



## Integrating Artificial Intelligence in Academic Writing

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### Abstract

*Through the use of deductive axiomatic approach by Padua (2012), this paper has produced a theory on the integration of AI in academic writing. The theory posits that integrating artificial intelligence (AI) in academic writing offers numerous benefits but also presents certain limitations. The primary benefit lies in AI's ability to enhance the efficiency and accuracy of the writing process. AI can automate routine tasks such as grammar checks, plagiarism detection, and citation formatting, thereby allowing researchers to focus on higher-level conceptual work. However, the integration of AI in academic writing is not without limitations. One major concern is the potential for over-reliance on AI. Ethical considerations regarding authorship and intellectual property arise when AI contributes significantly to the writing process. Ensuring transparency about AI's role and maintaining academic integrity are crucial. Furthermore, while AI integration can significantly enhance academic writing through efficiency and support it is essential to address its limitations to fully leverage its potential benefits and thus adopt a policy.*

**Keywords:** artificial intelligence, technology augmentation, ethical responsibility

### Introduction

Academic writing is crucial as it is the primary medium for disseminating research findings and advancing knowledge across various disciplines. It provides a structured platform for scholars to communicate their ideas, arguments, and evidence clearly and coherently, ensuring that their contributions are accessible and comprehensible to the academic community and beyond. According to Tang and Wang (2023), academic writing courses have been created to give students the abilities and information needed to succeed in a variety of educational settings. These educational programs have been specifically created by researchers to help students develop and enhance their writing proficiency in fundamental concepts. Through rigorous analysis and critical evaluation, academic writing fosters intellectual dialogue, promotes critical thinking, and upholds the standards of scholarly integrity (Tang and Wang 2023). Furthermore, it aids in the development of a well-documented body of knowledge that can be referenced, built upon, and challenged, thus driving innovation and progress in diverse fields of study.

The main goal of academic writing is to establish norms, standards, and strategies that are widely accepted in the academe (Ginting & Barella, 2022; Teng et al., 2022; Wilby, 2022). Although academic courses contribute to the advancement of knowledge in a variety of fields, researchers have found that academic writing presents difficulties for both students and novice writers (Cheong et al., 2023). This is supported in the study of Landicho (2020), that majority of the students in Philippine public schools have minimal or no prior experience in writing academic papers or laboratory reports. Urdano, et.al., (2020) even mentioned in their study the skills that students lack in writing. Students have problems in recognizing patterns in text, evaluating the coherence of text, poor vocabulary, organizing information, and insufficient knowledge on the proper citation. Many students struggle with writing academic papers due to the complexity and rigor that this type of writing demands. Academic writing requires not only a deep understanding of the subject matter but also the ability to articulate ideas clearly and logically, adhere to specific formatting and citation standards, and engage in critical analysis and synthesis of existing research. These challenges are often compounded by time constraints, limited access to resources, and varying levels of proficiency in academic writing conventions (Bets, 2021). As a result, students may find the process daunting and

overwhelming, leading to anxiety and difficulties in producing high-quality scholarly work. In full efforts to address these problems, new opportunities like artificial intelligence (AI) are arising to help students and scholars in writing their academic papers.

In the context of Philippine education, it is slowly embracing Artificial Intelligence. In fact, University of the Philippines is the frontier in leading AI discourse in the education sector in Asia (Pascual, 2023). Other institutions, such as De La Salle University, are also offering AI-related courses to prepare students for the evolving technological landscape (ABS-CBN News). According to the survey done by NYSE-listed education technology company Instructure, regarding the employment of generative AI, roughly 46% of respondents who are either students, teachers, or school authorities stated that their institutions have already implemented light guidelines, 28% reported the existence of rigorous guidelines, and the remaining respondents do not have any guidelines. Additionally, the survey revealed that 83% of students use generative AI—like ChatGPT—for writing and research, 52% said they use it to get ready for tests, and 47% said they use it to learn a foreign language. But in order to fully implement AIED, there needs to be a strong technological foundation and enough computer power that are in line with legal frameworks that handle issues like data protection, the digital divide, and the necessity of continuing faculty growth. Experts emphasize the need for ethical guidelines to prevent misuse and ensure that AI benefits are maximized especially in addressing ethical, legal, and practical challenges to ensure its responsible and effective use such as in writing.

Artificial intelligence (AI) and academic writing lies in AI's ability to enhance and streamline the writing process through advanced technologies such as natural language processing (NLP). Writing tools driven by (AI) are one of the emerging technologies that can be used in writing. NLP trained on vast collections of human-written text is a common feature of AI-driven writing tools (Ginting & Barella, 2022; Nazari et al., 2021; Perkins, 2023). AI-driven writing assistants have shown promise in improving students' writing skills, as well as in boosting their confidence and productivity during the writing process, according to a growing body of scholarly research. AI tools can assist students and researchers by automating literature searches, suggesting relevant references, and providing real-time grammar and style feedback. These tools can also help generate outlines, identify gaps in arguments, and ensure adherence to specific formatting and citation guidelines. By leveraging AI, academic writers can focus more on developing their ideas and less on the mechanical aspects of writing, thereby improving both the efficiency and quality of their scholarly work. But concerns have been raised about their potential to encourage dependency or improper use (Machicao, 2019). For instance, ChatGPT and other AI technologies can produce original and logical content that eludes detection by educated academic staff and existing technologies (Perkins, 2023), raising serious concerns about academic integrity.

