

CURRICULUM AND DEVELOPMENT OF AI TECHNOLOGY IN INDONESIA

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Abstrak

Artikel ini membahas perubahan kurikulum di Indonesia yang terjadi bersamaan dengan kemajuan teknologi kecerdasan buatan. Dalam menghadapi perkembangan teknologi yang semakin pesat, sistem pendidikan di Tanah Air perlu melakukan perubahan yang signifikan dalam rangka mempersiapkan siswa menghadapi tantangan di era digital yang dipengaruhi oleh AI. Artikel ini menyelidiki langkah-langkah konkret yang telah diambil dalam pengembangan kurikulum yang responsif terhadap kemajuan teknologi, sambil menganalisis berbagai tantangan yang muncul selama proses perubahan. Diskusi ini juga mencakup pengaruh perubahan kurikulum terhadap metode pengajaran, keterampilan yang diajarkan, dan kesiapan mahasiswa untuk memasuki dunia kerja yang semakin dipengaruhi oleh otomatisasi dan teknologi canggih. Selain itu, artikel ini menekankan pentingnya meningkatkan kualitas pendidikan untuk memastikan kurikulum tetap tepat, fleksibel, dan berorientasi ke depan. Dengan berbagai inovasi dan adaptasi yang diterapkan, perubahan kurikulum di Indonesia diharapkan dapat menghasilkan lulusan yang kompetitif, fleksibel, dan mampu berkontribusi dalam ekosistem AI yang semakin kompleks dan saling terhubung.

Kata kunci: Transformasi Kurikulum, Teknologi Kecerdasan Buatan, Kecerdasan Buatan, Pendidikan Indonesia, Pengembangan Kurikulum, Era Digital, Kompetensi Abad ke-21.

Abstract

This article discusses the changes in the curriculum in Indonesia that have occurred at the same time as the advancement of artificial intelligence technology. In the face of increasingly rapid technological developments, the education system in the country needs to make significant changes in order to prepare students to face challenges in the digital era influenced by AI. This article investigates the concrete steps that have been taken in the development of a curriculum that is responsive to technological advances, while analyzing the various challenges that have arisen during the process of change. This discussion also covers the influence of curriculum changes on teaching methods, the skills taught, and students' readiness to enter the world of work which is increasingly influenced by automation and advanced technology. In addition,

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this article emphasizes the importance of improving the quality of education to ensure the curriculum remains precise, flexible, and forward-oriented. With various innovations and adaptations implemented, curriculum changes in Indonesia are expected to produce graduates who are competitive, flexible, and able to contribute to an increasingly complex and interconnected AI ecosystem.

Keywords: Curriculum Transformation, Artificial Intelligence Technology, Artificial Intelligence, Indonesian Education, Curriculum Development, Digital Era, 21st Century Competencies.

INTRODUCTION

The development of artificial intelligence (AI) technology in Indonesia will experience an important phase in 2025. Through the National Strategy for Artificial Intelligence (Stranas KA), the government has set five main focuses, namely health, bureaucratic reform, education and research, food security, and smart mobility. In the field of education, AI is expected to be the main factor in learning transformation to improve the quality of human resources ahead of Golden Indonesia 2045. This policy is reflected in efforts to gradually integrate AI-based learning and coding at the junior high and high school levels, taking into account the readiness of infrastructure, teacher capabilities, and digital ecosystem in schools. (Badan Pengkajian dan Penerapan Teknologi (BPPT), 2020) (Suharyo et al., 2024)

Amid the ever-expanding development of technology, Indonesia is also witnessing significant growth in the AI sector, with a predicted increase of up to 28% by 2025. Various innovations have begun to be implemented, such as the use of chatbots for public services from BPJS Kesehatan, the generative intelligence platform "Neuro" developed by Telkom, and adaptive learning systems in higher education. This ecosystem shows that AI is not only developing as a technology, but also as a foundation for national digital transformation, including in curriculum innovation. (Efendi et al., 2025)

However, AI-based curriculum modifications encounter several challenges that need to be considered. The gap in access to digital infrastructure between developed and disadvantaged regions, the lack of teacher competence in AI literacy, and ethical and data security issues are significant obstacles in its implementation. In addition, the curriculum needs to be designed in an inclusive manner so that all learners, including those in remote locations, can experience the equal benefits of this technology. (Wirasti et al., 2024)

This article aims to investigate in depth how the development of AI in Indonesia affects the design and implementation of the national education curriculum. The discussion included the latest policy developments, the integration of AI in the learning process, the impact on students' competencies, and the challenges faced in the implementation of AI-based curriculum. In addition, this article underscores the importance of ethics, equal access, and strengthening digital literacy as crucial elements in preparing the younger generation to face an increasingly complex and competitive era of artificial intelligence.

