



Artificial Intelligence Software and the Research Writing Culture of Postgraduate Students in Federal Universities in South - South, Nigeria

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Abstract

Original Research Article

This study examines the extent of influence of AI software on the research writing culture of postgraduate students in Federal Universities in South-South Nigeria. A descriptive survey design was used for the study. Stratified random sampling procedures permitted selection of 381 postgraduate students from a total population of 8,015 at six institutions for the 2024/2025 academic session. A research instrument, consisting of 20 items titled "Artificial Intelligence Software and the Research Writing Culture of Postgraduate Students Questionnaires" (AISRWCPQS), was developed and validated by experts, achieving a high reliability coefficient of 0.89. The result showed that ChatGPT and Grammarly were perceived to be highly valuable and strongly influential on patterns of research writing for both master's and doctoral students. The findings revealed that the extent of influence was substantially greater for doctoral candidates than for master's students. However, the findings identified several limitations, including excessive reliance on these tools, reduced originality of academic work and major concerns with the ethical consequences of their use. As a consequence of these developments, the overall influence of AI software on the academic writing has been substantial and represents increasing urgency for effective and ethical integration of these technologies into programs of postgraduate education. Finally, our results support the view that components of AI literacy and experience with digital methods of writing should be incorporated into programs of postgraduate education to enable students to utilize AI technologies in a manner that is both responsible and consistent with the standards of academic writing.

Keywords: Artificial Intelligence, Academic Writing, Research Culture, Postgraduate Students, Writing Assistants.

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Introduction

Artificial intelligence tools are transforming traditional research practices by enabling writing, editing and content creation, and thereby reflecting a fundamental shift in research culture and scholarly productivity (Kasneji et al., 2023). This transformation

extends across multiple domains in which AI software increasingly replaces tasks requiring human intelligence with those performed by machines (e.g., learning and problem-solving) (Russell and Norvig, 2021). As a result, AI replicates human capabilities of interacting with technology and thereby increases the efficiency



of knowledge creation and application. The development of AI from simple rule-based systems to highly sophisticated applications of deep learning exemplifies the central role of AI in the Fourth Industrial Revolution and leads to major improvements in the generation and use of knowledge in academic and professional settings (Dwivedi et al., 2021). In addition, AI accelerates data analysis and exceeds human capacity for speed and accuracy of performance (Haenlein and Kaplan, 2019). This results in greater efficiency and fewer errors for complex tasks. Finally, applications such as ChatGPT and Grammarly substantially improve the efficiency and accuracy of research writing for graduate students and academics (Biber, 2020). Consequently, our initial efforts with simple rule-based systems have resulted in highly sophisticated tools that substantially increase the efficiency of scholarly work and extend its impact beyond academic settings.

ChatGPT is an advanced AI language model that has achieved wide popularity because of its human-like text generation capabilities and broad support for various writing tasks (Brown et al., 2020). It represents a major advance in NLP, and enables sophisticated text generation, comprehension and interaction (Brown et al., 2020). In contrast to traditional rule-based systems, use of large datasets with deep learning methods produces context-appropriate responses and supports development of essays, computer code and simulations of human conversation. This represents a major transformation in applications of AI to education, communication and research (Dwivedi et al., 2023). Application of deep learning and NLP methods allows explanation of concepts, generation of summaries, development of ideas and improvement of scientific writing (Brown et al., 2020). Processes of brainstorming, paraphrasing and enhancement of language skills are greatly accelerated, and provide substantial benefits for students and researchers seeking to increase efficiency of writing (Johnson, 2023). In addition, we encourage individualized approaches to learning and knowledge acquisition through immediate feedback and thereby increased efficiency of academic work that supports collaborative and innovative approaches to research (Rudolph et al., 2023).

Finally, the integration of deep learning and methods of natural language processing represent a fundamental reorganization of the ways in which individuals interact with writing, with research and with intellectual activity.

