid Ejjami, 2024), AI can play a role in supporting learning that is more responsive to student development, both in terms of learning speed and different learning styles. Thus, AI provides opportunities for each individual to gain a learning experience that is more tailored to their abilities.

The application of AI in education also includes various other aspects, such as providing teaching materials, managing assignments, and improving certain skills (Zhang & Zhang, 2024). For example, in language learning, AI can help students improve their writing skills by providing automated feedback, text analysis, and suggestions for improvement. This allows for more focused instruction on individual student needs, while also giving teachers the opportunity to manage their time and resources more efficiently. Thus, AI not only helps in teaching, but also in improving overall student learning outcomes.

ChatGPT Application

ChatGPT is an Artificial Intelligence (AI) based application designed to understand and generate text in natural language (Dergaa et al., 2023). This application utilizes natural language processing (NLP) technology, which allows ChatGPT to interact with users effectively, both in composing text, revising, and perfecting writing. According to (Al Momen Pranta, 2024), the NLP technology in ChatGPT allows users to communicate more naturally with machines, making it a very useful tool in various contexts, including education and business. ChatGPT can not only help in constructing better sentences but also in understanding the context, so it can provide relevant suggestions.

The main advantage of ChatGPT is its ability to support the process of brainstorming ideas, compiling initial drafts, and improving the quality of grammar (Ghafouri et al., 2024). With these features, this application is very useful in increasing productivity, especially for individuals who are often involved in text-based tasks. For example, in the world of education or professional writing, ChatGPT can speed up the writing process by providing suggestions or alternatives to better sentences. Research by (Cheng et al., 2023) shows that using ChatGPT in various text-based work contexts can increase

efficiency and reduce the time required to complete tasks, especially in composing long documents or articles.

Writing Quality

Writing quality is an important element that reflects the level of clarity, coherence, and completeness of a text (Stavans & Zadunaisky-Ehrlich, 2023). In the context of education, the quality of students' writing not only serves as an academic assessment, but also as an indicator of their ability to communicate ideas effectively. According to (Han, 2024), good writing skills can demonstrate a deep understanding of the material and mature critical thinking skills. However, students often face various challenges in maintaining the quality of their writing. Obstacles such as lack of ideas, grammatical errors, or lack of clear structure can reduce the effectiveness of communication in their writing.

Writing quality reflects the level of clarity, coherence, and completeness of a text. In an educational context, the quality of students' writing is an important indicator of their ability to communicate ideas effectively (Wayan Maba, 2023). Research shows that students often face challenges in maintaining the quality of their writing, especially when faced with obstacles such as lack of ideas, poor grammar, or lack of clear structure. With the help of AI-based

applications such as ChatGPT, students can be helped in composing more structured writing, although the role of these tools in encouraging the development of an original writing style still needs to be studied further (Niloy et al., 2024).

Writing Productivity

Writing productivity refers to the ability to produce written content in a timely manner without sacrificing quality. The integration of digital technologies, including AI, has helped students increase their productivity in completing writing assignments (Marzuki et al., 2023). Digital tools speed up the process of composing texts and help students overcome "writer's block," a common obstacle in writing. However (Suryadi & Suswanto, 2024) emphasized that although digital tools can speed up the writing process, their impact on the creativity and originality aspects of writing still varies. Therefore, it is important to ensure that the use of tools such as ChatGPT not only increases productivity but also supports the development of writing skills as a whole.

This literature review shows that while AI, specifically ChatGPT, has great potential in supporting education, there are still challenges and limitations that need to be further explored. The combination of technological efficiency and human skill

development will be key to maximizing the benefits of this tool.

METHOD

This study adopted a mixed-methods approach, combining quantitative and qualitative data to comprehensively assess the impact of ChatGPT usage on students' writing process. The instruments used for data collection included writing assignments and questionnaires. Students' writing assignments were assessed based on two dimensions, namely productivity, which includes word count and time efficiency, and quality, which includes grammar, and plagiarism. This study involved 10 English study program students from three universities who were selected through purposive sampling technique to ensure that the selected sample was relevant to the research objectives.

Data collection was conducted by asking students to complete writing assignments either with or without assistance using ChatGPT. In addition, a survey was used to capture students' perceptions of the usefulness of ChatGPT in assisting their writing process. In terms of data analysis, this study used several statistical techniques. Descriptive statistical tests were used to calculate the average writing productivity, such as the number of words and processing time, and to measure the distribution of data using standard

deviation (SD). Furthermore, a difference test was conducted using the Paired Sample T-Test to compare the results of productivity and writing quality before and after using ChatGPT.

