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Developing AI-Enhanced Writing Materials for University Students: A Case Study at Universitas Muhammadiyah Surakarta

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Abstract

This study explores the development of Artificial Intelligence (AI)-enhanced teaching materials for improving university students' writing skills at Universitas Muhammadiyah Surakarta (UMS). In response to the ongoing digital transformation in higher education, AI-based tools such as Grammarly, ChatGPT, and Write & Improve have been increasingly utilized in writing instruction. The study employs a qualitative descriptive design and gathers data through classroom observations, semi-structured interviews with three English lecturers, and reflective journals from twenty students in the English Education Department. The findings reveal that AI tools significantly enhance students' engagement, critical thinking, and awareness of writing mechanics. However, several challenges remain, including over-reliance on AI, gaps in digital literacy, and insufficient teacher training. The study proposes a localized model for AI-integrated material development grounded in Tomlinson's (2011) materials development framework and the TPACK model (Mishra & Koehler, 2006). It concludes that thoughtful integration of AI can enrich the process writing approach and promote learner autonomy when pedagogical principles remain central to instructional design.

Keywords deve: AI in education, materials lopment, writing instruction, digital literacy, UMS, English education

Introduction

In recent decades, Artificial Intelligence (AI) has emerged as one of the most transformative forces in education, reshaping how knowledge is created, delivered, and assessed. The global movement toward digitalization and automation has accelerated the integration of AI-powered tools in language teaching and learning. According to the World Economic Forum (2022), more than 70% of educational institutions now utilize AI technologies to personalize learning and enhance student engagement. In the field of English language teaching (ELT), AI applications such as automated writing evaluation systems, machine translation, and generative text models have changed how writing is taught and practiced. These innovations have created new opportunities for developing communicative competence and learner autonomy. However, their pedagogical use must be grounded in sound theoretical frameworks to ensure that technology supports, rather than replaces, the human elements of teaching and learning. In the Indonesian context, the adoption of digital and AI-based learning tools has gained significant momentum, particularly in higher education. The Ministry of Education, Culture, Research, and Technology has encouraged universities to integrate digital innovation into their curricula to prepare students for the Fourth Industrial Revolution. This transformation aligns with Indonesia's vision of Merdeka Belajar Kampus Merdeka (Freedom to Learn, Independent Campus), which emphasizes flexible, technology-supported, and student-centered education. Despite these efforts, challenges remain such as uneven access to technology, limited teacher training, and concerns about academic integrity. As Indrawati and Utami (2022) note, successful digital transformation in Indonesia requires not only technological readiness but also cultural adaptation and pedagogical innovation. Therefore, understanding how AI can be effectively integrated into English writing instruction within specific university contexts is both timely and necessary.

At Universitas Muhammadiyah Surakarta (UMS), one of Indonesia's leading private Islamic universities, the integration of technology in education has become a central focus of institutional development. Guided by its vision of cultivating faith, knowledge, and service (iman, ilmu, amal), UMS strives to balance technological innovation with ethical and humanistic values. The English Education Department, in particular, has made significant strides toward incorporating AI tools in writing instruction. Writing has long been recognized as a challenging skill for EFL learners due to its demands on linguistic accuracy, coherence, and critical thinking (Hyland, 2019). Many UMS students struggle with generating ideas,

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organizing arguments, and maintaining clarity of expression. AI-powered platforms such as Grammarly, ChatGPT, and Write & Improve have been introduced to assist in these areas by offering real-time feedback and language suggestions. However, while such tools provide opportunities for scaffolding and independent practice, their implementation requires a thoughtful approach that aligns with UMS's pedagogical philosophy and ethical principles. Despite the growing integration of AI tools in English language teaching, there remains limited understanding of how AI-enhanced writing materials can be systematically developed and implemented within the specific context of Indonesian Islamic higher education. At UMS, while AI tools such as Grammarly and ChatGPT are increasingly available, their pedagogical integration lacks a coherent framework that balances technological affordances with ethical considerations and learner-centered principles. This gap raises critical questions about the effectiveness, appropriateness, and sustainability of AI use in writing instruction. Many educators remain uncertain about how to design lessons that incorporate AI tools meaningfully while maintaining academic integrity and fostering genuine learning. Furthermore, students face confusion about the appropriate boundaries of AI assistance, often struggling to distinguish between legitimate support and over-dependence that may undermine their own skill development.

