Mediating the Effect of Artificial Intelligence Tools on the Academic Writing Skills of University Students in Kano State, Nigeria

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Abstract

The integration of Artificial Intelligence tools in educational contexts has considerable implications for university students' academic writing skills, often leading to negative outcomes. It is highlighted that Artificial Intelligence (AI) tools provide both benefits and significant setbacks. This study explored the influence of AI tools on the academic writing skills of university students and proposed strategies to mediate AI usage for positive reinforcement of writing skills. A mixed-method design was employed in the study: a quantitative approach for the statistical analysis of the collected data and qualitative approach for content analysis of students' written tasks. The study employed Taro Yamane formulae to select sample size of 320 undergraduate (students) from the target population in the four selected universities in Kano State, Nigeria. Data were collected through questionnaire instrument, as well as the pre-test and post-test written tasks scores of the control and experimented groups. Descriptive and inferential statistics were used in the analysis of the collected data. Findings of the study revealed no significant negative impact of AI tools on the academic writing of university students. In addition, various strategies for the ethical usage of AI-guided tools to improve students' academic writing proficiency were supported by majority of teachers. Therefore, it is concluded that AI tools is a supportive mechanism for enhancing writing skill, if well monitored and regulated. Parts of the recommendations of the study are that AI tools should be integrated into a blended approach alongside traditional approach to improve students' writing skills.

Keywords: artificial intelligence, automated content generation, grammarly, academic writing, AI-guided tools

INTRODUCTION

Academic writing involves active cognitive engagements and logical application of multiple skills, such as organising ideas, structuring of substance, presenting facts, explaining points, selecting appropriate words and adhering to grammatical conventions. However, the increasing rapid advancement of Artificial Intelligence (henceforth, AI) and its subsequent integration/usage in educational context, especially by students (in writing academic discourse) seems to challenge those inherent core cognitive processes/engagements that are involved in academic writing. Admittedly, using AI tools, such as grammar checker (Grammarly), writing assistant (ChatGBT) and Automated Content Generation platforms (Quillbot, WordTune, Grok) by university students is perceived by scholars and researchers as having dual-faceted influence (Marzuki et al., 2023; Hassan & Adebayo, 2025). On the negative influence, Iskender (2023) argued that students' over-reliance on AI tools can lead to diminished critical thinking skills, creativity and originality. It is further argued by Haleem et al. (2022 in Clara & Samuel, 2025) that AI-automated generated contents might be inappropriate/inaccurate in a given context; as generated contents intended to serve as expository discourse might turn out as argumentative leading to mismatch content. In the same vein, the over-simplification of certain (writing) tasks, discourages students to engage deeply with the writing processes, potentially impairing their writing skills development (Bala, 2023 in Ibrahim, 2025). What is more, AI tools can encourage unethical practices resulting in intellectual stagnation and plagiarism (Sakina, 2025 in Ibrahim, 2025). Significant disparities in learning outcome is another identified negative impact of AI tools on students writing skill (Mozumder et al., 2023 in Clara & Samuel, 2025); as not all students have equal access to the tools. Similarly, a study conducted by Hassan & Adebayo (2025) revealed that AI tools have significant negative impact on university students' ability to write good academic discourse.

Despite these concerns on the negative influence, there are also evidences to suggest that AI tools can have potential positive impact in facilitating students writing skills proficiency. For instance, Marzuki et al. (2023) affirmed that AI tools significantly improve students writing skills, stimulate idea generation, reinforce logical expression and enrich vocabulary development. In addition, Bhutoria (2022) and Cohyano et al. (2023) explained that AI tools guide self-directed learning opportunity for students and the ability to identify their writing efficiency. AI tools are also found effective in improving students' grammar and punctuations usage (Tambunan et al. 2022), foster critical thinking and independent reasoning (Nykyporets, 2023 in Clara & Samuel, 2025) and improve

students' paraphrasing skills (Fitria, 2021). Not only that, AI tools can boost students' active engagement and interest in writing processes (Danladi, 2024 in Ibrahim, 2025).

Considering the potential benefits of AI tools and their evident negative influence on students' academic writing proficiency, it is important to provide insights on the effective strategies that can be ethically and judiciously employed to help students leverage these resources for positive maximum utilization, while minimizing the detrimental influences. Therefore, the aim of this study is to examine the impact of AI tools on university students' academic writing proficiency and to explore mediating strategies. This is expected to mitigate the negative impact and improve students' proficiency in creating high-quality academic discourse using the AI tools wisely.