In addition, a relationship analysis was conducted using Pearson Correlation to measure the relationship between productivity and writing quality. Thus, this study not only aims to assess the impact of ChatGPT, but also to ensure that the research results are reliable and credible. To collect data on the impact of the ChatGPT application on students' writing productivity and quality, the following steps were implemented:

Table 1. Steps in Collecting Data

No	Description
1	Pre-test Session: Students were asked to complete a writing assignment without using ChatGPT, focusing on a given topic. Writing tasks were evaluated for productivity (word count, processing time) and quality (grammar and plagiarism).
2	Introduction to ChatGPT: Students were introduced to the ChatGPT application. The researcher demonstrated how to use ChatGPT for writing purposes, including generating ideas, enhancing grammar, and organizing content.
3	Guided Practice: Students were given tasks to practice with ChatGPT, focusing on generating drafts and refining ideas. They explored various features of ChatGPT, including prompts for paraphrasing, correcting grammatical errors, and expanding arguments.
4	Post-test Session: Students completed a similar writing assignment with the assistance of ChatGPT. Their performance was evaluated using the same parameters as the pre-test. Students were required to save their drafts and send them to the researcher for analysis.
5	Survey Distribution: Students filled out a questionnaire designed to capture their

	perceptions of ChatGPT's usefulness, ease of use, and overall impact on their writing process.
6	Data Analysis: The collected data was analyzed quantitatively to compare writing productivity and quality before and after using ChatGPT. Descriptive statistics, paired sample T-tests, and Pearson Correlation were utilized to measure the impact of ChatGPT. The survey responses using questionare design were analyzed qualitatively to provide additional insights

RESULT AND DISCUSSION

Descriptive Statistical Test of Writing Productivity

The data description in this study was conducted to provide a general overview of the characteristics of the respondents and the variables studied (Sandi et al., 2021). Data was obtained from the results of data before using ChatGPT by 10 active English study program students who used ChatGPT in writing scientific papers. Here are the results of the data before and after using ChatGPT

Table 2. Word count and time data before and after using ChatGPT

No	Number of Words Written Before Using ChatGPT	Processing Time (Minutes) Before Using ChatGPT	Number of Words Written After Using ChatGPT	Processing Time (Minutes) After Using ChatGPT
1	450	40	650	25
2	380	35	600	20
3	500	37	700	30
4	300	30	650	27
5	550	45	750	32
6	420	47	680	29
7	470	47	710	30
8	530	50	700	28
9	390	37	650	25
10	460	45	670	28

Figure 1 . Descriptive data of words and time before and after using ChatGPT from Jamovi Statistic Application

The results of the descriptive analysis showed a significant increase in students' writing productivity after using ChatGPT. Before using ChatGPT, the average number of words written was 445 words with a median of 455 words. The data distribution was relatively high with a standard deviation (SD) of 75.31 and a variance of 5672.2, indicating a significant difference between students in the number of words written.

The range of the number of words written was 300 words, with a minimum of 250 words and a maximum of 550 words. After using ChatGPT, the average number of words increased to 676 words, with a median of 675 words. The data distribution became smaller, with an SD of 41.69 and a variance of 1737.8, indicating better consistency among students. The range of the number of words written also became narrower, namely 150 words, with a minimum of 600 words and a maximum of 750 words.

In addition, there was an increase in the efficiency of writing task completion time after using ChatGPT. Before using

ChatGPT, the average completion time was 41.3 minutes, with a median of 42.5 minutes. The distribution of completion time was relatively large, with an SD of 6.45 and a variance of 41.6, with a completion time range of 20 minutes (minimum 30 minutes, maximum 50 minutes). After using ChatGPT, the average completion time decreased to 27.4 minutes, with a median of 28.0 minutes. The distribution of completion time became smaller, with an SD of 3.41 and a variance of 11.6, and a time range of only 12 minutes (minimum 20 minutes, maximum 32 minutes). Overall, the use of ChatGPT increased students' writing productivity with a greater number of words and more efficient completion time.

