Al-Ishlah: Jurnal Pendidikan
Vol.17, 3 (September, 2025), pp. 4303-4314
ISSN: 2087-9490 EISSN: 2597-940X, DOI: 10.35445/alishlah.v17i3.5585

AI Integration in Learning: Case Study of Indonesian Language and Literature Education Students at a Private University in Indonesia

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ARTICLE INFO

Keywords:

artificial intelligence;
Indonesian language education;
NLP in education;
student engagement;
educational technology

Article history:

Received 2024-06-26
Revised 2024-11-20
Accepted 2025-09-14

ABSTRACT

This study investigates the integration of Artificial Intelligence (AI) in Indonesian Language and Literature Education at Universitas Muslim Nusantara (UMN) Al-Washliyah. AI is increasingly recognized as a transformative tool for enhancing student engagement, language proficiency, and pedagogical innovation. However, its application in the context of Bahasa Indonesia and local literature remains underexplored. Using a qualitative case study design complemented by quantitative survey data, the study involved 50 undergraduate students and 5 faculty members. Data collection methods included classroom observations, student and faculty interviews, focus group discussions, and Likert-scale surveys measuring student motivation, comprehension, and learning experiences. Findings show that AI tools—particularly those utilizing Natural Language Processing (NLP)—significantly improved students' grammar accuracy, sentence clarity, vocabulary diversity, and reading comprehension. Real-time feedback and adaptive learning features increased motivation and participation by 25–30%. AI also facilitated deeper engagement with regional dialects and literary texts. However, challenges emerged, including limited infrastructure, insufficient AI literacy among faculty and students, and the lack of NLP models optimized for the Indonesian language. The study concludes that AI integration holds significant promise for language and literature education, provided that institutional support, localized AI tools, and training programs are in place. Future research should focus on developing culturally inclusive, linguistically accurate AI systems tailored to low-resource languages.

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1. INTRODUCTION

The integration of artificial intelligence (AI) in Indonesian language and literature education is becoming increasingly significant in enhancing language acquisition, critical thinking, and cultural understanding. The relevance of AI in this context is particularly crucial given the linguistic and literary

diversity of Indonesia, where multiple dialects, regional languages, and traditional narratives coexist. Despite the growing adoption of AI in global education, there remains a gap in AI applications tailored to the specific needs of Indonesian language and literature learning. This research is essential in addressing these gaps by exploring how AI can be effectively integrated into the curriculum to support language mastery, cultural engagement, and pedagogical efficiency.

AI-powered tools such as natural language processing (NLP) applications, automated assessment platforms, and language learning software have demonstrated their effectiveness in facilitating personalized learning experiences. In the context of Indonesian language education, these tools can provide real-time feedback on students' reading comprehension, grammar, and vocabulary, enabling a more tailored approach to language learning (Chen et al., 2020; Sun, Cui, & Chao, 2022). For literature studies, AI can analyze texts and help students engage with classical and modern Indonesian literary works through sentiment analysis, thematic exploration, and automated summarization. These advancements allow students to critically engage with literary texts while improving their linguistic proficiency.

A key advantage of AI in this field is its ability to expose students to various linguistic registers, dialects, and literary styles, reflecting the diversity of the Indonesian language (Susanto & Nafi, 2021; Wang & Liu, 2020). Given that many AI-powered educational tools are designed primarily for widely spoken global languages such as English and Mandarin, there is a pressing need to develop AI solutions that can process and understand the complexities of the Indonesian language, including its regional dialects and traditional literary forms.

For educators, AI offers valuable assistance by automating routine administrative tasks, such as grading assignments and generating performance reports. This automation allows teachers to dedicate more time to designing culturally relevant and interactive lessons that engage students with Indonesia's rich literary heritage (Popenici & Kerr, 2017; Luckin et al., 2016). AI-driven platforms equipped with data analytics capabilities can also help educators monitor student progress and adjust teaching strategies accordingly. This is particularly beneficial in literature studies, where interpretative skills are essential, and personalized feedback can enhance students' analytical and critical thinking abilities (Chung & Lee, 2020; Zawacki-Richter et al., 2019).