Grammarly is an AI-based writing assistant designed to improve the clarity, quality and correctness of written communication. Use of deep learning, machine learning and natural language processing results in detection of grammatical errors, suggestions for improvements in word choice and refinement of sentence structure (Flor, 2021). This utility is especially valuable for non-native speakers of English and for individuals seeking to achieve high standards of academic writing. In contrast with conventional spell checkers, real-time feedback on grammar, punctuation, conciseness and style provides access to an advanced tool for academic and professional writing. Extensive availability of the program is achieved through integration with web browsers, Microsoft Word and Google Docs (Dembsey, 2017). Immediate, individualized feedback with regard to use of English by AI-based programs such as Grammarly promotes independent learning and increases competence in written communication (Li et al., 2022). As a result, the program is widely regarded as a valuable resource for students and researchers, and leads to greater awareness of and corrections for weaknesses in written communication (O'Neill and Russell, 2019). Finally, errors in essays, theses and research reports are substantially reduced. Overall, use of highly sophisticated algorithmic methods with wide compatibility with various computer platforms provides access to a particularly important tool for academic and professional writing (Johnson, 2023).

The technology acceptance model provides a basis for understanding factors that influence users' acceptance of technology. Specifically, perceived usefulness and perceived ease of use are the primary determinants of technology acceptance (Technology Acceptance Model - TAM). Here we apply the model to describe reasons for acceptance of AI-based writing tools for academic work. The influence of AI software on research writing deserve particular attention. ChatGPT produced

coherent, appropriately contextualized text that reflected sentiment, opinion or style as specified in prompts (Radford et al., 2019). As a result, preparation of statistical summaries was facilitated, significance tests were performed and quantitative results were obtained for researchers (Brown et al., 2020). In addition, development and organization of ideas were facilitated by prompts and suggestions to achieve effective written communication (Brown et al., 2020). Finally, efficiency of the writing process was increased and high quality research manuscripts were produced by researchers who integrated use of ChatGPT (Chen et al., 2023). Instant feedback to users during the writing process enabled on-line corrections and improvements that were especially valuable for achieving accuracy in complex academic writing (Smith, 2020). Use of Grammarly improved the clarity and conciseness of writing and provided alternative formulations for excessive or redundant expressions (McCracken, 2018) as well as suggestions for transitions between ideas (McCracken, 2018). Finally, use of the program resulted in detection of text tone and provision of suggestions to achieve compatibility with the intended audience and purpose to produce effects of increased formality, neutrality or friendliness (Kary, 2019).

Statement of the Problem

Research writing represents a fundamental demonstration of students' abilities to generate and communicate scholarly knowledge. Against this background, the present study describes our attempt to evaluate the extent to which AI software influences the research writing culture of postgraduate students in Federal Universities in South-South, Nigeria. Our efforts reflect the interaction of major challenges and emerging opportunities that characterize the current academic environment. Postgraduate students at Federal Universities in South-South Nigeria experience numerous difficulties, including inadequate writing skills, poor grammar, concerns about plagiarism and limited availability of advanced research resources. These limitations ultimately impair the quality of student theses and dissertations. In response to these difficulties, we utilized AI tools that provided assistance with grammar

correction, generation of ideas and reduction of plagiarism. However, because of the widespread availability of these tools, there is very little empirical information concerning their effectiveness for students in our country. As a result, we have developed a major gap in knowledge concerning whether AI tools are actually increasing originality, critical thinking and productivity or, instead, are promoting excessive dependence and gradually impairing student skills with written communication. Finally, the ultimate role of AI software in modifying the research writing culture of postgraduate students remains to be determined, and thus supports the need for our present investigation.

Purpose of the Study

The main purpose of the study was to examine artificial intelligence software on the research writing culture of postgraduate Students in Federal Universities in South-South, Nigeria. Specifically, the study seeks to determine:

1. The extent of influence of ChatGPT on the research writing culture of Masters and PhD Students in Federal Universities in South-South, Nigeria.
2. The extent of influence of Grammarly on the research writing culture of Masters and PhD Students in Federal Universities in South-South, Nigeria.

Research Questions

The following research questions were raised to guide the study:

1. What is the extent of influence of ChatGPT on the research writing culture of Masters and PhD Students in Federal Universities in South-South, Nigeria?
2. What is the extent of influence of Grammarly on the research writing culture of Masters and PhD Students in Federal Universities in South-South, Nigeria?