Difference Test (Comparative Analysis) of Writing Productivity

Paired Sample T-Test uses to compare productivity results before and after using ChatGPT

Paired Samples T-Test			statistics	df	p
number of words before	number of words after	Student's t	-14.42	9.00	< .001
time before	time after	Student's t	7.95	9.00	< .001

Figure 2. Paired sample T-test data for words and time before and after using ChatGPT from Jamovi Statistic Application

The results of the Paired Samples T-Test analysis showed a significant difference in writing productivity and time

efficiency of completing assignments before and after using ChatGPT. For the number of words written, the t-statistic value was -14.42 with a degree of freedom (df) of 9 and a probability value (p) <0.001, indicating that the average number of words after using ChatGPT was significantly higher than before. This indicates that the use of ChatGPT increases students' writing productivity.

Meanwhile, for the task completion time, the t-statistic value of 7.95 with df 9 and p-value <0.001 indicates that the average completion time after using ChatGPT is significantly lower than before. This result confirms that ChatGPT not only increases the number of words written but also helps students complete assignments more efficiently. This finding supports the hypothesis that the use of ChatGPT has a positive impact on productivity and efficiency in writing.

Correlation Analysis of Writing Productivity

Pearson Correlation is used to measure the relationship between ChatGPT usage and writing productivity.

Correlation Matrix		number of words before	number of words after	time before	time after
number of words before	Pearson's r	—			
	df	—			
	p-value	—			
number of words after	Pearson's r	0.772	—		
	df	8	—		
	p-value	0.009	—		
time before	Pearson's r	0.738	0.617	—	
	df	8	8	—	
	p-value	0.015	0.057	—	
time after	Pearson's r	0.593	0.944	0.515	—
	df	8	8	8	—
	p-value	0.071	< .001	0.128	—

Figure 3 . Correlation test data between the use of ChatGPT and writing productivity from Jamovi Statistic Application

The results of the Correlation Matrix analysis show a significant relationship between several variables measured in this study. The correlation between the number of words before and after using ChatGPT has a Pearson's r coefficient of 0.772, with a df of 8 and a p value of 0.009. This indicates a strong and significant positive relationship between the number of words written before and after using ChatGPT, indicating that students with higher initial productivity tend to remain productive after using the tool.

The correlation between the processing time before and after using ChatGPT with the number of words after is also interesting. The correlation between the time before and the number of words after has an r value of 0.617 and a p value of 0.057, indicating a moderate positive relationship, but not statistically significant at the 95% confidence level. In contrast, the time after has a very strong and significant correlation with the number of words after (r = 0.944, p < 0.001), indicating that the efficiency of processing time after using ChatGPT is highly correlated with increased productivity.

Meanwhile, the relationship between the processing time before and after using ChatGPT has a correlation coefficient of 0.515 with p = 0.128, indicating a moderate but insignificant positive relationship. This result shows that although there is consistency in processing time among students, the main impact is seen in time efficiency after using ChatGPT. Overall, these findings underline the positive impact of ChatGPT in improving writing productivity and task processing time efficiency.

The results of the writing quality test between using ChatGPT and without ChatGPT

The following is one of the results of writing by English students with the help of the AI Chat GPT application and without the help of AI ChatGPT

Jenang Sengkolo depicts the sacredness and complexity of culture in Javanese society, where traditional practices are maintained to maintain spiritual balance and good luck in everyday life(NUHA 2019). In the context of a road intersection, the placement of jenang becomes a ritual intended to ward off bad luck or balak. Even though physically Jenang Sengkolo is only an offering that is not eaten or shared with passersby, its presence has a deep meaning in an effort to maintain blessings and harmony in the surrounding environment.(Muqoddam and Maghfiroh 2019).

The tradition of placing Sengkolo jenang at road intersections also reflects the social values that are strong in Javanese culture, especially mutual cooperation and solidarity. Even though the jenang is not eaten or shared, its presence at road intersections invites people to reflect on and strengthen spiritual ties and togetherness(Margerita 2022). This practice emphasizes that luck and blessings are not only the responsibility of the individual, but are also the result of collaboration and concern for the common good(Husna 2020). Thus, the Sengkolo jenang at the crossroads is not only a symbol of spiritual belief, but also a representation of the spirit of cooperation which is the main pillar in Javanese culture.

