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Utilization of Artificial Intelligence in Supporting Learning Content Creativity for Javanese Language Teachers: a Systematic Literature Review

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Abstract

The development of artificial intelligence (AI) technology opens up great opportunities to increase the creativity of learning content, including in Javanese language learning. This study aims to explore how AI can support teachers in creating creative and interesting Javanese language learning materials for students. This study adopts a qualitative approach with the Systematic Literature Review (SLR) method using secondary data from various scientific articles. Data sources were obtained from Google Scholar, accredited national journals, and reputable international journals. Data collection was carried out through documentation techniques, with strict selection criteria based on the 2022-2024 publication range, publisher reputation, and relevance to the research topic. Data were analyzed through a process of summarizing, synthesizing, and comparing key findings from various literatures, as well as critical evaluation of the strengths and weaknesses of each study. The results of the study show that AI, through generative tools such as ChatGPT, DALL·E, Gamma, and so on, enables Javanese language teachers to create varied, interactive, and adaptive materials to students' needs. This technology not only enriches the learning process but also plays an important role in preserving the Javanese language and culture through more contextual and interesting learning methods.

Keywords: *artificial intelligence, creativity of learning content, Javanese language learning*

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A. Introduction

Progress in artificial intelligence (AI) technology is transforming multiple areas, including healthcare, business, entertainment, and education. The application of AI in education is becoming increasingly prevalent and holds significant promise for enhancing learning quality, affecting various aspects from administrative functions to curriculum development (Chen et al., 2020). Artificial intelligence can improve a customized and adaptable educational experience, enabling the learning system to modify instructional materials and techniques according to the distinct requirements and abilities of each student, thus promoting a more inclusive learning environment. This tailored methodology can particularly advantage children with learning difficulties since AI can adjust pacing and information presentation to align with each student's capabilities (Du Boulay, 2016). Moreover, AI can aid educators in classroom management by providing instant feedback and identifying areas needing further attention, so allowing teachers to focus more on personalized assistance rather than repetitive tasks (Y. Liu et al., 2022). This suggests that AI serves as a tool that improves efficacy and efficiency in education, aiding educators by automating administrative tasks and providing real-time insights into student performance (Oseremi Onesi-Ozigagun et al., 2024). However, the application of AI for local language education still requires special adaptations. This is as suggested by Zhong et al. (2024) that AI technology needs to be adapted to understand the cultural context and language varieties for minority languages.

AI integration further enhances instructional creativity, significantly enriching the educational process by introducing dynamic methods of engaging students (Alam & Mohanty, 2023). Educators can utilize AI to provide diverse and dynamic instructional resources, including interactive simulations and immersive virtual reality lessons, thereby enhancing student engagement and curiosity. Educators can utilize machine learning algorithms to examine student preferences and learning patterns, facilitating the creation of information customized to individual requirements and improving accessibility (Gligorea et al., 2023). Moreover, AI-driven digital platforms facilitate collaboration between educators and learners, enabling real-time feedback, discourse, and exchange of ideas, so fostering a more participatory and adaptive educational atmosphere. This method fosters educators' creativity in content creation while enhancing student engagement in learning, since students create a stronger connection to the materials and actively contribute to their educational experience (Amer-Yahia, 2022). AI

enhances the educational experience for both educators and learners, making it more interesting, individualized, and collaborative (Zheng et al., 2023).

Technological constraints in Javanese language education provide a significant difficulty. Numerous Javanese language educators continue to depend on conventional materials, especially textbooks, which frequently exhibit redundancy and inadequately cater to the varied learning requirements of pupils (Cantika & Hernawan, 2024; Kurnia & Nugroho, 2017; Kurwidaria et al., 2019; Pudjastawa & Cantika, 2020; Subrata, 2022). This dependence on static content restricts instructional diversity and diminishes the potential for interactive or individualized learning experiences (Putra & Pratama, 2023). This reliance on traditional approaches diminishes student enthusiasm and stifles creativity in the classroom, hindering students' sustained attention over time (Indarta et al., 2022). Resolving this issue necessitates a more imaginative strategy, with increasing interest in employing AI to rectify these deficiencies. We urge Javanese language instructors to utilize AI techniques in creating engaging and contemporary educational materials that align with curriculum goals. For instance, by employing AI technology, educators might develop augmented reality (AR) learning material that presents Javanese folklore in an interactive 3D visual format, thereby enhancing student engagement with Javanese cultural values and language. This can ignite students' attention, promoting active involvement and a more inclusive, flexible learning environment where technology connects instructional resources with students' learning experiences (Suariqi Diantama, 2023). Integrating AI technology may provide novel insights into language acquisition, rendering the curriculum more pertinent to contemporary pupils in the digital era (Pedro et al., 2019).