Research Hypotheses

The following research hypotheses were formulated to guide the study:

- H₀₁: There is no significant difference in the mean responses of Masters and PhD Postgraduate Students on the extent of ChatGPT influence on the research writing culture in Federal Universities in South-South, Nigeria.
- H₀₂: There is no significant difference in the mean responses of Masters and PhD Postgraduate Students on the extent of Grammarly influence on the research writing culture in Federal Universities in South-South, Nigeria.

Research Methods

A descriptive survey design was adopted for this study. The study was conducted in selected Federal Universities in South-South Nigeria. The population for this study comprised 8015 Postgraduate Students in six Federal University in South-South, Nigeria for 2024/2025 session. A sample of 381 postgraduate students was selected using stratified random sampling to ensure representation across disciplines. The researcher developed twenty (20) items research instrument titled: “Artificial Intelligence Software and the Research Writing Culture of Postgraduate Students Questionnaires” (AISRWCPQS) for

data collection for this study. The instrument was face validated by three experts in educational technology and measurement, while reliability testing using Cronbach’s alpha yielded a coefficient of 0.89, indicating high internal consistency. The questionnaire was administered to the respondents by the researcher together with one research assistant. Mean was used to answer the two research questions while the independent sample t-Test was used to test null hypotheses at 0.5 level of significance. Real limit was used as a decision rule for the research questions as indicated in the following order: Very Low Extent = 1; Low Extent =2; Moderate Extent = 3, Great Extent = 4 and Very Great Extent = 5. In order to test the null hypotheses, if the p-value was less or equal to 0.05 ($p \leq 0.05$), the null hypothesis was rejected. Notwithstanding, where p-value was greater than 0.05 ($p > 0.05$), then the null hypothesis was retained.

Results and Discussion

Research Question 1: What is the extent of influence of ChatGPT on the research writing culture of Masters and PhD Students in Federal Universities in South-South, Nigeria?

Table 1: Mean Responses of Students on the extent of influence of ChatGPT on the research writing culture of Masters and PhD Students. (n = 375)

S/N	Items	Groups	Mean1 (PhD) Mean2 (Masters)	Remarks
1	I use ChatGPT to brainstorm ideas in my research topics.	PhD	3.30	ME
		Masters	3.27	ME
2	ChatGPT ensures that my style of academic writing is consistent.	PhD	3.40	ME
		Masters	3.32	ME
3	I use ChatGPT in summarizing large volumes of research literature.	PhD	4.78	VGE
		Masters	4.46	GE
4	I use ChatGPT in rephrasing sentences to avoid plagiarism.	PhD	4.70	VGE
		Masters	3.84	GE

5	I use ChatGPT in formulating research questions.	PhD	4.78	VGE
		Masters	4.46	GE
6	ChatGPT provides researcher with writing assistance by suggesting improvement in grammar.	PhD	3.55	GE
		Masters	3.13	ME
7	ChatGPT assist the researcher in the drafting sections of the research writing.	PhD	3.97	GE
		Masters	3.39	ME
8	ChatGPT serves as a resource for accessing information.	PhD	3.55	GE
		Masters	3.12	ME
9	I use ChatGPT to identify gaps in the existing research.	PhD	3.90	GE
		Masters	3.43	ME
10	I use ChatGPT generate accurate citations.	PhD	3.53	GE
		Masters	3.18	ME
Cluster Mean		PhD	3.95	GE
		Masters	3.56	GE

Source: Field Survey (2025).

The findings from Table 1 reveal that PhD students ($M = 3.95$) relied significantly more on ChatGPT compared with their master's-level counterparts ($M = 3.56$), as reflected by cluster means from Table 1. This pattern illustrates the greater effectiveness with which doctoral-level researchers integrated the tool into their processes of conducting research. However, both groups viewed ChatGPT as a valuable resource for improving their practices of writing research at their respective academic levels. Use of the tool was especially favorable for summarizing literature, formulating research questions and avoiding plagiarism. Both groups reported high effectiveness for these functions, and identified the processes of generating ideas and maintaining consistency of academic writing

styles as providing moderate effectiveness. Overall, both groups perceived ChatGPT as a highly valuable instrument for influencing the culture of research writing, and achieved high overall effectiveness for all dimensions of academic research writing. Finally, the degree of integration of ChatGPT into academic research writing was substantially greater for doctoral than for master's students. In aggregate, our results confirm the utility of ChatGPT for supporting and modifying the practices of research writing at both academic levels.

