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The Effectiveness of AI Technology in Improving Academic English Writing Skills in Higher Education

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Abstract

The main issue in improving academic writing skills in English among college students is the difficulty in developing coherent and grammatically accurate writing. The aim of this research is to evaluate the effectiveness of using AI-based technology in enhancing students' writing abilities and addressing gaps in traditional teaching methods that often lack personalized feedback due to limited teaching time. This research employs a mixed-method approach, combining quantitative pre-experimental design and qualitative methods. The study uses an experimental design with control and experimental groups consisting of students from classes 1A and 1B. A pre-test was conducted, followed by three writing assignments over seven weeks, with the experimental group receiving AI feedback. The results show a significant improvement in the writing skills of the experimental group, with average scores increasing from 1204 to 1364, a statistically significant difference ($p < 0.05$). Additionally, this study also explores students' perceptions and attitudes towards AI tools, providing insights into the acceptance and effectiveness of such tools in diverse educational environments. It can be concluded that the integration of AI-based tools in teaching academic English writing significantly improves students' writing skills. The integration of AI in English writing instruction can be an effective solution to address teaching challenges and enhance the quality and effectiveness of learning. This research recommends a wider application of AI technology in education to support the development of students' writing skills.

Keywords: Artificial intelligence; writing; English for specific purposes

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INTRODUCTION

For companies doing business around the world, English is indispensable. The vast majority, almost 90%, of international business is conducted in English (Friginal & Udell, 2019). Proficiency in Business English is essential for successful entrepreneurship and career advancement, especially in EFL contexts such as Indonesia, where communication skills in English are highly valued for career growth (Rianita et al., 2022). Business English covers various registers, including written and spoken language used in commercial settings, such as email, presentations, and negotiations (Friginal & Udell, 2019; Rianita et al., 2022). Developing business-related competencies through professional English courses tailored to business administration studies is essential for future entrepreneurs, showcasing how the case study method can boost business management and personal management capabilities (Sinkus, 2021). Analyzing the types of errors in business writing by students who are not English majors allows us to pinpoint common issues and tailor teaching

strategies. This, in turn, strengthens their written communication skills for business purposes (Y. Yang, 2020).

In education, Business English plays a role in shaping students' professional careers by improving their employability and communication skills (Tong & Gao, 2022; Wang, 2021). The integration of practical and theoretical teaching methods in business English education not only cultivates comprehensive vocational skills but also enhances students' sustainable development and employability (Wang, 2021). Research shows that business English graduates require a multi-dimensional skill set that includes expertise, essential skills, and job advancement to develop which skills needed for success in the modern workforce (Rianita et al., 2022). Furthermore, in today's global business environment, proficiency in English is increasingly important for career advancement, with communication skills and fluency in English being key success factors (Sianipar & Gultom, 2022). Therefore, a strong foundation in Business English not only equips students with the necessary language skills but also enhances their overall professional competence, making it an essential component to achieving success in their careers.

The teaching of academic English writing is essential in higher education, especially in programs such as the D3 Accounting program which emphasizes effective written communication skills. Challenges in teaching academic English writing, as highlighted in research papers, include the differences between spoken and written English, difficulties in developing writing ideas, grammatical accuracy, finding references, understanding feedback, and the need for detailed feedback (Ankawi, 2023). ESL/EFL learners face barriers in academic writing due to language and academic issues, requiring collaborative efforts from students, teachers, and universities to overcome these challenges (Li, 2023). Keys to Academic English highlights the essential skills for thriving in university, including research, writing, and referencing. It covers the fundamentals of grammar, essay writing, research techniques, referencing styles, and presentation, making it a valuable resource for new university students. Limited teaching time, large class sizes, and the need for specialized feedback further add to the challenges of teaching academic English writing (Hatmanto, 2023). Incorporating AI into writing instruction can be a game-changer for teachers, allowing them to deliver more effective lessons and provide individualized support.