The objectives of this study are to explore the integration of AI in academic writing, assess its potential benefits, and evaluate its limitations. By investigating how AI can support the writing process, the paper aims to highlight how AI can improve efficiency, enhance the quality of writing, and democratize access to AI tools. The benefits include time savings, increased accuracy in grammar and style, and better access to relevant literature. However, the paper also examines limitations such as the potential for over-reliance on AI, the risk of diminished critical thinking skills, and concerns about data privacy and algorithmic biases. Through a balanced analysis, this research aims to develop a theory providing a comprehensive understanding of the role of AI in academic writing.

## **Methodology**

This paper will develop its theory through the process of deduction. The deductive axiomatic approach begins with a few axioms which are straightforward assertions on the nature of reality. According to Miner, et.al., (2018), the nature of axioms can be used to infer knowledge of the phenomenon. This approach will be used to generate a theory on integrating AI in academic writing.

According to Padua (2012), axioms are logical statements that are assumed to be true, the outcomes of these axioms are the propositions. These propositions are validated by employing the proper approach and particular data. The generated theory has to be accepted after these propositions are



accepted (Zalaghi & Khazaei, 2016). This paper will follow a framework from Padua (2012) which has five steps seen in Figure 1. Each step will be discussed thoroughly below.

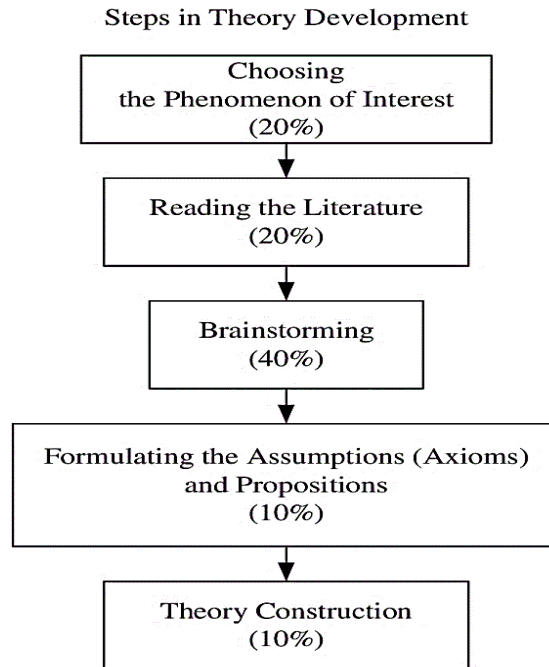


Figure 1. Deductive Axiomatic Approach in Theory Development

**Step 1.** The first step in generating theory using deductive axiomatic approach is to choose or select a phenomenon of interest. The first step is crucial for theory development since this is the focal point which the remaining concepts will be based on. This study has selected a topic that is timely and relevant. Integrating AI in academic writing is crucial as it explores a transformative tool that can enhance the quality and efficiency of research and writing processes. AI can offer significant benefits, such as providing instant access to vast amounts of information, aiding in grammar and style correction, and generating insights through data analysis. However, its limitations must also be considered, including potential biases in AI-generated content, over-reliance on technology which may hamper critical thinking and creativity, and ethical concerns surrounding data privacy and plagiarism. Addressing these aspects comprehensively can help educators and students leverage AI effectively while maintaining academic integrity. The choice of topic shapes the direction of this paper, influencing its relevance to current educational needs and the potential for addressing the gaps in knowledge translation.

**Step 2.** Reading relevant literature is the second step of this approach. Reading literature is crucial in writing research because it provides a foundation of existing knowledge, theories, and methodologies that inform and contextualize new studies. This step also provides the initial formation of axioms which are the primary tool in deductive axiomatic approach. Moreover, engaging with literature allows researchers to identify gaps in current knowledge, build on previous work, and avoid duplicating efforts. It also helps in refining research questions, developing hypotheses, and selecting appropriate methods by understanding how similar problems have been approached in the past. Furthermore, literature reviews enable researchers to critically analyze and synthesize information, fostering a deeper understanding of the subject and contributing to the scholarly dialogue within the field. Thus, thorough literature reading is fundamental to producing rigorous, relevant, and impactful research.

**Step 3.** Brainstorming which has the highest percentage in this approach is the 3<sup>rd</sup> step. Upon examining the body of current literature, this study looked into a variety of facets of the phenomenon



by creating and examining the information and learning many viewpoints on it (Mickenberg, 2017). In order to show the relevance of the phenomenon, convergent alignment of facts and linked articles requires brainstorming (Seeber et al., 2017). These aided the researcher to create axioms relevant to the phenomenon and make propositions that are consistent with the axioms. This phase supports the cohesiveness and coherence of information to be employed in formulating theories (Henningsen & Henningsen, 2018).

**Step 4.** In the process of developing a theory, axioms and propositions must be formulated. This is the step where axioms and propositions are formulated, examined and supported by literature. Axioms are fundamental theorems and presumptions that govern propositions, which are claims derived from them (Novikov, 2011). To create axioms and propositions, the brainstorming results were collected, evaluated, and combined.