Furthermore, AI-facilitated learning can bridge gaps in accessibility by offering digital resources that allow students to explore classical and contemporary Indonesian literature at their own pace. Virtual storytelling platforms, AI-driven literature recommendation systems, and interactive digital annotations can make literary analysis more engaging, helping students appreciate the historical and cultural significance of Indonesian literary works. Such approaches align with national education goals to preserve linguistic and literary traditions while fostering innovative teaching methodologies.

Despite the promising benefits of AI in Indonesian language education, several challenges must be addressed to ensure effective implementation. One of the primary obstacles is the limited familiarity with AI technologies among educators and students. At institutions such as Universitas Muslim Nusantara (UMN) Al-Washliyah, insufficient training and exposure to AI tools can result in inconsistent or suboptimal integration (Amir et al., 2021; Hamzah et al., 2018). Many educators may lack the technical expertise to fully utilize AI-driven platforms, while students with minimal prior exposure to digital learning tools may struggle to adapt. This underscores the need for structured AI literacy programs and professional development initiatives to equip educators with the necessary skills to integrate AI into their teaching practices effectively.

Another challenge is the lack of AI tools specifically designed for Indonesian language and literature education. Most NLP-based AI applications cater to major global languages, leading to limitations in processing Indonesian syntax, idiomatic expressions, and regional dialects. As a result, AI-generated feedback and language analysis may be less accurate or contextually relevant for Indonesian learners (Susanto & Nafi, 2021; Kasim et al., 2020). To overcome this issue, there is a need for localized AI development efforts that prioritize the linguistic and cultural aspects of Indonesian language learning.

Additionally, infrastructure and access constraints present significant barriers to AI adoption in under-resourced educational institutions. Limited technological infrastructure, insufficient internet connectivity, and a lack of digital resources can hinder students and teachers from fully utilizing AI-based learning tools (Khalid et al., 2019; Zawacki-Richter et al., 2019). Addressing these challenges requires investment in digital infrastructure, as well as policies that support the equitable distribution of AI-based educational resources across Indonesia's diverse regions.

Given these challenges, targeted research and policy development are essential to optimize AI integration in Indonesian language and literature education. Collaborative efforts between academia, government agencies, and technology developers can drive the creation of AI models that cater to the specific linguistic needs of Indonesian learners. Moreover, policy frameworks that support teacher training programs, curriculum adaptation, and ethical AI implementation are crucial for ensuring that AI is effectively utilized in language education.

This study on AI integration in Indonesian language and literature education at UMN Al-Washliyah aims to contribute to these efforts by assessing the current state of AI adoption, identifying key challenges, and proposing strategies for improvement. By addressing the unique linguistic and cultural requirements of Indonesian learners, AI can become a transformative tool in advancing language education, fostering literary appreciation, and preserving Indonesia's rich linguistic heritage.

2. METHODS

This study employed a convergent mixed-methods case study design (Creswell & Plano Clark, 2017) to examine the integration of Artificial Intelligence (AI) in Indonesian Language and Literature Education at Universitas Muslim Nusantara (UMN) Al-Washliyah. The qualitative case study approach (Yin, 2018; Stake, 2013) enabled an in-depth exploration of context-specific phenomena, while quantitative survey data supported triangulation and enhanced the credibility of findings.

2.1 Participant Sampling

Purposeful sampling was used to recruit 50 undergraduate students and 5 faculty members from the Indonesian Language and Literature Education program, based on their involvement in AI-assisted learning environments. This sampling strategy ensured the inclusion of participants with diverse experiences related to AI in education (Palinkas et al., 2015).

Participants demonstrated varying levels of digital literacy and exposure to AI. While most students were proficient in basic digital tools, few had prior experience with advanced AI applications such as NLP-based writing assistants or automated feedback systems. Faculty members reported moderate technological competence but limited hands-on experience with AI pedagogical tools.

All participants had intermediate to advanced proficiency in Bahasa Indonesia. However, several students struggled with the grammatical and stylistic nuances of academic and literary Indonesian. Exposure to regional dialects and traditional literary forms was passive and rarely incorporated into active learning.