Even though the Sengkolo jenang at the crossroads has a rich meaning in Javanese culture as a ward off bad luck, a gap, in theory, can occur in understanding the concrete mechanisms or processes involved in the process of "removing balak". Although there is a strong belief in Javanese society regarding the magical power of Sengkolo jenang in warding off bad luck, there is no strong empirical evidence to support this claim in a scientific context. This gap in theory indicates that there is a gap between belief and scientific understanding regarding the effect of Sengkolo jenang in preventing bad luck at road intersections.

Apart from that, a gap of theory also appears in linking the placement of Sengkolo jenang at road intersections with the specific aim of preventing bad luck.(Fanani 2023). Although this belief is strong in Javanese culture, there has been no in-depth research to explain in detail how the location and context of placement of Sengkolo jenang affects its effectiveness as a ward off bad luck. Further research is needed to bridge the gap between cultural beliefs and scientific understanding of Sengkolo jenang, as well as to identify other factors that may influence people's perceptions of luck and bad luck in this context.

Figure 4. Writing Results with AI ChatGPT

Tradition in the world is very much and various, but many traditon that contradiction with the rule in realigion, like obligations that we don't be able to leave but, because there is a tradition that require it has to do. So we will get sin if we keep doing it. And even there is a tradition that in realigion that is obligation to be left, but it has attached in the community. Like tradition in Bali, Java, and Madura, like make foods to celebrate a important moment, the name like Tumpeng, Ritual offering, etc. At the past any one make it to eulogize a place of worship soul ancestors, and that tradition attache until now. Like when a people celebrate their birthday, or make it when give ritual offerings in sea, or make celebrate to their plan in spate of that their plan grow fertile, and make celebrate to a place that scary, in spate of that calm. So that is forbiden in realigion, but many people keep doing it, because that is tradition from soul ancestors.

And also there is a tradition that so contradiction with obligatuon in realigion, and many people consider it the usual thing. It is a people when engaged, she has to spend the night in her fiance's home, and even it's been let to touch her, and bring her wherever it(get ride). Whereas in realigion all people obligation to keep their body to another family or their husband(muhrim). So if they keep doing that, they same with disobey their obligation in their realigion But also many people that fear to do it, because they fear disobey their obligation in their obligation. However if they don't do it they same with disobey their tradition. So from here we have to look for manner or solution that in case our choose have to batter.

There is another tradition that also disobey obligation in realigion, that is believe to prediction. All muslim have to believe to just to God. Forbiden believe to another God, but past tradition is believe to prediction and still keep doing that. Many people do it because that is a tradition in spite of that they know their future or their solution when get problem. So that is

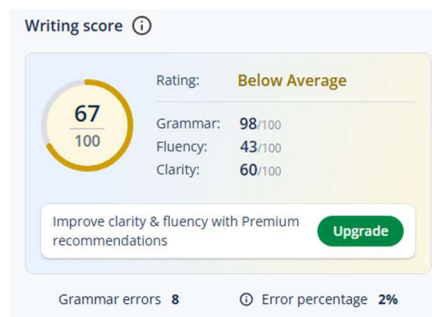**Figure 5.** Writing Results without AI ChatGPT

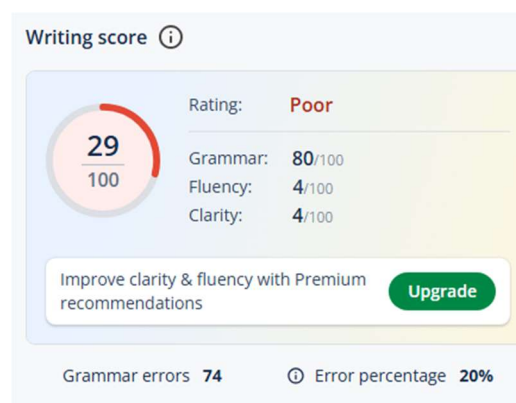**Figure 6.** Results of checking text with AI ChatGPT

Figure 7. Results of checking text without AI ChatGPT

The grammar check results of the two writings show a significant difference in quality. In the first writing, the overall score reached 67/100 with a rating of Below Average. The grammar score reached 98/100, with only 8 grammar errors, which makes the error rate very low at 2%. The fluency of this writing is also better than the first writing, with a score of 43/100, although there is still room for improvement to make it more natural. In terms of clarity, the first writing scored 60/100, indicating that most parts are quite easy for readers to understand.