**Step 5.** Gabriel et.al. define a theory as a collection of ideas, philosophies, or approaches that are used to make sense of a wide range of observable reality. A theory is also a general assertion of abstract concepts or ideas that support, elucidate, or forecast relationships or connections between numerous phenomena, within the parameters of crucial limiting assumptions that the theory may make explicitly (2008; cited in Torres, 2020). The field's efficient growth, the provision of an analytical framework, and the necessity of the field's practical application to real-world problems all depend on the development of theory. Developing a theory is crucial because it provides a structured framework for understanding, predicting, and explaining phenomena within a specific field of study. A well-constructed theory offers a coherent set of principles that guide research, inform practice, and facilitate the accumulation of knowledge. It allows researchers to identify patterns, establish relationships between variables, and generate testable hypotheses (Gay & Weaver, 2011). Theories serve as a foundation for developing new methodologies and advancing the discipline by integrating existing knowledge and highlighting areas that require further investigation. Theory Development is the final step in the Deductive Axiomatic Approach by Padua, 2012.

## Axioms

Teachers look for approaches utilizing technology to address problems like pedagogical strategies, especially in writing in a way that would be secure, efficient, and accessible (Cardona, et.al., 2023). Naturally, educators are curious about whether the rising advancements in technology in daily life could assist. According to Tewari (2023), by improving instruction methods and revolutionizing learning experiences, artificial intelligence is already changing the educational landscape for both teachers and students. Artificial Intelligence (AI) significantly enhances teaching and learning experiences by providing innovative opportunities for academics to personalize education.

According to Ones, et.al., (2024), personalized learning experiences catered to the needs of each student have been made possible by the use of AI in education. Adaptive learning systems driven by artificial intelligence examine student performance data to design personalized learning pathways that meet each student's knowledge and level of understanding. AI is also changing the way that teachers teach by giving teachers the tools they need to improve instructional pedagogy and automate administrative work. AI-powered technologies can produce interactive classes, create lesson plans, and provide feedback to students.

AI is transforming instructional strategies by giving teachers useful perspectives on the development and performance of students (Chaudhry & Kazim, 2022, Tula, et al., 2023). Large volumes of data can be analyzed by AI-powered analytics tools to find patterns and trends, enabling to provide teachers with the information they need to choose their teaching tactics. Furthermore, AI can automate repetitive chores, such lesson planning and grading, to free up teachers' time for more meaningful student interactions (Falaiye et al., 2024; Ogunjobi et al., 2023). Individualized learning enabled by AI has the potential to completely transform education encounters, modifying instructional strategies, and streamlining administrative procedures. By utilizing AI technology, educators may produce more interesting and productive lessons settings that meet the wide range of learners' demands.

It is, therefore, assumed that **Artificial Intelligence is revolutionizing teaching and learning process (Axiom 1).**

Artificial Intelligence is transforming the way that educators educate by giving them new tools and methods to improve learning, reduce administrative work, and help students develop critical thinking abilities (Alahira, et. al., 2024, Dada, et. al., 2024). Teachers may create dynamic and engaging learning environments that support student achievement by utilizing AI-powered tools for administrative duties, designing interactive classes with real-time feedback, and putting a strong emphasis on supporting learning and fostering critical thinking abilities. AI will play a bigger part in education as it develops, enabling teachers to adjust to the shifting needs of society and students.

Teachers can also benefit from using AI-powered tools to help students have more individualized learning experiences. By analyzing student performance data, these technologies can pinpoint areas in which particular students might benefit from extra help or enrichment (Ali et al., 2024; Usman et al., 2024). AI, for instance, can offer advanced materials to students who are performing well while recommending certain resources or activities to struggling students to help them understand complex ideas. All students can be challenged at the right level and have the opportunity to realize their full potential with the support of this individualized approach to learning.

Another way AI is reshaping teaching methodologies is by incorporating AI tools to writing. Before the emergence of AI, academic writing courses at universities face a number of difficulties. Since writing involves more than just putting spoken ideas into written form, it can be challenging for writers to organize and think through their research before beginning (Ali, 2020; Teng & Wang, 2023) (Hemachandran et al., 2022; Mendoza et al., 2022). Effective scientific writing is further hampered by graduate students' lack of specialized instruction (Cheong et al., 2023). Several rewrites and changes also make the writing process more difficult because many students don't have the necessary writing abilities (Schillings et al., 2023). Negative experiences of students in academic writing courses are further compounded by limited information literacy, time restrictions, and high expectations from lecturers (Cheong et al., 2023). These difficulties can draw attention to the increasing trend among students to use AI technologies in their academic writing in order to improve their writing abilities.

AI writing tools have been there since 2007 (Zhai & Ma, 2022). The first automated internet sports writing tool was launched in North Carolina in 2007 and was called StatSheet. The writing assistance Grammarly was then released in 2009, and then WordSmith and Quill from Narrative Science (Wu et al., 2022). Another notable example of this development is the Chat Generative Pre-trained Transformer (ChatGPT – open AI's GPT-3 model). Large text volumes have typically been sorted and analyzed by academic research using laborious manual processes. Recent developments in natural language processing (NLP) technology, however, have made a lot of these activities automatable. One such system that has showed promise in scholarly study is ChatGPT. Large language model (LLM) ChatGPT can generate text responses that resemble those of a human since it has been trained on a vast corpus of data. It has been clear for a few years now that AI is capable of producing intelligible language, and it is getting harder and harder to tell an AI phrase apart from a human-written one (Labadze et al., 2023). Scientists were already utilizing chatbots as research assistants in 2022, according to a report published in the journal Nature. These chatbots helped scientists create codes, organize their thoughts, get comments on their work, and even recap previous research findings.