2.2 Data Collection Techniques

a) Surveys

A structured survey with Likert-scale items was administered to all student participants to measure engagement, motivation, comprehension, and perceived learning outcomes post-AI integration. Items were adapted from validated instruments in technology-enhanced learning studies (Dillman, Smyth, & Christian, 2014). A pilot test was conducted to ensure clarity, and Cronbach's alpha ($\alpha = 0.86$) indicated high internal consistency.

b) Interviews and Focus Groups

Semi-structured interviews were conducted with all faculty members and a stratified subset of 12 students. Interview protocols focused on experiences with AI tools, challenges in implementation, and perceived pedagogical impact. Two focus group discussions (6 students each) were also held to capture collaborative reflections and peer dynamics in AI-facilitated learning.

All qualitative instruments were peer-reviewed for content validity and pre-tested with non-participant students.

2.3 Data Analysis

Quantitative survey data were analyzed using descriptive statistics to identify trends in motivation, comprehension, and engagement.

Qualitative data from interviews and focus groups underwent thematic analysis following Braun and Clarke's (2006) six-phase framework. Codes were generated inductively and refined through iterative reading. Two independent coders were involved, and inter-coder reliability was established ($\kappa = 0.81$).

Triangulation was achieved through the integration of qualitative themes and quantitative findings. Member checking and audit trails enhanced trustworthiness, and reflexive notes were maintained to minimize researcher bias.

3. FINDINGS AND DISCUSSION

This section presents the findings from both quantitative and qualitative data, followed by a discussion in light of existing literature. The findings are organized under major themes, particularly around the advantages of AI-driven real-time feedback, its effects on student motivation and engagement, cultural relevance and personalization, and the challenges faced in Indonesia. The discussion integrates and compares these findings with prior studies, and draws implications for practice and research.

3.1 Advantages of AI-Driven Real-Time Feedback Over Traditional Approaches

One of the most compelling findings of this study is that students who utilized AI tools—such as writing assistants, grammar checkers, and real-time feedback software—demonstrated significantly greater improvements in language skills compared to those who relied solely on traditional feedback methods.

Quantitative survey data revealed notable gains across several core areas: grammar accuracy, sentence clarity, vocabulary diversity, and reading comprehension—all showing improvements ranging from 19% to 23% (see Table 2).

For instance:

1. Grammar accuracy increased from 60% (baseline) to 81% after AI integration—a 21% improvement.
2. Sentence structure clarity rose from 55% to 77% (+22%).
3. Vocabulary diversity improved from 50% to 73% (+23%).
4. Reading comprehension scores climbed from 63% to 82% (+19%).

Table 1. Student Motivation and Participation Before and After AI Integration

Factor	Before AI Implementation	After AI Implementation	Percentage Increase
Self-motivation to study	58%	83%	+25%
Class participation	62%	87%	+25%
Engagement in online exercises	48%	78%	+30%
Interest in exploring dialects	42%	67%	+25%

The integration of AI-powered learning tools increased student motivation and classroom engagement by 25–30%. Features such as gamification (e.g., progress tracking, achievement badges) and adaptive real-time learning played a critical role in enhancing participation.

AI-supported grammar tools significantly contributed to improvements in writing accuracy, reading comprehension, and vocabulary retention. The data below highlights performance gains in core language competencies:

Table 2. Improvements in Student Language Comprehension After AI Implementation

Language Skill	Before AI (Baseline Accuracy)	After AI (Post-Implementation)	Improvement
Grammar accuracy in writing	60%	81%	+21%
Sentence structure clarity	55%	77%	+22%
Vocabulary diversity	50%	73%	+23%
Reading comprehension scores	63%	82%	+19%

Qualitative responses further reinforce these findings. As one student shared:

"Whenever the AI flagged my sentence, I could immediately see what I did wrong—before I submitted my assignment. That instantaneous correction helped me not repeat the same mistake." (Student 17)

Another student commented:

"In traditional classes, I waited days for feedback. With AI, I adjust my writing right away, so my grammar errors started decreasing quickly." (Student 33)

These reflections echo the findings of Zhang, Liu, and Lin (2021), who reported a 40% improvement in writing accuracy across a semester among students using AI-based feedback. While our study observed slightly lower gains, the overall trend remains consistent: real-time, contextual feedback allows learners to recognize and correct errors promptly, internalize grammatical rules, and prevent long-term fossilization of mistakes (Zhang et al., 2021; Chen et al., 2020).