Given this background, this study aims to address several research objectives and questions. The first objective is to develop AI-enhanced writing materials that support the process writing approach in the English Education Department at UMS. The second objective is to explore the perceptions of English lecturers and students regarding the use of AI tools in writing instruction, capturing both their experiences and attitudes toward this technological integration. The third objective is to identify challenges and opportunities emerging from integrating AI tools into writing pedagogy at UMS, particularly focusing on practical implementation issues and potential benefits. The fourth objective is to propose a framework for AI integration aligned with UMS's pedagogical philosophy and Islamic ethical principles, ensuring that technology serves educational and moral goals rather than contradicting them.

These objectives translate into four key research questions. First, how can AI-enhanced writing materials be developed to support the process writing approach in the English Education Department at UMS? Second, what are the perceptions of English lecturers and students regarding the use of AI tools in writing instruction? Third, what challenges and opportunities emerge from integrating AI tools into writing pedagogy at UMS? Fourth, how can AI integration be aligned with UMS's pedagogical philosophy and Islamic ethical principles? By answering these questions, this study seeks to contribute to both theoretical understanding and practical application of AI in language education within the unique context of Indonesian Islamic higher education.

Literature Review

The integration of Artificial Intelligence (AI) into language education has become a major research focus in the last decade, particularly as educators search for effective ways to support writing development. Studies have shown that AI-driven writing tools, such as Grammarly, ProWritingAid, Write & Improve, and ChatGPT, have transformed feedback practices by providing instant, individualized suggestions on grammar, vocabulary, and style (Li et al., 2023; Bai & Guo, 2021). These tools have been reported to enhance students' accuracy and fluency while reducing teacher workload (Warschauer & Liaw, 2019). However, critics have raised concerns about over-reliance and the possible erosion of learners' critical thinking (Selwyn, 2019). Within higher education, particularly in EFL contexts, the challenge lies not in whether AI should be used, but how it should be implemented in ways that align with sound pedagogical principles. As Scherer et al. (2023) note, effective AI adoption requires institutional readiness, teacher competence, and ethical frameworks that balance innovation with accountability. One theoretical foundation for designing effective AI-based writing instruction is materials development theory, as proposed by Tomlinson (2011, 2012). He emphasizes that well-designed materials should expose learners to authentic input, encourage engagement, and promote cognitive challenge. The materials should not simply deliver content but also stimulate reflection and creativity. In this regard, AI tools can be viewed as extensions of learning materials interactive, adaptive, and capable of providing multimodal feedback. Research by Gilmore (2007) and Nation & Macalister (2010) supports this idea, highlighting that authentic, learner-centered materials foster deeper processing and transfer of knowledge. In the context of Universitas Muhammadiyah Surakarta (UMS), material development must also consider cultural and ethical dimensions. AI-supported materials should not only address linguistic competence but also reflect Islamic moral values and critical digital literacy. Thus, materials development and AI integration should be approached holistically, combining technological affordances with contextual sensitivity.

