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ROLE OF AI ASSISTANCE IN ACADEMIC WRITING: A CASE STUDY OF ARABIC LANGUAGE STUDENTS FROM PROMPT TO PUBLICATION

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Abstract

This research aims to explore in depth how students of the Arabic Language Education Study Program utilize artificial intelligence (AI) in the academic writing process, and how such practices reshape pedagogical, cognitive, and ethical dimensions within higher education. This research use qualitative approach with an exploratory-interpretive case study design, data were collected through semi-structured interviews, limited participant observations, and analysis of student manuscripts before and after AI-assisted revisions. The findings reveal that students employ AI across three core functions: as a catalyst for conceptual development and structural planning, as a linguistic and cohesive revision tool, and as a facilitator of academic self-efficacy. However, significant ethical dilemmas emerge, including ambiguity in intellectual attribution, unclear boundaries of AI contribution, and the absence of institutional regulation. Patterns of AI interaction varied by institutional context: reflective at UIN Sunan Kalijaga Yogyakarta, pragmatic at Universitas Muhammadiyah Yogyakarta, and philosophical at STAI Masjid Syuhada. This research recommends the development of AI literacy and digital ethics curricula, along with clear

institutional policies regarding the use of AI in academic writing. Additionally, continuous training and equitable digital access are needed to ensure that AI integration occurs fairly and reflectively.

Keywords: *Role of AI, academic writing, Arabic language students, digital ethical literacy.*

Abstrak

Penelitian ini bertujuan untuk mengeksplorasi secara mendalam bagaimana mahasiswa Program Studi Pendidikan Bahasa Arab memanfaatkan kecerdasan buatan (AI) dalam proses penulisan akademik, dan bagaimana praktik tersebut membentuk kembali dimensi pedagogis, kognitif, dan etika dalam pendidikan tinggi. Penelitian ini menggunakan pendekatan kualitatif dengan desain studi kasus eksploratif-interpretatif, data dikumpulkan melalui wawancara semi-terstruktur, pengamatan peserta terbatas, dan analisis naskah mahasiswa sebelum dan sesudah revisi berbantuan AI. Temuan ini mengungkapkan bahwa siswa menggunakan AI di tiga fungsi inti: sebagai katalis untuk pengembangan konseptual dan perencanaan struktural, sebagai alat revisi linguistik dan kohesif, dan sebagai fasilitator efikasi diri akademik. Namun, dilema etika yang signifikan muncul, termasuk ambiguitas dalam atribusi intelektual, batasan kontribusi AI yang tidak jelas, dan tidak adanya regulasi kelembagaan. Pola interaksi AI bervariasi menurut konteks kelembagaan: reflektif di UIN Sunan Kalijaga Yogyakarta, pragmatis di Universitas Muhammadiyah Yogyakarta, dan filosofis di STAI Masjid Syuhada. Penelitian ini merekomendasikan pengembangan kurikulum literasi AI dan etika digital, bersama dengan kebijakan kelembagaan yang jelas mengenai penggunaan AI dalam penulisan akademik. Selain itu, pelatihan berkelanjutan dan akses digital yang adil diperlukan untuk memastikan bahwa integrasi AI terjadi secara adil dan reflektif.

Kata kunci: *kecerdasan buatan, penulisan akademik, mahasiswa bahasa Arab, literasi etika digital.*

INTRODUCTION

Over the past decade, artificial intelligence (AI) has revolutionized the landscape of higher education, including the domain of academic writing. This technological advancement has not only facilitated automated linguistic corrections, but also shifted the ways in which students conceptualize and construct scholarly arguments. Jacob, Tate, and Warschauer said that observed that second language (L2) writers who employ AI demonstrate significant improvement in metalinguistic awareness and reflective thinking strategies, thereby enhancing the overall quality of their academic writing.¹ This transformation signals the emergence of a new era in academic literacy practices, wherein technology not only accelerates the writing process but also reshapes the cognitive structures of student writers.

¹ Jacob, S., Tamara Tate, dan Mark Warschauer. "Emergent AI-Assisted Discourse: A Case Study of a Second Language Writer Authoring with ChatGPT." *arXiv Preprint*, 2023.

As the use of AI in academic contexts becomes more prevalent, higher education institutions are confronted with new challenges in redefining ethical regulations, intellectual attribution, and the boundaries of technological contribution to student-authored texts. When students begin to replace the lecturer as the sole source of feedback with interactive AI systems, the demand arises for digital literacy that is not only technical in nature but also grounded in ethical understanding. Uncritical reliance on AI may lead to what he terms the *delegation fallacy* the abdication of intellectual responsibility to machines without adequate epistemic reflection.² Accordingly, AI in education must be viewed not merely as a functional tool, but as a discursive subject that demands contextual ethical and pedagogical governance.

In the context of students enrolled in the Arabic Language Education Study Program in Indonesia, the use of artificial intelligence (AI) has become increasingly significant, considering the multidimensional challenges they face in academic writing, both in Indonesian and Arabic. AI is perceived as a safe space for experimentation, allowing students to formulate, revise, and evaluate ideas without the rigid pressure of evaluative judgment.³ Tools such as Chat-GPT are often employed to generate initial drafts or rephrase complex arguments; Grammarly is used to improve linguistic accuracy and stylistic coherence, particularly when writing in English or Indonesian; and platforms like QuillBot or SciSpace assist in paraphrasing, summarizing, and understanding academic texts.⁴ These applications not only support linguistic production but also foster a reflective writing process, enabling students to iterate and develop their academic voice more confidently across languages.