3.1.1 AI-Enhanced Writing and Grammar Corrections

AI writing assistants in this context performed multiple functions: they detected grammatical errors, flagged syntax issues, and offered suggestions for improved word choice. Students reported that seeing immediate alternatives helped them comprehend the grammatical structures they were weak in, especially in complex aspects of Bahasa Indonesia, such as affixation, passive voice, or regional morphological variation.

One faculty member observed:

"When students used the grammar correction tool, I saw fewer repeated errors in their papers. They seemed to reflect more before writing." (Faculty 2)

This supports earlier findings by Kasim, Fitriani, & Yusuf (2020), who pointed out that Indonesian learners benefit when AI detects recurrent patterns of error and provides targeted practice (Kasim et al., 2020).

3.1.2 AI-Driven Reading Comprehension Support

Reading comprehension also showed significant gains. Survey data indicate that students' comprehension scores rose by approximately **19%** (from baseline to post-implementation). The AI tools provided dynamic difficulty adjustment: when many comprehension questions were answered correctly, subsequent tasks increased in complexity; when errors increased, tools provided scaffolding (definitions, examples, glosses).

A student commented:

"If I missed a difficult phrase, AI would stop, explain it, give another example. That extra help saved me from frustration." (Student 45)

Motivation, as reported by surveys, increased by 25-30%, consistent with previous studies (Susanto & Nafi, 2021) that found personalized materials reduce disengagement by tailoring challenge to ability. This confirms that AI-assisted comprehension tools can adjust in real time, aligning with cognitive load theory: by reducing extraneous processing (through explanations) and matching intrinsic load to learner capacity, comprehension improves (Susanto & Nafi, 2021; Chen et al., 2020).

3.1.3 Literary Analysis and Dialectical Exposure

An unexpected but important benefit was the exposure to dialects and richer literary registers. Students often reported that AI tools enabled them to explore texts in regional dialects with glossing: AI identified idioms, local proverbs, or regional speech patterns and offered meaning or "translation" into standard Bahasa Indonesia for clarity.

One student said:

"The tool showed me a region-specific proverb, I didn't know its meaning—after AI's gloss, I could see how it tied back to the theme of the story." (Student 21)

Faculty also noted improved awareness of cultural and linguistic diversity among students; that students who previously stuck to standard language forms were now more willing to experiment with dialectal expressions.

This echoes Hamzah, Putra, & Fadilah's (2018) report that students exposed to AI-driven dialectal learning tools improved their comprehension of regional dialects by about 25%. In our data, students' self-reported ability to understand dialects increased by **~24%**, almost matching the prior finding.

3.2 Impact of Real-Time Feedback on Student Motivation and Engagement

Another key theme is enhanced motivation and engagement. The survey results show increases of 25-30% in several indicators: self-motivation to study, class participation, engagement in online exercises, interest in exploring dialects (Table 1: e.g., self-motivation from 58% before AI to 83% after; participation from 62% to 87%; online exercise engagement from 48% to 78%; interest in dialects from 42% to 67%).

Qualitative data deepen this:

"*Knowing that I will get feedback immediately makes me less afraid to try. I don't wait until I get my essay back; I try as I write." (Student 8)*

"Seeing the progress badges online pushes me to do more exercises." (Student 29)

These point to aspects such as immediate reinforcement, reduce frustration, and gamification elements (progress tracking, badges) as motivational levers. Prior research by Amir, Ismail, Nasir, & Ahmad (2021) similarly found ~25% increase in participation and self-motivation among students using AI tools.

