Enhancing Academic Writing with AI Tools: A Framework for Responsible Integration

Joseline M. Santos[1,*], Teody C. San Andres[1], and Keno C. Piad[2]

[1]College of Education, Bulacan State University, City of Malolos, Philippines
[2]College of Information and Communications Technology, Bulacan State University, City of Malolos, Philippines
Email: joseline.santos@bulsu.edu.ph (J.M.S.); teody.sanandres@bulsu.edu.ph (T.C.S.A.); keno.piad@bulsu.edu.ph (K.C.P.)
[*]Corresponding author
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***Abstract*—This study explores the utilization of Artificial Intelligence (AI) in research writing among 509 students and 47 faculty members at a state university in Bulacan. Using a quantitative descriptive research design, a structured survey adapted from the Artificial Intelligence Assessment Framework was administered to assess the frequency and extent of AI tool usage in academic writing tasks such as grammar checking, plagiarism detection, paraphrasing, and data analysis. Descriptive statistics revealed that both students and faculty members commonly use AI applications like Grammarly, ChatGPT, and Quillbot for enhancing grammar and ensuring originality, while AI-driven data analysis and citation tools are less frequently utilized. Independent samples *t*-tests were conducted to determine significant differences in AI usage between the two groups. Results showed no significant difference in the frequency ($t = 1.558$, $p = 0.120$) and extent ($t = 0.692$, $p = 0.489$) of AI use between faculty and students. These findings suggest that AI tools are being adopted at comparable levels across academic roles. The study underscores the importance of institutionalizing AI literacy programs and ethical guidelines to promote responsible AI integration in research writing. The proposed Artificial Intelligence Utilization Scale (AIUS) Framework offers a structured policy guideline for evaluating and disclosing AI usage, ensuring academic integrity and proper attribution in scholarly outputs.**

***Keywords*—artificial intelligence, research writing, Artificial Intelligence (AI) utilization, ethical AI integration, AI literacy**

I. Introduction

Artificial Intelligence (AI) has emerged as a transformative force across various domains, revolutionizing industries and enhancing daily life. From healthcare and finance to education and entertainment, AI applications are vast and diverse, offering innovative solutions and improving efficiency [1]. In research writing, AI tools are increasingly being utilized to streamline processes, enhance accuracy, and support researchers in various tasks [2, 3].

The extent of AI use is significant, and its adoption is expanding quickly across sectors. According to recent reports, AI now outperforms humans in several benchmark tasks and is widely integrated into both professional and personal activities [4, 5]. Studies have shown that AI can assist in preparing manuscripts, writing grant applications, and even peer reviews, making research faster and more accessible [6–8]. For instance, AI-powered tools can help researchers identify relevant literature, generate summaries, and suggest potential research questions [9, 10]. This not only saves time but also enhances the quality of research by providing comprehensive insights and reducing human errors [11].

However, the use of AI has raised ethical concerns. Issues such as algorithmic bias, privacy, and accountability are critical considerations that must be addressed to ensure responsible AI deployment [12, 13]. Algorithmic bias could lead to unfair outcomes, particularly if the data used to train AI models does not represent diverse populations [14–16]. Privacy concerns arise from the vast amounts of data required by AI systems, including sensitive information [17, 18]. Additionally, accountability in AI decision-making processes is crucial, as it can be challenging to determine who is responsible for errors or biases in AI-generated outputs [19–21].

AI policies across different regions and organizations exhibit similarities and differences in governance approaches. The United States and Canada focus on innovation-driven AI policies that promote economic growth and technological advancement with minimal regulatory intervention [22, 23]. The U.S. approach is largely industry-driven, relying on corporate stakeholders and voluntary ethical guidelines, whereas Canada emphasizes research and talent retention to ensure that the country remains competitive in the AI sector. However, both countries face challenges in mitigating AI bias, ensuring data privacy, and addressing workforce displacement owing to automation.

By contrast, the European Union (EU) and United Nations Educational, Scientific and Cultural Organization (UNESCO) adopted a regulation-focused approach that promotes ethical AI use and risk mitigation [24, 25]. The EU AI Act categorizes AI based on risk levels, ensuring strict oversight for high-risk applications, while allowing minimal regulation for low-risk AI. UNESCO's framework, though non-binding, provides global ethical guidelines emphasizing human-centered AI, transparency, and accountability [26]. While these policies foster responsible AI development, they may also slow innovation and impose high compliance costs on startups and small businesses [27].

On a global scale, organizations such as the Global Partnership on AI (GPAI) and Organization for Economic Cooperation and Development (OECD) AI Policy Observatory seek to harmonize AI governance through international cooperation [28]. However, geopolitical differences and inconsistent regulatory approaches pose significant challenges to global AI governance [29]. Ultimately, an optimal AI policy framework would balance innovation with ethical safeguards, ensuring technological progress and human rights protection.

The Philippines' AI policies focus on economic growth, talent development, and ethical AI use through the National AI Strategy Roadmap [30]. Led by Department of Trade and

Industry (DTI), it promotes AI adoption in Business Process Outsourcing (BPO), healthcare, agriculture, and manufacturing, emphasizing public-private partnerships and global collaboration. Although the Data Privacy Act governs AI-related concerns, a dedicated regulatory framework is lacking [31]. Challenges include infrastructure limitations, funding gaps, and job-displacement risks. To fully harness AI's potential of AI, the Philippines must strengthen regulations, invest in technology, and enhance digital literacy, ensuring responsible AI development that aligns with global standards and economic sustainability [32].

Despite these advancements, there are still gaps in the literature regarding the use of AI in research writing, particularly in understanding its full potential and limitations [15, 33–35]. Although AI tools can significantly enhance research productivity, there is a need for more comprehensive studies to evaluate their long-term impact on the research process and outcomes [36]. Furthermore, the application of AI in research writing raises questions regarding the role of human creativity and critical thinking in the research process [3]. As AI tools become more sophisticated, it is essential to ensure that they complement rather than replace human researchers [37].

Despite the growing presence of Artificial Intelligence (AI) in academic settings, there remains a lack of empirical data on how faculty members and students utilize AI tools in the research writing process. While AI is becoming increasingly accessible, its role in shaping academic outputs—whether as aids for grammar correction or tools for content generation–remains underexamined in higher education. This gap presents a pressing concern, especially as institutions face mounting challenges in upholding academic integrity amid evolving digital technologies. The urgency of this issue lies in the absence of clear standards for AI use in scholarly work, leaving both educators and learners vulnerable to misuse, misattribution, and over-reliance on AI tools. This study sets apart the development of an Artificial Intelligence Utilization Scale (AIUS) in research writing, an original framework designed to assess and guide the ethical, pedagogical, and policy-driven integration of AI in academia.