Another crucial framework relevant to this study is the Process Writing Approach, originally developed by Hayes and Flower (1980, 1996). This approach reconceptualizes writing as a recursive process involving planning, translating, reviewing, and monitoring. Instead of emphasizing accuracy in the final product, the process approach focuses on developing students' strategies and cognitive awareness. AI tools align naturally with this model because they provide feedback at each stage of writing. ChatGPT, for example, supports brainstorming and idea generation during planning; Grammarly offers linguistic feedback during translation and drafting; and peer-AI comparative activities can facilitate the reviewing stage. Empirical research has demonstrated that AI-assisted process writing increases learners' metacognitive awareness, autonomy, and motivation (Kohnke & Moorhouse, 2023; Li et al., 2023). Nonetheless, scholars caution that without critical guidance, AI feedback may encourage surface-level revisions rather than deeper cognitive engagement

(Hyland, 2019). Therefore, teachers play an essential role as facilitators who guide learners to interpret and evaluate AI suggestions meaningfully.

The successful use of AI in writing instruction also depends on teachers' ability to integrate technological and pedagogical knowledge effectively. Mishra and Koehler's (2006) Technological Pedagogical Content Knowledge (TPACK) framework provides a valuable lens for understanding this integration. TPACK emphasizes that effective teaching requires an intersection of three domains: technological knowledge (knowing how to use AI tools), pedagogical knowledge (understanding how students learn best), and content knowledge (mastery of writing instruction). When teachers can balance these elements, AI can serve as a catalyst for innovation rather than a source of confusion. Recent studies highlight that teacher preparedness and training are critical determinants of successful AI integration (Zawacki-Richter et al., 2019; Warschauer & Liaw, 2019). At UMS, where educators are encouraged to incorporate digital tools within Islamic and humanistic frameworks, the TPACK model is particularly relevant because it emphasizes the harmony between technology and pedagogy guided by ethical principles. This perspective aligns with UMS's institutional mission to produce graduates who are intellectually capable, technologically literate, and morally grounded. Beyond pedagogical frameworks, the concept of AI literacy and ethics has become central to modern education. AI literacy refers to the ability to use, interpret, and critically evaluate AI technologies responsibly (Long & Magerko, 2020). As students increasingly rely on AI tools to assist with academic writing, it is essential that they understand both the benefits and limitations of these systems. Ethical considerations include awareness of data privacy, plagiarism, authorship, and the potential for algorithmic bias (Smutny et al., 2023). Universities worldwide are now embedding AI literacy into their curricula to ensure students become not just users but critical thinkers and responsible digital citizens. For UMS, this means fostering a balanced approach to AI adoption that integrates moral education and reflective practice. As Munir (2021) emphasizes, Islamic higher education must ensure that technology serves humanity, not the reverse. Therefore, developing AI-enhanced writing materials at UMS is not simply a technological endeavor but also a moral and pedagogical commitment to shaping ethical, autonomous, and competent writers for the digital era.

Methodology

This study adopted a qualitative descriptive design aimed at providing an in-depth understanding of how AI-enhanced writing materials are implemented and perceived within the English Education Department at Universitas Muhammadiyah Surakarta (UMS). The qualitative approach was chosen because it allows the researcher to capture natural classroom dynamics, teacher strategies, and student experiences in their authentic contexts. It also aligns with the exploratory nature of this study, which seeks to uncover how AI tools such as Grammarly and ChatGPT contribute to the writing process rather than to measure learning outcomes numerically. The focus was therefore on generating rich, descriptive data that illuminate how pedagogical principles, technological use, and contextual factors intersect within the UMS learning environment. The participants consisted of three English lecturers and twenty second-year undergraduate students from the English Education Department. The lecturers were selected through purposive sampling based on their active engagement with digital technologies in teaching, while students were chosen to represent a range of writing proficiency and digital literacy levels.