At UMN Al-Washliyah, the comparison between AI vs traditional feedback groups on grammar and sentence structure comprehension found that AI group reported a 35% higher comprehension rate (as perceived by survey respondents). Interview data confirmed that students in the AI group spent more time rewriting, reflecting, and using tools independently.

This aligns with learning theories that emphasize timely feedback and self-regulated learning: when learners can adjust in real time, they engage more closely with the material and are more invested in the learning process.

3.3 Cultural Relevance and Personalized AI Content

An important finding is that AI tools which were localized or allowed for content sensitivity improved cultural engagement. Students appreciated when AI incorporat ed local idioms, proverbs, historical contexts, or regional literary references.

One quote:

"*When AI suggested a proverb from my region, I felt seen, and I understand literature more—not just grammar." (Student 12)*

Faculty noted that localized content helped students see how language functions in multiple registers—standard, regional, literary—and fostered deeper connection to their own cultures. This supports Popenici & Kerr (2017), who emphasized that cultural content integrated into AI-driven systems supports both preservation of linguistic heritage and pedagogical innovation. It also aligns with literature showing biases when AI systems are built for global languages and lack local adaptation (Bender, Gebru, McMillan-Major, & Shmitchell, 2020).

3.4 Challenges of AI Implementation in Indonesia

While the benefits are substantial, several challenges emerged clearly in the data.

3.4.1 Technological Infrastructure Constraints

Survey data revealed that 40% of students reported frequent disruptions due to unstable Internet; 30% reported using mobile phones rather than computers, which limited functionality of some AI tools; 25% reported electricity or device issues.

Students in rural or peri-urban areas were particularly affected. A student from a dorm in a more remote area said:

"Sometimes the WiFi is too slow, and the grammar checker takes minutes to load. By then, I'm frustrated." (Student 47)

Faculty also commented that some AI tools relied on cloud computing and high bandwidth: when connectivity is poor, tools lag or are unusable.

These issues echo findings of Khalid, Rafiq, & Sharif (2019), who reported only about 56% of rural schools in Indonesia have adequate internet connectivity, compared to 90% in urban centers. Hamzah

et al. (2018) similarly pointed to limitations of infrastructure and argued for offline AI-powered applications or low-bandwidth designs.

3.4.2 Lack of AI Training for Educators and Students

Qualitative responses showed that many faculty felt unprepared to integrate AI pedagogically beyond mere assignment correction. One faculty member:

> *"I know the tools exist, but I don't know best practice: when to use feedback, how to adapt lesson plans, how much I should rely on AI vs my own instruction." (Faculty 4)*

Students also expressed desire for guided orientation:

> *"I want a workshop so I understand what the tool does behind the scenes so I trust its suggestions." (Student 25)*

Survey data supported this: 68% of faculty and 55% of students agreed or strongly agreed that more formal training was needed.

This aligns with the study by Amir et al. (2021) which found a similar proportion (≈ 68%) of Indonesian educators felt unprepared to use AI tools due to a lack of institutional training programs. Hamzah et al. (2018) also noted that students from less privileged backgrounds often lack exposure to digital literacy initiatives, reducing their readiness to use advanced AI tools.

3.4.3 Limitations of NLP Tools for the Indonesian Language

Participants frequently pointed out that grammar checkers or writing tools sometimes misinterpreted idiomatic expressions or regional/dialectal speech, giving suggestions that were grammatically "correct" in standard Bahasa Indonesia but inappropriate for literary or dialectal contexts.

A student said:

> *"AI told me to change a dialectal word to standard form, but that erased local flavor. I didn't want to lose identity." (Student 31)*

Another said:

> *"Sometimes the automatic correction misses nuance in poetry or metaphor, which matters in literature." (Student 14)*

These qualitative insights match findings by Kasim et al. (2020), who highlighted that many current NLP models struggle with informal/dialectal variation, idiomatic expressions, and literary metaphors. Susanto & Nafi (2021) also found that AI-generated corrections in Indonesian were about **72%** accurate, lower than in English (~92%) in comparative studies, which may cause confusion rather than clarity.

3.5 Comparative Analysis: Indonesia vs Global Context

When we juxtapose the findings from UMN Al-Washliyah with global AI education literature, several similarities and differences emerge.