RESEARCH QUESTIONS

The following research questions are set to guide the study:

1- How does the performance of university students taught writing skill with AI-Guided tools compare to those taught through conventional methods?

2- What strategies can mediate the effective use of AI tools to improve university students' academic writing skills?

RESEARCH HYPOTHESES

HO_1- There is no significant difference between the performance of university students taught writing skill with AI-Guided tools and those taught through conventional methods.

METHODOLOGY

The study employed a mixed-methods design that included both quantitative and qualitative approaches. A quasi-experimental method was used with participants divided into control and experimental groups. Initially, a pre-test evaluated the students' writing proficiency. The experimental groups were then allowed to use AI tools to generate ideas for narrative essays over two weeks, while the control group followed conventional teaching methods without AI tools or assistance. After the experiment, a post-test was administered to both groups. The pre-test and post-test scores were compared to evaluate the impact of AI tools on the participants writing skills. In addition, descriptive analysis was applied for the data collected through questionnaire.

The target population of the study was undergraduate students from the four selected universities: Aliko Dangote University of Science and Technology, Wudil, Bayero University, Kano, North-West University and The Nigeria Police Academy, Wudil, all located in Kano State, Nigeria. A purposive sampling technique was employed to select 320 undergraduate (students) using the Yaro Tamane formulae for selecting appropriate sample size for a study. The sample was divided into two groups of 160 for each of the control and experimental groups.

The study collected data two sources. First, students' essays administered during the pre-test and post-test phases. The students' writings were assessed using a set of scoring criteria for evaluating writing task, Writing Assessment Rubric (WARU) developed by Spack & Burden (2015). The rubric is widely used by researchers as criteria for assessing writing associated tasks. It provides comprehensive and all-encompassing guidelines for assessing and scoring writing tasks/essays including content, organization, mechanics, language use and vocabulary as concisely described in Table 1 below:

Table 1

Criteria for Scoring Writing Skills Proficiency

SN	Score	Items Assessed/Marked
1	Content	Topic Sentence, Uniting Ideas and Development
2	Organization	Logical Sequencing and Transition, Organization and Paragraphing
3	Mechanics	Spelling, Punctuation and Capitalization
4	Language Use	Fluent Expression, Grammar, Formal Usage and Clarity
5	Vocabulary	Words Choice and Usage, Appropriate Use of Register, Idioms and Figurative Expressions

Source: Spack & Burden (2015 in Hassan & Adebayo, 2025)

The second source of data was a validated questionnaire; a teachers' questionnaire which is a ten-item structured questionnaire distributed to forty (40) randomly selected lecturers across the four designated universities (ten selected teachers from each of the selected universities). The ten items in the questionnaire seek to elicit data on the impact of AI tools on the mediating strategies for effective and ethically-oriented usage of the AI tools in facilitating excellent academic writing skill among university students.

Data were collected/gathered through validated questionnaire instrument and from the scores of the writing task/essays of the pre-test and post-test (scores). To evaluate the stated hypotheses of the study, a T-test analysis was employed based on the data collected from the test scores. In addition,

descriptive analysis using simple percentages/histogram was employed for the data collected via the questionnaire instruments.

The treatment plan used in this study involved the following stages:

One week was used for the administration of Pre-test for the two groups under the same condition. This means that the two groups were given the same items, as such the groups answer the same questions.

Three weeks were used or spent for the actual teaching of writing skill using two different methods in the teaching processes; conventional and AI-supported. Thus, the experimental group was taught using the AI-guided method, while the control group was taught through the traditional-based or conventional method. The selected topics were based on Narrative and Argumentative Essays. In addition, the selected topics and contents taught in the two groups were the same, only the teaching methods differed.

In the fifth week, post-test was administered to the two participating groups; the experimental and the control groups. The collected results were analysed with a view to determining which of the two methods was the most effective in promoting students' academic performance in academic writing.

Factors considered as intervening or extraneous variable capable of constituting negative influence on the outcome of the study are two: Participant and Situational Variables. The participant variables are those factors related to students' characteristics, their background and training. For instance, one group might have an undue advantage over the other due to differences in socio-economic background, as students from economically sound family can have better access to sophisticated AI tools, smartphones, computers and availability of learning materials. In addition, the classroom size or population of the students is another factor that can influence the academic performance of learners.

