
AI-Powered Learning: Shaping the Future of Academic Writing in EFL Education in Indonesia

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Abstract

This study investigates the use of artificial intelligence (AI) in English as a Foreign Language (EFL) academic writing teaching, with an emphasis on problems and perceptions among Indonesian teachers and students. To analyze prevalent challenges connected to AI use in education, data were collected using a qualitative descriptive approach from teacher comments, classroom observations, and relevant literature. The findings highlight five important themes: low digital literacy, unequal access to infrastructure, student overreliance on AI technologies, a lack of pedagogical training, and varied teacher attitudes towards AI in the classroom. Despite these challenges, many Indonesian EFL teachers recognise AI's potential to assist personalised learning, streamline feedback processes (especially via conferencing), and improve instructional methods. This study advances our understanding of AI's educational impact in Indonesian EFL environments, emphasising the importance of focused professional development and equal access to technology.

Keywords: Artificial Intelligence, EFL Education, Academic Writing, Indonesia, Teacher Perceptions, AI in Language Learning

1. INTRODUCTION

The integration of AI into education has significantly transformed teaching and learning practices across various disciplines (Wolf & Brown, 2023). AI-powered tools, once considered a futuristic concept, have now become essential components of the educational landscape, providing

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previously unimaginable solutions. AI tools are increasingly employed in language education to assist learners in attaining higher proficiency levels, especially in academic writing. These tools provide various functionalities, including grammar correction and content generation, which can substantially improve the learning experience. The integration of AI in education is motivated by its capacity to deliver personalized learning experiences that cater to the distinct needs and abilities of individual students (Tütünüş & Küçükali, 2014). Personalization is essential in EFL education due to the diverse linguistic backgrounds and varying proficiency levels of learners.

Proficiency in academic writing is essential for Indonesian EFL learners, but many encounters substantial challenges such as limited vocabulary, a lack of critical thinking abilities, and unfamiliarity with academic conventions (Sakkir, Rahman, & Salija, 2016). Traditional teaching methods frequently fall short of meeting these obstacles, necessitating more effective and inventive alternatives. AI tools, such as automated writing evaluation systems, grammar checkers, and plagiarism detection software, provide tailored, timely, and actionable feedback (Yunus, Salehi, & Tarmizi, 2011). These tools not only assist students identify errors, but also teach them how to develop their writing skills over time. AI tools allow students to learn at their own pace by delivering quick feedback, instilling a sense of autonomy and responsibility for their own education. This is especially critical in Indonesia, where huge class sizes and insufficient resources make it impossible for teachers to deliver targeted instruction to each student.

The intersection of artificial intelligence (AI) and academic writing provides a unique opportunity to reimagine the teaching-learning dynamic, promoting inclusivity and closing access gaps to quality education (EFL Students' Perceptions in Indonesia and Taiwan on Using AI to Improve Writing Skills, 2024). AI can democratize education, empowering individuals from diverse backgrounds to attain academic achievement. This is especially crucial in Indonesia, where urban and rural areas have vastly different educational opportunities and outcomes (The impact of AI writing tools on the content and organization of EFL student writing, 2023). Educators can foster equity in education and bridge the digital divide by offering high-quality educational experiences to students in remote and underserved communities through the use of

AI and technology tools (The Use of AI and Technology Tools in Developing Students' English Academic Writing Skills, 2023). In the classroom, AI tools are invaluable resources due to their ability to provide personalized feedback, support language development, and improve writing skills (Utilizing Artificial Intelligence-based Paraphrasing Tool in EFL Writing, n.d.).

The objective of this paper is to illuminate the present state of AI integration in academic writing instruction in Indonesia for English as a Foreign Language (EFL), examining the opportunities and obstacles it presents. This study also aims to offer insights into the practical implications of AI in language education and identify strategies for effective implementation by analyzing the experiences and perspectives of Indonesian EFL teachers (Using Artificial Intelligence (AI) ChatGPT as A Writing Tool, 2024; Patterns of Utilizing AI-Assisted Tools Among EFL Students, 2024).