AI has the potential to revolutionize research by offering innovative solutions and improving efficiency. However, it is crucial to address ethical issues and gaps in the literature in order to fully harness its benefits. This study aims to provide a comprehensive understanding of the use of AI in research writing and contribute to the development of guidelines for its responsible and effective use in academic research. In doing so, it seeks to ensure that AI serves as a valuable tool for researchers, enhancing their work while maintaining the integrity and quality of the research process. At the end of the study, the researchers aimed to develop a policy that would set the standard of a state university in Bulacan for the integration of AI in research writing.

II. Literature Review

A. Educational AI Policy Development

The integration of Artificial Intelligence (AI) into education has prompted significant discourse on the need for well-defined policies that address both opportunities and challenges in its implementation. Various studies have emphasized the importance of institutional governance, ethical considerations, and tailored policies to ensure responsible AI use in academic settings. In particular, there has been growing recognition of the necessity for structured AI policies that align with national and international frameworks, as seen in European institutions that are strengthening their governance structures to effectively regulate AI [38]. Research suggests that the adoption of AI in education must be supported by institutional frameworks that not only encourage innovation but also safeguard ethical considerations and academic integrity.

The literature also highlights the necessity of developing tailored AI policies, rather than adopting a one-size-fits-all approach. Since different educational institutions have varying levels of technological expertise among educators, AI policies must be customized to suit their unique contexts [39]. This study suggests that AI guidelines should be designed to accommodate different pedagogical needs, technological capacities, and institutional priorities. This approach ensures that AI technologies can be effectively utilized in education without overwhelming educators or creating disparities in access to technological resources. By implementing adaptive policies, institutions can maximize the benefits of AI while addressing the potential challenges related to digital readiness and inclusivity.

One of the most pressing concerns in the development of AI policy is the ethical use of AI tools in education. The study raised issues regarding academic integrity, bias in AI-generated content, and the use of generative AI in student assessments [40]. The increasing reliance on AI-powered tools such as automated grading systems and AI-assisted research has led to calls for clear ethical guidelines to prevent misuse and uphold academic standards. Institutions are actively formulating policies to regulate the use of AI-generated content in student work, ensuring that these tools enhance learning rather than compromise originality and critical thinking skills [41].

The roles of AI in English as a Foreign Language (EFL) and English as a Second Language (ESL) education have also been explored in recent research. AI-powered tools such as ChatGPT have shown potential to create interactive and personalized learning experiences for language learners [42]. This study indicates that AI can assist in providing scaffolding, automated feedback, and engaging language exercises that support learner motivation. However, effective integration of AI in language instruction requires clear policies that guide teachers on ethical and pedagogically sound applications. Without proper guidelines, there is a risk that AI-generated content may be used to diminish critical engagement and authentic language learning.

The literature underscores the importance of structured AI policies in education, focusing on institutional governance, ethical considerations, and tailored frameworks in diverse learning contexts. As AI continues to evolve, educational institutions must develop comprehensive policies that balance technological advancements with ethical and pedagogical concerns. Future discussions should explore the best practices in AI policy implementation to ensure that AI serves as a tool for enhancing education while maintaining integrity and inclusivity.

B. Ethical Awareness and AI Application in Research

Studies emphasize that an ethical approach is crucial when integrating AI into research because its misuse or lack of ethical considerations could compromise scientific credibility. Researchers who lack ethical awareness but apply AI extensively risk negative research consequences, aligning with the "Triple-Too Problem" discussed by the authors of [43], where ethical principles remain abstract and impractical.

The need for a user-centered, realism-inspired approach has also been emphasized in the literature, particularly to bridge the gap between high-level ethical guidelines and real-world research applications [43]. This is especially relevant for researchers with low ethical awareness and AI impact, who require structured guidance to ensure responsible AI integration [44]. Additionally, studies on AI automation in misinformation detection stress that AI can enhance research accuracy; it must be ethically implemented to prevent unintended biases or ethical breaches [45].

The increasing discussions on ChatGPT and advanced AI ethics reflect growing scholarly and public concerns about the societal impact of AI. This resonates with the findings of Ref. [46], where varied ethical awareness levels influenced AI applications. Those with high ethical awareness demonstrate responsible AI use, whereas others underutilize AI due to ethical concerns. These insights collectively underscore the need for targeted AI ethics training to balance ethical responsibility and the transformative potential of AI in research.

C. The Role of Artificial Intelligence (AI) in Academic Writing

The integration of Artificial Intelligence (AI) into academic work has been a growing area of research, with varying levels of adoption observed across different institutions. A study conducted at the University of Duhok (UoD) found that only 36.94% of participants had utilized AI technologies in their academic work [47]. This relatively low percentage suggests that, while AI tools are available, their adoption among academics in this region remains limited. Factors such as a lack of familiarity, resistance to change, or inadequate training may contribute to this low level of integration.

AI technology has undergone significant transformations over the last century, evolving from a concept often associated with negative implications to becoming an essential tool across various fields [48]. The increasing reliance on AI in academic and scientific writing highlights a shift in perception, with more professionals recognizing its potential to enhance productivity and efficiency. This evolution underscores the growing acceptance and integration of AI technology in professional and academic settings.

AI tools, particularly ChatGPT and other Generative AI (GenAI) applications, have been identified as significant aids for scientists, researchers, and students. These AI-driven tools facilitate the writing process by helping in drafting, structuring, and refining scientific articles [49]. The ease with which AI can generate coherent and well-structured content allows researchers to focus on the analytical and interpretative aspects of their work, rather than spending excessive time on writing mechanics. Moreover, AI-augmented writing has been shown to enhance readability, language diversity, and informativeness, making academic writing more accessible and engaging [50]. These improvements indicate that AI is a valuable resource for scholars striving to enhance the clarity and impact of their work.

In addition to benefiting researchers, AI tools have also been increasingly adopted among students. Research indicates a significant rise in both familiarity with and usage of AI-driven writing tools among students, suggesting that integrating AI into academic instruction can enhance student engagement [51]. By incorporating AI into academic writing courses, educators can equip students with the skills necessary to effectively leverage these technologies, thereby improving their writing proficiency and overall academic performance.