To control these factors and ensure that no group had undue advantage over the other, five steps or considerations were applied. First, the selected schools and participants had the same or shared certain characteristics. For instance, the schools had the same standard or near-the-same standard in terms of the socio-economic status of the students; as such both the control and experimental groups were public owned universities. Second, the researcher studied the availability of the instructional or teaching learning facilities in such a way that each of the participating groups had equal access to some facilities. The third consideration that was taken to ensure the control of any intervening variables in the study was the purposive

selection of the sample of the study. In addition, the sample sizes in both the Control and Experimental Groups were the same; there were forty students in each class. Thus, there were four classes for each group with a population of forty participants per class.

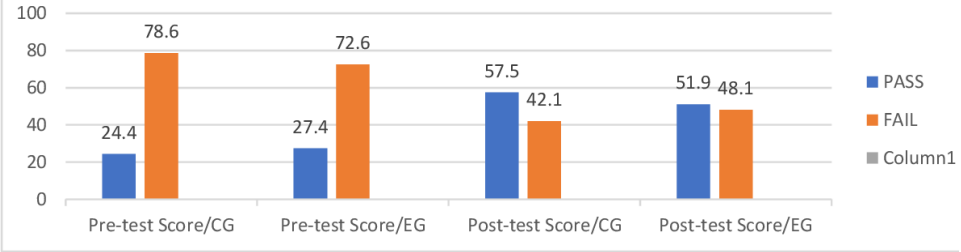
Another expected extraneous variable that might likely influence the result of the study is the Situational Variable which consists of variables like the classroom setting and the students' population in the classroom. To control these variables, the classroom settings were made conducive by providing adequate facilities such as lightening, ventilation, furniture, and space. In addition, forty participants were allowed for each class as over-crowded class setting can interfere with effective teaching and learning processes (Howard, 2019).

RESULTS

1. Mediating Strategies for the Effective Use of AI-Guided Tools to Improve Academic Writing Skills of University Students.

Figure 1

Performance of University Students Taught with AI-Guided Tools and those taught via the Conventional/Traditional Method



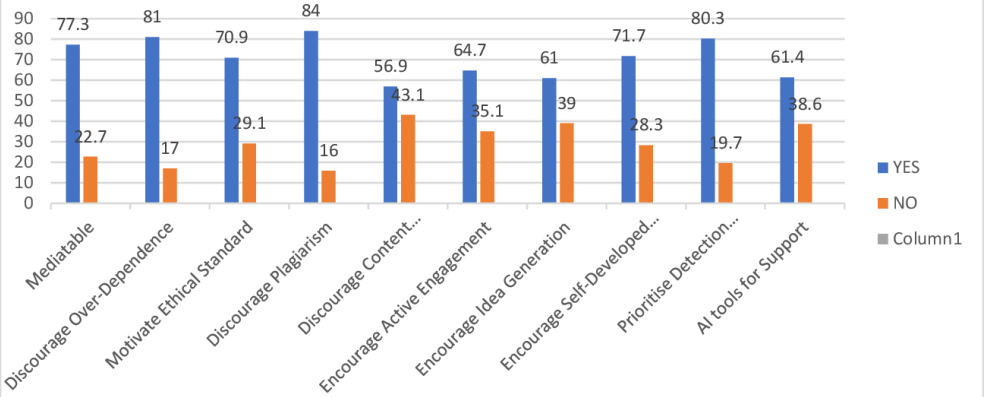
Source: Field Study Generated Data, Dated November/December, 2025

As indicated in the results presented in the histogram above indicate that the pre-test scores for both groups were almost identical, with high failure rates of 78.6% for the control groups and 72.6% for the experimental groups. The pass rates were 24.4% (control group) and 27.4% (experimental group). Similarly, the post-test scores for both groups followed va comparable trend, but demonstrated higher pass rates. The percentages of those who passed were 57.5% for the control group and 51.95 for the experimental group, while the failure rates were 42.1% (control group) and 48.1% (experimental group).

2- Mediating strategies for the effective use of AI-guided tools to improve academic writing skills of university students.