AI is perceived as a safe space for experimentation, allowing students to formulate, revise, and evaluate ideas without the rigid pressure of evaluative judgment. However, in this context, AI often functions as an “*invisible co-author*” whose contributions are not explicitly acknowledged, thus raising ethical concerns regarding intellectual ownership and textual authenticity.⁵ This ambiguity not only complicates the process of attributing authorship but also challenges traditional academic norms that prioritize originality, personal effort, and verifiable sources of knowledge. As AI-generated outputs become increasingly fluent and human-like, distinguishing between student-authored and machine-assisted content becomes a growing concern for educators and institutions.

² Floridi, Luciano. “Ethical Authorship and Moral Motivation: The Key to Ethical AI Use.” *SAGE Open* 13, no. 1 (2023).

³ Nugroho, Ribka Anastasia, dan Anis Trisusana. “Students’ Challenges and Solutions of Using AI-Based Tools for Academic Writing.” *Pubmedia Jurnal Pendidikan Bahasa Inggris* 2, no. 2, (2025): 1–11.

⁴ Mahapatra, Santosh, dkk. “Impact of Chat-GPT on ESL Students’ Academic Writing Skills.” *Smart Learning Environments* (2024).

⁵ Gao, L., Y. Zhang, dan H. Wang. “Potential Societal Biases of ChatGPT in Higher Education: A Scoping Review.” *Open Praxis* 16, no. 1 (2021): 654.

While previous studies have addressed the effectiveness of AI in language learning and writing skill development, very few have examined the sociopedagogical impact and ethical dilemmas associated with AI use in academic writing within non-technological disciplines, particularly in Arabic studies. This gap is critical, as academic writing among non-IT students exhibits unique dynamics ranging from limited access to supervision, differing epistemological structures, to diverse academic norms. Consequently, there remains substantial conceptual space to explore how students engage reflectively, ethically, and strategically with AI in their academic practices.

This study offers novelty by presenting a case study of three higher education institutions with varied academic cultures and levels of digital readiness: UIN Sunan Kalijaga, Universitas Muhammadiyah Yogyakarta, and STAI Masjid Syuhada. This approach not only captures the variation in AI usage practices, but also opens the opportunity to examine how institutional context, cognitive background, and supervisory access shape students' relational patterns with AI. The primary focus lies in actual practices rather than perceptions, enabling a deeper understanding of AI's role as a mediator in academic learning processes.

Specifically, this study seeks to answer the central question: how do Arabic language education students utilize AI in their academic writing process, and what pedagogical and ethical implications arise from such usage in reshaping their learning experiences? By positioning students as active epistemic agents who not only employ but also assess and reflect on AI's role in writing, the inquiry adopts an analytical and interpretative lens. The main objective of this study is to describe and analyze the practices of AI-assisted academic writing among Arabic language students in a cross-institutional and contextualized manner. By mapping the interaction patterns, perceptions, and ethical reflections of students across three distinct institutions, this research aims to contribute conceptually to the development of digital ethical literacy, technology-enhanced pedagogy, and adaptive institutional policy. Ultimately, this article seeks to broaden the discourse on academic literacy and writing practices in the era of artificial intelligence.

METHOD

This study used qualitative approach with an exploratory-interpretive case study design⁶, selected to capture the complexity, contextuality, and dynamic nature of AI usage in academic

⁶ Ponelis, Shana R. "Using Interpretive Qualitative Case Studies for Exploratory Research in Doctoral Studies: A Case of Information Systems Research in Small and Medium Enterprises." *International Journal of Doctoral Studies* 10 (2015): 535–550

writing.⁷ The design is appropriate for investigating contemporary phenomena within their real-life context, especially those involving human technology interaction in educational settings. In this approach, students are positioned as active epistemic agents who not only utilize AI technologies but also critically reflect on and negotiate their roles within academic processes.⁸

The research was conducted at three higher education institutions in Yogyakarta, Indonesia: UIN Sunan Kalijaga, Universitas Muhammadiyah Yogyakarta, and STAI Masjid Syuhada. These institutions were selected using purposive sampling based on their diversity in academic cultures and digital readiness. Each institution offered a distinct contextual orientation: UIN Sunan Kalijaga fostered reflective and conceptual engagement with AI, UMY demonstrated a pragmatic and technical approach, and STAI Masjid Syuhada revealed a more philosophical and intuitive stance toward AI-assisted writing.

Data collection was carried out using method including three primary techniques: (1) semi-structured interviews with 15 students from each institution; (2) limited participatory observation of students' real-time writing processes with AI tools; and (3) document analysis involving pre- and post-AI-revision academic manuscripts. The interview protocols were guided by theoretical frameworks of self-regulated learning⁹, scaffolding theory¹⁰, and digital ethics.¹¹

For data analysis, thematic analysis was applied, comprising the stages of open coding, axial categorization, and thematic selection. The trustworthiness of the findings was ensured through member checking, peer debriefing, and a detailed audit trail documenting the analytical procedures.¹² Epistemologically, this research is anchored in the interpretive-critical paradigm, which views AI not as a neutral tool, but as a socio-cultural construct that mediates relationships among technology, human agency, and academic values.¹³ Thus, the study aimed not only to describe AI usage in academic writing but also to critically examine the ethical, epistemological, and pedagogical dynamics that emerge within the broader context of Arabic language education in higher education.

⁷ Joubert, Ina, dan Elize du Plessis. "A Qualitative Exploration of the Use of Artificial Intelligence in Academic Writing: Implications for Higher Education." *Procedia - Social and Behavioral Sciences* 228 (2020): 481–88.