The reviewed literature emphasizes the transformative role of AI in academic writing. Although adoption rates vary across institutions, the potential benefits of AI tools, particularly in enhancing writing quality and efficiency, are widely recognized. The increasing familiarity with and use of AI among students further suggests that integrating AI into academic curricula can foster better engagement and skill development in academic writing.

D. AI Frameworks

Zhou and Schofield [52] presents a conceptual framework for integrating Artificial Intelligence (AI) into the curriculum, building on prior research and AI integration efforts. It draws from existing frameworks, AI literature, and case studies from the Queen Mary University of London's AI literacy project. This study aims to develop a teaching and learning toolkit to help educators enhance students' AI literacy and skills. It has two main objectives: (1) developing an AI literacy framework to assist educators in AI integration, and (2) providing practical suggestions for engaging with the framework in teaching and learning contexts.

Perkins *et al.* [53] shows the transformative impact of Generative AI (GenAI) in education, highlighting both its pedagogical benefits and ethical challenges. To facilitate its integration into assessment, it introduced the AI Assessment Scale (AIAS), a practical tool that helps educators determine appropriate levels of GenAI usage based on learning outcomes. IAS ensures clarity, fairness, and transparency for students and institutions while balancing the opportunities and limitations of GenAI in education. Additionally, this paper advocates shifting the discourse from GenAI as a tool for misconduct to one that enhances teaching and learning through responsible implementation.

Both studies underscore the transformative role of AI in education, emphasizing its potential to enhance teaching, learning, and assessment. While recognizing the challenges associated with AI integration, they advocate ethical, structured, and transparent implementation strategies.

III. Objectives of the Study

The primary objective of this study was to assess the frequency and extent of Artificial Intelligence (AI) use in research writing among faculty members and students at a state university. Specifically, it examines how AI tools are

integrated into various stages of the research writing process, ranging from grammar checking and plagiarism detection to content development and data analysis. By identifying usage patterns, this study seeks to determine whether there are significant differences between faculty and student AI usage, using statistical analyses such as t-tests to support the findings. This study also intends to address the growing need for academic institutions to guide ethical and effective AI integration. To this end, this research culminates in the development of the Artificial Intelligence Utilization Scale (AIUS) framework, which serves as a proposed policy reference for promoting responsible, transparent, and pedagogically sound use of AI in academic research writing.

IV. Materials and Methods

This study employed a quantitative research design with a descriptive approach to examine the utilization of Artificial Intelligence (AI) in research writing in terms of the most commonly used AI applications by respondents, how they use AI in research writing, and the extent of use based on percentage.

The primary instrument used in this study was a structured survey questionnaire developed to assess the frequency and extent of Artificial Intelligence (AI) utilization in research writing among 509 student respondents and 47 faculty members from a state university in Bulacan. The instrument was adapted and modified from the framework proposed by Ref. [36] and aligned with the Artificial Intelligence Assessment Framework proposed by the authors of [53] to suit the objectives of the study. It consisted of four main sections: (1) demographic profile, which gathered basic information such as age, year level, teaching experience, and college affiliation; (2) AI tools used, which identified specific AI applications commonly used by the respondents; (3) frequency of AI use, where participants rated how often they used AI for research writing tasks, such as grammar checking, paraphrasing, and plagiarism detection, using a Likert scale; and (4) extent of AI use, which asked respondents to estimate the percentage of their research writing assisted by AI, categorized into usage levels ranging from 0% to 100%. The instrument underwent content validation by experts in AI-assisted research and methodology to ensure clarity and relevance. A pilot test was conducted to establish reliability, and internal consistency was confirmed using Cronbach's alpha. Data gathered through the instrument were analyzed using descriptive statistics and inferential methods, particularly independent sample t-tests, to determine whether significant differences existed between the AI usage patterns of faculty and students in terms of both frequency and extent.

All faculty members and students were invited to complete the questionnaires. A total of 47 faculty members and 509 students voluntarily participated in the survey. Most student respondents were 21–25 years old, with 67.39% coming from the College of Engineering. Regarding academic standing, most students were in Year 3 (34.18%) or Year 4 (39.88%). Faculty respondents exhibited a diverse demographic distribution regarding their teaching experience, with the majority specializing in professional courses (55.32%) and specialization courses (42.55%). The most common age range among faculty members was 37–52 (48.94%).

Statistical analysis was conducted to determine the significant differences in AI usage and its extent among the respondents. The Artificial Intelligence Assessment Framework by the authors of [53], literature review, along with the survey results, served as the foundation for developing the Artificial Intelligence Utilization Scale (AIUS) in research writing.

V. Result and Discussion

A. AI Applications Used in Writing Research

AI applications come in various forms, all designed to enhance efficiency and support users in creating smarter and more effective work. Both faculty members and students shared the AI tools they frequently used, highlighting the growing integration of AI in academic and professional tasks.

The tables below show the top ten AI apps used by the faculty and students.

Table 1. Descriptive analysis of AI applications used in research by the faculty

AI Applications	Frequency	Rank
Grammarly	30	1
ChatGPT/OpenAI	29	2
Quillbot	14	3
AI Excel Add-ins (e.g., Data Analysis ToolPak)	11	4
Microsoft Co-pilot	10	5
Mendeley	8	6
Scispace	5	7
Excel AI Add-ins (e.g., ChatGPT, Python Add-ons)	3	9
Google Data Studio / Power Business Intelligence (BI)	3	9
SPSS with AI Enhancements	3	9

Table 1 reveals a clear preference among faculty members for AI tools that support language refinement and content generation, with Grammarly and ChatGPT/OpenAI emerging as the most widely used. This suggests that faculty members primarily engage with AI to enhance writing clarity, correctness, and coherence, which aligns with the demands of academic publishing and instruction. Tools such as Quillbot, also geared toward paraphrasing and summarization, rank next, further reinforcing the trend of leveraging AI for textual refinement.

Notably, more technical or data-driven AI tools, such as AI Excel Add-ins, Microsoft Co-pilot, and Mendeley, show moderate use, while those that support data visualization and advanced analytics (e.g., Power BI, Scispace, SPSS with AI features) are the least utilized. This pattern indicates that faculty may be less inclined or less prepared to integrate AI for quantitative tasks or data presentation, possibly due to either limited training or a greater comfort level with traditional tools in those domains.

This pattern suggests that faculty adoption of AI is strongest when it supplements their writing process, while its use in more specialized or technical aspects of research remains limited. This highlights a potential area for professional development in expanding the faculty capacity for AI integration in data analysis, research management, and visualization tasks.