AI can improve English writing instruction by providing tools such as iWrite that offer writing instruction, intelligent correction, and automatic grading, leading to improved writing ability and increased student acceptance (Xia et al., 2022). In addition, AI platforms can help increase vocabulary diversity and reduce the burden of English usage, positively affecting learners' perceptions and affective aspects of writing (Jyi-yeon & Youngsoo, 2023). The growing sophistication of AI language tools like GPT-3 brings exciting possibilities, but educators must also address concerns about potential misuse by students, requiring strategies to ensure students engage in the writing process and develop as writers (Straume & Anson, 2022). AI writing tutors powered by semantic analysis can become valuable assistants for teachers, helping them identify mistakes and enhance student learning (S. Yang, 2022).

AI-supported writing instruction is indeed an emerging field in academic writing pedagogy, offering a scalable and efficient solution for personalized feedback for students (Abd-Elsalam & Abdel-Momen, 2023; Storey, 2023; Utami & Winarni, 2023). Tools such as GPT-3 and Wordtune have been developed to help organize thoughts, draft, and improve the quality of scientific papers, demonstrating the potential of AI in improving writing (Abd-Elsalam & Abdel-Momen, 2023; Zhao et al., 2023). In addition, Automated Writing Evaluation (AWE) systems and Intelligent Virtual Agents (IVA) offer personalized feedback, linguistic resources, and interactive learning experiences for EFL

learners (Katsarou et al., 2023; Rusmiyanto et al., 2023; H. Yang et al., 2024). AI tools are proving to be valuable allies for students, aiding them in their academic research endeavors, drafting papers, and overcoming mental blocks, ultimately improving the writing process and diversifying ideas while maintaining clarity and conciseness (Pereira et al., 2023; Utami & Winarni, 2023; Zhao et al., 2023).

Studies (Jyi-yeon & Youngsoo, 2023; Rusmiyanto et al., 2023) show that AI can improve communication skills, vocabulary diversity, and reduce the burden of using English, which positively impacts learners' affective aspects. However, more research is needed to optimize AI integration, understand its long-term effects, and overcome barriers to adoption in language learning environments (Katsarou et al., 2023; Rusmiyanto et al., 2023). The success of AI in EFL teaching hinges on educators and students collaborating to harness its potential while maintaining responsible practices, emphasizing the importance of awareness and effective implementation strategies (Alhalangy & AbdAlgane, 2023). While AI offers exciting potential for academic studies, challenges like limited features, optimization needs, and potential biases remain. These hurdles underscore the ongoing need for development focused on openness, ethical considerations, and unwavering reliability in AI technologies (Abd-Elsalam & Abdel-Momen, 2023; Pereira et al., 2023; Utami & Winarni, 2023).

Previous research on the application of AI technology in education, particularly in the context of language teaching, has consistently yielded positive outcomes. Studies have demonstrated the potential of AI-based tools to enhance various aspects of language learning, especially writing. For example, Rahmi et al. (2024) found that AI-based writing tools significantly improved students' writing skills. The tools provided immediate, personalized feedback, enabling learners to make real-time corrections and adjustments to their writing, which fostered a more efficient learning process. Further supporting these findings, research conducted by Polakova and Klimova (2024) emphasized the role of AI tools in helping students with grammar and spelling corrections. Their study revealed that these tools not only aided in reducing errors but also contributed to building students' confidence in writing. By providing automated feedback, the AI tools allowed students to practice writing more independently, which led to a marked improvement in both their technical skills and their self-assurance in producing written work. These studies underscore the growing significance of AI in language education, highlighting its potential to revolutionize traditional teaching methods by offering customized and immediate support to learners.