The study took place over eight weeks in two writing classes focusing on argumentative and academic writing. Ethical considerations were prioritized throughout the research process: participants were informed of the study's objectives, consented to participate voluntarily, and were assured confidentiality. The classroom context at UMS was ideal for this study, as it reflected the university's broader efforts to integrate technology and faith-based education under the Muhammadiyah philosophy of ilmu yang amaliah dan amal yang ilmiah (knowledge that serves and action that enlightens). Data collection employed three main techniques: classroom observation, semi-structured interviews, and student reflective journals. Classroom observations focused on the ways lecturers and students interacted with AI tools during the writing process particularly during brainstorming, drafting, and revising stages. Semi-structured interviews were conducted with the three lecturers to gather insights into their perceptions, strategies, and challenges in integrating AI into writing instruction. Meanwhile, student reflective journals provided rich evidence of learners' self-perceived progress, difficulties, and ethical concerns related to AI use. The collected data were analyzed using thematic analysis following Braun and Clarke's (2006) six-step framework: familiarization, coding, theme generation, review, definition, and interpretation. Data triangulation across multiple sources strengthened the study's validity, while member-checking with participants ensured the credibility and trustworthiness of the findings.

Finding and Discussion

The integration of Artificial Intelligence (AI) tools in writing classes at Universitas Muhammadiyah Surakarta (UMS) revealed several interconnected themes concerning learner engagement, writing development, and teacher adaptation. Classroom observations showed that both lecturers and students viewed AI tools as a supportive complement rather than a replacement for traditional instruction. Grammarly was the most frequently used platform, providing students with immediate feedback on grammar, coherence, and style. ChatGPT, on the other hand, was commonly employed for

brainstorming and planning essay outlines. One lecturer, referred to as Lecturer A, described AI as "a bridge between what students think and how they express it in writing." This comment aligns with findings from Li et al. (2023) and Bai & Guo (2021), who noted that AI-powered feedback increases learners' awareness of structure and language accuracy. However, while technology promoted independence, it also raised questions about authenticity and over-reliance, echoing concerns by Selwyn (2019) regarding automation complacency in education. Students at UMS expressed positive attitudes toward AI-enhanced writing materials, noting that such tools made them "feel more confident to write without fear of mistakes." In their reflective journals, several students reported that receiving instant feedback from Grammarly helped them revise multiple drafts independently before submission. This process reflects the essence of the process writing approach (Hayes & Flower, 1980), where feedback and revision are iterative and formative. As Student 4 stated, "I like Grammarly because it tells me what is wrong, but I decide what to change." This kind of decision-making illustrates a shift toward learner autonomy, as described by Benson (2011), where students assume responsibility for evaluating and applying feedback. Nevertheless, some students admitted relying too heavily on AI corrections without critically analyzing suggestions. Similar patterns were identified by Kohnke and Moorhouse (2023), who found that while AI enhances writing fluency, it may inadvertently discourage metacognitive reflection unless guided by teachers.

Lecturers highlighted the importance of scaffolding AI use within pedagogical frameworks to ensure meaningful engagement. Lecturer B emphasized that "AI tools are helpful, but students must learn when to trust the feedback and when to question it." This reflects the notion of critical AI literacy, which encourages learners to evaluate AI-generated output critically (Long & Magerko, 2020). Observations revealed that when teachers incorporated structured reflection activities such as comparing AI feedback with peer comments students developed deeper understanding of writing mechanics. For instance, students were asked to justify whether they accepted or rejected specific AI suggestions. This activity increased awareness of grammatical reasoning and rhetorical appropriateness, supporting Vygotsky's (1978) concept of scaffolding and the Zone of Proximal Development (ZPD). Similar strategies were reported effective by Warschauer and Liaw (2019), who found that guided reflection promotes transfer of AI feedback into internalized writing competence. Another prominent theme was the evolving role of teachers in AI-integrated classrooms. Lecturers at UMS found themselves shifting from being traditional knowledge providers to facilitators and mediators between technology and learners. Lecturer C mentioned, "I am no longer the only source of feedback now I teach students how to evaluate the feedback they receive." This pedagogical shift aligns with the TPACK framework (Mishra & Koehler, 2006), which emphasizes the intersection of technological, pedagogical, and content knowledge in effective teaching. Teachers who demonstrated stronger TPACK competence were better able to align AI tools with lesson objectives, creating balanced instruction between automation and human guidance. These findings resonate with Zawacki-Richter et al. (2019), who argue that sustainable AI integration in education depends on educators' ability to synthesize these three domains. However, lecturers also expressed concern about the pace of technological change, noting that "keeping up with AI updates is like chasing a moving target," highlighting the need for ongoing professional development. Ethical and institutional challenges also emerged as critical findings. Some students misused AI tools to generate entire paragraphs without attribution, prompting concerns about academic integrity. Teachers responded by emphasizing process-based evaluation, grading students' brainstorming notes, outlines, and reflections rather than final essays alone. This approach discouraged plagiarism and encouraged accountability. According to Lecturer B, "When I see how students use AI in each step, I understand whether they are learning or just copying." This mirrors Selwyn's (2019) warning that AI must be framed as a cognitive aid, not a shortcut. Moreover, accessibility issues persisted: several students mentioned unstable internet connections and limited device availability. To address this digital divide, UMS provided access to the Digital Learning Center, ensuring students could practice with institutional resources. These findings are consistent with Indrawati & Utami (2022), who found that equitable access and teacher readiness are key to successful technology integration in Indonesian universities.