Table 2 shows that students overwhelmingly favor AI tools that directly support writing, paraphrasing, and idea generation, with ChatGPT/OpenAI, Quillbot, and Grammarly leading by a wide margin. This suggests that students

primarily use AI rather than technical or analytical tasks to streamline the language aspect of research writing, such as drafting, rewording, and improving grammar. The minimal gap among the top three tools reflects how deeply integrated these applications have become in the students' writing process, possibly as a response to increasing academic writing demands and pressure to produce polished outputs.

Table 2. AI applications used in research by students

Indicators	Ave Rating	SD	Description	Rank
Writing Assistance and Grammar Checking	3.53	1.30	Often	1
Plagiarism Detection and Similarity Checking	3.43	1.34	Sometimes	2
Paraphrasing, Summarization, and Content Enhancement	3.13	1.34	Sometimes	3
Proofreading, Editing, and Revisions	3.07	1.34	Sometimes	4
Content Structuring and Formatting	2.98	1.24	Sometimes	5
Citation and Reference Management	2.89	1.23	Sometimes	6
Literature Review and Research Paper Discovery	2.87	1.28	Sometimes	7.5
Research Paper Writing and Drafting	2.87	1.24	Sometimes	7.5
Abstract and Executive Summary Writing	2.71	1.31	Sometimes	9
AI for Statistical Analysis	2.67	1.33	Sometimes	10
Data Analysis	2.65	1.23	Sometimes	11
Research Topic Generation and Idea Development	2.64	1.17	Sometimes	12
Visualization and Data Presentation	2.58	1.18	Sometimes	13
Overall	2.95	1.27	Sometimes	

Note: SD-Standard Deviation

By contrast, tools designed for data handling, citation formatting, and academic resource discovery are significantly underutilized. Applications such as AI Excel Add-ins, Co-pilot, and Semantic Scholar are used far less frequently, indicating that students may lack either awareness or proficiency in applying AI for more advanced research processes such as data analysis, literature retrieval, or reference management. The lower frequency of use of tools such as CiteThisForMe and Semantic Scholar also suggests a reliance on manual citation and search methods, or possibly a misunderstanding of how AI can assist in these areas.

The data revealed a narrow application of AI among students, concentrated heavily on surface-level text improvement rather than deeper research functions. This highlights the need for targeted AI literacy programs that go beyond writing enhancement and train students to use AI in research structuring, critical evaluation, data analysis, and scholarly sourcing, thus promoting a more meaningful and responsible integration of AI in academic work.

B. Usage of AI in Research Writing

Artificial Intelligence (AI) applications exist in various forms and serve diverse purposes. One example is generative AI, which is designed to generate new, coherent text by analyzing and learning from existing patterns [54].

Table 3. Descriptive analysis of usage of AI in research writing by the faculty

Indicators	Ave Rating	SD	Description	Rank
Plagiarism Detection and Similarity Checking	2.83	1.45	41–60%	1
Writing Assistance and Grammar Checking	2.70	1.46	41–60%	2
Paraphrasing, Summarization, and Content Enhancement	2.62	1.38	41–60%	3
Proofreading, Editing, and Revisions	2.53	1.46	41–60%	4
Content Structuring and Formatting	2.50	1.38	41–60%	5
Citation and Reference Management	2.39	1.37	21–40%	6
Literature Review and Research Paper Discovery	2.35	1.25	21–40%	7
Research Paper Writing and Drafting	2.20	1.20	21–40%	8.5
Abstract and Executive Summary Writing	2.20	1.20	21–40%	8.5
AI for Statistical Analysis	2.09	1.13	21–40%	10
Data Analysis	2.04	1.17	21–40%	11
Visualization and Data Presentation	1.98	1.01	21–40%	12
Research Topic Generation and Idea Development	1.96	1.07	21–40%	13
Overall	**2.36**	**1.27**	**21–40%**	

Table 3 reveals that faculty members most frequently used AI in research writing for language-focused tasks, particularly for writing assistance and grammar checking, which was the only task rated in the "often" category. This suggests that faculty members primarily rely on AI to improve the technical quality and readability of their manuscripts, rather than generating or analyzing content. Closely following are applications for plagiarism detection, paraphrasing, and proofreading, indicating a strong orientation toward ensuring academic integrity and refining written outputs rather than using AI as a tool for content development or conceptual innovation.

By contrast, AI tools for deeper academic functions, such as data analysis, topic generation, literature review, and visualization, are used less frequently and are uniformly rated in the "sometimes" range. These patterns reflect hesitancy or limited capacity among faculty members to apply AI in the more technical or interpretive stages of the research process. The relatively low mean scores for tasks such as statistical analysis, data visualization, and drafting suggest that AI is not yet fully embedded in the cognitive or analytical dimensions of faculty research workflows.

The consistent standard deviation values (mostly above 1.20) across the indicators indicated considerable variation in usage patterns among faculty members. This implies that while some faculty members are active users of AI in certain tasks, others are still not engaging with these tools at all, possibly due to differences in technological readiness, field of specialization, or institutional policy support.

This pattern suggests that AI use among faculty members is still concentrated at the surface level of writing

enhancement rather than in the substantive aspects of research production. This highlights the need for institutional strategies to support AI training, particularly when using AI for data-driven, conceptual, and analytical research tasks, which could help broaden the scope of AI integration and ultimately enhance research productivity and innovation.

Table 4. Descriptive analysis of usage of AI in research writing by the students

Indicators	Ave Rating	SD	Description	Rank
Writing Assistance and Grammar Checking	4.03	0.90	Often	1
Plagiarism Detection and Similarity Checking	3.84	1.18	Often	2
Paraphrasing, Summarization, and Content Enhancement	3.78	1.01	Often	3
Proofreading, Editing, and Revisions	3.21	1.18	Sometimes	4
Content Structuring and Formatting	3.20	1.02	Sometimes	5
Citation and Reference Management	3.13	1.22	Sometimes	6
Research Topic Generation and Idea Development	3.01	0.95	Sometimes	7
Literature Review and Research Paper Discovery	2.86	1.12	Sometimes	8
Abstract and Executive Summary Writing	2.82	1.13	Sometimes	9
Data Analysis	2.79	1.07	Sometimes	10
Visualization and Data Presentation	2.76	1.19	Sometimes	11
AI for Statistical Analysis	2.67	1.15	Sometimes	12
Research Paper Writing and Drafting	2.63	1.09	Sometimes	13
Overall	**3.13**	**1.09**	**Sometimes**	

Table 4 highlights a clear trend among students: AI is predominantly used for language-related tasks, particularly those that enhance surface features of academic writing. The highest-rated uses involved writing assistance, grammar checking, plagiarism detection, and paraphrasing, all of which fall under the "often" category. This suggests that students tend to rely on AI to improve the form and presentation of their work, rather than to assist with content development or analytical processes. These tools are likely to be perceived as accessible and safe ways to meet academic writing standards without replacing the need for original thinking.