⁸ Yin, Robert K. *Case Study Research and Applications: Design and Methods*. 6th ed. Thousand Oaks, CA: SAGE Publications, 2018.

⁹ Zimmerman, Barry J. "Becoming a Self-Regulated Learner." *Theory into Practice* 41, no. 2 (2002): 64–70.

¹⁰ Vygotsky, Lev S. *Mind in Society: The Development of Higher Psychological Processes*. Cambridge, MA: Harvard University Press, 1978.

¹¹ Floridi, Luciano. "Ethical Authorship and Moral Motivation: The Key to Ethical AI Use." *SAGE Open* 13, no. 1 (2023).

¹² Braun, Virginia, dan Victoria Clarke. "Using Thematic Analysis in Psychology." *Qualitative Research in Psychology* 3, no. 2 (2006): 77–101.

¹³ Garrison, D. Randy. "E-Learning in the 21st Century: A Framework for Research and Practice." *TechTrends* 55 (2011): 94–95.

RESULT AND DISCUSSION

Based on field observations and in-depth interviews, four major thematic patterns emerged, highlighting students' engagements with artificial intelligence (AI) during the process of academic article writing. These themes include: (1) AI as a stimulus for conceptual ideation and structural organization, (2) AI-assisted linguistic revision and textual cohesion, (3) the reinforcement of academic self-efficacy and autonomous learning, and (4) ethical dilemmas and the ambiguity of boundaries in AI-supported authorship.

AI as a Stimulus for Conceptual Ideation and Structural Organization

Students across the three institutions used tools such as Chat-GPT as an initial step in constructing academic ideas. At UIN Sunan Kalijaga, students exhibited a critically engaged interaction with AI.¹⁴ Rather than relying solely on surface-level information, they approached AI as a dialogic partner one that facilitated the construction of theoretical frameworks and exploration of initial references. Some students submitted inquiries related to Arabic language pedagogy theories or requested support in articulating research questions.¹⁵ Here, AI transcended its role as a technical assistant to serve as an intellectual trigger for deep academic reflection. This aligns with the findings demonstrated that AI-assisted writing can foster higher-order thinking when approached reflectively and intentionally.¹⁶

At Universitas Muhammadiyah Yogyakarta, students adopted a more instrumental and pragmatic approach. Chat-GPT was used to organize entire article structures, from formulating titles and objectives to sequencing logical flows between sections. Some students even used AI to evaluate paragraph coherence and ensure thematic continuity across subtopics. Within this framework, AI functioned as a technical scaffold, accelerating manuscript development and optimizing cognitive load a function consistent with recent research suggesting AI's capacity to streamline discourse planning in academic writing.¹⁷

In contrast, students at STAI Masjid Syuhada many of whom hail from pesantren-based educational backgrounds demonstrated a more intuitive and exploratory use of AI. They frequently

¹⁴ Agung, S. "Learning Arabic Language by Analyzing the Linguistic Expressions in the Verses of Surah al-Fatihah." *Alsinatuna* 7, no. 2 (2022): 101–115

¹⁵ Tulus, M. "Psycholinguistics in Arabic Learning: History and Urgency." *Alsinatuna* 6, no. 1 (2020): 45–58.

¹⁶ Zhang, X., Y. Wang, dan J. Li. "The Impact of Artificial Intelligence on Human Behavior: A Comprehensive Review." *Computers in Human Behavior* 139 (2023): 107640.

¹⁷ Zou, B., Y. Du, Z. Wang, dan W. Zhang. "An Investigation into Artificial Intelligence Speech Evaluation Programs with Automatic Feedback for Developing EFL Learners' Speaking Skills." *SAGE Open* 13, no. 3 (2023): 21582440231193818

posed basic questions to understand abstract academic terminology or structural components of research writing. Common queries included the distinction between a background section and a problem statement, or requests for sample opening paragraphs tailored to specific topics. In such cases, AI served as a flexible, on-demand learning companion, particularly valuable in settings with limited access to intensive academic supervision. This reflects that AI tools can democratize access to academic guidance in resource-constrained environments, enabling students to develop independent learning strategies.¹⁸

Table 1. AI-Assisted Arabic Writing and Institutional Analysis

Institution	AI-Assisted Arabic Text	Analytical Commentary
UIN Sunan Kalijaga	مقدمة البحث: تعد المهارات اللغوية من أهم الركائز في تعلم اللغة العربية، وخصوصاً مهارة الكتابة الأكاديمية التي تحتاج إلى تنظيم فكري ودقة لغوية عالية.	This introduction was generated via Chat-GPT in response to Arabic prompts. The sentence demonstrates high-level rhetorical structure, appropriate use of <i>bayani</i> style, and <i>tarkīb idāfī</i> constructions. Students at UIN used AI as an academic interlocutor for conceptual framing, reflecting deep engagement with writing conventions.
Universitas Muhammadiyah Yogyakarta	فقرة التحليل: يهدف هذا البحث إلى الكشف عن فاعلية استخدام التكنولوجيا الحديثة، وخاصة الذكاء الاصطناعي، في تحسين جودة الكتابة الأكاديمية لدى الطلاب الجامعيين.	Students used Chat-GPT to construct logically structured arguments linking objectives and content. The use of <i>إلى</i> shows causal clarity, and the grammar adheres to formal Arabic norms. This reflects AI's function as a technical guide in manuscript development.
STAI Masjid Syuhada	تعريف المفهوم: التعلم الذاتي هو الأساس في تطوير مهارات الطالب، حيث يتيح له فرصة استكشاف المعرفة بناءً على حاجاته الخاصة ووتيرته الذاتية.	Students sought AI-generated definitions for key research terms. The sentence shows clear use of <i>mubtada'</i> and <i>khobar</i> , indicating mastery of definition structure. This

¹⁸ Jokinen, H., H.-M. Kuivila, S. Pramila-Savukoski, M. Koskimäki, J. Juntunen, T. Törmänen, dan K. Mikkonen. "The Hybrid Education Competence of Educators in the Social, Healthcare, and Health Science Fields: A Cross-Sectional Study." *Teaching and Learning in Nursing* 18, no. 3 (2023): e550–e556.

illustrates AI's role as a scaffold for learners with limited supervisory access.

