

Research Article

The Integration of AI Technology in Implementation Independent Curriculum

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Abstract: Artificial Intelligence (AI) or commonly known as intelligence artificial is something that allows the machine to can do working that can done by humans . In the development of digital technology, AI brings major influence on the sector education . Where AI makes the learning process take place more adaptively , individually, and efficiently so that support transformation education in the digital era. This research aims For study AI concepts in context education , analyzing its suitability with the characteristics of the Independent Curriculum, as well as identify various Benefits and challenges in applying AI to the learning process . The method used was library research , which examined several scientific articles relevant to the research topic . The data was analyzed . For get description about AI integration in the implementation of the Independent Curriculum. Study results shows that AI has important role in supporting personal learning , technology-based assessment , development of teaching materials, and improvement effectiveness of the teaching and learning process. In addition, AI contributes to improving competence teacher pedagogy , digital literacy , creativity , and critical thinking skills student. However , the implementation of AI is still face various challenges , including limited technological infrastructure, digital access gap, low educator technology literacy , as well as issue ethics and data privacy . Therefore , it is necessary improvement digital competency , infra-structure support, and clear regulations so that the integration of AI in the Independent Curriculum can run optimally and sustainably in improving quality education in Indonesia.

Keywords: Artificial Intelligence (AI); Curriculum; Educational; Technology; Digital.

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1. Introduction

The development of digital technology, particularly Artificial Intelligence (AI), has brought significant changes to the world of education. Artificial Intelligence (AI), or what is commonly referred to as "smart intelligence," is what enables machines to perform tasks that humans can (Nusridho & Priyatno, 2023). AI enables the learning process to be more adaptive, personalized, and efficient. One of the most prominent innovations is that Artificial Intelligence (AI) now plays a central role in curriculum design, data-driven learning, and assessment. AI no longer functions merely as a technical tool but has become a strategic component in building a more adaptive, personalized, and efficient education system (Devi & Subiyantoro, 2026).

According to Kause, Nubaton, & Faot, 2025, the concept of the independent learning curriculum fosters freedom of thought. This freedom of thought is determined by teachers. This means that teachers are the main pillar in supporting success in education. In the current digital era, technological developments influence the quality of education. Every activity carried out by both teachers and students is inextricably linked to digital devices. In Indonesia, the implementation of the Independent Curriculum emphasizes flexibility, competency-

based learning, and character building through the Pancasila Student Profile. In this context, AI integration becomes relevant as a tool to support student-centered learning. The implementation of AI-based learning can facilitate educators' integration of technology into instruction (Yani, Mursyid, & Sukardi, 2026). Various previous studies have examined the use of digital technology and AI in the learning process. Some studies used literature reviews to identify the potential of AI in education, while others employed survey methods to measure teacher and student acceptance of AI technology. The results indicate that AI can help personalize learning, improve evaluation efficiency, and support the development of teaching materials. However, the implementation of AI in the Independent Curriculum still faces various challenges, such as teacher readiness, infrastructure, and digital literacy. Therefore, a literature review is necessary to understand the concept, benefits, and barriers to AI integration in education. Therefore, the research questions are: how the concept of AI integration in education is conceptualized, how the characteristics of the Independent Curriculum support technology integration, and what are the benefits and challenges of using AI in implementing the Independent Curriculum. The contribution of this research is to examine the concept of AI in education, analyze its suitability to the Independent Curriculum, and identify the benefits and challenges of AI implementation.

2. Literature Review

The Concept of Artificial Intelligence in Education

Artificial Intelligence is enabling technology machine copy intelligence humans, such as learn, analyze, and retrieve decision.

