Exploring the Influence of Generative AI on Academic Writing among Post Graduate Students of North-Eastern Hill University

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Abstract

This study delves into the burgeoning domain of Generative Artificial Intelligence (AI) and its impact on academic discourse prevalent within the sphere of postgraduate studies. students at North-Eastern Hill University(NEHU), Shillong. By harnessing a quantitative approach, the research surveys students' interactions with AI tools, measuring variables such as AI engagement, literacy, perceived ease of use, and perceived usefulness. The survey employs Likert-scale items to capture nuanced responses, which are subsequently compiled into composite scores for comprehensive analysis via regression models. The results reveal significant positive influence of AI tool use on academic writing output. High levels of AI engagement and literacy correlate strongly with improved writing performance, with the perceived ease of use and usefulness of AI tools also showing strong positive correlations. The study underscores the capacity for AI to bolster academic writing among postgraduate students, highlighting the significance of integrating such technology into the educational ecosystem. It opens a dialogue on the evolving role of AI in education, suggesting the rationale for policies and training that maximize its benefits while upholding academic integrity.

Keywords: Generative AI, Academic Writing, Postgraduate Education, AI Engagement, Educational Technology

1. Introduction

Generative Artificial Intelligence (AI) represents a significant technological advancement in academic writing, characterized by its ability to automate the process of generating text. content based on data inputs. This technology employs sophisticated algorithms, frequently rooted in machine learning models such as GPT (Generative Pre-trained Transformer), to generate text that emulates human writing styles and meets specific academic standards.

The primary application of generative AI in academic contexts is its capability to streamline the research process. Researchers can utilize AI to automatically generate literature reviews, synthesize findings from multiple studies, and even draft sections of research papers. These AI systems are trained on a vast corpora of academic texts, enabling them to comprehend and replicate complex scientific terminology and concepts accurately (Johnson et al., 2022).

Moreover, generative AI plays an essential part in data analysis and interpretation. It can process large datasets to identify trends, patterns, and correlations, presenting these findings in a coherent written format. This not only speeds up the research phase but also guarantees that information interpretation is grounded in statistical rigour, thereby enhancing the reliability of research outcomes (Chubb et al., 2021)

Furthermore, to research and content generation, generative AI significantly contributes to the editing process. AI-powered tools can suggest improvements in grammar, syntax, and style, making academic texts clearer and more engaging. These instruments are in particular beneficial in ensuring consistency in how arguments are presented and terms are used, which is critical in maintaining the integrity of academic work (Selim, 2024).

2.   Use of Generative AI Among Students in Education

In higher education, generative AI is increasingly becoming an instrument for educational enhancement among students. AI-driven applications assist across diverse facets of academic writing, from initial research and note-taking to the drafting and revision of documents. For instance, AI tools can aid students in structuring their research notes into coherent outlines, suggest sections for their papers, and provide templates for standard academic documents such as essays and reports.

These instruments are particularly advantageous in helping students overcome barriers to effective writing, such as difficulties with structure, argumentation, and citation. By providing real-time feedback and suggestions, AI enables students to acquire knowledge and apply academic conventions more effectively. Additionally, AI-driven tutoring systems offer personalized support, adapting to individual learning preferences and providing practice tasks tailored to each student's needs (Rizvi, 2023).

Another significant application is the use of AI in combating plagiarism and fostering originality in student work. Generative AI tools can check drafts for potential plagiarism, verifying that all sources are properly cited and that the student's work maintains academic integrity. Apart from teaching students the importance of ethical writing practices they also assist them enhance skills in paraphrasing and properly integrating source material into their work (Malik et al., 2023).

The application of generative AI to academic writing offers substantial benefits, streamlining complex tasks and supporting rigorous academic practices. As this technology continues to evolve, its role in enhancing both the efficiency and quality of academic writing is expected to grow, providing valuable support to researchers and students alike.