In general, students across all three institutions reported that AI played a pivotal role in overcoming ideational stagnation and in fostering self-confidence during the early stages of academic writing. The assistance provided by AI enabled them to transform unstructured and preliminary ideas into more coherent and systematically organized academic frameworks. Moreover, it expanded their cognitive scope, allowing them to perceive themselves not merely as learners, but as emerging scholarly writers. The use of AI in this initial phase significantly reduced academic anxiety, mitigated writer's block, and facilitated the translation of abstract or underdeveloped thoughts into logical and academically acceptable arguments.

These findings align with the conclusions emphasize that AI-supported writing environments offer scaffolding that enhances both cognitive fluency and writer identity in L2 academic contexts.¹⁹ Similarly, AI fosters a psychologically safe writing space that empowers students to experiment with ideas without the fear of immediate evaluation, thereby reinforcing exploratory learning.²⁰ Thus, AI's function in the pre-writing phase is not merely technical; it is epistemic and affective, operating as a catalyst for academic growth and intellectual self-efficacy.

Table 2. Findings from the Initial Writing Phase Using AI

Institution	Initial Writing Phase Findings
UIN Sunan Kalijaga	Students demonstrated a critical interaction with Chat-GPT. They utilized AI to construct conceptual frameworks and explore preliminary references. AI functioned as an intellectual dialogue partner, particularly in formulating research questions.
Universitas Muhammadiyah Yogyakarta	Students adopted a pragmatic use of Chat-GPT to develop the entire article structure from title generation to organizing logical transitions between sections. AI served as a technical facilitator, expediting the manuscript development process.
STAI Masjid Syuhada	Students from pesantren-based backgrounds engaged with AI in an exploratory and intuitive manner. They

¹⁹ Zhang, X., Y. Wang, dan J. Li. "The Impact of Artificial Intelligence on Human Behavior: A Comprehensive Review." *Computers in Human Behavior* 139 (2023): 107640.

²⁰ Zou, Di, Lina Kong, dan Chi-Hung Lee. "Students' and Teachers' Perceptions of Artificial Intelligence in Education: A Systematic Review and Meta-Analysis." *Computers & Education* 200 (2023): 105999.

	posed foundational questions to comprehend academic concepts and requested writing examples. AI operated as a flexible learning companion, especially in contexts with limited supervisory access.
General Conclusion	Overall, AI helped students overcome idea generation blocks, reduce academic anxiety, and build systematic structures for scholarly writing. It expanded their intellectual horizons and nurtured confidence during the initial writing stages.

As reflected in the table, students primarily engage with AI tools during the pre-writing and drafting stages of their academic work. These tools are commonly used to generate initial ideas, reformulate sentences, and clarify argumentative structure especially when students feel uncertain about how to begin or develop their texts. The table shows consistent patterns of reliance on AI as a scaffolding mechanism, supporting students' cognitive flow and emotional readiness in approaching academic writing. Differences in usage practices also emerge across institutional contexts, indicating that students' interaction with AI is influenced not only by individual preferences but also by the pedagogical environment and the availability of digital support systems within each institution.

AI-Based Linguistic Revision and Textual Cohesion

During the revision stage, students from all three institutions utilized various AI-powered tools such as Grammarly and SciSpace to enhance linguistic precision, improve sentence structure, and align their writing style with academic conventions. Students at Universitas Muhammadiyah Yogyakarta demonstrated the most comprehensive use of AI features. They employed Grammarly not only for grammar correction but also for tone detection and clarity enhancement to ensure their writing conformed to scholarly expectations. Some students further utilized SciSpace for the automatic formatting of citations and references in APA style, significantly streamlining the bibliography compilation process.

At UIN Sunan Kalijaga, students adopted a more integrative approach by combining technical feedback from AI with substantive guidance from academic advisors. AI tools were deployed primarily to correct spelling and grammar, while content quality and argumentative rigor were refined through direct supervision and academic dialogue. This collaborative method nurtured students' critical editing skills and fostered reflective practices throughout the revision process. In contrast, students at STAI Masjid Syuhada engaged with AI tools more selectively. Typically, they copied

specific paragraphs into Grammarly and revised them based on suggested edits, while retaining manual control over the overall editing process. Despite facing technological infrastructure limitations, these students exhibited strong motivation and a proactive learning spirit. AI was perceived not as a substitute for authorship, but as a flexible, personalized learning assistant that supported their individual writing development.