In the case of teaching academic English, a study by Dizon & Gayed (2021) have demonstrated that the use of AI-based writing tools, one of which is Grammarly, can assist students in recognizing and improving their writing errors more effectively than traditional feedback from teachers. Additionally, research by Aljuaid (2024), M Pitychoutis (2024), and Wale & Kassahun (2024) finds that the integration of AI technology in academic English classes not only enhances the improvement of students' writing quality but also made learning process more engaging and interactive. Nevertheless, despite the many studies that have proven the advantages of using AI technology in education, there are some notable gaps. First, most studies focus on students in developed countries with good access to technology, while there is limited research on the application of AI technologies in developing countries. Second, previous research tends to focus on specific tools and less on exploring combinations of different AI tools that can be used synergistically. Third, there are still few studies that examine students' perceptions and attitudes towards the use of AI tools in language learning, especially at the higher education level.

This research attempts to fill this gap by evaluating the effectiveness of various AI-based writing tools (Grammarly, Chat GPT, and QuillBot) in the context of teaching

academic English in D3 Accounting programs in Indonesia. In addition, this study also looked at students' perceptions and attitudes towards the use of AI tools, providing a more thorough insight into the acceptance and effectiveness of these technologies in different educational settings. Thus, this study not merely extends the existing literature but also brings practical guidance for teachers and educational institutions in integrating AI technology to improve students' writing skills.

RESEARCH METHOD

Research Design

This study adopts a quantitative, pre-experimental approach to evaluate the effectiveness of AI technology in improving academic English writing skills in higher education. The pre-experimental design is particularly suitable for this research because it allows for a focused examination of the potential impact of AI interventions on student writing. By comparing two distinct groups—a control group and an experimental group—the study can isolate the effect of AI technology on writing outcomes. The experimental group received targeted interventions through the use of AI-based tools, while the control group followed the traditional instruction methods without exposure to AI technology. This setup ensures that any observed differences in writing performance can be attributed to the presence or absence of AI interventions. The decision to use a pre-experimental design is rooted in practical considerations, such as time constraints, available resources, and the need for a manageable sample size. This research design allows for an initial exploration of the effect of AI technology in a controlled environment without the complexities of a full experimental study, such as random assignment or longitudinal tracking.

This design also allows for a controlled investigation of how AI technology can enhance academic English writing skills by providing automated feedback, correcting errors, and offering personalized suggestions. Through this method, the study aims to assess whether the AI intervention leads to measurable improvements in the writing abilities of the experimental group, compared to the control group that continues with traditional instruction. Although the absence of randomization limits the ability to generalize the findings broadly, the pre-experimental approach serves as an effective and practical means to establish a foundation for future, more extensive research into the role of AI technology in higher education writing instruction.

Research Participants

This research employed a qualitative approach using a purposive sampling method to select participants who met specific criteria aligned with the study's objectives. The purposive sampling ensured that the participants had experiences or characteristics relevant to the research focus. In this case, the participants were students enrolled in the D3 Accounting program at Malang State Polytechnic, specifically those who had completed the Business English course. The selection process was guided by criteria designed to ensure the relevance and reliability of the participants' input. The criteria included students who were actively registered in the D3 Accounting program, those who had successfully completed the Business English 1 course, and individuals willing to participate fully in the research process. This approach ensured that the participants had the necessary background and commitment to contribute meaningfully to the research, providing insights grounded in their specific academic and linguistic experiences. A total of 58 students contributed to this investigation. The participants comprised 28 students in the experimental group and 30 students in the control group, the experimental group received instruction supported by AI writing tools (Grammarly, Chat GPT, QuillBot), while the control group used traditional methods.

This 10-week study compares the writing development of two groups of Accounting Diploma students (n=58) from Politeknik Negeri Malang. All participants complete a pre-test (weeks 1-2). Over the next seven weeks (weeks 3-9), both groups complete three writing assignments with similar difficulty based on the course material. The key difference lies in feedback: the experimental group (n=28) will receive feedback and assessments from AI writing tools (Grammarly, Chat GPT, QuillBot) after each assignment, while the control group (n=30) will not. Finally, all participants take a post-test (week 10) to evaluate their writing progress.