In the Philippines, the study of Vacarales, et. al., (2024) entitled Artificial "Intelligence: Tertiary Students Perception of Using ChatGPT in Writing Tasks" of Misamis Oriental showed that students believe that ChatGPT will help them become better writers. The participants expressed agreement that ChatGPT improves their grammar; a mean score of 3.63 and a standard deviation of 1.39 suggest that ChatGPT has an impact. With a mean of 3.93 and a standard deviation of 1.25, punctuation showed improvement as well, confirming its significant influence. Stronger support was given to the influence on sentence structure, as seen by the mean score of 4.84 and the standard deviation of 0.37, indicating its high level of influence. At a mean of 4.94 and a standard deviation of 0.31, ChatGPT was likewise found to be very influential in helping people organize ideas more clearly. Additionally, students thought that ChatGPT was influential because it helped them write



more logically, with a mean score of 3.80 and a standard deviation of 1.36. With a standard deviation of 0.936 and an overall mean score of 4.23 for writing proficiency, it can be said that ChatGPT has a significant impact on improving students' writing abilities. Moreover, Caratiquit (2023) revealed in his study that ChatGPT boosts students' motivation to learn when used as an academic assistance tool. This is achieved through providing useful resources, fast feedback, and interesting features such as in writing that pique students' attention and boost their involvement in their academic pursuits. The correlation shown between ChatGPT and learning motivation implies that ChatGPT has a favorable impact on students' drive to achieve academic success. Additionally, ChatGPT directly increased learning motivation, which had an indirect positive impact on improved academic performance. By fostering pupils' interest, zeal, and drive to learn, this is achieved. Students as a result worked harder, engaged in their studies more, overcame setbacks, and took an active approach to their academic assignments. An increased desire to learn led to this better academic achievement. AI use of computer systems and technologies to carry out tasks that are traditionally linked with human intelligence and cognitive capacities in academic writing education at the university level (Leoste et al., 2021; Kamalov et al., 2023). AI can include programs, tools, and language models specifically for academic writing courses that help teachers and students with different parts of the writing process (Akgun & Greenhow, 2022; Fyfe, 2023; Gardner et al., 2021).

With these studies, it can be assumed that **AI offers techniques for writing academic papers (Axiom 2).**

But as academics embrace AI's potential advantages in writing research papers, concerns regarding AI writing's effects on individual authorship, research integrity, and the distinctive contributions made by human researchers emerge. Artificial intelligence (AI) is capable of processing and analyzing vast amounts of literature quickly, but it is not as sophisticated or contextually aware as human scholars. Relying exclusively on AI for academic writing could result in a loss of human expertise and lead to important ideas being missed or the relevance of some discoveries being interpreted incorrectly.

Wagner, Lukyanenko, and Pare observe in a study on the efficacy of AI in literature reviews that "much remains to be done to support the more repetitive tasks and to facilitate insightful contributions" and that "there is no doubt that these contributions require human interpretation and insightful syntheses, as well as novel explanation and theory building" (2021). Even while AI systems are skilled at producing content based on patterns in training data, they may make unintentional copies of words and ideas by referencing existing literature (Huang and Tan, 2023). If not carefully monitored, this could lead to the accidental insertion of someone else's work into a research paper, which, if discovered, could harm the reputations of the publisher and the author. Upholding research integrity requires maintaining the originality and credit of ideas. Researchers also need to be careful to make sure that AI-generated information is properly cited and does not unintentionally violate ethical standards.

Concerns over AI's potential impact on students' capacity for critical and creative thought have been raised by the introduction of AI into academic writing programs. However, advocates assert that AI technologies can be beneficial and enable rigorous research opportunities (Ali et al., 2023; Perkins, 2023). In academic writing, artificial intelligence also presents ethical questions. The cryptic nature of AI-generated content makes it challenging to detect plagiarism because it may violate intellectual property rights. Additionally, some worry that the use of AI technology in doctoral dissertation writing may impair originality and critical thinking (Alston et al., 2022; Nazari et al., 2021). The researchers did, however, emphasize how crucial teacher supervision is for encouraging creativity and critical thinking. Chaudhry et al. (2023) examined the ethical implications of AI's impact on plagiarism detection, emphasizing the necessity for precise guidelines and educating students on the limitations and appropriate use of AI.

Thus, it can be assumed that although Integrating AI into writing has several benefits still, **there are risks in solely relying to AIs (Axiom 3).**

Using AI writing tools in universities poses a number of ethical concerns, including plagiarism, authorship attribution, transparency, and potential biases in the algorithms, according to a study done by Aljuaid (2023). Due to plagiarism, students may use artificial intelligence (AI) writing tools

to create articles without properly citing the original authors (Chen et al., 2020b; Kuleto et al., 2021). Authorship attribution may arise from the difficulty in determining the author of a written notion, which arise when researchers use artificial intelligence techniques (Scott et al., 2020; Ali et al., 2020). A lack of transparency in the way AI algorithms operate may give rise to questions about justice and responsibility (Gayed et al., 2022; Kim et al., 2022; Makarius et al., 2020).

In September of last year, US-based Hanover Research conducted a survey titled "State of Vocational Education in the Philippines," which found that when students use AI-assisted applications, vocational learning institutions are "less concerned" with plagiarism (31 percent) and "more concerned with issues, such as the loss of creativity and critical thinking" (52 percent) and data privacy (49 percent). Concerns over the potential suppression of creativity and critical thinking skills among students using artificial intelligence (AI) for academic purposes are shared by nearly half of the nation's vocational education institutions.