Table 3. Arabic Text Revision with AI Assistance and Analytical Evaluation

Institution	Revised Arabic Text Using AI	Analytical Commentary on the Revision Process
Universitas Muhammadiyah Yogyakarta	إنّ استخدام أدوات الذكاء الاصطناعي في تحرير المقالات يساهم في تحسين وضوح النصوص ودقتها خاصة عند معالجة الأخطاء النحوية وتناسق الأسلوب	Students engaged intensively with tools such as Grammarly and SciSpace to enhance textual clarity. This Arabic sentence was restructured from its original form to achieve greater conciseness and efficiency. AI-assisted revision refined the use of <i>idhafah</i> and <i>tarkib wasfi</i> structures, resulting in improved linguistic coherence.
UIN Sunan Kalijaga	تُظهر نتائج هذا البحث أن التفاعل بين الطالب والأدوات الذكية يوفر فهماً أعمق لبنية النص الأكاديمي ويساعد في تطوير مهارات التحرير الذاتي	This sentence emerged from an AI-assisted revision process followed by student consultations with academic supervisors. The application of <i>al-masdar</i> and <i>jumlah fi'liyah</i> structures reflects the student's growing awareness of differences between academic and narrative styles. While AI optimized the grammatical framework, substantive enhancement was guided by lecturer input.
STAI Masjid Syuhada	الطلاب Grammarly يساعد في اكتشاف الأخطاء الإملائية والنحوية، مما يمنحهم فرصة للتعلم الذاتي وتصحيح الأخطاء بشكل مستقل	Although revisions were manually executed based on Grammarly's suggestions, students maintained stylistic control over their writing. The resulting sentence demonstrates a simple yet formal structure. Edits focused on eliminating lexical redundancy and correcting adjective gender agreement in accordance with formal Arabic usage.

The table illustrates how students from three different institutions utilized AI tools to revise Arabic academic texts, each reflecting distinct patterns of interaction shaped by institutional culture and pedagogical orientation. At Universitas Muhammadiyah Yogyakarta, students appeared to adopt a pragmatic approach, relying heavily on AI platforms like Grammarly and SciSpace to enhance linguistic precision and textual cohesion. Revisions in this context prioritized efficiency and clarity, particularly in refining grammatical constructs such as *idhafah* and *tarkib wasfi*. In contrast, the revision process at UIN Sunan Kalijaga was marked by a more reflective and dialogic character, where AI-assisted outputs were further refined through academic supervision. This allowed students to deepen their understanding of Arabic rhetorical forms, balancing between machine-generated scaffolding and human feedback. Meanwhile, at STAI Masjid Syuhada, the revision process emphasized autonomy and linguistic awareness. Although students followed AI-generated suggestions, they preserved control over tone and structure, using the feedback to reinforce grammatical accuracy and stylistic appropriateness. Collectively, these examples suggest that AI functions not merely as a correction tool, but as a pedagogical mediator that adapts to each learner's context and level of academic maturity.

AI-Assisted Academic Revision and Self-Efficacy Enhancement

Overall, students from all three institutions demonstrated significant improvement in the quality of their academic manuscripts. Their writing became more coherent, technically sound, and better aligned with the scholarly standards required by academic journals. These findings indicate that integrating AI tools into the revision process meaningfully accelerates the development of academic writing skills.

Table 4. AI-Assisted Academic Revision Findings

Institution	AI-Assisted Academic Revision Findings
Universitas Muhammadiyah Yogyakarta	Students exhibited high levels of AI engagement, utilizing Grammarly for grammar correction along with advanced features such as tone detection and clarity suggestions. SciSpace was used for automatic citation and reference formatting in APA style.
UIN Sunan Kalijaga	Students integrated AI-generated technical feedback with substantive guidance from their academic supervisors. AI was employed to address linguistic issues, while content-related aspects were improved through discussions. This approach strengthened their critical editing skills.
STAI Masjid Syuhada	Students used AI tools selectively. Revisions were made manually based on Grammarly's suggestions. Despite limited

	technological infrastructure, students displayed a high level of motivation for self-directed learning.
General Conclusion	Across the three campuses, students improved the coherence and accuracy of their writing. Texts became more technically refined and met academic writing conventions more consistently.

The table outlines distinct patterns of AI-assisted academic revision across three institutions, each reflecting varying degrees of technological engagement and pedagogical integration. At Universitas Muhammadiyah Yogyakarta, students demonstrated advanced utilization of AI tools, particularly by leveraging Grammarly's grammar correction features alongside tone detection and clarity enhancements, as well as using SciSpace for streamlined citation and reference formatting. Meanwhile, students at UIN Sunan Kalijaga adopted a blended approach, where AI feedback on linguistic form was complemented by supervisor input on content and conceptual development thereby fostering more critical and reflective editing habits. At STAI Masjid Syuhada, AI usage was more limited and pragmatic; students relied on Grammarly's suggestions but revised their texts manually, showing strong self-regulation and motivation despite infrastructural constraints. Overall, the findings indicate that students across all three contexts were able to improve the structure, coherence, and academic rigor of their writing, with AI functioning as both a technical aid and a stimulus for deeper editorial awareness.

Strengthening Academic Self-Efficacy through AI Integration

The use of Artificial Intelligence (AI) has proven to positively contribute to the enhancement of students' academic self-efficacy, particularly in the domain of scholarly writing. AI is perceived as an ever-present learning companion that does not exert emotional pressure, unlike traditional supervisory interactions. Students described feeling safe to experiment, make mistakes, and revise their texts repeatedly without fear of criticism or incompetence.

At Universitas Muhammadiyah Yogyakarta, students became increasingly confident in experimenting with sentence construction and argumentative style. They reported that AI enabled them to pose questions and re-evaluate word choice or paragraph structure without shame. This process fostered a deeply reflective learning space in which they explored multiple writing options before selecting the most effective. Some even developed new learning strategies, such as maintaining a '*prompt bank*' a collection of effective questions directed to AI as sources of inspiration when experiencing idea blockages.

Students from UIN Sunan Kalijaga described AI as a 'mental map' that guided them in developing logical flows and avoiding digressions from their core focus. AI helped them ensure coherence between paragraphs and align content with their research objectives. In practice, it also strengthened their metacognitive awareness especially when assessing how well-developed ideas represented the intended conceptual framework.