3.5.1 Global Gains vs Local Constraints

Studies in China, the U.S., and Europe (e.g., Zhang et al., 2021) report large gains in writing accuracy with AI feedback (sometimes up to 40% improvement). Our study's gains (19-23%) are meaningful though somewhat smaller, likely due to infrastructural constraints or less mature AI models for Bahasa Indonesia.

Similarly, as in India (Gupta & Joshi, 2021) and Africa (Bender et al., 2020), students benefit from localized AI tools; however, these regions sometimes have more resources or more extensive institutional support for multilingual AI.

3.5.2 Low-Resource Language Challenges

Indonesia shares the challenge of under-resourced languages with many developing nations: limited annotated corpora; fewer NLP tools tailored to dialects; less commercial AI tool development for local languages. As noted by Kasim et al. (2020), AI tools built for English or Mandarin may not transfer well to Bahasa Indonesia, especially in literary or dialectal registers.

3.5.3 Infrastructure and Equity

While developed countries often assume stable, high-speed internet, good access to hardware, and minimal power issues (Luckin, Holmes, Griffiths, & Forcier, 2016), many regions in Indonesia do not have such guarantees. This gap delays adoption and creates inequities.

3.6 Implications for Practice and Policy

Based on these findings, several implications arise.

1. Design localized, culturally sensitive AI tools: Tools should support dialects, idioms, and non-standard registers. They should allow optionality—preserving literary flavor, not forcing standardization in contexts where diversity matters.
2. Provide systematic training and professional development: For both faculty and students, workshops, guided tutorials, and institutional support are needed. Training should not only cover tool use, but integration into curriculum, assessment, and reflection.
3. Improve infrastructure, especially in under-resourced areas: Offline versions of AI tools, low bandwidth designs, and investment in hardware and connectivity are required to ensure equitable access.
4. Ensure ongoing evaluation and feedback loops: Since many AI tools are evolving, data from users should inform improvements. Monitoring accuracy, especially for dialects and literary texts, is crucial.
5. Blend AI with traditional pedagogy: AI should augment, not replace, human instruction. Teachers' role in interpretation, cultural framing, and higher-order thinking remains indispensable.

In conclusion, this study corroborates prior literature that AI-driven real-time feedback produces measurable improvements in grammar, comprehension, vocabulary, and motivation among students in Indonesian language and literature education (Chen et al., 2020; Zhang et al., 2021; Susanto & Nafi, 2021). However, the degree of improvement is mediated by infrastructural readiness, tool accuracy for local language varieties, and the level of training faculty and students receive.

Overall, while AI presents promising opportunities, successful implementation in Indonesia requires attention to equity, localization, and integration with existing educational practices. Future research should include longitudinal studies to assess retention over time, and experimental designs comparing different kinds of AI tools (e.g., dialect-aware vs standard only) to determine which designs yield the best outcomes.

4. CONCLUSION

This study confirms that AI-driven tools significantly enhance language learning outcomes in Indonesian language and literature education, with measurable improvements in grammar accuracy (21%), sentence clarity (22%), and vocabulary diversity (23%). By integrating real-time feedback, personalized instruction, and NLP-based features, AI not only supports linguistic development but also

fosters cultural and analytical competencies. The research further highlights the digital divide in AI accessibility, particularly in under-resourced rural areas, and calls for low-bandwidth solutions to ensure inclusivity. Comparative insights with global AI ecosystems emphasize the importance of localized NLP development tailored to the unique characteristics of Bahasa Indonesia. However, limitations such as uneven technological infrastructure, limited teacher preparedness, and the underrepresentation of regional dialects in AI models constrain the broader impact of AI adoption. Therefore, future research should focus on developing NLP for low-resource languages, assessing cognitive load in AI-assisted learning, addressing cultural and ethical concerns in AI-generated content, and evaluating the scalability of AI implementation over time. By aligning policy, pedagogy, and technology, and prioritizing equity and localization, AI has the potential to transform language education across Indonesia sustainably and inclusively.

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