According to Balasubramaniam (2020), autonomy, anonymity, and privacy are ethical concerns that are interconnected. The foundation of many AI systems' operations is the collection of vast amounts of personal data from various sources. Significant privacy risks could result from the possible misuse of data. AI privacy concerns may occasionally have an impact on people individually as well as on society as a whole. Similarly, ethical issues surrounding autonomy include the degree to which technologies can impact people's consideration of their own autonomy, including worker surveillance, people's ability to make their own decisions, and the potential for man-out-of-the-loop operations and their effects.

Doyal (2023) in his study, ChatGPT and Artificial Intelligence in Medical Writing: Concerns and Ethical Considerations said that one potent tool that can be utilized for a variety of natural language processing applications, including medical writing, is ChatGPT, an OpenAI language generation model. Its use, however, also brings up important ethical issues that need to be properly thought through, such as bias, inaccuracy, privacy, a lack of transparency, and plagiarism. Bias is one main area of interest. Large text datasets are used to train language generation algorithms, and any biases in the training data may show up in the text that is generated. This may result in insulting or discriminating remarks, which would reinforce negative stereotypes. A further issue is false information. material generated using language generation models may not always be factually correct, which could be problematic if the material is used in delicate fields like finance or medical.

Thus, this would suggest that, ***there are ethical concerns regarding the use of AI in academic writing (Axiom 4).***

Artificial intelligence (AI) systems can help with research writing by organizing information, recommending topics, and formatting citations. But jobs like developing ideas and interpreting complex data require more critical thinking, creativity, and contextual awareness than what AI is currently capable of. It is a fair comment made by Narayanaswamy that "NLPs [(Natural Language Processors)] may not be able to fully understand the nuances and complexities of a research topic because they are still machines and not humans." Artificial intelligence (AI)-based models have the potential to fabricate research using fictitious study subjects and statistics, or they might completely distort a piece of a paper and ignore its context (Young, 2023).

Over-reliance on AI technology may impede the development of writing and critical thinking skills (An et al., 2023; Lee et al., 2023). Because AI systems are capable of handling and retaining sensitive data, privacy concerns may arise (Rohde et al., 2023; Sajjad et al., 2023). In the study of Aljuaid (2024), results demonstrate that the employment of AI technologies in academic writing courses has ethical issues, especially with regard to plagiarism, as these tools may inadvertently generate content that is similar to previously published works. Privacy concerns arise when student data is not adequately protected. While an over-reliance on AI may hinder the development of critical thinking and creativity, algorithmic bias has the potential to maintain inequality.

With these several concerns, institutions may need to adopt a policy to address the issues in integrating AI into writing to ensure ethical, equitable, and effective use of technology. Such a policy should consider the accessibility of AI tools, making them affordable and available to a broad spectrum of users, including students and marginalized communities. It should also address privacy



and data security concerns, establishing clear guidelines on the ethical use of data and the protection of user information. Additionally, the policy must promote digital literacy, equipping users with the skills necessary to utilize AI tools responsibly and effectively. By addressing these critical issues, the policy can foster a more inclusive and balanced integration of AI in writing, maximizing its benefits while mitigating potential risks.

The University of the Philippines (UP) is spearheading the nation's AI development. The question still stands for a national institution dedicated to advancing artificial intelligence in the nation: how to encourage the ethical and responsible application of AI while reducing its unfavorable effects. It is therefore adopting the following Principles for Responsible and Trustworthy AI in order to provide guardrails and indicate the way forward on the development and use of AI in the University and the country (UP, 2024).

Harrison Kelly, managing director of Instructure Asia-Pacific, said in a statement that, "it's vital that institutions continue to provide strong support to students as they complete their courses and advance in their lifelong learning journey." This entails overcoming inherent challenges in this rapidly changing educational landscape as well as providing them with the newest technological tools and skills.

According to Michael Poa, the department's spokesperson, the Department of Education (DepEd) will shortly release a set of guidelines on the application of AI in the nation's educational system. Poa added, "The DepEd curriculum strand is currently looking into this and crafting a policy on AI." However, he stated that there is currently no "definite timeline" on whether the policy would be released in time for the 2024–2025 academic year.

Based on that, it could be seen that ***some institutions are considering adopting policies to their curricula to incorporate training on AI tools. (Axiom 5).***

Despite the rapid advancements in artificial intelligence and its potential to revolutionize academic writing, no comprehensive policies have yet been established in the Philippines to guide its integration into the educational system. This lack of regulatory framework leaves a significant gap in addressing critical issues such as accessibility, ethical use, and data privacy. Without clear guidelines, educational institutions and students are left to navigate the complexities and potential pitfalls of AI tools on their own, risking inconsistent and potentially inequitable implementation. The absence of policy also hampers efforts to standardize AI-assisted academic work, which could lead to disparities in educational quality and outcomes. To harness the benefits of AI while ensuring fair and ethical use, it is imperative that policymakers in the Philippines develop and implement robust regulations.