In education, AI is used For :

- a. System learning adaptive
- b. Evaluation automatic
- c. Virtual learning assistant
- d. Learning data analysis student

Characteristics Independent Curriculum Independent Curriculum has characteristics main;

- a. Learning based competence
- b. Flexibility in methods and materials
- c. Focus on development character
- d. Learning differentiation

Characteristics This in line with AI capabilities in give personal and adaptive learning

Integration of AI in Independent Curriculum AI integration can done through :

- a. Personalized Learning AI adapts material in accordance ability student
- b. Assessment Based Assessment Technology automatic and analytical development student
- c. AI Teacher is able to support helps in ;manufacturing material, evaluation, planning learning and Learning Based Project (P5).
- d. AI can used in project based technology and innovation

Benefits of AI Integration;

- a. Increase effectiveness learning
- b. Speed up the evaluation process
- c. Support individual learning
- d. Increase students' digital literacy

AI Integration Challenges;

- a. Limitations infrastructure technology
- b. The low teacher digital competence
- c. Inequality access technology
- d. Issue data ethics and privacy

3. Proposed Method

This research employed a library research method, which analyzes a topic from a collection of data found in various literature (Adlini, Dinda, Yulinda, & Chotimah, 2022). The data collection technique employed was to construct data from various sources, such as books and pre-existing research articles (Fadli, 2021). The research was conducted by collecting journal articles from various relevant sources and reviewing eight references obtained from Google Scholar. This approach aims to identify various theories and research findings related to the problem under study, thus serving as a basis for discussing and interpreting the research results.

4. Results

This study look for literature that discusses about Integration of AI Technology in Implementation Independent Curriculum , where inside it related with The concept of AI in Education and the suitability of AI to curriculum independent moment This as well as How benefits and challenges in AI implementation . The following table display summary results study sourced from a number of journal that becomes base in this discussion as follows;

Table 1. of The Previous Research.

No.	Author (Year)	Title	Main Findings
1	Acep et al. (2025)	Analysis the Use of Artificial Intelligence (AI) in Education Supporting Teachers and Students	AI membantu guru menyusun materi ajar, mendukung pembelajaran mandiri, dan meningkatkan personalisasi pembelajaran, meskipun masih menghadapi tantangan privasi data dan kesenjangan teknologi.
2	Wati et al. (2025)	Implementation of AI-Based Personalized Learning on Improving Student Learning Outcomes	AI meningkatkan hasil belajar melalui pembelajaran adaptif, umpan balik real-time, dan materi yang disesuaikan dengan kebutuhan siswa.
3	Nue et al. (2025)	Systematic Literature Review (SLR): Analysis of Curriculum Development in the Era of AI-Based Technology	AI mendukung pengembangan kurikulum yang lebih efektif, personal, dan berorientasi pada keterampilan abad ke-21.
4	Harjun et al. (2026)	Transformation of Artificial Intelligence Education Curriculum in the Society 5.0 Era	Kurikulum berbasis AI mengintegrasikan teknologi, karakter, dan keterampilan abad ke-21 melalui implementasi Kurikulum Merdeka.
5	Hasanah et al. (2025)	Systematic Review: Implementation of Artificial Intelligence in Science Learning	AI meningkatkan kompetensi guru, kreativitas pembelajaran, berpikir kritis, serta literasi sains dan digital.
6	Rahmawati et al. (2025)	Artificial Intelligence Integration in	AI meningkatkan kualitas pembelajaran dan administrasi, tetapi

No.	Author (Year)	Title	Main Findings
		Indonesian Higher Education	masih terkendala infrastruktur, literasi digital, dan regulasi.
7	Nur et al. (2025)	The Role of Artificial Intelligence in the Digitalization of Education	AI mendukung pembelajaran adaptif, tutor virtual, dan digitalisasi pendidikan, namun menghadapi tantangan etika, privasi, dan kesiapan SDM.
8	Nainggolan (2025)	Integration of Artificial Intelligence (AI) in the Independent Curriculum	AI meningkatkan motivasi, partisipasi, dan pemahaman siswa melalui pembelajaran adaptif dan berdiferensiasi.