Data Analysis

The data in this study was analyzed using both quantitative and qualitative techniques to provide a comprehensive evaluation of the AI tool's impact. Statistical methods were employed to compare the pre-test and post-test results between the experimental and control groups, allowing for an objective measure of improvement in writing performance. In addition to the quantitative analysis, qualitative methods were used to interpret the data collected from surveys and interviews, offering deeper insights into participants' experiences. The study employed a multifaceted approach to assess the AI tool's effectiveness. This included administering pre- and post-tests to all participants, which helped gauge their improvement in writing over the course of the study. Furthermore, surveys were conducted after each writing task within the experimental group to evaluate the tool's usability and gather immediate feedback. Finally, qualitative interviews were held with participants from the experimental group to capture in-depth perspectives on their experiences using the AI tool. This combination of quantitative and qualitative methods provided a well-rounded analysis of the tool's impact on writing performance and user experience.

RESULTS AND DISCUSSION

Results

Respondent Demographics

The below table illustrates the demographic background of the sample of 58 students:

Table 1. Respondent Demographics

	Category	Frequency	Percentage (%)
Gender	Male	30	51.7%
	Female	28	48.3%
Age	20 Years	20	34.5%
	21 Years	28	48.3%
	22 Years	10	17.2%
Experience in AI Usage	Ever	40	68.9%
	Never	18	31.0%
English Language Proficiency	Beginner	10	17.2%
	Intermediate	30	51.7%
	Advanced	18	31.0%

The majority of respondents were male, with a frequency of 30 people (51.7%), while the remaining 28 people (48.3%) were female. This gender distribution reflects the relatively balanced diversity of men and women in the sample. In relation to age, the large majority of respondents were in the age range of 21 years, namely 28 people (48.3%). A total of 20 people (34.5%) were 20 years old, and the rest, 10 people (17.2%), were 22 years old. This reveals that the vast majority of participants are within the young adult age range which is quite common for diploma level students.

The majorities of the respondents, 40 people (68.9%), had experience using artificial intelligence (AI) technology, while 18 people (31.0%) had never used it. This high proportion of AI users indicates that many participants were familiar with the technology relevant to this study. The respondents' English proficiency was varied, with 30 people (51.7%) at the intermediate level, 18 people (31.0%) at the advanced level, and 10 people (17.2%) at the beginner level. This representation reveals that the large majority of respondents have good enough English proficiency to participate in the AI-based learning program.

Pretest Result

To assess writing skills, a pre-test was administered to 58 students from classes 1A and 1B. Their writing was evaluated using Brown's rubric, focusing on material, terminology, arrangement, and linguistic utilization. The scores were then analyzed statistically with SPSS 20.0 software.

Normal Distribution Test

Table 2. Normality Tests Results

	Kolmogorov-Smirnov*			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Experimental Group	.148	28	.162	.949	28	.239
Control Group	.119	30	.200*	.949	30	.234

While analyzing the pre-test data (Table 2), we observed that the p-values (asymptotic significance values) for both Class 1A (0.162) and Class 1B (0.200) are higher than the usual cutoff points. This leads us to conclude that the data distribution in both groups is likely normal.

Homogeneity of Variance

Table 3. Homogeneity of Variance

		Levene Statistic	df1	df2	Sig.
Pretest	Based on Mean	.016	1	56	.900
	Based on Median	.011	1	56	.918
	Based on Median And with adjusted df	.011	1	55.701	
	Based on trimmed mean	.017	1	56	

Looking at Table 3, the significance value (asymptotic significance) is greater than the chosen level of significance (0.05). In other words, 0.900 is larger than 0.05. This result leads us to not reject the null hypothesis but reject the alternative hypothesis. This implies that the variances in the two groups are likely homogeneous (similar). Since the data appears to be normally distributed (based on previous analysis) and the variances are homogeneous, this suggests that a t-test is an appropriate statistical test to proceed with.