Research Question 2: What is the extent of influence of Grammarly on the research writing culture of Masters and PhD Students in Federal Universities in South-South, Nigeria?

Table 2: Mean Responses of Students on the extent of influence of Grammarly on the research writing culture of Masters and PhD Students. (n = 375)

S/N	Items	Groups	Mean1 (PhD) Mean2 (Masters)	Remarks
1	Grammarly assist me to identifies common writing errors in research drafts.	PhD	4.70	VGE
		Masters	4.41	GE
2	I use Grammarly to improve the overall quality of academic writing.	PhD	4.78	VGE
		Masters	4.46	GE
3	I use Grammarly to enhance the readability of my research work.	PhD	3.55	GE
		Masters	3.72	GE
4	I use Grammarly to identifying grammatical errors in research manuscripts.	PhD	3.53	GE
		Masters	3.13	ME
5	I use Grammarly plagiarism detection feature to ensure originality in research work.	PhD	3.55	GE
		Masters	3.11	ME
6	I use Grammarly to identify unintentional plagiarism in paraphrased content.	PhD	4.67	VGE
		Masters	3.89	GE
7	Grammarly provides me with instant feedback as I write the research work.	PhD	4.69	VGE
		Masters	4.40	GE
8	Grammarly assist researcher to save time that would be used in proof reading.	PhD	4.59	VGE
		Masters	3.82	GE
9	I use Grammarly to streamline the editing process for research drafts.	PhD	4.67	VGE
		Masters	3.83	GE
10	Grammarly provides me feedback that aligns with journal requirements.	PhD	4.74	VGE
		Masters	3.87	GE
Cluster Mean		PhD	4.35	GE
		Masters	3.86	GE

Source: Field Survey (2025).

The findings in Table 2 indicate that PhD students (mean score = 4.35) experienced significantly greater benefits from use of the grammar-checking software Grammarly than did master's students (mean score = 3.86).

Collectively, these results confirm the importance of Grammarly in developing research-writing cultures for both groups of students. Use of features such as plagiarism detection and optimization of the editing process

was substantially more effective for PhD students and resulted in significantly greater satisfaction with these tools. All students recognized the effectiveness of Grammarly for detection of writing errors, improvement of overall quality of academic writing and provision of immediate feedback. However, PhD students expressed significantly greater satisfaction with all of these attributes. As a result, quality and integrity of work produced by PhD students were substantially improved by use of Grammarly. Although master's students also experienced considerable benefit from use of the program, they provided significantly lower ratings for several aspects of work quality,

especially for improvement of readability and adaptation to requirements for publication in journals. Overall, our results confirm the major effects of Grammarly on development of research-writing cultures at both the master's and PhD levels, with substantially greater benefits achieved by PhD students with use of all components of the program.

Research Hypothesis 1: There is no significant difference in the mean responses of Masters and PhD Students on the extent of ChatGPT influence on the research writing culture in Federal Universities in South-South, Nigeria.

Table 3: t-test analysis of the mean responses of Masters and PhD Students on the extent of ChatGPT influence on the research writing culture (n=375)

S/N	Items	Groups	Mean	t-Values	p-Values	Decision
1	I use ChatGPT to brainstorm ideas in my research topics.	PhD	3.30	.27	.788	NS
		Masters	3.27	.31	.761	NS
2	ChatGPT ensures that my style of academic writing is consistent.	PhD	3.40	.60	.549	NS
		Masters	3.32	.64	.526	NS
3	I use ChatGPT in summarizing large volumes of research literature.	PhD	4.78	6.17	.000	S
		Masters	4.46	9.82	.000	S
4	I use ChatGPT in rephrasing sentences to avoid plagiarism.	PhD	4.70	5.73	.000	S
		Masters	3.84	8.76	.000	S
5	I use ChatGPT in formulating research questions.	PhD	4.78	6.17	.000	S
		Masters	4.46	9.82	.000	S
6	ChatGPT provides researcher with writing assistance by suggesting improvement in grammar.	PhD	3.55	3.22	.001	S
		Masters	3.13	3.69	.000	S
7	ChatGPT assist the researcher in the drafting sections of the research writing.	PhD	3.97	4.07	.000	S
		Masters	3.39	4.97	.000	S
8	ChatGPT serves as a resource for accessing information.	PhD	3.55	3.28	.001	S
		Masters	3.12	3.77	.000	S