From the educator's perspective, the AI-generated new learning materials will provide significant benefits. Educators will have more time to develop innovative teaching strategies and can adapt instructional materials to align with technology progress and student needs. This capacity to customize learning experiences enables educators to tackle particular obstacles encountered by pupils, hence enhancing the efficacy of instructional practices (Chen et al., 2020). Moreover, implementing AI-driven methodologies allows educators to remain abreast of advancing educational technologies, promoting a progressive and flexible instructional approach. This elevates teacher professionalism and cultivates a more dynamic and engaging learning atmosphere (Salas-Pilco et al., 2022). The benefits of creativity in the educational process are substantial for kids. Captivating and dynamic material will augment student motivation and promote active involvement

in learning activities (Davies et al., 2013). AI-driven interactive exercises, including dialogue simulations and culturally themed games, offer students significant practice and exposure to the learning (George, 2023), especially in Javanese language learning.

Most of the existing AI-based technologies were developed for global languages as in the research of Gao (2024), Kumari (2024), Ribeiro (2020), Tan, (2019), which shows that AI development in the context of local language learning is still lacking, such as in the Javanese language learning, which has unique complexities in its structure and meaning. This limitation creates a significant gap in the development of AI-based learning technologies to support teachers' creativity in local language learning. A comprehensive review of the literature on this issue is essential to comprehend numerous facets concerning the application of AI in education, particularly in the context of Javanese language acquisition. This study aims to deliver an extensive overview of the potential implementation of AI in the development of creative learning content. Consequently, the findings of this study may serve as a reference for the formulation of more effective educational policies and pedagogical methods in the future. This research seeks to investigate the potential of AI in enhancing the originality of educational materials for Javanese language instructors.

B. Methods

This research utilizes a qualitative framework and implements a Systematic Literature Review (SLR) as its methodo approach. Creswell (2014) asserts that qualitative research aims to profoundly comprehend social processes by interpreting the meanings constructed by participants, hence, it permits adaptability to the evolving nature of findings. The SLR technique, as elucidated by (Lame, 2019), systematically identifies, evaluates, and integrates pertinent information on a certain issue. (Okoli, 2015) emphasizes that transparency and organization in systematic literature reviews improve the validity and dependability of research outcomes. This study employs the SLR method due to its capacity for structured collection, analysis, and synthesis of findings from diverse prior studies, thereby facilitating an exploration of the potential application of AI in enhancing teachers' content creativity in Javanese language education, an area that remains under-researched.

This study utilizes secondary data obtained from web sources. Principal databases encompass Google Scholar, ScienceDirect, Taylor & Francis, and several national journal repositories, guaranteeing a compilation of high-quality, pertinent material. We evaluate the chosen publications for their relevance to education, the role of artificial intelligence in education, and the role of creative content in learning. The research utilizes secondary data, encompassing a wide range of sources without the temporal and resource constraints typically associated with field studies. A documentation technique is employed for data collecting, encompassing the identification, acquisition, and analysis of scientific papers, including journal articles, books, and research reports. We implement a rigorous selection process to maintain relevance, we restrict publications to the years 2022–2024, select journals based on the publisher's prestige, and filter documents using specific keywords like "artificial intelligence," "learning content," "teacher content creativity," and "artificial intelligence in learning." The procedure entails an initial search, an abstract assessment for pertinence, and a comprehensive study of qualifying publications.

Table 1. Research Inclusion Criteria

Criteria	Inclusion
Time Period	Publication dates for the last 3 years starting from 2022-2024
Language	English and Indonesian
Subject	Utilization of artificial intelligence in learning
Article Type	Original articles and full text article
Article Content Theme	Utilization of artificial intelligence to support the creativity of language learning content for teachers

The initial search results produced 15.900 articles relevant to the specified keywords. After a rigorous selection process, we used 15 articles that met all the criteria for this study.