At STAI Masjid Syuhada, the use of AI took on a more philosophical dimension. Students interpreted AI as a symbol of intellectual autonomy, particularly in the absence of intensive face-to-face supervision. In such contexts, AI provided a flexible and personalized learning space where students could freely explore academic ideas beyond temporal or hierarchical constraints. In the long term, this contributed to students' growing confidence in critically revising their own work, a responsibility previously handed over entirely to supervisors.

Table 5. Informants' Testimonies and Analysis of Academic Self-Efficacy through AI

Institution	Informant Testimony (Interview Quote)	Discussion and Academic Analysis
Universitas Muhammadiyah Yogyakarta	<i>"Since using ChatGPT, I feel more confident. I can try different paragraph versions without the fear of making mistakes, and this has encouraged me to experiment."</i>	This statement reflects the affective dimension of self-efficacy enhancement: confidence and willingness to explore. AI creates a pressure-free learning environment, essential for students who tend to avoid mistakes in classroom settings.
UIN Sunan Kalijaga	<i>"AI acts like a mental map. When my ideas become too scattered, it helps me refocus on the main topic. I feel more structured in my writing."</i>	The student demonstrates improved cognitive control over their writing. AI serves as a guiding framework that reinforces idea organization and paragraph cohesion. This supports the metacognitive aspect of self-regulated learning theory.
STAI Masjid Syuhada	<i>"I used to wait for my lecturer's corrections. Now, with AI, I learn independently, identify my own mistakes, and make corrections directly."</i>	This testimony emphasizes a shift toward autonomous learning. Students move from passive to active and reflective learning models. AI supports the internalization of editing processes and academic writing structures, strengthening students' sense of agency.

Overall, AI does not merely serve as a technical tool, but rather functions as a facilitator of students' psychological development in facing the challenges of academic writing. Its presence

encourages more autonomous, reflective learning processes and fosters the formation of academic identity. This demonstrates that integrating AI into academic writing has the potential to support the achievement of learning autonomy and sustainable academic literacy.

Table 6. Strengthening Academic Self-Efficacy through AI

Institution	Academic Self-Efficacy Enhancement
Universitas Muhammadiyah Yogyakarta	Students reported greater confidence in experimenting with sentence structure and argumentation. AI was used to re-evaluate paragraphs, reduce fear of error, and promote reflective writing. Some students began to compile a personal prompt bank for independent reference.
UIN Sunan Kalijaga	Students used AI as a ' <i>mental map</i> ' to maintain focus and coherence in their writing. AI also enhanced their metacognitive awareness by helping them assess the alignment of ideas with their research objectives.
STAI Masjid Syuhada	AI was regarded as a symbol of independent thinking. Amid limited access to academic guidance, students viewed AI as a flexible learning space that sharpened their critical thinking and boosted their confidence in editing their own work.
General Conclusion	AI is not merely a technical tool; it also serves as a psychological facilitator that promotes self-directed, reflective learning and contributes to the development of students' academic identity.

Ethical Dilemmas in AI-Assisted Academic Writing

Although the presence of Artificial Intelligence (AI) in academic writing brings substantial benefits, students across the three institutions studied faced various complex ethical dilemmas. At UIN Sunan Kalijaga, for instance, students questioned the moral validity of using AI-generated text in their academic papers. Some expressed concern over authorship authenticity, with a few even referring to AI as an 'invisible co-author' whose contribution remains unacknowledged.

At Universitas Muhammadiyah Yogyakarta, students demonstrated ethical awareness by raising questions such as: Should AI be acknowledged in academic writing? Does its use constitute mere technical assistance, or does it represent a form of intellectual contribution? This awareness reflects students' critical stance toward AI output, emphasizing the importance of verifying and validating AI-generated content rather than accepting it as absolute truth.

Meanwhile, students at STAI Masjid Syuhada raised more philosophical and existential concerns. They questioned whether AI use might erode the intrinsic values of genuine learning processes, such as critical thinking, independent effort, and argumentative practice. In the absence of formal institutional guidelines, students were left to establish their own ethical boundaries often

intuitively and inconsistently. This moral ambiguity potentially disrupts the formation of academic integrity.

Table 7. Students’ Ethical Reflections on AI Use in Academic Writing

Institution	Student Interview Excerpt	Primary Ethical Issue	Critical Analysis
UIN Sunan Kalijaga	<i>“I feel strange copying text from AI because I’m not sure if I can still call it my own writing.”</i>	Moral validity and authorship authenticity	Students question the boundary between technological assistance and conceptual plagiarism. AI is perceived as an invisible co-author, highlighting attribution dilemmas. This indicates the need for clearer institutional policies.
UIN Sunan Kalijaga	<i>“If AI rewrites my argument, am I still the main author?”</i>	Ownership of ideas and academic responsibility	Uncertainty arises over who is ultimately accountable for the text’s content. Students express concerns that AI blurs the line between human creativity and automation.
Universitas Muhammadiyah Yogyakarta	<i>“I think AI should be acknowledged, but I’m confused is it a tool or an intellectual assistant?”</i>	Attribution of AI contribution	Students are becoming aware of AI’s significant role in shaping arguments and structure. However, there is no consensus on whether this qualifies as intellectual contribution.
Universitas Muhammadiyah Yogyakarta	<i>“I always double-check. AI often makes neat</i>	Validation of AI-generated information	Students do not blindly trust AI outputs. They re-

	<i>sentences, but sometimes they're illogical. We have to stay critical."</i>		evaluate content, demonstrating epistemic agency and reflective judgment.
STAI Masjid Syuhada	<i>"If everything is done with AI's help, are we still learning to write? Isn't the process what matters?"</i>	Loss of learning process value	Students express concern about the long-term impact of AI on critical thinking, logic, and academic confidence development.
STAI Masjid Syuhada	<i>"I feel increasingly dependent, but there are no clear rules from our lecturers."</i>	Lack of institutional guidelines	The absence of regulation forces students to set personal ethical boundaries intuitively. This leads to inconsistent standards and potential moral ambiguity.