2. LITERATURE REVIEW

The roots of Artificial Intelligence (AI) can be traced back to classical philosophy, where early thinkers such as Aristotle and Descartes investigated the nature of thinking, logic, and the potential of automating mind. However, the formalisation of AI as a scientific subject began in the mid-twentieth century, with a watershed moment: the 1956 Dartmouth Conference. This workshop, organised by John McCarthy, Marvin Minsky, Nathaniel Rochester, and Claude Shannon, brought together interdisciplinary researchers who shared the belief that "every aspect of learning or any other feature of intelligence can in principle be so precisely described that a machine can be made to simulate it" (McCarthy et al., 1955). During this event, the name Artificial Intelligence was coined, officially establishing the discipline. The Dartmouth Conference not only established the theoretical foundation for AI, but it also sparked decades of study into machine learning, problem solving, and cognitive modelling. It marked a move from philosophical speculation to scientific investigation, establishing the fundamental goals that continue to drive the subject today.

Artificial intelligence (AI) is the imitation of human intelligence processes by technology, specifically computer systems. Russell and Norvig (2021) describe AI as "the study of agents that receive precepts

from their environment and perform actions." These agents are intended to simulate cognitive processes such as learning, reasoning, problem solving, perception, and language comprehension. AI systems can be rule-based or data-driven, with the ability to modify their responses to the data they process. The development of AI has gone through numerous stages:

1. 1950s–1970s (Symbolic AI): Emphasis on rule-based systems and logical reasoning.
2. 1980s (Expert Systems): The creation of systems such as MYCIN and XCON that encoded expert knowledge in specific disciplines.
3. The 1990s and 2000s saw the rise of data-driven algorithms such as decision trees, support vector machines, and early neural networks.
4. 2010s–Present (Deep Learning and Big Data): Massive increases in computational power and data availability resulted in advancements in deep learning, allowing for applications in speech recognition, picture analysis, and natural language processing.

AI can be divided into numerous categories based on capabilities and functionality which described as follows:

a. Based on capability

1. Narrow AI (Weak AI): Designed to do a narrow task.
2. General AI (Strong AI) is a theorised type of AI capable of understanding and learning every intellectual task that a human can perform.
3. Superintelligent AI: A hypothetical AI that outperforms human intelligence in all fields – this remains speculative.

b. Based on functionality

1. Reactive Machines: Simple systems that have no memory or prior learning (such as IBM's Deep Blue chess program).
2. Limited Memory: Systems that make decisions based on past experiences (for example, self-driving automobiles).
3. Theory of Mind: These concepts, which are still in development, would help us understand human emotions and beliefs.
4. Self-aware AI: Future AI with consciousness and self-awareness.

AI is quickly evolving and having a revolutionary impact across numerous industries. AI is utilized in healthcare for medical imaging diagnostics, predictive analytics, and personalized therapy suggestions; systems such as IBM Watson Health demonstrate this integration. In

education, AI-powered technologies provide adaptive learning platforms, automated grading, and intelligent tutoring systems that cater to the needs of individual students. AI drives the development of self-driving vehicles, optimizes traffic management, and improves logistics through predictive routing. AI helps businesses make better decisions by analyzing data, automating customer care with chatbots, detecting fraud in financial transactions, and implementing targeted marketing strategies. As AI technologies advance, their impact in these fields is projected to grow, altering how services are offered and decisions are made.

2.1. The Integration of AI in Education

The incorporation of Artificial Intelligence (AI) in education has garnered considerable attention in recent years. Artificial intelligence technologies, like automated writing evaluation systems and intelligent tutoring systems, have been created to improve educational methodologies. Woolf (2010) asserts that AI can deliver customized learning experiences tailored to specific student requirements, therefore enhancing engagement and educational results. This customization is especially advantageous in English as a Foreign Language (EFL) setting, as students frequently display varying skill levels and learning preferences. Zawacki-Richter et al. (2019) emphasize that AI applications in education facilitate scalable and adaptive learning environments, enabling institutions to manage increasing student numbers while preserving high-quality training.