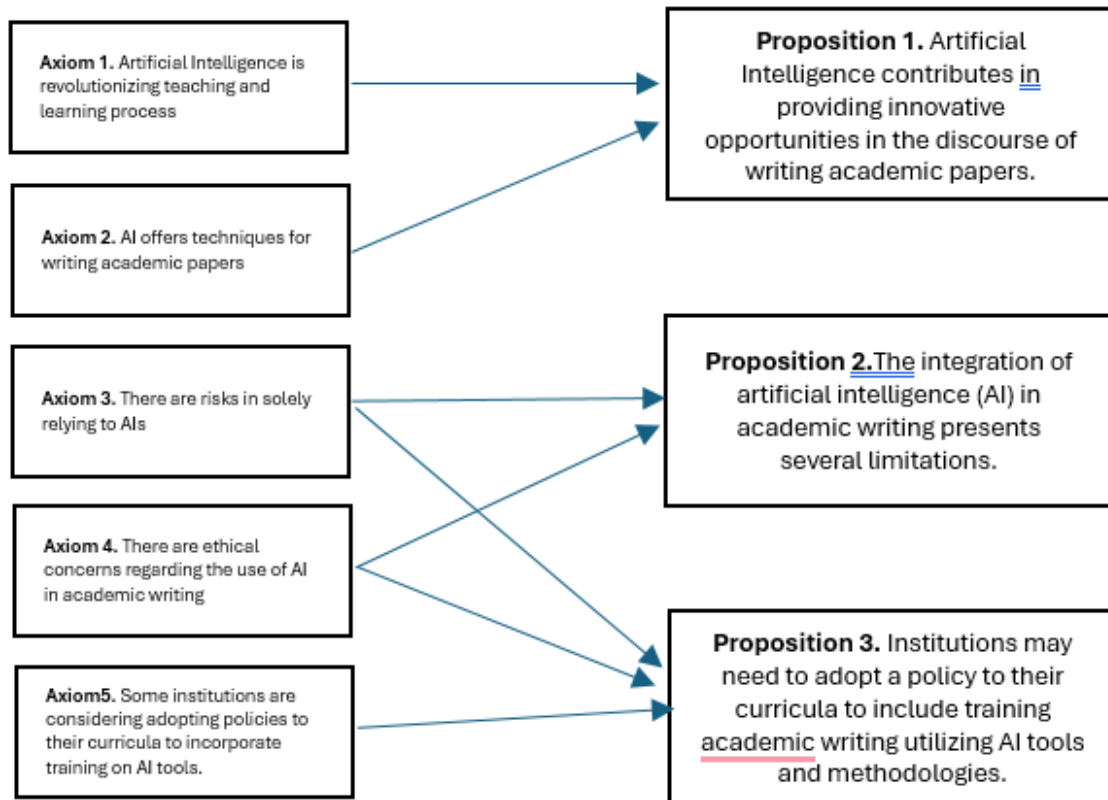


Figure 2. Schematic Diagram of the Axioms and Propositions

## Development of Propositions

### **Proposition 1: Artificial Intelligence contributes in providing innovative opportunities in the discourse of writing academic papers (Axioms 1 and 2).**

To justify the first proposition, **axioms 1 and 2** with supporting literatures above are weaved. With the integration of AI tools—which range from intelligent content generators to automatic grammar checkers—has ushered in a new era of productivity and creativity in the process of publishing scholarly works. AI is a potent tool for researchers, altering everything from the speed and depth of data processing to enhancing teamwork and literature reviews (Young, 2023). Studies have indicated that AI-powered learning resources can support students during various stages of the writing process, such as outlining and drafting, leading to improved composition skills (Gayed et al., 2022; Utami et al., 2023). Salvagno et al. (2023) demonstrated the positive impact of AI on students' confidence and writing prowess. These tools have shown to be beneficial resources for students, especially when it comes to providing quick feedback and improving writing skills. As a result, researchers have shown that AI-driven writing tools improve students' writing abilities by encouraging active engagement, providing timely and tailored feedback, and increasing grading efficiency.

### **Proposition 2: The integration of artificial intelligence (AI) in academic writing presents several limitations (Axioms 3 and 4).**

To justify the second proposition, **axioms 3 and 4** with supporting literatures above are constructed. According to Young (2023), writing is not intrinsically threatened by AI; rather, the danger may come from the way it is incorporated and applied. Without crucial human monitoring, an over-reliance on



AI technologies can result in problems like accidental plagiarism, the loss of individual originality, and a reduction in the caliber of written work. It is crucial to understand that artificial intelligence (AI) is a tool to improve efficiency and productivity, not a substitute for the distinct abilities of human expression, originality, and critical thinking in writing. Else (2023), in a recent study on fake research paper abstracts, shows that one of the main issues with ChatGPT is its remarkable capacity to produce remarkably realistic-looking phony research-article abstracts. Even ChatGPT freely suggests, "ChatGPT is not perfect. Think about verifying crucial information."

**Proposition 3: Institutions may need to adopt a policy to their curricula to include training academic writing utilizing AI tools and methodologies (Axioms 3, 4 and 5).**

To justify the last proposition, **axioms 3, 4 and 5** with supporting literatures above are constructed. In light of these various concerns, organizations might need to create a policy to handle the problems with incorporating AI into writing in order to guarantee the moral, just, and efficient use of technology. The affordability and availability of AI technologies to a wide range of users, especially students and underrepresented communities, should be taken into account in such a policy. Along with addressing privacy and data security issues, it should provide precise standards for the moral use of data and the safeguarding of user information. The strategy should also encourage digital literacy, giving consumers the tools they need to use AI products sensibly and productively. Through the resolution of these crucial concerns, the policy aims to promote a more equitable and comprehensive incorporation of AI in writing, optimizing its advantages while reducing any hazards.

The Philippine government, in particular the Department of Trade Industry (DTI), launched the National Artificial Intelligence Roadmap to provide a framework for users and producers of AI while also providing precise metrics for monitoring how the technology is adopted and used. In addition, several house bills have been filed that are focused on ensuring the innovative yet safe use of AI in the country. This is done to ensure that the benefits of artificial intelligence are harnessed while also protecting the people and the country from potential risks.