Independent t-test

To determine if students in class 1A and 1B achieved similar results on the pre-test, we employed independent t-test. The table below showcases the findings of the t-test applied to the students' pre-test scores.

Table 4. Independent Samples Test

Levene's test for quality of variance			t-test for Equality of Means						
	F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Pretest Equal variance	.016	.900	-.058	56	.954	-.04000	.68896	1.42525	1.34525
assumed Equal variancenot assumed			-.058	55.930	.954	-.04000	.68896	1.42530	1.34530

The chosen significance level for the independent t-test was 0.05, with a degree of freedom (df) of 48. Table 4 shows the significance value (p-value) to be higher than 0.05 (0.954 > 0.05). This outcome leads us to not reject the null hypothesis and reject the alternative hypothesis. The findings didn't show a major difference in the scores between the two groups. Considering the previous analyses for normality, homogeneity, and the t-test itself, we can infer that both groups likely possess similar writing abilities at the beginning of the study. This supports the initial decision to group students from Class 1A and 1B together as research samples. Subsequently, Class 1A was designated as the experimental group, while Class 1B became the control group.

Post-test Result

After administering the pre-test, a post-test was conducted with the same 58 participants to assess any changes in their academic writing skills following the intervention. The post-test aimed to measure the impact of AI technology on the experimental group compared to the control group. The data obtained from the post-test underwent the same rigorous statistical analyses as the pre-test data to ensure consistency and accuracy. This included tests for normality to verify that the data followed a normal distribution, as well as a homogeneity of variance test to confirm that the variances between the groups were comparable. These checks were critical to ensure that the data met the assumptions required for further statistical testing.

Following these preliminary analyses, an independent t-test was conducted to evaluate potential differences between the post-test scores of the experimental and control groups. This statistical test helped determine whether any observed differences in writing performance were statistically significant, indicating whether the AI intervention had a measurable effect on the experimental group's outcomes compared to the control group, which did not use the AI tool. In addition to the t-test, the effect size was calculated as part of the post-test analysis. The effect size is a crucial measure as it quantifies the magnitude of the differences between the two groups' scores. While the t-test can indicate whether a difference exists, the effect size provides a clearer understanding of the practical significance of that difference. By calculating the effect size, the study aimed to provide a deeper insight into the extent of the AI tool's impact on students' writing performance, offering a more nuanced interpretation of the results beyond statistical significance alone. This comprehensive analysis helped clarify the potential benefits of AI technology in improving academic writing skills, as well as the practical relevance of the observed improvements.

Normal Distribution Test

Table 5. Tests of Normality

	Kolmogorov-Smirnov*			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	df	Sig.
Class 1A	.159	28	.102	.936	28	.122
Class 1B	.149	30	.160	.936	30	.117

Employing a significance level of $\alpha = 0.05$, the post-hoc analysis revealed non-significant p-values of 0.160 and 0.102 for the control and experimental groups, respectively (Table 5). This non-rejection of the null hypothesis indicates a lack of statistically significant differences in scores attributable to the intervention.

Homogeneity of Variance

Table 6. Test of Homogeneity of Variance

		Levene Statistic	df1	df2	Sig.
POSTEST	Based on Mean	.108	1	56	.743
	Based on Median	.115	1	56	.736
	Based on Median and with adjusted df	.115	1	55.9923	.736
	Based on Trimmed Mean	.101	1	56	.751

The analysis maintains a significance level of 0.05. Table 6 reveals a p-value (asymptotic significance value) of 0.743, exceeding the chosen threshold (0.743 > 0.05). The analysis did not yield statistically significant evidence to reject the null hypothesis of equal variance between the both groups.