From these three institutional contexts, it is evident that AI integration in academic writing has generated an urgent need for digital ethical literacy within higher education. Without explicit regulations, guidelines, or educational efforts, students risk experiencing moral confusion that can disrupt their learning and compromise academic integrity. Therefore, institutional interventions such as training, policy development, and open discussions are crucial to framing AI use in a responsible and constructive manner.

Table 8. Ethical Dilemmas of AI Use by Campus

Institution	AI Ethical Dilemma
UIN Sunan Kalijaga	Students questioned the originality of AI-generated text and whether AI deserves to be labeled a ' <i>co-author</i> '. The lack of official guidelines exacerbated the confusion.
Universitas Muhammadiyah Yogyakarta	Students debated whether AI should be acknowledged in academic work. They also recognized that AI is not an absolute source of truth and requires careful validation.
STAI Masjid Syuhada	Students faced value-based conflicts, questioning whether AI compromises the authenticity of learning. In the absence of ethical guidelines, they found themselves in a moral gray zone.

General Conclusion	Students need systematic digital ethical literacy. Without clear regulation, they are at risk of experiencing ethical conflicts that can undermine academic integrity and educational objectives.
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This research unveils a new dimension in the use of Artificial Intelligence (AI) in academic writing among Arabic Language Education students from three higher education institutions in Yogyakarta that is UIN Sunan Kalijaga, Universitas Muhammadiyah Yogyakarta, and STAI Masjid Syuhada. Each institution exhibited a distinctive approach to integrating AI in the scholarly writing process. The findings not only illustrate practical applications but also offer scientific contributions in the form of novelty that reflect the diversity of institutional contexts and students' academic cultures.

This study reveals that AI integration in academic writing has extensive implications, including improved cognitive structuring, linguistic quality, academic efficacy, and ethical awareness. Broadly speaking, AI functions not merely as a technical assistant but also as a catalyst for reflective learning, autonomous study, and the formation of academic identity. These findings reinforce the role of AI as a supportive entity in higher education particularly in contexts involving non-IT students, which have been underexplored in Arabic academic writing. At UIN Sunan Kalijaga, students used AI as an *'intellectual partner'* in developing conceptual frameworks and reflecting on academic ideas. Their interactions with AI were critical and conceptual, positioning AI as a medium for idea exploration rather than just a technical tool. This signifies a shift from a teacher-centered learning model toward reflective dialogue with technology.

At Universitas Muhammadiyah Yogyakarta, students engaged with AI systematically and technically. They utilized features such as tone detection and auto-referencing and pragmatically incorporated AI into the drafting and revision of academic manuscripts. AI was regarded as a modern writing assistant that enhances efficiency and productivity in journal composition. At STAI Masjid Syuhada, AI was interpreted as a symbol of independent thinking and a substitute for supervisory interactions. In the face of limited formal academic guidance, students leveraged AI to bridge academic literacy gaps. AI was used intuitively to grasp abstract concepts and foster writing confidence, marking a cultural transition in learning from dependence to autonomy.

Cleaned Conceptual Diagram: AI Use in Academic Writing

This refined diagram displays all concepts within clear boxes to ensure visual clarity and academic precision.