In contrast, students made only moderate use of AI for content structuring, citation, idea generation, and more substantive research tasks, such as literature review, data analysis, and writing drafts, which are consistently rated as "sometimes." This reflects a more superficial integration of AI into the research process, where its use is concentrated at the level of improving written output, rather than facilitating deeper stages of academic inquiry. The lower ratings for statistical analysis, data visualization, and drafting of entire sections suggest either a lack of familiarity with these advanced AI functions or a hesitancy to depend on AI for more cognitively demanding tasks.

This pattern is further underscored by the relatively moderate standard deviation scores across most indicators, suggesting that while usage is fairly consistent among students, differences still exist in how widely and confidently these tools are applied. These differences may be influenced by students' field of study, level of digital literacy, or clarity of institutional guidelines on AI use.

The findings revealed that students view AI primarily as a writing aid rather than as a collaborative tool in the research process. This points to the need for AI literacy initiatives that go beyond grammar and plagiarism tools and promote the responsible, critical, and effective use of AI across the entire research cycle, from topic development to data interpretation and scholarly writing.

C. Extent of Use of AI by the Faculty

Table 5 indicates that faculty members exhibit moderate but selective use of AI tools, with the greatest extent of use concentrated on writing-related and integrity-focused functions. The higher average ratings for plagiarism detection, grammar checking, paraphrasing, and proofreading suggest that faculty members primarily engage with AI to enhance the linguistic quality and academic credibility of their research outputs. These tasks fall within the 41–60% usage range, implying that AI plays a supportive yet non-central role in the research-writing process.

However, the data also revealed a noticeable drop in the extent of AI use once the tasks moved beyond surface-level writing functions. AI applications related to citations, literature review, paper drafting, statistical analysis, and data visualization fall within the 21–40% range, indicating that these tools are less integrated into more substantive or technical research processes. This pattern suggests that faculty may lack training or confidence in using AI for analytical and conceptual tasks or that they perceive these activities as requiring deeper human expertise. The consistently low scores in AI use for topic generation and data visualization further point to the underutilization of AI's full potential in the research cycle.

Table 5. Descriptive analysis of the extent use of AI by the faculty

Indicators	Mean	SD	Description	Rank
Plagiarism Detection and Similarity Checking	2.83	1.45	41–60%	1
Writing Assistance and Grammar Checking	2.70	1.46	41–60%	2
Paraphrasing, Summarization, and Content Enhancement	2.62	1.38	41–60%	3
Proofreading, Editing, and Revisions	2.53	1.46	41–60%	4
Content Structuring and Formatting	2.50	1.38	41–60%	5
Citation and Reference Management	2.39	1.37	21–40%	6
Literature Review and Research Paper Discovery	2.35	1.25	21–40%	7
Research Paper Writing and Drafting	2.20	1.20	21–40%	8.5
Abstract and Executive Summary Writing	2.20	1.20	21–40%	8.5
AI for Statistical Analysis	2.09	1.13	21–40%	10
Data Analysis	2.04	1.17	21–40%	11
Visualization and Data Presentation	1.98	1.01	21–40%	12
Research Topic Generation and Idea Development	1.96	1.07	21–40%	13
Overall	**2.36**	**1.27**	**21–40%**	

Table 6. Descriptive analysis of the extent of use of AI by the students

Indicators	Ave Rating	SD	Description	Rank
Writing Assistance and Grammar Checking	3.15	1.26	41–60%	1
Plagiarism Detection and Similarity Checking	3.06	1.37	41–60%	2
Paraphrasing, Summarization, and Content Enhancement	3.04	1.27	41–60%	3
Proofreading, Editing, and Revisions	2.58	1.24	41–60%	4
Content Structuring and Formatting	2.47	1.10	21–40%	5
Citation and Reference Management	2.45	1.26	21–40%	6
Abstract and Executive Summary Writing	2.25	1.10	21–40%	7
Visualization and Data Presentation	2.19	1.13	21–40%	8
Literature Review and Research Paper Discovery	2.18	1.08	21–40%	9
Research Topic Generation and Idea Development	2.15	1.00	21–40%	10
Research Paper Writing and Drafting	2.14	1.08	21–40%	11
AI for Statistical Analysis	2.11	1.07	21–40%	12
Data Analysis	2.09	1.01	21–40%	13
Overall	**2.45**	**1.15**	**21–40%**	

The relatively high standard deviations across indicators (mostly above 1.20) also signal significant variation among faculty members regarding the extent to which they use AI. This variability may reflect differences in technological proficiency, academic disciplines, or access to AI tools, highlighting the need for targeted professional development.

The data reveal that, while AI has been adopted by faculty at moderate levels, its use is primarily confined to tasks that polish existing content rather than those that involve generating, analyzing, or synthesizing research material. This underscores the need for institutions to promote more comprehensive and critical engagement with AI, particularly in the earlier cognitive phases of research, if AI is to be fully leveraged as a partner in scholarly production.

Table 6 reveals that students tend to use AI most extensively for linguistic support tasks, rather than for the more analytical or content-generating stages of research writing. The highest extent of AI use falls within the 41–60% range and is concentrated on tasks such as writing assistance, plagiarism detection, and paraphrasing, suggesting that students primarily leverage AI to improve grammar, originality, and clarity. This reflects a pragmatic use of AI to meet academic writing standards, indicating that students are comfortable using AI for surface-level improvements, but are less inclined to rely on it for deeper cognitive work.

Beyond the top-ranked tasks, the extent of AI use significantly declined, with all other indicators falling within the 21–40% range. These include more complex tasks, such as content structuring, abstract writing, data analysis, and literature review, which implies that students either lack the skills or confidence to apply AI in these areas, or perhaps they are unaware of AI's capabilities in supporting more substantive academic tasks. The low ratings for research topic generation and data analysis further emphasize that AI has not yet been utilized by students as a conceptual or analytical partner in the research process.