2.2. AI's Impact on Academic Writing

Studies argue that AI tools can markedly enhance learners' academic writing abilities. Research conducted by Grimes et al. (2020) illustrates that AI-driven applications offer instantaneous feedback on grammar, style, and coherence, hence assisting students in enhancing their writing skills. Moreover, these tools promote iterative learning processes, enabling students to participate in self-directed enhancement (Baker & Inventado, 2014). In the realm of EFL education in Indonesia, where students frequently have difficulties with academic traditions and critical thinking abilities (Sakkir et al., 2016), AI can function as an essential support system. AI tools such as Grammarly and Turnitin have been shown to improve learners' capacity to recognize and rectify linguistic and structural faults, hence promoting their independence in writing (Chukharev-Hudilainen & Torrance, 2023).

2.3. Challenges in Implementing AI in EFL Education

Notwithstanding the prospective advantages of AI in language instruction, numerous obstacles impede its successful deployment. A significant concern is the inequity in technological access among various educational institutions. Fortunasari (2016) emphasizes that educational institutions in metropolitan locales typically possess superior access to technical resources than their rural counterparts. The digital divide intensifies pre-existing disparities in educational quality and student performance. Moreover, teacher readiness is a crucial determinant affecting the effective incorporation of AI tools. Research conducted by Marzuki et al. (2023) reveals that numerous instructors are insufficiently trained in the efficient integration of AI technologies into their pedagogical practices. This disparity highlights the necessity for extensive professional development initiatives centered on digital literacy and pedagogical approaches for incorporating AI into language education. A further obstacle pertains to cultural resistance, where conventional teaching approaches prevail, resulting in a sluggish adoption of AI tools in some countries (Lai & Smith, 2021).

2.4. Ethical Considerations in AI Usage

The emergence of AI-driven educational systems also prompts ethical issues related to data privacy, plagiarism, and academic integrity. Alghamdy (2023) emphasizes that instructors must create explicit criteria for the proper utilization of AI tools to reduce concerns related to academic dishonesty. Furthermore, cultivating a culture of ethical awareness among students is crucial to ensure they comprehend the ramifications of utilizing AI technology in their writing practices. Another issue is algorithmic bias, wherein AI technologies may unintentionally prioritize specific linguistic patterns, thereby disadvantaging non-native speakers or reinforcing prevailing biases in academic standards (Binns, 2018). Clarity in AI algorithms and ongoing assessment of their efficacy are essential for tackling these ethical dilemmas.

2.5. Future Directions for Research and Practice

Moving forward, more study is needed to investigate the long-term implications of AI integration on language learning outcomes and pedagogical practices. Collaboration between educators, researchers, and technology developers is critical for resolving both technical issues and pedagogical needs (Wolf & Brown, 2023). By fostering interdisciplinary

collaborations, stakeholders can develop creative solutions that improve the educational experience of EFL students. Future research should look into the function of AI in boosting higher-order thinking skills like critical analysis and synthesis in academic writing tasks. Furthermore, developing localized AI solutions that are adapted to the linguistic and cultural contexts of Indonesian learners has the potential to dramatically improve their accessibility and effectiveness. Integrating student feedback into AI design processes ensures that these technologies address real-world educational difficulties and help to create more equal learning environments.

3. METHODS

This paper adopts a review-based methodology, compiling and synthesizing findings from existing literature to analyze the integration of Artificial Intelligence (AI) in English as a Foreign Language (EFL) academic writing instruction. The approach involves identifying, reviewing, and summarizing relevant studies to provide a comprehensive understanding of the topic. Key themes include the potential of AI tools to enhance academic writing, the challenges of implementing such technologies in EFL contexts, and the ethical considerations surrounding their use.

The literature reviewed spans studies on personalized learning experiences facilitated by AI, its impact on language proficiency, and its transformative potential in Indonesian education. The findings are drawn from peer-reviewed journal articles, books, and conference proceedings, ensuring a broad and credible evidence base. By synthesizing these sources, this paper aims to highlight trends, identify gaps in the literature, and suggest future directions for research and practice.