3.   Review of Literature

AI's capabilities extend significantly within academic writing. Programs like ChatGPT can automate tedious tasks such as data analysis, literature reviews, and reference formatting, thereby increasing productivity and allowing researchers more time to engage in critical thinking and substantive analysis (Cooperman & Brandão, 2024). Such tools also promise enhanced accuracy and the capability to democratize access to

scientific writing, providing an equitable environment for researchers for researchers across different geographies.

Nonetheless, the utilization of AI in academic writing is not without its critics. There are concerns about the erosion of essential academic skills such as critical thinking and original content creation. The potential for AI to support plagiarism and reduce the authenticity of student work has led some institutions to implement strict regulations or outright bans on AI tools in academic settings (Schmohl et al., 2020).

The ethical implications of AI in academia are profound. Issues of authorship and the originality of AI-generated content present new challenges in defining intellectual property rights in the age of AI. Furthermore, there is the risk of AI perpetuating biases present in their training data, potentially leading to skewed research outcomes and reinforcing existing stereotypes (Bou-Mehdi, 2024).

Institutions are contending with these challenges by developing new legal frameworks and guidelines to govern the use of AI tools in research and education, intending to retain academic integrity while taking advantage of AI technologies (Weidmann, 2024).

As AI technologies continue to evolve, the academic community must stay vigilant about the continuous impact these tools have on education and research. The integration of AI offers an opportunity to rethink educational paradigms and potentially enrich the learning and research landscape. Yet, it also necessitates a balanced approach to harness its benefits while mitigating risks and ethical concerns.

Integrating artificial intelligence with academic writing and research presents a double-edged sword—offering substantial benefits in efficiency and accessibility, while also posing significant ethical and practical challenges. As such, the academic community must navigate these waters with careful consideration, ensuring that AI tools are used responsibly and do not undermine the foundational elements of academic scholarship.

Institutions must continue to evaluate and adapt their policies regarding AI to foster environments that encourage innovation while upholding stringent ethical standards. The ongoing debate and research into AI's implications will undoubtedly shape the future landscape of academic writing and research.

4. Methodology

This study adopted a survey-based approach, targeting postgraduate students at North-Eastern Hill University (NEHU), Shillong. 100 Participants from 7 departments of the School of Economics, Management and Information Sciences, NEHU, Shillong completed a structured questionnaire featuring Likert-scale items designed to assess their engagement with AI tools, their AI literacy, and their perceptions of the ease of use and usefulness of these tools in academic writing contexts.

The data gathered from this survey were collated into combined ratings for every construct and analyzed using regression analysis. This quantitative method enabled the examination of the relationships between AI-related factors and academic writing outputs among the students, providing insights into the influence

of AI tools on educational outcomes. This format was chosen because of its efficiency in gathering large-sample data, allowing for a broad evaluation of student experiences and perceptions.

5. Data Analysis

The data analysis section explores the impact of AI engagement, literacy, and perceived usability on academic writing outcomes. We aggregated responses into composite scores for five key variables—AI engagement, academic writing output, AI literacy, perceived ease of use, and perceived usefulness—before conducting regression analyses. This process ensures a thorough evaluation of the constructs.

Using regression analysis, we examined the relationships between these composites and academic writing output, assessing the influence of each factor. Calculations included Cronbach's alpha for scale reliability and regression models to ascertain the impacts of AI-related factors on writing performance. This approach yields empirical insights backed by statistical evidence, guiding our understanding of how AI tools contribute to academic writing enhancements in educational contexts.

Table 1:Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.807	.804	5

In the provided reliability statistics, Cronbach's Alpha for a set of five items is reported as 0.807, with the Alpha based on standardized items slightly lower at 0.804. These values indicate a high level of internal consistency between the items within the scale, this implies that the items consistently assess the same underlying construct. An alpha value above 0.7 is generally regarded as admissible in social science studies, which indicates that the scale is suitable for assessing its intended construct effectively. The consistency between the non-standardized and standardized alpha values also suggests that the items are measured on a comparable scale, affirming the robustness of the scale's reliability. Overall, these reliability metrics support the utility of this scale in further research and analysis, providing a dependable measure for evaluating the construct of interest.