Additionally, the moderate to high standard deviation values (ranging from 1.00 to 1.37) suggest variation in AI use among students, which may be attributed to factors such as differences in academic programs, year levels, or exposure to AI tools. This variability reinforces the idea that while AI is widely present in student workflows, its integration is uneven and often limited to specific low-risk functions.

This pattern illustrates a narrow pattern of AI integration, where students primarily use AI for writing enhancements rather than as a comprehensive research aid. This underscores the need for academic institutions to implement AI literacy programs that promote responsible and expanded use of AI across all stages of the research process, from topic formulation to data interpretation, to better support student researchers in a rapidly evolving digital academic environment.

D. Difference between the AI Faculty Members' and Students' Frequency and Extent of AI Use

Table 7. Test of significant difference between students and teachers' frequency and extent of AI use

Variables Compared	t	sig. value	Decision	Interpretation
Faculty Members' Frequency of AI Use and Students' Frequency of AI Use	1.558	0.120	Do not Reject Ho	There is no significant difference between the students and teachers' frequency of AI Use
Faculty Members' Extent of AI Use and Students' Extent of AI Use	0.692	0.489	Do not Reject Ho	There is no significant difference between the students and teachers' extent of AI Use

Note: *t*—t-value; *sig.*—significance

Table 7 shows the statistical analysis comparing the frequency and extent of AI use between faculty members and students which revealed no significant difference in how these two groups engaged with AI tools in research writing. The comparison of faculty members' frequency of AI use versus students' frequency of AI use resulted in a t-value of 1.558 and a significance (sig.) value of 0.120. Since the sig. value is greater than 0.05, the null hypothesis is not rejected, indicating that faculty and students use AI tools at similar frequencies. Likewise, a comparison of faculty members' extent of AI use versus students' extent of AI use resulted in a *t*-value of 0.692 and a sig. value of 0.489, which is also greater than 0.05, leading to non-rejection of the null hypothesis. This confirms that faculty members and students do not significantly differ in how extensively they apply AI tools to research writing.

These findings suggest that AI adoption rates are comparable across academic levels, indicating that both students and faculty actively integrate AI into their research workflows. The results also highlight the potential for shared AI training programs that cater to both groups rather than developing separate AI literacy initiatives. Since both faculty members and students use AI tools at similar levels, institutions should consider implementing standardized

policies and ethical guidelines to ensure responsible AI usage in research. Furthermore, the absence of a significant difference suggests that AI is becoming an essential tool across academic communities, supporting both students and faculty in research and writing. Moving forward, institutions may focus on enhancing AI competency and ethical awareness, and maximizing AI's potential to improve research efficiency while maintaining academic integrity.

E. Development of the AIUS Framework

The Artificial Intelligence Utilization Scale (AIUS) in the Research Writing framework is based on the Artificial Intelligence Assessment Scale. The AIUS in research writing was formulated from the AIAS Framework [53] and AI in the teaching and learning framework [52] the AIUS in Research Writing was formulated. The Artificial Intelligence Utilization Scale (AUIS) in the Research Writing Framework (Fig. 1 and Table 8) outlines five levels of AI utilization in research writing, ranging from no AI involvement to extensive collaboration. At the No AI level, researchers rely entirely on their knowledge and skills with no AI assistance. AI-Assisted Idea Generation and Structuring involves using AI for brainstorming and organizing, but excludes AI-generated content in the final paper. AI-Assisted Editing uses AI to enhance clarity and grammar without altering the original ideas, thus requiring submission of the unedited version. AI Task Completion with Human Evaluation employs AI for specific tasks such as summarizing or formatting, with outputs critically refined by the researcher. At the Full AI level, AI acts as a collaborative partner throughout the writing process, enhancing productivity and creativity while the researcher maintains oversight.

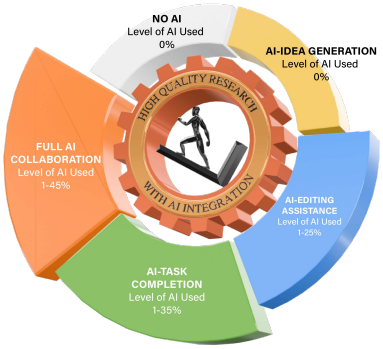

Fig. 1. AIUS for research writing framework.

Table 8. Matrix of AIUS for research writing

Level	AI Use and Percentage	Description and Examples	Declaration, Requirements, and Principles
1	**NO AI** **Level of AI Used - 0%**	The research is conducted and written without any AI involvement. Researchers rely entirely on their knowledge, understanding, and skills throughout the process.	**Declaration**: AI was not utilized at any stage of research or writing.
2	**AI-IDEA GENERATION** **Level of AI Used – 0%**	AI is used for brainstorming, generating ideas, and organizing the structure of the research paper. This level focuses on leveraging AI for conceptual and preparatory tasks but excludes AI-generated content from the final submission. **Examples**: • Generating Research Topics • Creating Research Questions • Brainstorming Literature Review Themes • Suggesting Paper Structures • Identifying Relevant Keywords • Developing an Annotated Outline • Concept Mapping • Idea Refinement	**Declaration**: No AI-generated content is included in the final research paper.
3	**AI-EDITING ASSITANCE** **Level of AI Used – 1–25%**	**AI-Assisted Editing** AI tools are employed to enhance the clarity, grammar, and readability of the research paper. However, AI is not used to generate new content or alter the original ideas and arguments. **Examples**: • Grammar and Syntax Correction • Enhancing Clarity • Improving Readability • Formatting Assistance • Polishing Academic Tone • Identifying Redundancies • Checking Consistencies • Editing Abstract and Conclusion	**Requirement**: The original version (created without AI) must be submitted as an attachment alongside the final paper. **Declaration**: AI was used exclusively for editing and refining the original content.
4	**AI-TASK COMPLETION** **Level of AI Used – 1–35%**	**AI Task Completion with Human Evaluation** AI is utilized to perform specific tasks in research writing, such as summarizing data, drafting certain sections, or formatting references. Researchers critically evaluate and refine all AI-generated content to ensure quality and alignment with the research objectives. **Examples**: • Summarizing Data • Drafting a Section • Formatting References • Generating Visual Summaries • Writing a Preliminary Abstract • Summarizing Literature Review Themes • Checking Data Accuracy • Drafting Technical Descriptions	**Requirement**: Any AI-generated content must be clearly cited in the paper. **Declaration**: AI was used to complete defined tasks, and its outputs were critically assessed and modified by the researcher.