Two proposed bills pertaining to artificial intelligence are House Bill 10457, entitled An Act Establishing a National Strategy for the Development of Artificial Intelligence and Related Technologies, which is specifically written to establish the National Center for Artificial Intelligence Research (NCAIR), and House Bill No. 7396, the Act Promoting the Development and Regulation of AI in the Philippines, which covers the creation of the Artificial Intelligence Development Authority (AIDA), which will be responsible for overseeing the use of AI technologies. Even though proposals have been created, there are currently no national standards or necessary laws pertaining to AI, nor are there any rules that are tailored specifically to AI. As a result, the Philippines lags behind other nations in terms of usage regulations and the use of AI.

## **THEORY OF INTEGRATING AI IN ACADEMIC WRITING**

A theory on the integration of AI in academic writing arose, predicated on the sets of axioms created, and it asserts that:

***The integration of Artificial Intelligence (AI) in academic writing is transforming the landscape of education and research. This integration involves utilizing AI tools to assist in generating, editing, and enhancing academic content. The theory posits that AI can significantly enhance the quality and efficiency of academic writing, while also depicting restrictions which necessitates the adoption of policies in the academic curriculum.***

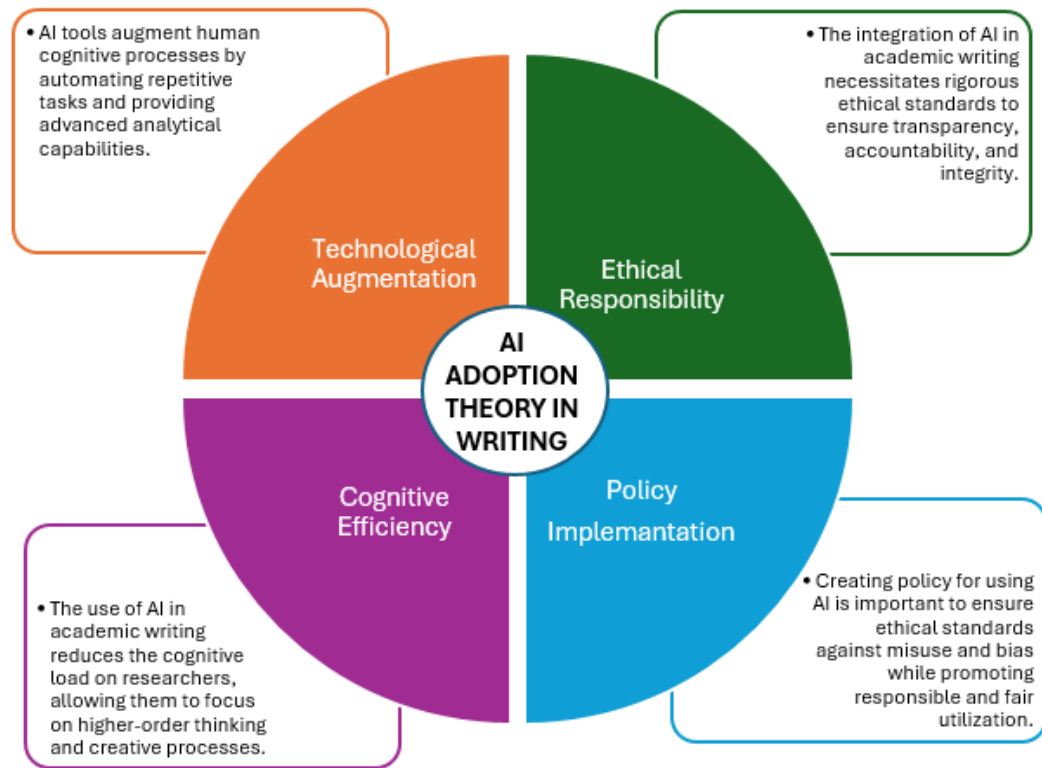


Figure 2. Theory of AI-Enhanced Academic Writing

The Theory of AI-Enhanced Academic Writing suggests that the strategic adoption of AI can revolutionize the academic writing process, leading to more efficient, accurate, and creative outputs. However, it also underscores the importance of ethical considerations and the need for researchers to adapt to new technological paradigms. This theory provides a framework for understanding the transformative potential of AI in academia and offers a roadmap for integrating AI tools in a responsible and effective manner.

**Technological augmentation** in integrating AI into academic writing significantly boosts researchers' efficiency by automating repetitive tasks like grammar checks, plagiarism detection, and citation management. AI tools can analyze large datasets and summarize key findings, expediting the literature review process and enabling scholars to focus on higher-level conceptual work. This integration not only enhances the accuracy and consistency of academic writing but also fosters innovative thinking by freeing up cognitive resources for complex analysis and creative endeavors. Integrating AI into academic writing improves **cognitive efficiency** by automating time-consuming tasks like data analysis, formatting, and grammar correction. This allows researchers to allocate more cognitive resources to higher-order thinking, such as developing novel hypotheses and conducting in-depth analysis. As a result, scholars can produce more rigorous and innovative work while maintaining a high standard of accuracy and consistency. **Ethical responsibility** must be involved in integrating AI into academic writing ensuring transparency about the role of AI in research processes and publications. It requires addressing concerns related to data privacy, algorithmic bias, and the proper attribution of AI-generated content. Establishing clear guidelines and ethical frameworks helps maintain academic integrity and fairness while leveraging AI's capabilities to enhance scholarly outputs responsibly. In all of these, there is a need to **establish guidelines** to govern the ethical use of AI tools, ensuring accountability and transparency throughout the research

and publication processes. This helps mitigate risks such as plagiarism, bias, and data privacy concerns, fostering a responsible and trustworthy academic environment.