In contrast, the second piece of writing shows much lower quality with an overall score of only 29/100 with a Poor rating. Its grammar score is quite high, at 80/100, but there are 74 grammatical errors causing an error rate of 20%. In addition, this writing has a very low fluency score of 4/100, indicating that the sentences are difficult to understand or not well structured. The clarity of the writing is also at the same number, at 4/100, so readers are

likely to have difficulty understanding the overall meaning.

Overall, the second draft was of much better quality than the first, with fewer errors and a clearer structure. The first draft required extensive revision to improve fluency and clarity, while the second required only minor improvements to be more optimal.

The following are also the results of a plagiarism check for one of the articles that uses the ChatGPT application and one that does not use the ChatGPT application.
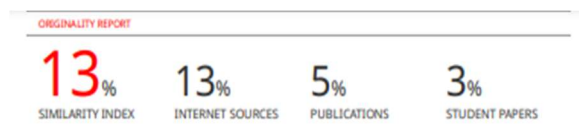

Figure 8. Results of checking plagiarism of student writing using ChatGPT
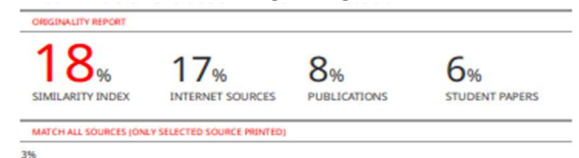
Figure 9. Results of checking plagiarism of student writing without using ChatGPT
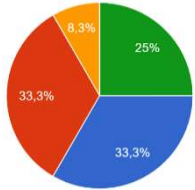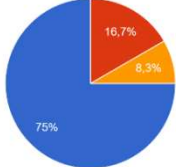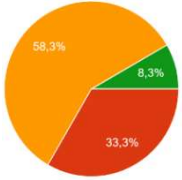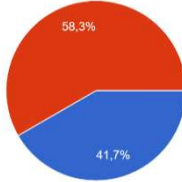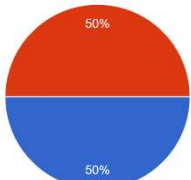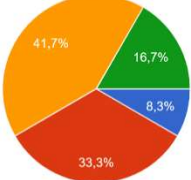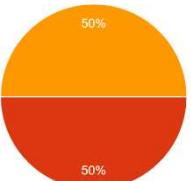
The plagiarism check results show differences in the level of similarity between writings that use ChatGPT and those that do not. In the first result using ChatGPT, the level of similarity was 13% with a breakdown of 13% from internet sources, 5% from publications, and 3% from other student works. This percentage shows that the use of AI can help produce more original writing by automatically
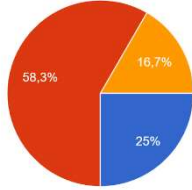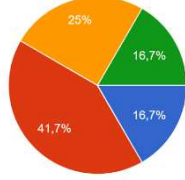
modifying the language so as to avoid direct similarities to existing sources.

Meanwhile, the second result that did not use ChatGPT showed a similarity level of 18%, with 17% from internet sources, 8% from publications, and 6% from other student works. This higher similarity level suggests that writing that does not use AI assistance may be more likely to follow the sentence patterns of existing references. This difference indicates that using ChatGPT can be a helpful tool in producing more unique content, although quality and originality still depend on the editing and adaptation process carried out by the user.

Table 3. Image of English Language Students' Response Results Using the ChatGPT Questionnaire

	Semester
	How often do you use ChatGPT AI to write in English?

	What is your main purpose of using AI ChatGPT?
	To what extent do you feel ChatGPT AI helps in your writing process?
	In what types of writing do you most often use ChatGPT AI?
	Has using AI ChatGPT improved your writing productivity?
	How does AI ChatGPT impact the quality of your writing?
	Which part of your writing was most influenced by AI ChatGPT?
	Do you feel like you rely too much on ChatGPT AI when writing?

	Does AI ChatGPT help you be more confident in writing English?
	In your opinion, what are the main disadvantages of using AI ChatGPT in writing?

Based on the results of a survey conducted using a questionnaire, as many as 70% of respondents in semesters 7-8 use AI ChatGPT several times a week, with the main goal of composing complete paragraphs or essays and improving grammar. As many as 85% of them reported that AI ChatGPT was very helpful in the writing process, especially for daily assignments and journal articles, and significantly increased their productivity. Around 75% stated that the quality of their writing had improved, especially in terms of writing structure and idea development. Even so, 60% of respondents felt quite dependent on AI but still maintained their independence. As many as 80% said that using AI ChatGPT increased their confidence in writing, although 40% felt that using AI could reduce independent learning.