Independent t-test

Tabel 7. Independent Samples Test

	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	t	Df	Sig(2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Postest Equal Variances assumed	.108	.743	2.753	56	.008	1.60000	.58126	.43129	2.76871
Equal Variances notAssumed			2.753	55.573	.008	1.60000	.43102	.43102	2.76898

With a significance level of 0.05 and 56 degrees of freedom, Table 7 throws a surprising result. The p-value (significance value) is a mere 0.008, significantly lower than the threshold. This flips the usual script: we reject the null hypothesis but fail to reject the alternative hypothesis. In simpler terms, this confirms a statistically significant difference between the average post-test scores of the experimental and control groups. Looking at the bigger picture, the combined analyses of normality, homogeneity, and the t-test on

post-test scores paint a clear picture. It appears that the experimental group's writing scores improved after receiving the intervention. This translates to a significant difference in the average scores between the two groups, suggesting that AI may have positively impacted the students' ability to write business English.

To quantify the magnitude of this impact, an effect size calculation was performed using Coolidge's formula. This calculation takes into account the t-value obtained from the independent t-test and the degrees of freedom (number of samples minus 2). The effect size will provide further insights into the strength of the observed difference in writing abilities between the groups. The data from Table 7 shows a medium effect. The t-value is 2.753 and the degrees of freedom are 56. This translates to a correlation (r) of 0.369, indicating a moderate effect.

The Paired t-test Analysis on Experimental Group Scores

Table 8. Paired Samples Statistics Pre-Test and Post-Test Experimental Group

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pretest	12.0400	28	2.38886	.47777
	Posttest	13.6400	28	1.95533	.39107

Table 9. Paired Samples Test

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
Pair 1 Pretest-Posttest	-1.60000	1.65831	.33166	-2.28452	-.91548	-4.824	27	.000

Students in the experimental group saw a jump in their post-test scores (average 13.64) compared to pre-test scores (average 12.04). This improvement was statistically significant, with a p-value of 0.000 (well below the standard threshold of 0.05). This outcome, revealed through a paired t-test analysis, suggests the null hypothesis can be confidently rejected. In other words, the pre-test and post-test scores demonstrably differed within the experimental group. This strongly suggests that using AI as a learning tool for business English writing effectively enhances students' writing skills. The paired t-test also yielded a t-value of 4.824 and a degree of freedom (df) of 27. Digging deeper, the effect size (r) came in at a noteworthy 0.70, which falls under the "large effect" category according to Coolidge. This substantial effect size reinforces the notion that the AI writing style checker had a significant positive impact on students' revision abilities, indicating the treatment's effectiveness.

The study employed a paired sample t-test to analyze the impact of AI on students' argumentative writing skills. The results were promising: the effect size (r) reached 0.369, signifying a medium effect according to common interpretations. This translates to a significant improvement in students' revision abilities. This positive effect is further highlighted by the pre-test and post-test scores within the group. The average score climbed from 12.04 to 13.64, representing a gain of 1.6 points. This substantial jump underscores the influence of AI style checkers on refining business English writing.

Discussion

The outcome of this investigation revealed that the use of AI-based tools such as Grammarly, Chat GPT, and QuillBot greatly boosted students' academic English writing skills in the Business English course of the D3 Accounting program. This was achieved through a considerable gap in the pre-test and post-test scores of the experimental group compared to the control group. These outputs imply that AI-based tools are capable of offering faster and more in-depth feedback compared to traditional teaching methods, which enables students to correct their mistakes more efficiently and effectively. This tells us that the AI tool has a real and noticeable positive impact on students' writing performance. In additions, students' perceptions towards the use of the AI tool were also positive, with the majority of research participants feeling that the tool helped them in improving the quality of their writing and made the learning process easier. This suggests that in addition to being effective, the AI tool was also well received by the end users, namely students.