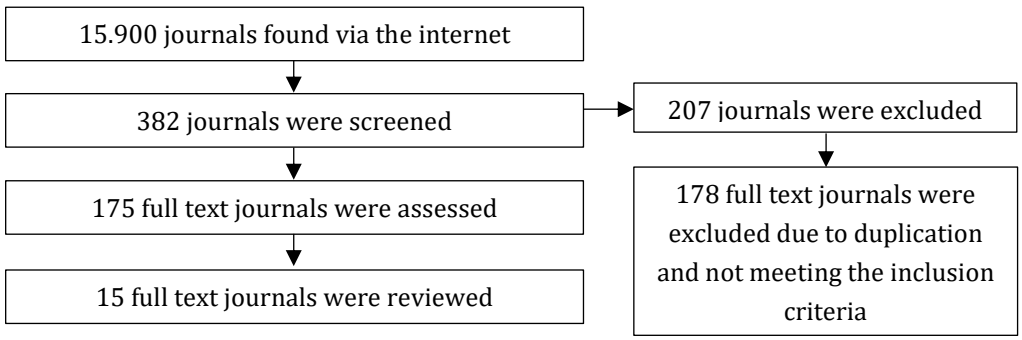

Figure 1. SLR Flowchart

The data analysis technique in this study was carried out systematically through several stages. Overall, this study's data analysis process adheres to Sugiyono's (2017) framework, which includes summarizing, synthesizing, comparing and contrasting, and criticizing.

Summarizing the literature content to highlight key findings.

Synthesizing information from multiple sources to form a comprehensive understanding.

Comparative analysis to identify significant similarities and differences between findings.

Critical evaluation to assess the strengths and weaknesses of each study reviewed, providing insights and recommendations for future research.

C. Result and Discussion

With the advancement of digital technology, the integration of technology, particularly artificial intelligence (AI), has emerged as a primary emphasis in the realm of education. This study effectively gathered and examined 15 pertinent papers. However, it should be noted that this research is based on an analysis of only 15 scientific articles relevant to the use of AI in education. While these articles provide significant insights, they may not be sufficient to represent the entire spectrum of AI applications in various educational contexts. Moreover, the analysis results indicate that the utilization of AI not only enhances the development of more creative and novel learning content but also contributes to the augmentation of teachers' creativity. Utilizing diverse AI-driven applications and tools, educators can more efficiently develop engaging materials tailored to student requirements, while also enhancing the learning experience. This study presents a comprehensive evaluation of the existing literature.

Table 2. Utilization of Artificial Intelligence in Supporting Learning Content Creativity

No.	Title	Author	Journal	Citation
1.	Using Artificial Intelligence in Craft Education: Crafting	(Vartiainen & Tedre, 2023)	Journal Digital Creativity, Vol. 34, No. 1	The use of AI in crafts can inspire teachers to consider the unique aspects of creativity

	with Text-to-Image Generative Models			as well as the challenges faced in adopting generative technologies.
2.	The Application of Artificial Intelligence Assistant to Deep Learning in Teachers' Teaching and Students' Learning Processes	(Z. Y. Liu et al., 2023)	Journal Frontiers in Psychology, Vol. 13	AI technologies, including ChatGPT and other generative design tools, are recognized as valuable resources for enhancing educators' creative abilities.
3.	Artificial Intelligence & Creativity: A Manifesto for Collaboration	(Vinchon et al., 2023)	Journal of Creative Behavior, Vol. 57, No. 4	Generative AI tools, such as ChatGPT and DALL·E, enable teachers to quickly generate creative content, reducing preparation time and increasing the diversity of teaching materials.
4.	Use of Chat-GPT and AI Tools by Undergraduates: Students and Teachers' Perspective	(Khoso et al., 2023)	Journal Spry Contemporary Educational Practices, Vol. 2, No. 2	AI tools can help educators stay up-to-date on best practices and new methodologies, which they can then incorporate into their teaching strategies to enhance creativity in the classroom.
5.	Use of Social Media Tools by Undergraduates: Students and Teachers' Perspective	(Marzuki et al., 2023)	Journal of Social Sciences Review, Vol. 3, No. 1	The integration of AI tools in storytelling encourages the development of critical thinking and creative skills among

				teachers and students.
6.	Keterampilan Guru dalam Membuat Media Pembelajaran Digital dengan Menggunakan Artificial Intelligence Aplikasi Canva	(Maulid et al., 2024)	Didaktika: Jurnal Kependidikan, Vol. 13, No. 1	Teachers have good skills in using graphic design tools, including AI applications such as Canva, to create engaging digital learning media.
7.	Pendampingan Guru Penggerak dalam Pembuatan Bahan Ajar Bahasa Inggris dengan Memanfaatkan Teknologi Artificial Intelligence (AI) pada Kurikulum Merdeka	(Erlita et al., 2024)	Jurnal Abdidas, Vol. 5, No. 3	The use of Tome.app helps teachers in presenting interesting slides of teaching materials, thereby increasing students' attention and enthusiasm for learning.
8.	Penggunaan Aplikasi Gamma bagi Guru dalam Membuat Presentasi yang Menarik dan Otomatis	(Anas, 2024)	Journal of Information System and Education Development, Vol. 2, No. 1	The Gamma application offers teachers the convenience of creating presentation materials automatically, reducing the burden in terms of design and content, although it still requires revisions for the suitability of the material.
9.	Pelatihan Pembuatan Karikatur 3D Melalui Pemanfaatan Artificial	(Fauzi et al., 2024)	PaKMas: Jurnal Pengabdian Kepada Masyarakat, Vol. 4, No. 1	The creation of 3D caricatures by teachers with the help of AI has proven to be effective in attracting students' attention,