Figure 2

Teachers' Response Patterns on Mediation Strategies for Effective AI Tools Usage to Enhance Uni. Students' Writing Skill



Source: Field Study Generated Data, Dated November/December, 2025

As indicated by the result presented on the Histogram on the mediating strategies that can be adopted to leverage the negative impact of AI tools on the academic writing skills of university students for positive and complementary guide for developing effective writing skills among university students, it is indicated that majority of the respondents have indicated that the negative impact of AI tools on students writing skills is mediatable (77.3%), while minority response (22.7%) showed the opposite. In addition, majority response patterns of 81%, 70.9%, 84% and 56.9% have indicated that the mediating strategies of discouraging students over-reliance on AI tools (81%), motivation of ethical standard among students while using AI tools (70.9%), discouraging the unethical habit of plagiarism (84%) and discouraging automated content generation (56.9%) are parts of the possible strategies that can be used by teachers to mitigate the negative impact of AI tools on students' academic writing skills, while minority responses of 17%, 29.1%, 16% and 43.1% showed the contrary. In addition, encouraging students' active participation in all the stages of writing activities is indicated by 64.7% as the effective strategy for mitigating the negative impact of AI tools on students writing skills, while 35.1% have contrary perspective. Again, 61% and 71.7% majority responses indicated the strategies of stimulation of self-generated ideas and independent logical development of self-generated ideas by students as viable strategies for mitigating the negative impact of the AI tools on students writing skills. Furthermore, it is indicated by 80.3% that prioritization of detection mechanism by teachers for AI-generated contents, as well as the use of AI tools as a collaborative guide in stimulating writing skills (61.4%) as parts of the mediating strategies, on

the other hand, the response patterns of 19.7% and 38.6% show the contrary. Overall, it is revealed by the majority of the respondents that the negative impact of AI tools on students writing skills can be effectively mediated or mitigated through the application of effective strategies which can positively transform the AI tools as complementary mechanisms for enhancing students' ability to write excellent academic discourse devoid of unethical practices.

3. Differences in the academic performance of university students taught writing skills with AI-Guided tools and those taught via conventional method.

Table 2

Differences in the Academic Performance of Students in Writing Task Based on Conventional and AI-Guided Tools

	Pre-test Scores					Post-test Score				
Approaches	**N.**	**Mean**	**SD**	**%Pass**	**%Fail**	**N**	**Mean**	**SD**	**%Pass**	**% Fail**
Conventional.	**160**	**6.5**	**5.7**	**24.4**	**78.6**	**160**	**8.0**	**6.5**	**57.5**	**42.1**
AI-Guided	**160**	**6.1**	**5.5**	**27.4**	**72.6**	**160**	**7.0**	**5.8**	**51.9**	**48.1**

Source: Field Study Generated Data, Dated November/December, 2025

As shown in Table 2, the results indicate that majority of the students in the control group performed poorly in the test, as majority of the subjects which represents 78.6% failed the test, while only 24.4% passed the test. On the other hand, majority of the subjects in the pre-test scores of the experimental group which represents 72.6% failed, while 27.4% passed the test. This has obviously indicated that majority of the students in the two groups had poor academic performance in the pre-test scores.

In the post-test score analysis of the two groups, majority of the subjects in the control group which represents 57.5% passed the test and that indicates evidence of good academic achievement among those subjects who were taught via the use of the conventional approach, while 42.5% failed the test. However, majority of the subjects in the experimental group which represents 51.9% passed the test which signifies evidence of high academic achievement among majority of the subjects who were taught via the application of the AI-guided tools, while 48.1% failed the post-test. The pre-test and post-test performances of the participants in the two groups are nearly the same.

Table 3:

Summary of Independent Sample T-test on Pre-Test Score of the Differences of the Academic Performance on Writing Tasks of the Two Groups

Approaches	N	Mean	SD	df	t-calculated	t-critical	sign. (2 tailed)	Decision
Conventional	160		5.5					
		6.2		318	-0.88	1.96	.05	Retained
AI-Guided	160		5.1					

Source: Field Study Generated Data, Dated November/December, 2025

As shown in Table 3 results indicate that there is no significant difference between the academic performances of the two groups: Control and Experimental Groups in the given writing tasks, as the calculated t- value of -0.88 is less than the t- critical value of 1.96 for a two-tailed test at the .05 level of significance for 318 degrees of freedom. Therefore, the stated null hypothesis is accepted, concluding that the two scores of the pre-test of the two groups did not differ. This means that the pre-test scores show no significant differences in the academic performance between the two groups before their exposure to treatment.