The integration of AI in academic writing brings numerous benefits, transforming the way students and educators approach the writing process. AI-powered tools can assist in generating ideas, improving grammar, and providing instant feedback, making writing more efficient and accessible. These tools can also help non-native English speakers and students with learning disabilities, ensuring a more inclusive educational environment (Aljuaid, 2024). However, the use of AI in academic writing is not without its limitations. One major concern is the potential for over-reliance on AI tools, which could hinder the development of critical thinking and writing skills (Young, 2023).

Given these benefits and limitations, it is clear that there is an urgent need to adopt policies regulating the integration of AI in academic writing. Such policies should ensure that AI tools are accessible to all students, regardless of their economic background, and provide guidelines for ethical use and data privacy. Additionally, policies should promote digital literacy, equipping students and educators with the skills to use AI tools effectively and responsibly. By establishing a regulatory framework, policymakers can maximize the benefits of AI while mitigating its risks, fostering a more equitable and effective educational environment.

## **EXISTING THEORIES ON AI IN EDUCATION**

**Automated Writing Evaluation (AWE)** systems use AI to assess and provide feedback on writing. These systems are grounded in theories of formative assessment and feedback, which suggest that timely and specific feedback can significantly improve writing skills. AWE systems like Grammarly and Turnitin provide real-time feedback on grammar, style, and originality, helping students refine their writing through iterative revisions (Al-Inbari 2022).

**Natural Language Processing (NLP) and Machine Learning (ML)** theories underpin many AI applications in academic writing. These theories involve the development of algorithms that can understand, interpret, and generate human language. AI-powered tools such as GPT-4 (the model you are interacting with) use NLP and ML to assist with writing tasks like generating content, summarizing texts, and even co-writing academic papers by understanding context and producing human-like text (Holdsworth, 2024).

**A system model for learning theory.** This theory contends that a three-level (micro, meso, and macro) model of learning that integrates and synthesizes current learning theories may help computational modeling to advance the applications of AI in education. Through the lenses of micro, meso, and macro levels, the suggested causal model explains how knowledge is released and used, as well as aggregated or brought together, both within and between levels. Developmental psychology, computational biology, instructional design, cognitive science, and sociocultural theory were all incorporated into the definition and development of the model (Gibson, 2023). Though drawn from intersecting fields of research implicated in learning, such as complex systems, biology, psychology, computer science, sociology, and pedagogy, we argue that these theories can be unified by their literal and functional similarities. The proposed model is an expansion and integration of existing learning theories. Three historical sources are combined in the proposed unification: cultural-historical activity theory, a cognitive and social science model of how people learn in teams and knowledge communities, and Piagetian theory of individual learning enhanced to form a core mechanism for cognitive, affective, and behavioral learning theories. The goal of the model is to use similarities between all levels and within each level to logically integrate the various learning theories currently in use. As a result, we can more readily. By doing this, we make it easier to think of artificial intelligence (AI) in the broad sense—that is, automated cognition with a high degree of independent agency—as a computational partner for research into the system model's leverage points, or the places where new information and actions can have an impact on the system.

Automated Writing Evaluation (AWE) Theory and Natural Language Processing (NLP) and Machine Learning Theories focus on leveraging AI to improve the quality and efficiency of academic writing. AWE Theory emphasizes the use of AI systems like Grammarly and Turnitin to provide instant,

detailed feedback on grammar, style, and originality, promoting iterative improvements in students' writing. NLP and Machine Learning Theories underpin advanced AI applications, including language models like GPT-4, which can generate, summarize, and enhance written content by understanding and mimicking human language patterns. Both theories aim to enhance the writing process through automation and intelligent feedback, thereby reducing the cognitive load on students and enabling them to focus on higher-order thinking and content development.

The Theory in Integrating AI in Academic Writing, on the other hand, takes a broader perspective, evaluating the overall impact of AI on academic writing. This theory considers both the positive aspects, such as improved efficiency, personalized feedback, and enhanced learning experiences, and the potential drawbacks, including over-reliance on AI, reduced development of critical thinking skills, and issues related to data privacy and academic integrity. While AWE and NLP/ML theories highlight specific technological advancements and their direct applications in writing, the Theory of Integrating AI in Academic Writing provides a holistic view, weighing the pros and cons of AI integration to inform balanced and ethical implementation in educational contexts.

### Conclusion and Recommendations

In this study, AI is integrated as supplementary resource to augment student learning and writing abilities. AI Adoption Writing Theory posits that AI can significantly enhance the quality and efficiency of academic writing, while also depicting restrictions which necessitate the adoption of policies in the academic curriculum. AI-driven applications assist in generating ideas, refining language, and optimizing content for various audiences, enabling writers to produce high-quality work more efficiently. However, this integration also necessitates a careful consideration of ethical implications, including the preservation of academic integrity and the prevention of undue reliance on automated systems. Thus, there is a need to establish guidelines to govern the ethical use of AI tools, ensuring accountability and transparency. This helps mitigate risks such as plagiarism, bias, and data privacy concerns, fostering a responsible and trustworthy academic endeavor.

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