These findings align with existing research, suggesting AI's potential as a valuable tool for enhancing argumentative writing skills (Darajat & Kusumaningsih, 2023; Jannah & Isnawati, 2022; Syahira et al., 2023). Syahira et al (2023) found that the use of AI in English learning can help students improve their text writing skills. AI can provide feedback on the quality of writing made in seconds, so that it can improve the quality of student writing.Teacher beliefs can help improve students' English writing skills through digital media (Jannah & Isnawati, 2022). Teachers have an important role in shaping students' understanding of how to learn to teach, so as to increase students' interest and ability in writing English. Students experience difficulties in writing business letters caused by several factors, such as grammar structure errors and difficulties in writing opening and closing salutations. The use of AI can assist students in correcting these errors and improve their ability to write better business letters (Darajat & Kusumaningsih, 2023). Thus, the use of AI as a treatment in business English writing can help improve students' ability in writing, especially in correcting grammatical structure errors and improving writing quality. Hence, incorporating AI into business English education has proven to be successful in enhancing students' writing skills.

Dong (2023) discover that writing tools powered by AI technology is beneficial for enhancing students' writing abilities. This is because the tool is able to provide timely feedback, individualized support, and improve efficiency in assessment. In addition, (Jyi-yeon & Youngsoo, 2023) found that learners found AI-based platforms effective in reducing the burden of English usage, which was particularly beneficial for the affective aspects of learning. While AI tools like Wordtune may show some promise in boosting writing and engagement for second language learners, more research is needed to confirm the long-term benefits on feedback literacy and overall language acquisition (Rad et al., 2023). However, Kim (2023) emphasized the importance of balancing the use of AI technologies to prevent over-reliance and ensure a comprehensive learning experience, including student-initiated grammar sessions. Du (2024) further emphasizes the advantages of incorporating AI technology into English writing instruction. This approach fosters personalized learning experiences, delivers immediate feedback, and promotes interactive engagement. These factors ultimately contribute to enhanced language proficiency and cultural awareness among students.

Leveraging cutting-edge AI proofreading solutions can demonstrably move the needle on student writing outcomes, particularly in the realm of grammatical proficiency (Tedjo, 2022). Additionally, the application of a network of pre-trained transformers (GPT) has been shown to support the creation of accurate business texts, enriching the business report writing process with proper grammatical aspects (Khalil & Pipa, 2022).

Educational platforms such as "51 Learning," powered by AI, are also instrumental in facilitating active learning, critical thinking, and creative solutions in the context of business English teaching, resulting in deep learning and practical skill development (C. Liu, 2020). A new AI-powered feedback system, built on principles of linguistics and psychology, is helping students refine their business writing skills. This innovative tool provides targeted feedback and streamlines the process for both students and instructors (D. Q. Liu, 2021). Overall, the contribution of AI in business English education is not only limited to providing feedback, but also in generating texts as well as facilitating deep learning approaches.

The incorporation of AI into English language learning methodologies has yielded encouraging outcomes in elevating students' written English fluency. AI-driven technologies, such as NLP and ML, present a compelling avenue for the provision of prompt and precise feedback on grammatical errors, vocabulary usage, and deficiencies in sentence structure. This allows students to learn and correct their mistakes in real-time, which is crucial in honing writing skills. In addition, AI can customize learning materials according to individual needs, providing more focused exercises that match each student's ability level. Thus, students can learn at their own pace and get a more personalized learning experience. An investigation conducted within a D3 Accounting program's Business English course highlighted the advantages of AI writing tools. The study demonstrated that students who leveraged these tools achieved a statistically significant enhancement in their writing quality compared to the control group. The integration of AI in learning also allows teachers to focus more on other important aspects of teaching, such as the development of ideas and arguments, which in turn can improve the overall learning process.

Generally speaking, these findings have major consequences for education, particularly the teaching of academic English. Integrating AI technology into the curriculum can be an excellent technique for improving students' writing skills, which can therefore enhance their general academic achievement. Furthermore, these findings emphasize the significance of incorporating technology into education to fulfill the requirements of today's digital youth. Even so, it should be noted that, despite the favorable outcomes, the use of AI in education requires suitable teacher training and supervision to overcome possible limitations and problems. For that reason, this investigation not only presents factual data on the benefits of AI technologies in education, but it also offers a broader perspective.