9	I use ChatGPT to identify gaps in the existing research.	PhD	3.90	3.39	.000	S
		Masters	3.43	4.03	.000	S
10	I use ChatGPT generate accurate citations.	PhD	3.53	2.79	.006	S
		Masters	3.18	3.10	.002	S

S = Significant at 0.05 level of Significance, NS = Not Significant at 0.05 level of Significance, df = 373.

Source: Field Survey 2025

The t-Test analysis in Table 3 indicated that significant differences were found between the mean responses of master's and doctoral students. For eight of the 10 items, p values ranged from 0.00 to 0.006, and t values exceeded 2.79 to 9.82, all values less than the 0.05 level of significance for 373 degrees of freedom. Consequently, the null hypothesis was rejected for these eight items. In contrast, results for the remaining two items were not significantly different between master's and doctoral students. Observed t values ranged from 0.27 to 0.64, with

corresponding p values of 0.53 to 0.79, all exceeding the 0.05 level of significance. As a result, the null hypothesis was not rejected for these items.

Research Hypothesis 2: There is no significant difference in the mean responses of Masters and PhD Students on the extent of Grammarly influence on the research writing culture in Federal Universities in South-South, Nigeria.

Table 4: t-test analysis of the mean responses of Masters and PhD Students on the extent of Grammarly influence on the research writing culture (n= 375).

S/N	Items	Groups	Mean	t-Values	p-Values	Decision
1	Grammarly assist me to identifies common writing errors in research drafts.	PhD	4.70	5.70	.000	S
		Masters	4.41	8.59	.000	S
2	I use Grammarly to improve the overall quality of academic writing.	PhD	4.78	5.97	.000	S
		Masters	4.46	9.36	.000	S
3	I use Grammarly to enhance the readability of my research work.	PhD	3.55	-1.69	.092	NS
		Masters	3.72	-1.63	.101	NS
4	I use Grammarly to identifying grammatical errors in research manuscripts.	PhD	3.53	3.06	.002	S
		Masters	3.13	3.50	.001	S
5	I use Grammarly plagiarism detection feature to ensure originality in research work.	PhD	3.55	3.31	.001	S
		Masters	3.11	3.80	.000	S
6	I use Grammarly to identify unintentional plagiarism in	PhD	4.67	5.51	.000	S
		Masters	3.89	8.24	.000	S

paraphrased content.

7	Grammarly provides me with instant feedback as I write the research work.	PhD	4.69	5.62	.000	S
		Masters	4.40	8.39	.000	S
8	Grammarly assist researcher to save time that would be used in proof reading.	PhD	4.59	5.43	.000	S
		Masters	3.82	8.06	.000	S
9	I use Grammarly to streamline the editing process for research drafts.	PhD	4.67	5.55	.000	S
		Masters	3.83	8.43	.000	S
10	Grammarly provides me feedback that aligns with journal requirements.	PhD	4.74	5.71	.000	S
		Masters	3.87	8.84	.000	S

S = Significant at 0.05 level of Significance, NS = Not Significant at 0.05 level of Significance, df = 373. Source: Field Survey 2025.

The t-Test analysis in Table 4 revealed that among the 10 items evaluated, nine yielded statistically significant differences in mean responses between master's and doctoral students regarding the influence of Grammarly on research writing culture. With t-values ranging from 3.06 to 9.36 and associated P values between 0.00 and 0.002, all results were below the 0.05 level of significance for 373 degrees of freedom and allowed rejection of the null hypothesis for these 9 items. The only exception was for item 3, for which the null hypothesis was not rejected. In fact, t-values for this item ranged from -1.69 to -1.63 and were accompanied by P values of 0.092 to 0.101 that exceeded the level of significance of 0.05. Consequently, there was no evidence of a difference in mean responses for this item between the two groups of students.