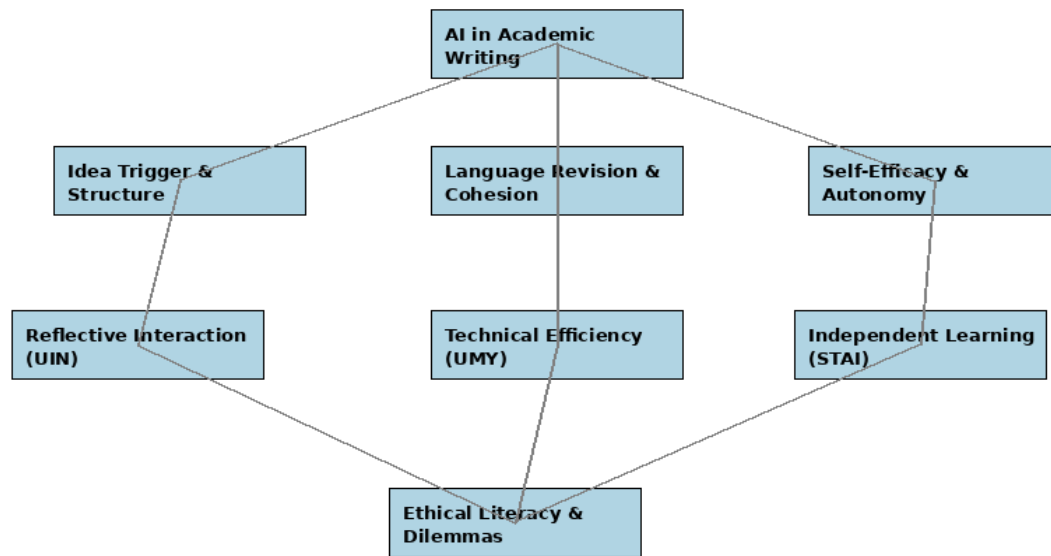


Figure. Conceptual Diagram: AI Use in Academic Writing

This conceptual diagram encapsulates the core dimensions derived from field research concerning the integration of Artificial Intelligence (AI) into academic writing among Arabic Language Education students. AI is positioned as a central entity facilitating three principal functions: as a trigger for idea generation and structural organization, a tool for linguistic revision and textual cohesion, and a catalyst for self-efficacy and autonomous learning. Each function correlates closely with the unique patterns observed at each institution. At UIN Sunan Kalijaga, AI fosters reflective interaction, prompting students to interrogate ethical boundaries and authorship authority. At Universitas Muhammadiyah Yogyakarta, AI is embraced for technical efficiency, reflecting adaptive readiness toward technological tools. Meanwhile, students at STAI Masjid Syuhada perceive AI as a challenge to their conception of independent learning. All these trajectories converge on the overarching theme of ethical literacy and academic dilemmas, which binds all dimensions as critical consequences of AI adoption in higher education. Thus, this diagram does not merely visualize observational data, but also reveals the causal and interdependent relations among thematic elements driving AI dynamics in scholarly writing.

Artificial Intelligence (AI) has emerged as a transformative force in the academic writing practices of Arabic Language Education students, not merely functioning as a technological tool but as an epistemic agent that redefines cognitive and pedagogical dynamics. At Universitas Muhammadiyah Yogyakarta, AI use fostered scaffolded autonomy among students, aligning with

Vygotsky's, that Zone of Proximal Development.²¹ Students displayed a heightened capacity to navigate argumentative structures, engage in lexical experimentation, and develop prompt banks, treating AI as a dialogical partner in the learning process. Jacob, Tate, and Warschauer was emphasize that AI contributes to metalinguistic awareness and cognitive autonomy, essential traits for second-language academic writers, not as a shortcut but as a scaffold for deeper engagement.²²

However, this technological integration also raises critical questions about authorship, intellectual responsibility, and educational values. At UIN Sunan Kalijaga, students perceived AI as an *"invisible co-author,"* leading to epistemological ambiguity regarding ownership and originality. This blurring of human-machine contributions highlights the need for clearer institutional policies and ethical attribution frameworks. Gao was warn that academic integrity is now challenged not just by concerns of plagiarism, but by uncertainties over cognitive authorship: *"The problem is no longer about who wrote the sentence, but who owns the thought behind it"*.²³ Likewise, students from STAI Masjid Syuhada voiced philosophical concerns, warning that uncritical AI reliance risks intellectual disengagement a notion echoed in Floridi's finded *"delegation fallacy,"* where responsibility for thinking is prematurely surrendered to machines.²⁴

These insights collectively underscore the urgent need for higher education institutions to embed AI literacy and ethics into academic curricula. The lack of structured ethical guidance leaves students navigating a grey zone of moral decision-making, which could foster inconsistent standards in academic writing practices. A tripartite pedagogical framework is proposed: (1) promoting critical awareness of AI's cognitive limitations, (2) enforcing transparent attribution protocols, and (3) facilitating faculty-student dialogue on AI's ethical use. In this context, AI is not a threat to academic integrity but a catalyst for cultivating reflective, autonomous, and ethically grounded scholarship. Through strategic intervention, universities can transform AI from a mechanical assistant into a partner in the evolution of critical thinking and intellectual maturity.

²¹ Vygotsky, Lev S. *Mind in Society: The Development of Higher Psychological Processes*. Cambridge, MA: Harvard University Press, 1978.

²² Jacob, S., Tamara Tate, dan Mark Warschauer. "Emergent AI-Assisted Discourse: Case Study of a Second Language Writer Authoring with ChatGPT." *arXiv Preprint*, 2023.

²³ Gao, Fei, Tian Luo, dan Ke Zhang. "ChatGPT and Education: Opportunities, Challenges, and Implications." *Open Praxis* 16, no. 1 (2021).

²⁴ Floridi, Luciano. "Delegation Fallacy and Epistemic Responsibility in AI Use." *Social Epistemology*, advance online publication, 2023.

CONCLUSION

This study has revealed that the integration of artificial intelligence (AI) tools in the academic writing practices of Arabic Language Education students significantly enhances their capacity for conceptual ideation, structural organization, and linguistic refinement. AI serves not merely as a mechanical aid but as an epistemic collaborator, particularly in the pre-writing and drafting phases, where students are afforded a safe space to explore and articulate ideas without the immediate pressure of formal evaluation. The findings underscore the pedagogical value of AI in fostering students' self-efficacy, cognitive fluency, and academic voice especially in multilingual and cross-cultural academic contexts.

In light of these findings, it is recommended that higher education institutions integrate AI literacy and ethical use into academic writing curricula. Structured guidelines and reflective frameworks should be developed to help students navigate the boundaries between assistance and authorship. Additionally, future innovations may include the design of AI-assisted platforms that align more closely with Arabic syntactic and rhetorical conventions, providing culturally and linguistically responsive feedback. By embracing AI as both a technological and pedagogical partner, educators can foster more autonomous, reflective, and ethically grounded academic writers.

In addition, this research enriches the on going conversation surrounding the ethical and instructional dimensions of AI use in academic environments. Although AI tools have proven effective in supporting clarity, structure, and linguistic accuracy, their widespread use raises important concerns regarding authorship and intellectual agency. To address this, educational institutions must go beyond technical training and actively cultivate students' ethical judgment and critical engagement with AI-generated content. Further investigations are needed to examine how sustained exposure to AI influences students' capacity for independent reasoning, creative articulation, and adherence to academic integrity across various educational and cultural contexts.

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