	Intelligence (AI) Bagi Guru KB Belia Puraya			with high graphic quality and strong visual appeal.
10.	Eksplorasi Penggunaan AI Generatif untuk Menciptakan Materi Pembelajaran Bahasa Indonesia yang Menarik dan Efektif	(Rizal, 2024)	Innovative: Journal Of Social Science Research, Vol. 4	Generative AI has the potential to create personalized learning materials, such as texts and practice questions, that can improve student motivation and learning outcomes.
11.	Elementary School Teachers' Perspectives on Utilizing Artificial Intelligence for Developing Learning Media	(Rachmadtullah et al., 2024)	Journal of Integrated Elementary Education, Vol. 4, No. 1	The integration of AI in education allows for the customization of instruction according to student needs, creating a more personalized and efficient learning experience.
12.	Do Innovative Teachers Use AI-Powered Tools More Interactively? A Study in The Context of Diffusion of Innovation Theory	(Uzumcu & Acilmis, 2024)	Journal Technology, Knowledge and Learning, Vol. 29, No. 2	More innovative teacher candidates tend to use AI tools interactively in teaching, which can increase student engagement.
13.	Enhancing or Hindering? AI's Role in Sparking Creativity in Language Teaching: Insights from Private High School EFL Teachers	(Tümen Akyıldız, 2024)	International e-Journal of Educational Studies, Vol. 8, No. 18	AI can create engaging interactive content for students, encouraging teachers to innovate in their teaching strategies.
14.	AI-Assisted Content Creation of Naked-	(Li et al., 2024)	2024 IEEE International	AI tools help teachers generate visually

	Eye 3D Effects on Curved LED Screen: Enhancing Artistic Expression and Creativity		Conference on Multimedia and Expo Workshops (ICMEW)	engaging content, such as 3D effects, which can enhance artistic expression in learning.
15.	Pedagogical Framework for Cultivating Children's Data Agency and Creative Abilities in the Age of AI	(Kahila et al., 2024)	Journal Informatics in Education, Vol. 23, No. 2	AI helps teachers to facilitate student exploration and experimentation thereby encouraging innovation in learning.

The study's findings indicate that the implementation of artificial intelligence (AI) in education can substantially enhance the originality of learning materials for educators. Numerous research indicate that generative AI tools, such ChatGPT and DALL·E, allow educators to swiftly produce creative content, thereby diminishing preparation time and enhancing the variety of instructional materials (Vinchon et al., 2023). Moreover, AI technology helps educators stay updated on best practices and innovative approaches, which they can incorporate into their teaching strategies to promote creativity in the classroom (Khoso et al., 2023). Despite the limited research on the implementation of AI in local languages, especially within educational settings, Solekhah's (2023) study exemplifies the adaptation of AI for local languages like Balinese. Cubatbot, a web-based tool, was built to leverage Natural Language Processing (NLP) for comprehending and presenting information in Balinese. This study validates that AI possesses significant potential to aid in the preservation and application of local languages, while also creating prospects for the advancement of analogous technologies in diverse local language settings.

The use of AI tools into the educational process fosters the enhancement of creative and critical skills in both educators and learners. The utilization of AI-driven graphic design tools like Canva and similar applications assists educators in producing captivating digital instructional materials (Maulid et al., 2024). Applications like Tome.app and Gamma facilitate educators in delivering captivating and interactive instructional materials, thereby enhancing students' focus and passion for learning (Anas, 2024; Erlita et al., 2024). AI possesses the capability to facilitate a more individualized and effective learning experience. Artificial intelligence techniques can produce customized educational resources, including

texts and practice questions, which can enhance student motivation and academic performance (Rachmadtullah et al., 2024; Rizal, 2024). Moreover, the application of AI in education promotes pedagogical innovation among educators and enhances opportunities for student discovery and experimentation (Kahila et al., 2024; Tümen Akyıldız, 2024).