5. Discussion

Based on the results of a literature review from various journals, the concept of using AI in education has a positive impact, as seen in tables 1 and 2. The research findings confirm the importance of AI in education in improving the quality of education through personalized learning, the development of interactive teaching materials, and support for independent learning, while still considering ethical aspects, data privacy, and equitable access to technology. The research findings in tables 3 and 4 indicate that the current curriculum supports the use of AI, as evidenced by the study's conclusion that the integration of AI into the curriculum strengthens the implementation of the Independent Curriculum through more personalized, adaptive, and student-centered learning, while simultaneously developing 21st-century skills, such as digital literacy, creativity, collaboration, and critical thinking. The research findings in tables 5 through 8 present various findings on the benefits and challenges of using AI in this curriculum, as evidenced by several points in the research findings that can be concluded;

Benefits of Using AI of the Education

- a. Increase quality of process and results learning.
- b. Support personalization learning according to students' needs, abilities and learning styles.
- c. Increase competence teacher pedagogy.
- d. Push teacher creativity in developing learning media.
- e. Develop critical thinking skills of students.
- f. Strengthen literacy science and digital literacy of students.
- g. Increase effectiveness and efficiency learning.
- h. Provides fast , real-time feedback.
- i. Support digitalization education through learning adaptive.
- j. Utilizing chatbots and virtual tutors as learning companions.
- k. Automate administrative tasks so that reduce educator workload.
- l. Support education inclusive and learning differentiation.
- m. Increase participation , motivation , and understanding students to learning materials.

Challenge Uses of AI of the Education

- a. Gaps between regions and institutions education.
- b. Limited access to technology and supporting resources.

- c. The low partial technological literacy educators and students.
- d. The readiness of teachers and students in adopting AI technology is still diverse.
- e. Not yet available clear regulations regarding the use of AI in education.
- f. Risk violation ethics in the use of AI.
- g. Problems user data privacy and security.
- h. Potential dependence on technology in the learning process.
- i. The need for training and mentoring sustainable for educators in integrating AI in a effective.

Thus, the integration of AI technology in the implementation of the Independent Curriculum demonstrates the enormous potential of Artificial Intelligence (AI) to improve the quality of education at various levels, from elementary to higher education. This finding aligns with numerous studies that demonstrate AI's ability to support more effective, adaptive, and student-centered learning processes. AI serves not only as a technological tool but also as a means to create more personalized learning experiences tailored to the needs, abilities, and characteristics of each student. AI also contributes to improving teachers' pedagogical competence. The use of AI helps teachers develop more interactive, relevant, and engaging teaching materials. Teachers can utilize various AI-based platforms to create learning media, design assessments, and obtain recommendations for learning strategies tailored to student characteristics. In the context of curriculum development, research findings indicate that AI integration is highly relevant to the demands of education in the Society 5.0 era. Modern curricula are oriented not only toward mastering knowledge but also toward developing 21st-century skills such as critical thinking, creativity, collaboration, communication, and digital literacy. The implementation of the Independent Curriculum (Curriculum Merdeka) is one form of adaptation that supports the integration of AI technology because it provides flexibility in the learning process and encourages students to learn independently and actively. While there are a number of challenges in implementing AI in education, research indicates that AI makes a significant contribution to improving the quality of learning processes and outcomes.

6. Conclusions

Integration of Artificial Intelligence (AI) Technology in The Independent Curriculum plays a role important in support transformation education in the digital era. Study results show that AI is capable create more personal, adaptive , and learner - centered learning educate through adjustment of the learning process in accordance needs and characteristics students . In addition , AI helps increase teacher competence in develop material learning , composing assessment , providing bait come back in a way fast , and reduce burden administrative so that the learning process can ongoing more effective and efficient . In a way overall , results study confirm that AI has potential big For support success implementation Independent Curriculum. Therefore that , is nec-essary support infrastructure , clear policies , and training sustainable for educators so that the use of AI can done in a way effective , ethical and sustainable so that the benefits can felt in a way evenly distributed throughout participant educate.

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