4. RESULTS

The data gathered highlights a number of common concerns and themes that characterize the current stage of AI implementation in Indonesian schools.

1. *Limited digital literacy and technical skills.*

One of the most common issues raised by both teachers and students is a lack of digital literacy and technological skills. Many educators, particularly those in rural or underprivileged regions, struggle to grasp how AI tools work and how to successfully incorporate them

into their teaching practices. Students, too, frequently lack the ability to explore AI-powered platforms independently. This issue is congruent with the findings of Sari and Wahyudi (2023), who state that uneven digital literacy remains a barrier to effective AI application in Indonesian education.

2. *Access and Infrastructure Gaps*

Inequitable access to dependable internet and technology infrastructure is another major issue. While urban schools may have better access to digital tools and high-speed connections, many rural schools continue to confront barriers to implementing AI technologies. Teachers expressed difficulty implementing AI-based learning tools due to irregular electricity, old devices, and inadequate financing for digital resources (Putra et al., 2022).

3. *Concerns about student dependency and academic integrity.*

Teachers voiced fear that students will become overly reliant on AI tools like ChatGPT and automated interpreters. There is rising concern that students will utilize these technologies for assignments without fully participating in the learning process, potentially jeopardizing academic integrity and limiting possibilities for critical thinking. Aditya and Nugroho (2024) raise similar worries, warning that AI may contribute to a "copy-paste" mentality among students.

4. *A lack of pedagogical support and training.*

The majority of Indonesian instructors claimed that they had gotten insufficient training on how to use AI effectively in their classrooms. While many people recognize AI's potential for personalized learning and administrative support, many are unprepared to design classes or evaluations that incorporate AI tools in pedagogically sound ways. Teachers have advocated for more structured professional development programs geared towards AI integration in the classroom (Rahmawati, 2023).

5. *Mixed Views and Attitudes Towards AI in Education*

While some teachers see AI as a useful breakthrough that can minimize their workload (for example, through automatic grading or administrative aid), others are skeptical. Concerns were raised regarding the likelihood of AI replacing teachers, reducing human interaction in classrooms, and exacerbating educational disparities. Nonetheless, teachers who had previously utilized AI technologies tended to have a

more favorable view, emphasizing the potential for increased engagement and improved learning outcomes when used responsibly.

4.1 Future Trends in AI-Powered Language Education

The future of AI-powered language education is promising, with several trends expected to shape the landscape:

1. AI systems can customize training to meet individual learners' needs, providing individualized feedback and adaptive content delivery. This customization is especially useful in EFL environments to handle various language competency levels and learning styles. Personalized AI-powered learning platforms may now identify specific linguistic deficits and offer focused solutions. This customized method guarantees that every student receives the assistance they require, which improves their learning outcomes. Furthermore, individualized learning experiences can increase student motivation and engagement, as students are more likely to stick with their studies when the information is relevant to their needs and interests.

2. Improved Feedback Mechanisms: AI programs like Grammarly, QuillBot, and ChatGPT offer extensive insights into writing faults and recommend ways to enhance grammar, coherence, and word usage. These technologies also promote iterative learning, allowing students to improve their writing skills individually. Furthermore, its incorporation into classroom procedures has demonstrated potential for lowering teacher effort while preserving high-quality feedback. AI tools are an excellent addition to the educational toolset because they help students while also lessening teachers' obligations. The capacity to provide fast, thorough, and constructive feedback can speed up the learning process and help students attain their academic objectives more efficiently.

Integration of AI in Teacher Training: As AI becomes more prevalent, teacher training programs must incorporate digital literacy and the pedagogical use of AI tools. Educators need to develop strategies to integrate AI into classroom instruction effectively while maintaining a focus on critical thinking and creativity. Teacher professional development programs should include workshops on ethical AI use, scenario-based training, and resource management. These programs are essential for equipping teachers with the skills and knowledge necessary to leverage AI tools effectively. By investing in teacher training,

educational institutions can ensure that teachers are well-prepared to navigate the complexities of AI-powered education and to support their students in achieving success.