This study shows that the use of AI technology in learning can enrich students' learning experiences by providing a variety of interactive and engaging resources. When connected to the context of Javanese language learning, teachers can use AI applications to produce teaching materials that include literary texts, folk tales (Wee et al., 2019), and speaking exercises (Pokrivcakova, 2019) in Javanese. This approach not only invites students to comprehend the language structure, but also engages them in exploring the rich culture and traditions of Java. This is certainly important to build a sense of love and pride for regional languages, as well as increase students' motivation to learn more deeply (Latifah & Wathon, 2021). Additionally, AI-generated interactive stories or quizzes can help students connect with the language in a fun and immersive way (Anggoro & Pratiwi, 2023). This method fosters a learning atmosphere that balances cultural appreciation with language acquisition (Tundreng et al., 2023).

The utilization of AI, can assist educators in developing diverse interactive modules, including quizzes, dialogue exercises, and conversation simulations (Ji et al., 2023) in Javanese. This technology enables educators to develop customized resources, including pertinent conversational dialogues and interactive presentations (Kim et al., 2022) of Javanese traditional stories. Teachers can create conversational activities that modify responses based on students' answers, so engaging pupils in more dynamic and contextual. Consequently, pupils acquire not only the language but also the cultural subtleties and expressions inherent within it (Jauhiainen & Guerra, 2023). AI can further customize these sessions to certain dialects of the Javanese language, providing pupils with enhanced understanding of regional variances. This adaptation can enhances language comprehension and deepens pupils' appreciation of Javanese cultural variety.

Artificial intelligence (AI) in the realm of Javanese language acquisition can assist educators in producing audio or video materials that improve students' auditory comprehension. Teachers can utilize AI algorithms to generate authentic Javanese voices for incorporation into narrative-based educational resources or instructional audio. By providing many material alternatives tailored to individual student capabilities, educators can promote a more inclusive methodology in

Javanese language acquisition, enabling each learner to advance at their own rhythm (Moore et al., 2024). Furthermore, AI-driven evaluations furnish educators with insights into pupils' pronunciation and auditory understanding, facilitating focused enhancements (Najar, 2024). The incorporation of AI enhances the sustainability of the Javanese language by cultivating a generation proficient in regional languages, fostering both confidence and skill. Over time, these AI-assisted methods also aid in recording and maintaining the Javanese language, ensuring its vitality for future generations.

Nonetheless, the utilization of AI in enhancing the creativity of Javanese language educators may encounter certain challenges. A restriction is the scarcity of high-quality datasets that accurately reflect the complexity of Javanese language systems, encompassing vocabulary, speech levels, and cultural settings. Furthermore, numerous educators may encounter technical challenges in accessing and utilizing AI technologies due to insufficient training and inadequate supporting infrastructure in educational institutions, as indicated by the study conducted by Cantika & Hernawan (2024), which highlights the necessity for Javanese language teachers to receive training on the integration of digital technology in their instruction. Additional issues encompass potential cultural resistance to new technologies viewed as undermining the core of conventional learning (Zinchenko et al., 2023).

Future research should concentrate on creating artificial intelligence (AI) applications that accommodate the intricacies of Javanese language structure and culture, thereby enhancing teachers' creativity in generating interactive and pertinent learning content, as indicated by the findings of the systematic literature review (SLR). Furthermore, subsequent research must investigate the efficacy of implementing AI technology across many educational tiers, especially with the acquisition of local languages. The results of this study align with other studies that underscore the significance of employing AI to facilitate local language acquisition, considering the scarcity of technology suited for these requirements. This research introduces unique insights by offering information on AI-based methodologies tailored to enhance the originality of educational content, while also addressing research gaps concerning the adaption of AI technology inside local language and culture-specific learning contexts. This discovery is anticipated to serve as a significant reference for the advancement of inclusive learning technologies tailored to local requirements.

D. Conclusion

This study concludes that the implementation of artificial intelligence (AI) in Javanese language education can enhances teachers' creative development of learning materials, facilitating the production of more diverse, interactive, and adaptive resources tailored to students' needs. AI, utilizing tools like ChatGPT, DALL·E, Gamma, and so on, assists educators in creating engaging Javanese language learning materials, including conversational and audio-visual activities that enhance student motivation and reinforce their connection to local culture. The integration of AI fosters a personalized and adaptive learning experience, enhancing the efficacy of the educational process and catering to pupils' unique capabilities. This study's findings affirm that the incorporation of AI in Javanese language instruction enhances pedagogical approaches and significantly contributes to the preservation of regional languages and cultures. We anticipate that policymakers will use the findings of this study as a reference when evaluating the integration of AI into the curriculum, especially in regional language acquisition, to uphold cultural identity amidst technological advancements. This study suggests that teachers require specialized training to optimize AI technology for efficiently teaching local languages, including Javanese. This study highlights the necessity of collaboration among government entities, educational institutions, and technology companies to formulate pertinent and sustainable AI solutions for the preservation of local culture.

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