Table 2: Inter-Item Correlation Matrix

	AI_engagement Writing_ Output	Academic ease_of_ use	AI Literacy usefulness	Perceived	Perceived
Engagement with AI tools	1.000	.347	.494	.302	.175
Academic Writing Output	.347	1.000	.516	.631	.578
AI Literacy	.494	.516	1.000	.426	.528
Perceived ease of use of AI tools	.302	.631	.426	1.000	.502
Perceived usefulness of AI tools	.175	.578	.528	.502	1.000

The inter-item correlation matrix indicates meaningful relationships among various constructs related to the use of AI in academic settings. Notably, there is a substantial positive relationship among perceived ease of use and academic writing production (0.631), suggesting that ease of use of AI tools significantly enhances their effectiveness in improving writing tasks. Similarly, perceived usefulness is also robustly correlated with the academic writing output (0.578), which indicates that the benefits perceived from AI tools are closely linked to improvements in academic writing quality. AI engagement and AI literacy both show moderate to strong positive correlations with academic writing output, AI literacy, perceived ease of use of AI tools, and perceived usefulness of AI tools, reinforcing the idea that greater familiarity and interaction with AI tools enhance their perceived and actual utility in academic writing tasks. These correlations underscore the importance of usability, functional value, and user engagement in leveraging AI tools effectively in educational environments, suggesting that initiatives to enhance user understanding and ease of use could significantly impact academic performance.

Hypothesis 1

(H1): Increased AI engagement positively influences academic writing output among students.

Table 3: Regression Coefficients for AI Engagement on Academic Writing Quality

Coefficients[a]

Model	Unstandardized B	Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
(Constant)	2.487	.553		4.500	.000
Engagement with AI tools	.418	.114	.347	3.666	.000

a. Dependent Variable: Academic Writing Output

The regression analysis confirms a statistically significant influence of AI engagement on academic writing output. Specifically, the unstandardized coefficient (B) for AI engagement is 0.418, which indicates that for every unit increase in AI engagement, academic writing output increases by 0.418 units. This impact is statistically significant with a p-value of less than 0.001, providing robust substantial proof against the null hypothesis. The standardized coefficient (Beta) of 0.347 illustrates that AI engagement has a moderate positive influence on academic writing output when measured in terms of standard deviations. Additionally, the constant value of 2.487, also significant at $p < 0.001$, represents the baseline level of academic writing output in the absence of AI engagement. These results strongly support the hypothesis that AI engagement positively influences academic writing output, highlighting the beneficial impact of effectively integrating AI tools in educational settings to boost academic performance.

Hypothesis 2

(H1): AI literacy positively influences academic writing output.

Table 4: Regression Coefficients for AI Literacy on Academic Writing Quality

Coefficients[a]

Model	Unstandardized B	Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
(Constant)	2.065	.416		4.959	.000
AI Literacy	.536	.090	.516	5.969	.000

a.   Dependent Variable: Academic Writing Output

The regression analysis results provide strong evidence of a significant positive influence of AI literacy on academic writing output. AI Literacy has an unstandardized coefficient (B) of 0.536 which indicates that for each unit increase in AI literacy, academic writing output increases by 0.536 units. This effect is statistically significant (p-value < 0.001), strongly refuting the null hypothesis. The standardized beta (Beta) of 0.516 implies that, measured in standard deviations, AI literacy has a significant beneficial effect on academic writing production. Additionally, the constant value of 2.065, which is also statistically significant (p < 0.001), represents the expected level of academic writing output when AI literacy is zero. These findings clearly support the hypothesis that AI literacy positively influences academic writing output, emphasizing the importance of AI skills in enhancing academic performance.

Hypothesis 3

(H1): Perceived ease of use of AI writing tools positively influences academic writing output.