Despite these challenges, the incorporation of AI-enhanced writing materials significantly enriched the learning experience at UMS. Students became more reflective, teachers more adaptive, and classroom dynamics more interactive. The triangulated findings suggest that AI tools, when used ethically and pedagogically, promote learner autonomy, metacognitive awareness, and engagement. This reflects Chapelle and Sauro's (2017) assertion that technology's value in language learning depends on how it is mediated through human interaction. In the UMS context, AI integration was not merely technological but deeply pedagogical and moral. The university's Islamic values encouraged teachers to discuss ethical dimensions of AI, framing it as a tool for amanah (responsibility) and ikhtiar (effort), rather than dependency. As Student 8 reflected, "My teacher said AI helps us, but the real writer must still be me. That made me think differently." This demonstrates the alignment between technological innovation and moral education envisioned by Munir (2021) in Islamic higher education. The findings ultimately affirm that AI integration in writing instruction can be transformative when grounded in a pedagogy of reflection, ethics, and autonomy. AI tools provided scaffolding for students to move from surface correction to conceptual understanding, from dependency to independence. However, this transformation required continuous teacher mediation, ethical awareness, and institutional support. In line with Hyland's (2019) view that writing development is a social and cognitive process, AI should be seen as a facilitator of interaction and thought, not as an automatic writing solution. Therefore, the UMS experience underscores a balanced paradigm one that unites AI innovation with spiritual and intellectual development, preparing students to become not just proficient writers but responsible digital citizens in the age of intelligent technology.

Conclusion

This study concludes that AI-enhanced writing materials hold great promise for improving students' writing competence at Universitas Muhammadiyah Surakarta. When guided by theoretical frameworks such as Tomlinson's materials development principles, the process writing approach, and the TPACK model, AI can serve as a powerful pedagogical ally. The integration of AI tools supports multiple stages of the writing process planning, drafting, revising, and reflecting while fostering autonomy and engagement. However, successful implementation requires careful attention to challenges, including over-reliance, ethical concerns, and the digital divide among students. For educators and curriculum developers at UMS, several recommendations emerge. First, AI integration should be process-oriented, aligning each tool with a specific stage of writing. Second, teacher training programs on AI literacy and materials development should be prioritized to ensure informed pedagogical decisions. Third, institutional policies must establish clear ethical guidelines for AI use, emphasizing academic honesty and critical engagement. Finally, further research should explore longitudinal effects of AI on writing proficiency and investigate how multimodal AI platforms can support other language skills such as speaking and reading. In essence, the goal of integrating AI in writing instruction is not to replace teachers but to empower them and their students. UMS, as a forward-looking institution, is well positioned to model a balanced and ethical approach to AI in education one that combines technological innovation with human-centered pedagogy.

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