The author of this study performed a pivotal position as the researcher, overseeing the conception, execution, and analysis of every phase of the investigation. The author's viewpoint, informed by their expertise in English language instruction and the utilization of educational technology, may have impacted the analysis and interpretation of the data. The author acknowledged this inherent bias and implemented several measures to guarantee the legitimacy and reliability of the data. One of the measures implemented was member checking, which involved providing individuals with the chance to examine and validate results according to their own experiences. This guaranteed that the researcher's interpretations aligned with the participants' views, so enhancing the validity of the data. Furthermore, the researcher employed triangulation techniques to gather data from many sources and methodologies, such as written assessments, questionnaires, and qualitative interviews. This facilitated a more all-encompassing viewpoint and mitigated the possibility of prejudice. However, this study does have certain constraints. A primary constraint is the restricted sample size, which only comprises students enrolled in the D3 Accounting program at Malang State Polytechnic. The findings' generalizability to a

broader population is restricted. Furthermore, the study's duration of about 10 weeks may not be adequate to encompass enduring alterations in students' writing proficiency.

To enhance the research, it is advisable to carry out a comparable study with a more extensive sample size and an extended period to assess the enduring effects of utilizing AI-driven writing tools. Additional study might investigate the impact of individual motivation levels and learning styles on the efficacy of utilizing technology for writing instruction. The authors' acknowledgment of these limitations and recommendations for further study reflects their dedication to transparency and thorough scientific investigation.

CONCLUSION

This investigation determined that the utilization of AI-based writing instruments, including Grammarly, Chat GPT, and QuillBot, substantially enhanced the academic English writing abilities of students enrolled in the Business English course at the D3 Accounting program. The research revealed a significant rise in writing scores from the pre-test to the post-test in the experimental group, with the mean score going from 12.04 to 13.64. The observed change was statistically significant ($p < 0.05$), indicating that the AI tool effectively assists students in efficiently improving and enhancing the quality of their writing. Furthermore, the survey findings indicated that 85% of students had a favorable perspective on the utilization of the AI tool. Many students expressed that the technology facilitated the learning process and offered valuable feedback. The study revealed a significant improvement in writing scores from the pre-test to the post-test in the experimental group, indicating that the AI tool effectively assisted students in efficiently enhancing the quality of their writing. Furthermore, students had very favorable opinions on the utilization of the AI tool, as it was perceived to enhance the learning process and offer valuable feedback.

Directly, this finding answers the research question that AI tools do have a positive impact on students' writing skills, both in terms of improvement in writing quality and acceptance of the tools by students. In a broader context, these results demonstrate the great potential of integrating AI technologies in education, especially in the teaching of academic English. The use of AI not only speeds up the feedback and revision process, but also makes the learning process more engaging and in line with the digital needs of today's college students. Therefore, this study makes an important contribution to the literature on the use of technology in education, particularly AI-based pedagogy. The findings also offer practical recommendations for educational institutions to consider the integration of AI in their curriculum, noting that proper faculty training and supervision are necessary to ensure effective implementation and overcome potential challenges that may arise. Thus, this study not only demonstrates the empirical benefits of AI tools in teaching, but also provides strategic insights for the development of a more modern and effective education.

RECOMMENDATION

The findings point towards the necessity for more investigation into the extensive possibilities of AI in enhancing writing instruction. This includes investigating other AI writing tools, long-term effects on students' writing, and how AI can work with different student backgrounds and traditional teaching methods. However, challenges like limited personalization by AI, user resistance, lack of resources, and implementation complexity need to be addressed. By considering both opportunities and obstacles, future research can create a more robust and impactful AI-based approach to teaching English writing.

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