Table 4:

Summary of Independent Sample T-test on Post-Test Score of the Differenceses of the Academic Performance on Writing Tasks of the Two Groups

Approaches	N	Mean	SD	df	t-calculated	t-critical	sign. (2 tailed)	Decision
Conventional	160	5.9	4.4					
				318	-1.79	1.96	.05	Retained
AI-Guided	160	6.6	5.1					

Source: Field Study Generated Data, Dated November/December, 2025

As shown in Table 4, results indicate that there is no significant difference between the academic performance of the students in the control group (taught using conventional approach) and those in the experimental group (taught using AI-Guided tools), as the calculated t- value of -1.79 is less than the t- critical value of 1.96 for a two-tailed test at the .05 level of significance for 318 degrees of freedom. Therefore, the stated null hypothesis is accepted, concluding that the two scores of the post-test of the two groups did not differ.

DISCUSSION OF THE FINDINGS OF THE STUDY

The study's findings did not reveal a significant negative influence of AI tools on the academic writing skills of university students; as AI tools did not improve academic performance on writing tasks. This conclusion is

supported by the tests scores, which displayed similar patterns of academic performance, with the majority of participants in both groups demonstrating poor on the assigned writing tasks, indicating an inability to produce quality academic discourse. In addition, the post-test scores for both groups exhibited similar patterns of high failure rates. This suggests that the use of AI tools by participants in the experimental groups did not lead to improved academic performance. On the contrary, participants in the control group showed evidence of slight improvement, but this was not significantly better than the performance of the experimental group. Therefore, the use of AI tools did not notably hinder writing skill among university students. This further implies that the students' inability to produce high-quality academic discourse is not primarily due to their use of AI tools. Instead, various other factors may contribute to the worrisome issue, which contrasts with the common expectation that university students, as members of an academic community who are extensively exposed to writing, should be able to produce exceptional academic discourse.

As AI tools are not significant in affecting students' ability to write efficiently, this further suggests that the tools can be effectively utilised as an integrative mechanism to enhance the teaching and learning of basic writing skills and those stages involved, thereby fostering collaborative learning. Thus, traditional or conventional approach, which promotes independent thought and creativity, can be effectively implemented by the integration of AI tools to support students' efforts. Furthermore, the negative impact associated with AI tools, which can hinder active students' engagement in the writing processes, can be managed and discouraged. Besides, ethical issues such as plagiarism can be addressed by teachers through the implementation of thoughtful strategies.

The findings support the perspective that AI tools might be useful as a learning-guided tools, if it used via the application of useful strategies capable of those perceived threat posed by AI tools in motivating students' active engagement in the actual writing processes. These strategies include demotivation of unethical usage, plagiarism, wrong use of whole content-generated discourse, use of grammar checker to conceal language deficiencies, motivation of idea generation, wise usage that serve as a guide to effective development of writing, as well as efficient use of detection mechanisms by teachers. These viable strategies, are relevant in de-stimulating the unprecedented negative impact of AI tools on students writing proficiency; as AI tools are incapacitated in teaching the deeper and critical skills of constructing coherent discourse or adhering to rigorous disciplinary conventions. These shortcomings are easily managed

through the conventional approach. This suggests that both AI tools and conventional approach can be used simultaneously reinforcing each other for effective teaching writing skills.

CONCLUSION

Findings of the study demonstrate that AI tools do not have significant negative impact on students' writing proficiency and students' usage of these tools did not automatically translate into improved writing skills; as usage did not facilitate better academic performance. Therefore, it can be concluded that AI tools can be integrated with the conventional approach of teaching writing by a blended strategy based on ethical, critical, original analysis and creativity. It is obvious that teaching academic writing in the AI era cannot be determined by the technology alone, but by the application of a blended approach based on human-centred framework of active engagement of different learning processes that are necessarily involved in meaningful learning context.

RECOMMENDATIONS

The following recommendations are made:

1- Students' use of AI tools should be monitored and adhere to ethical standards.

2- Teachers should implement a variety of strategies to encourage the constructive use of AI tools, enhancing the teaching and learning process.

3- Teachers should employ AI detection mechanisms to evaluate students' writing wit a view to identify content generated by AI that is submitted as original work.

4- AI tools should be integrated into a blended approach alongside traditional writing instruction to improve students' writing efficiency.

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