3. Ethical and pedagogical considerations. The emergence of AI-powered learning raises ethical concerns regarding data privacy, plagiarism, and the role of technology in the classroom. Educators must set clear norms and procedures to guarantee that AI tools are used responsibly while maintaining a collaborative and interactive learning environment. Furthermore, information about how AI algorithms work is critical for fostering confidence among instructors and students. Addressing these ethical considerations is critical to the successful and long-term integration of artificial intelligence in education. Educators and politicians must collaborate to create ethical frameworks that safeguard student privacy, encourage academic integrity, and ensure that AI tools are utilized in ways that improve rather than degrade the educational experience.

4.2 Implications for the Future

The findings of this study have several implications for the future of AI-powered language education:

1. Curriculum Development: Institutions must update curricula to include AI-powered tools, highlighting their importance in developing 21st-century abilities like critical thinking, cooperation, and digital literacy. Curriculum designers could also think about include AI literacy modules to train students for ethical and effective tool use. These modifications will assist students in developing the skills required for success in today's increasingly digital environment.

2. Professional Development for Educators: Ongoing training programs should provide teachers with the skills and knowledge they need to effectively employ AI tools, allowing them to direct students toward meaningful learning outcomes. These programs should include practical activities for using AI tools into instructional preparation and assessment methods. Continuous professional development is essential for keeping teachers current on the newest technological breakthroughs and pedagogical approaches.

3. Collaborative Research and Innovation: Cross-disciplinary collaborations between educators, technologists, and policymakers are critical for improving the integration of AI into language education while

tackling both technical and pedagogical problems. Pilot projects investigating AI's impact on writing development may yield useful information for scaling its use. Collaboration is essential for generating innovation and ensuring that AI technologies are designed and applied in ways that benefit education.

5. DISCUSSION

The initial findings indicate that Indonesian EFL teachers view AI as both an opportunity and a challenge. AI tools improve students' learning experiences and outcomes; however, teachers encounter challenges in integrating these technologies due to resource limitations, insufficient training, and differing levels of technological proficiency. The challenges underscore the necessity for extensive support and resources to enable the effective implementation of AI in educational settings. Despite these challenges, a strong consensus exists among educators regarding the potential advantages of AI-powered learning. Numerous educators indicated that AI tools have markedly enhanced students' writing abilities through the provision of immediate, tailored feedback. This has facilitated students' ability to identify and rectify errors more efficiently, resulting in improved learning outcomes.

Educators emphasized the capacity of AI tools to address learning disparities through the provision of immediate and practical feedback. They expressed concerns regarding the excessive dependence on AI, which may impede the development of critical writing skills. Ethical issues, especially those related to plagiarism and academic integrity, emerged as recurring themes. The concerns highlight the necessity of instructing students on the responsible utilization of AI tools and promoting an understanding of academic integrity. Educators highlighted the necessity for explicit guidelines and policies to promote ethical and responsible use of AI tools among students. The significance of imparting critical thinking skills to students and promoting their active engagement in the writing process, rather than depending exclusively on AI tools for corrections, was also emphasized.

5. CONCLUSION

This study sheds light on Indonesian EFL teachers' opinions of AI-powered learning, highlighting its existing obstacles, implications, and future possibilities in Indonesia's educational scene. The findings show

that, while AI has transformative potential for improving English language training both inside and outside the classroom, such as through automated feedback and virtual conferencing, its application is hampered by a number of contextual factors. These include poor digital literacy, unequal access to infrastructure, concerns about academic integrity, insufficient pedagogical training, and conflicting teacher attitudes. Notably, instructors in rural or underserved areas frequently fail to effectively implement AI tools, and many are concerned about students increasing reliance on such technologies.

Teachers who have already used AI, on the other hand, are more favourable about it, recognising its ability to promote differentiated instruction, foster learner autonomy, and expedite administrative work. By studying these various problems and viewpoints, the study helps to gain a better understanding of AI's developing role in EFL instruction in Indonesia. It emphasises the importance of systemic support, such as professional development and infrastructural investments, to ensure that AI integration is consistent with pedagogical aims and educational equity.

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