Table 5: Regression Coefficients for Ease of Use on Academic Writing Quality

Coefficients[a]

Model	Unstandardized B	Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
(Constant)	1.965	.325		6.042	.000
Perceived ease of use of AI tools	.618	.077	.631	8.060	.000

a. Dependent Variable: Academic Writing Output

The regression analysis results strongly indicate that the perceived ease of use of AI writing tools has a significant positive influence on academic writing output. The unstandardized coefficient (B) for Perceived Ease of Use is 0.618, implying that for each unit increase in the perceived ease of use, academic writing output increases by 0.618 units. This effect is highly significant, as indicated by a p-value below 0.001,

which strongly rejects the null hypothesis. The standardized coefficient (Beta) of 0.631 further demonstrates that perceived ease of use has a substantial positive effect on academic writing output, measured in standard deviations. Additionally, the constant value of 1.965, which is statistically significant ($p < 0.001$), indicates the expected level of academic writing output when the perceived ease of use is zero. These results confirm the hypothesis that greater perceived ease of use of AI writing tools enhances academic writing output, highlighting the critical role of usability in the effectiveness of educational technologies.

Hypothesis 4

(H1): Perceived usefulness of AI writing tools positively influences academic writing output.

Table 6: Regression Coefficients for Perceived Usefulness on Academic Writing Quality

Coefficients[a]

Model	Unstandardized B	Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
(Constant)	1.790	.395		4.537	.000
Perceived usefulness of AI writing tools	.624	.089	.578	7.020	.000

a. Dependent Variable: Academic Writing Output

The regression analysis results robustly demonstrate that the perceived usefulness of AI writing tools significantly and positively influences academic writing output. The unstandardized coefficient (B) for Perceived Usefulness is 0.624, indicating that for each unit increase in perceived usefulness, academic writing output increases by 0.624 units. This relationship is statistically significant, demonstrated by a t-value of 7.020 and a p-value under 0.001, decisively rejecting the null hypothesis. The standardized coefficient (Beta) of 0.578 underscores the strong influence of perceived usefulness on academic writing output when adjusted for the variability of both measures. Furthermore, the constant of 1.790, significant at $p < 0.001$, suggests the baseline level of academic writing output when perceived usefulness is at zero. These findings validate the hypothesis that perceived usefulness of AI tools is a crucial factor in enhancing academic writing outcomes, Emphasizing the necessity of aligning tool functionalities with user needs to optimize academic performance.

6. Conclusion

The results from this study underscore the significant impact of AI tools on scholarly writing among PG students at North-Eastern Hill University, Shillong. The regression analyses indicate that AI engagement, AI literacy, perceived ease of use, and perceived usefulness all positively influence academic writing output. These tools, apart from enhancing the writing process by improving efficiency and effectiveness, also play a significant part in developing students' understanding of academic writing norms.

AI tools are instrumental in helping students manage and enhance their academic work, as evidenced by the robust positive correlations between these AI attributes and improved writing outcomes. These technologies enable a deeper engagement with academic content, facilitate a better understanding of complex concepts, and improve the overall quality of academic writing.

7. Suggestions

Based on the study's findings, it is suggested that:

Institutional Adoption: Educational institutions should consider integrating AI writing tools into their academic programs to support student learning and writing development.

Training Programs: To maximize the benefits, universities should offer training sessions to help students and faculty understand and efficiently use AI tools in their academic work.

Continuous Evaluation: There should be ongoing assessments of AI tool effectiveness, ensuring they are regularly updated with the latest educational standards and technological advancements.

8. Recommendations

Ethical Use Guidelines: Institutions should develop guidelines to ensure the ethical use of AI tools, addressing issues such as plagiarism and the maintenance of academic integrity.

Accessibility Measures: Ensure that these AI tools are accessible to the general students' community, which includes those from diverse backgrounds and with varying levels of technical proficiency.

Research on Long-Term Effects: Further research should be conducted to understand the long-term impacts of AI tool usage on academic skills development, particularly critical thinking and analytical skills.

Customization and Personalization: AI tool developers are encouraged to tailor their products to satisfy the needs of the academic community, enhancing personalization features to adapt to individual learning styles.

In conclusion, while AI tools offer substantial benefits in academic writing, careful consideration and responsible implementation are essential to leverage their full potential without compromising the educational values of critical thinking and original content creation. By addressing these considerations, educational institutions can foster a setting that appreciates technological advancement but also preserves the core principles of academic excellence.

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