Level	AI Use and Percentage	Description and Examples	Declaration, Requirements, and Principles
5	**FULL AI COLLABORATION Level of AI Used – 1–45%**	AI serves as a collaborative partner throughout the research and writing process, contributing to idea generation, drafting, editing, and refining the paper. This level embraces a co-creative approach, where AI significantly supports the researcher's efforts. **Examples**: ● Idea Generation and Refinement ● Drafting the research proposal ● Conducting Literature Reviews ● Analyzing Data ● Drafting and Refining Sections ● Formatting and Citation ● Language and tone polishing ● Collaborative abstract writing ● Iterative Feedback and Revision ● Preparing for submission	**Declaration**: AI was used extensively to support the entire research writing process, and specific AI contributions do not need to be distinguished in the final document. **Principles**: The researcher ensures all outputs are critically evaluated and refined. Ethical and academic standards are upheld, with AI serving as a co-creative partner rather than replacing human intellectual contributions.

The diagram illustrates the levels of AI usage in research writing, symbolized by a circular, gear-like structure that emphasizes the goal of achieving high-quality research. At its center is the phrase "High Quality Research" alongside a figure-climbing step, representing effort, progress, and determination. Gear design is a deliberate symbol of a state university in Bulacan, signifying its commitment to innovation, knowledge, and academic excellence. The circular structure was divided into five colored segments, each representing the level of AI involvement. The white segment (No AI, 0%) signifies research conducted entirely without AI. The yellow segment (AI-Idea Generation, 0%) represents the AI used for brainstorming and conceptual tasks. The blue segment (AI-Editing Assistance, 1–25%) reflects the AI's role in improving clarity, grammar, and readability. The green segment (AI-Task Completion, 1–35%) shows AI performing specific tasks, with human refinement ensuring quality. Finally, the orange segment (Full AI Collaboration, 1–45%) highlights AI as a co-creative partner throughout the research process. The progression of colors symbolizes increasing AI involvement, emphasizing transparency and ethical practices, while reflecting BulSU's advocacy for leveraging technology in education and research.

This framework emphasizes how AI can progressively support researchers while improving the overall quality and efficiency of research writing. This ensures that researchers maintain their ethical and academic integrity at all levels.

Table 8 categorizes AI integration into five levels, ranging from no AI involvement to full AI collaboration, defining their extent of use, examples, and required declarations or principles. These classifications ensure transparency, academic integrity, and AI utilization in research writing.

At Level 1 (No AI Use, 0%), research was conducted entirely without AI involvement, relying solely on the researcher's knowledge, skills, and critical thinking. The declaration explicitly stated that AI was not used at any stage, maintaining a fully human-driven research process.

At Level 2 (AI-Idea Generation, 0%), AI is used only for brainstorming and structuring but does not contribute to the final research content. AI assists in developing research topics, formulating questions, mapping concepts, and outlining key themes; however, all written content remains researcher-driven. This declaration requires assurance that no AI-generated text is included in the final submission.

At Level 3 (AI-Editing Assistance, 1–25%), AI tools are employed exclusively for editing and refining content, ensuring clarity, grammar, readability, and formatting. AI does not generate new content or alter core ideas. Examples include grammar correction, improved academic tone, and formatting citations. The requirement mandates the submission of the original version (pre-editing) along with the final document to verify the authenticity of human-generated content.

At Level 4 (AI-Task Completion, 1–35%), AI assists in performing specific research tasks while requiring critical evaluation by the researcher. AI tools may summarize data, format references, draft technical descriptions, or generate visual summaries; however, researchers must assess and refine all the AI-generated content. The declaration mandates citing AI-assisted contributions to ensure transparency and accountability in AI use.

At Level 5 (Full AI Collaboration, 1–45%), AI acts as a co-creative partner, significantly contributing to idea generation, drafting, analysis, and revision. AI involvement spans literature reviews, citation management, abstract drafting, and iterative feedback, making it an integral research tool. However, human oversight is critical for refining the AI-generated outputs. These principles emphasize that AI should support rather than replace human intellectual contributions, ensuring adherence to ethical and academic standards.

- Justification for the percentage of each level in the AIUS:

Based on the survey results on AI usage in research writing among faculty and students, 41–60% of respondents primarily used AI for plagiarism detection and similarity checking, writing assistance, grammar checking, paraphrasing, summarization, content enhancement, proofreading, editing, and content structuring and formatting. These findings highlight the growing role of AI as a support tool in research writing, helping faculty and students enhance their efficiency, accuracy, and writing quality. The increasing reliance on AI reflects its potential to streamline academic work, making research writing more effective and precise while maintaining academic integrity [55].

VI. Discussion

The findings of this study provide significant insights into the use of Artificial Intelligence (AI) in research writing among faculty members and students. The results indicate that AI is primarily used for writing assistance, grammar checking, and plagiarism detection, with less focus on more complex research-related applications such as statistical analysis, data visualization, and literature review synthesis. This study of [3, 56] on the website of the American Psychological Association categorizes the use of AI in academic writing into three clusters: enhancing writing, addressing challenges, and maintaining authorship integrity. It highlights the various functions of AI tools such as text generation, proofreading, and translation. This trend underscores the growing reliance on AI as a tool for refining academic writing, while highlighting areas where its adoption remains limited. Nguyen [9] resonates with the findings of this study, wherein he explored the integration of AI in higher education, noting its benefits in enhancing creativity and efficiency in writing and research. However, it also highlights the challenges and ethical considerations, particularly in avoiding over-reliance on AI for complex analytical tasks.

The descriptive analysis of AI tools used in research writing shows that both faculty members and students predominantly utilize AI-powered applications, such as Grammarly, ChatGPT, and Quillbot. These tools assist in improving the writing quality, ensuring grammatical accuracy, and paraphrasing content. Grammarly ranked highest among faculty members, emphasizing the need for polished academic writing, whereas ChatGPT was the most frequently used tool among students, suggesting a reliance on AI for idea development and drafting support. The study [46] found that students and faculty members at the University of Duhok (UoD) predominantly utilized AI-powered applications, with ChatGPT being the most widely used tool (70.68%). The study in [57] indicated that faculty members are increasingly adopting AI tools for various aspects of academic writing, including grammar checks and writing assistance. Ozfidan *et al.* [58], students frequently used applications such as ChatGPT, Grammarly, and Google Translate for their academic writing tasks. This aligns with the trend of students seeking assistance from AI tools to enhance their writing skills and efficiency.