Discussion of Findings

ChatGPT has profoundly influenced the culture of research writing for both PhD and master's students in Federal Universities in South-South, Nigeria, and its effects are reflected in the results shown in Table 1. Higher mean values of responses were obtained for PhD students compared with those for master's students. Among the 10 items evaluated by

hypothesis testing, 8 yielded P values less than 0.05 and thus confirmed large differences in responses between the 2 groups. However, P values for the remaining 2 items exceeded 0.05, and no significant differences in responses for these aspects were detected. As a consequence, ChatGPT has become an essential tool for students and researchers seeking to increase efficiency of writing through functions of brainstorming, paraphrasing and generation of ideas. In agreement with these results, Radford et al. (2019) found that ChatGPT was capable of producing coherent text in response to prompts, and Chen et al. (2023) noted that this resulted in improvements in the quality of research writing. Finally, our results confirm Brown et al. (2020) regarding the importance of quantitative methods of data analysis, of processes of brainstorming and organization of ideas, and ultimately of efficient methods of written communication with use of ChatGPT.

Grammarly exerts a substantial influence on research writing culture for students enrolled in Federal Universities in South-South, Nigeria. Differences in mean scores on measures of writing quality confirmed significantly greater facility with the research writing process among PhD than among master's students. Results of the hypothesis analyses confirmed large differences

between the two groups for all but one of the items, and provided further support for the substantial influence of Grammarly on the research writing process. However, a relatively small difference was found for one item ($p = 0.08$), and this finding is consistent with the interpretation that no significant difference existed between the two groups for this aspect of the influence of Grammarly on the writing process. The ability of Grammarly to correct errors of grammar, provide feedback on style of writing and increase overall clarity accounted for our results. These capabilities have been described previously; for example, McCracken (2018) found that conciseness and coherence of writing were increased by use of alternative forms of wordy phrases and transitional expressions, results consistent with those reported here. Kary (2019) emphasized adjustments in style of writing appropriate to audience and purpose also were emphasized by use of this program, and Smith and McCarthy (2020) noted that real-time feedback for complex academic writing resulted in immediate correction of errors.

Conclusion

Based on the findings of this study, it was concluded that there is a great a great extent of influence of artificial intelligence software on the research writing culture of postgraduate students in federal Universities in South-South, Nigeria. It was further concluded that the research writing cultures of PhD and master's students in Federal Universities in South-South Nigeria were strongly influenced by both ChatGPT and Grammarly, with greater effects on PhD students than on master's students. Use of Grammarly was especially extensive and resulted in highly significant differences in average responses between the two student cohorts for nine of 10 items. Only one item failed to produce a significant difference, further reflecting variability in perception of the extent of influence. Similar results were obtained for use of ChatGPT. Significant differences in average responses between the two student cohorts occurred for eight of 10 items, whereas two additional items did not produce significant differences. Taken together, these results reflect

differences in perception of the magnitude of influence exerted by ChatGPT. As a result, we strongly recommend incorporation of training in AI literacy and digital writing skills into the postgraduate curriculum. This will provide students with experience of and training in appropriate and ethical application of AI technologies to academic writing. Ultimately, our results confirm the increasing importance of AI-based tools in shaping the writing practices of postgraduate students, and support the view that institutional provision of guidance is not only appropriate, but essential.

Recommendations

Based on the findings of the study, the following recommendations are made:

1. Clear policies distinguishing between supportive uses (e.g., grammar checking) and unethical practices (e.g., complete text generation without attribution) should be developed and disseminated by the Nigerian University Commission to define acceptable uses of AI for research writing.
2. Rigor and authenticity of work should continue to reflect the emphasis on original thought, critical analysis and scholarly style by project supervisors even in the presence of AI technologies.
3. Incorporation of training in AI competencies and skills of digital writing into graduate education represents an action that should be undertaken by University administrators to achieve both competent and ethical use of AI for purposes of academic writing.
4. To reduce disparities in outcomes of research writing attributable to financial limitations, provision of access to high-end AI tools should be considered as an additional action by University administrators.

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