Respondents from semesters 5-6, as many as 65%, also use AI several times a

week with the main focus on helping brainstorm ideas and correcting grammar. As many as 70% feel very helpful in completing daily tasks and journal articles, with 60% of them reporting a significant increase in productivity. However, only 50% said the quality of writing has improved significantly, with the aspect of idea development being the most affected part. As many as 55% feel quite dependent on AI but can still maintain balance in their writing process.

In semesters 3-4, 40% of respondents rarely or never used AI ChatGPT, while 50% used AI several times a week to improve grammar or help brainstorm ideas. Of those who used AI, 70% found it very helpful, especially in completing daily tasks. As many as 60% reported increased productivity, although only 45% acknowledged an increase in the quality of writing. In terms of dependence, 65% stated that they did not rely too much on AI, with 75% citing AI as helping to increase their confidence in writing. However, 30% cited inaccurate AI answers as a major drawback in the writing process.

The results above show that the use of ChatGPT as a tool in the writing process has a significant impact on student productivity. ChatGPT is able to provide initial ideas, text structure suggestions, and language revisions that help students start

and speed up the writing process. Many students reported that the time needed to compose an essay or academic report was significantly reduced with the help of this technology. In addition, students were able to quickly develop a logical and systematic writing framework compared to if they did it manually.

In terms of writing quality, ChatGPT helps improve the use of grammar, vocabulary, and sentence structure to be more coherent and persuasive. Some students also showed improvements in constructing logical and in-depth arguments. However, excessive use of ChatGPT has the potential to reduce creativity and originality of writing because students tend to rely too much on automatic suggestions without developing ideas independently (Niloy et al., 2024). This challenge raises concerns about the authenticity of academic work.

The majority of students gave positive responses to the use of ChatGPT in learning. They felt that it helped reduce anxiety when writing and gained confidence in composing writing. However, some students still felt that interaction with lecturers or peers was needed for more contextual and personal feedback. ChatGPT, although sophisticated, has limitations in understanding specific contexts and providing critical suggestions

on the content of students' writing (Datskiv et al., 2024).

Some other challenges found in this study include students' dependence on technology that can hinder their ability to think independently, ChatGPT's limitations in providing contextual feedback, and concerns regarding academic ethics, such as plagiarism and originality of writing (Dergaa et al., 2023). Therefore, although ChatGPT has great potential as a learning tool, its integration into the teaching process needs to be accompanied by clear ethical guidelines and guidance from lecturers to maintain a balance between the use of technology and students' critical thinking skills. With a wise approach, ChatGPT can be an effective tool to increase productivity and writing quality, while still encouraging students' creativity and originality in producing academic work.

CONCLUSION

Based on the results of this study, it can be concluded that the use of ChatGPT has a significant positive impact on productivity and time efficiency in writing scientific papers by English study program students. Before using ChatGPT, the average number of words written by students was 445 words with an average processing time of 41.3 minutes. After using ChatGPT, the average number of words increased to 676 words, while the

processing time decreased to 27.4 minutes. The results of the descriptive analysis showed an increase in consistency and efficiency after using ChatGPT, with a decrease in data distribution and processing time span.

The results of the Paired Sample T-Test showed a significant difference in the number of words and the time of work before and after using ChatGPT ($p < 0.001$), supporting the hypothesis that the use of ChatGPT increases students' writing productivity. In addition, the correlation analysis showed a significant relationship between time efficiency and writing productivity after using ChatGPT, with a very strong correlation coefficient between time after and the number of words after ($r = 0.944$, $p < 0.001$).

In terms of writing quality, grammar checks showed significant improvements in ChatGPT-assisted writing, with higher grammar scores and significantly lower error rates compared to writing without ChatGPT assistance. These findings suggest that ChatGPT not only helps students improve their productivity but also the quality of their writing.

Overall, this study shows that the use of AI-based technology such as ChatGPT can be an effective tool to support writing learning, increase time efficiency, and improve the quality of students' writing. These findings can be a consideration for

educational institutions in integrating AI technology into the learning process to develop students' literacy skills.

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