Despite these advantages, the study also found that AI applications related to data analysis, visualization, and citation management were less frequently used. These findings support those of Ref. [59], which highlight that AI applications related to data analysis, visualization, and citation management are not used as frequently as they could be. Similarly, in the studies of [60] and [61], visualization tools that can help educators and students understand complex data are less commonly used. This indicates a gap in AI literacy when leveraging AI in technical and analytical tasks. The limited adoption of AI in these areas suggests the need for targeted training programs to equip users with the knowledge and skills to maximize AI's potential of AI in research writing beyond text generation and refinement.

This study examined the extent to which faculty members and students incorporated AI tools into their research writing. The findings indicate that AI usage is moderate, with faculty members using AI tools in approximately 21–40% of their research writing tasks, while students' usage falls within the 41–60% range. The most frequently used AI functions include plagiarism detection, grammar assistance, and content paraphrasing, whereas AI-driven data analysis, statistical evaluation, and literature synthesis remain underutilized. These findings support the studies of [57] and [62], wherein faculty members predominantly use AI tools for plagiarism detection, which helps ensure the originality of academic work, and AI-driven data analysis and statistical evaluation are underutilized.

Interestingly, this study found no significant difference in the frequency and extent of AI use between faculty members and students. There was no quantitative study existing to compare the usage of AI by faculty and students, but a qualitative study conducted by the authors of [63] revealed that there were significant differences in perceptions of AI usage between students and staff. Both groups tended to overestimate the extent of AI use by others, indicating a gap in the understanding of how AI is actually utilized within the academic environment. This suggests that AI adoption is not influenced by academic level but rather by awareness and accessibility. Both faculty members and students use AI at comparable levels, which presents an opportunity for shared AI literacy initiatives that cater to both groups, rather than segregating training programs based on academic standing. The studies of [64] and [65] discussed that both students and faculty members utilize AI tools at similar levels, thus highlighting the necessity for training both students and lecturers in using AI tools effectively.

As AI tools become increasingly integrated into research writing, ethical concerns have emerged regarding their responsible use. One major concern highlighted in the literature and reflected in the study's findings is the risk of overreliance on AI, which may compromise originality and critical thinking skills. While AI tools enhance efficiency, they should complement rather than replace human cognitive processes. The same concern was raised in the studies of [66–68] that students may become overly reliant on AI dialogue systems, which can lead to a decline in their critical thinking abilities. When students depend on AI for their answers, they might not engage deeply with the material or develop their own ideas, which is essential for critical analysis. The development of the Artificial Intelligence Utilization Scale (AIUS) for the Research Writing Framework addresses this issue by categorizing AI usage into distinct levels, ensuring that it serves as an assistive tool rather than a primary research generator. The AIUS Framework for research writing is similar to that proposed in Ref. [69], which introduces the Artificial Intelligence Disclosure (AID) framework, which aims to provide a comprehensive and standardized approach to AI disclosures in academic contexts. This framework is designed to assist researchers in developing clear and detailed disclosures regarding the use of GenAI tools.

Another key ethical issue is the need for transparency in the AI-generated content. This study supports the implementation of mandatory AI disclosures in research writing to uphold academic integrity. For instance, at the AI-Assisted Editing level, researchers are required to submit an original (pre-edited) version along with the final document to demonstrate that AI was used solely for refinement and not

content generation. Similarly, at the AI-task completion level, AI-generated outputs must be critically assessed and cited appropriately to maintain scholarly rigor. The results of this study resonate with those of Ref. [70], which highlight that AI technologies can lead to new forms of academic misconduct, such as data fabrication and text plagiarism. By mandating disclosures, researchers can clarify how AI tools are used in their work, which helps maintain transparency and accountability in research practices.

The findings of this study serve as a foundation for the development of institutional policies governing AI integration in research. The proposed AIUS for Research Writing Framework provides structured guidelines on the ethical and responsible use of AI, ensuring that AI serves as a support system rather than a substitute for human intellectual contributions.

Educational institutions, particularly state universities in Bulacan, can leverage these findings to formulate policies that promote AI literacy, ethical AI usage, and responsible research practices. AI training programs should be incorporated into academic curricula to help students and faculty members effectively navigate AI applications. Moreover, institutions should establish clear guidelines on AI-assisted research practices, including permissible levels of AI involvement and the proper attribution of AI-generated content.

VII. Conclusion

This study highlights the growing role of AI in research writing, particularly in enhancing writing quality, ensuring grammatical accuracy, and detecting plagiarism. However, its underutilization in analytical and technical research tasks suggests a need for improved AI literacy. The development of the AIUS for Research Writing Framework offers a structured approach to integrating AI ethically and responsibly into academic research, ensuring that AI serves as a tool for enhancement rather than replacement. Institutions must take proactive steps to establish AI literacy programs, implement ethical guidelines, and continuously evaluate AI's role in research writing to maintain the integrity and credibility of academic scholarship.

While this study provides valuable insights into AI usage in research writing, further research is required to explore its long-term impact on academic productivity, critical thinking, and originality. Future studies could investigate how AI influences research quality across various disciplines and examine potential disparities in AI accessibility and adoption among different academic institutions.

Additionally, there is a need for ongoing evaluation and refinement of the AIUS framework to ensure its relevance to the rapidly evolving AI landscape. As AI continues to advance, institutions must remain proactive in updating their policies and training initiatives to align with emerging technological developments, while maintaining academic integrity.

This study had several limitations that may affect the generalizability of the findings. First, it focuses on a specific institution, thus limiting its applicability to other academic settings. The reliance on self-reported data introduces potential biases, while the lack of longitudinal data prevents the tracking of AI adoption trends over time. Additionally, this study primarily employs a quantitative approach that overlooks qualitative insights into AI usage challenges. Differences across disciplines, AI biases, and institutional AI literacy gaps have not yet been fully explored. Furthermore, access to AI tools and evolving technological advancements may impact the findings, emphasizing the need for ongoing assessments and policy updates.

Conflict of Interest

The authors declare no conflicts of interest.

Author Contributions

Dr. Joseline M. Santos conceptualized and designed the study, developed the Artificial Intelligence Utilization Scale (AIUS) framework, and conducted data analysis and interpretation. Dr. Teody C. San Andres provided methodological guidance, reviewed the instrument for validity, and contributed to the critical review and revision of the manuscript. Dr. Keno C. Piad contributed to the literature review, coordination of data gathering, refinement of the discussion, and policy implications. All authors participated in writing, reviewing, and approving the final version of the manuscript, and were equally accountable for its content and scholarly integrity.

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