RESEARCH METHODS

This study adopts a qualitative method that focuses on descriptive analysis from various written sources related to the educational curriculum and advances in Artificial Intelligence (AI) technology in Indonesia. The qualitative method was chosen because it can provide a deep understanding of the phenomenon being researched through the interpretation of texts, ideas, and concepts contained in the literature.

The type of research carried out is library research. In this study, researchers collected information from various literature sources such as books, scientific articles, journals, theses, dissertations, official reports, and e-books relevant to the theme of curriculum and AI technology. This literature is analyzed through the activities of reading, comprehending, taking notes, grouping, and reviewing the content systematically to produce comprehensive information.

The data collection process is carried out by searching for scientific sources using digital databases, especially Google Scholar, with keywords such as: Indonesian curriculum, education and technology, Artificial Intelligence, AI in education, and technology-based curriculum development. From the search results, the researcher selected about journals and reference books that were most suitable for the research.

After that, all selected literature is analyzed and summarized to find the main patterns, concepts, and ideas related to the development of the curriculum and AI technology in Indonesia. The data was analyzed verbally without using statistical techniques, in accordance with the characteristics of qualitative research. With this approach, this study is expected to provide a clear picture of how advances in AI technology have an impact on the development of the direction of the educational curriculum in Indonesia.

RESULTS AND DISCUSSION

The transformation of the curriculum in Indonesia reflects a change that is not only influenced by social and political dynamics, but also by technological advances at the global level. Analysis of the development of the Indonesian curriculum shows that changes from the colonial period, the independence period, the 1975, 1994 Curriculum, KBK, KTSP, the 2013 Curriculum, to the Independent Curriculum are increasingly clear in their direction to adapt to the needs of the times. In the modern era and the industrial revolution 4.0, the curriculum must be able to accommodate advances in the fields of science and technology, including artificial intelligence (AI), which is now an essential element of education systems around the world. (Nursalim et al., 2024)

The development of AI technology in Indonesia shows encouraging results in the education sector. Literature research and empirical studies show that AI offers many opportunities to improve the quality of learning. Through functions such as customizable learning, automated assessment, teaching through chatbots, big data analytics, and intelligent learning management systems, AI can simplify teachers' administrative tasks and speed up learning evaluation. AI technology also supports learning personalization, so students can learn according to their own abilities, interests, and learning styles. All of this is in line with the principles of fairness and differentiation in the Independent Curriculum, which emphasizes the right of each student to learn according to their individual needs. (Meriyanti, 2025)

The compatibility between the Independent Curriculum and the development of artificial intelligence (AI) technology is an important research result. The Merdeka Curriculum encourages adaptable, collaborative, and skill-focused learning. With the help of AI, the learning process can be more flexible because AI can provide materials, activities, and assessments that suit students' abilities. In addition, the Independent Curriculum also introduces Informatics subjects at all levels of education to help students get acquainted with

digital technology and AI from the beginning. The application of digital literacy values, computational thinking, data analysis, and the introduction of machine learning concepts shows that the direction of the Indonesian curriculum is in line with technological advances at the global level. Therefore, the Independent Curriculum can serve as a strategic tool in preparing the younger generation to succeed in the world of work that is increasingly influenced by automation and AI. (Nurazizah & Supriyadi, 2024)

However, curriculum changes to accommodate AI face a number of challenges that need to be thoroughly discussed. The first challenge is the digital divide. Many schools in remote areas still do not have good internet access, proper computer devices, or power resources to implement AI-based learning. The next challenge is the readiness of teachers. Although technology is developing rapidly, there are still some teachers in Indonesia who do not have an adequate level of digital literacy, and some even have difficulty in using basic learning technology. Therefore, intensive training through the Independent Teaching program or teacher ability improvement program is very important so that AI integration can be realized effectively. The third challenge relates to ethics and the protection of personal data. The use of AI requires the collection of student data, so strong policies are needed to protect personal information and ensure that the use of AI does not violate the rights of students. These challenges show that the application of AI is not only a technological issue, but also the readiness of the education system as a whole. (Nuryadin & Marlina, 2023)

Behind these challenges, AI advances offer new opportunities that can enrich the curriculum in Indonesia. One significant opportunity is AI's ability to create a more open learning environment for all. AI can help students with special needs through various features such as speech-to-text, text-to-speech converters, automatic reader systems, and speech recognition technology to support students with vision, hearing, or language difficulties. This is an important aspect of the Independent Curriculum which emphasizes inclusivity and equality in education. In addition, AI also opens up opportunities to expand project-based and collaborative learning methods. With the support of AI platforms, students can collaborate on projects involving multiple schools, even from different countries, providing a more varied learning experience. (Anam et al., 2025)

AI also influences the way curriculum is developed. Through big data analysis, governments and schools can collect information about student learning progress over a certain period. This data can be used to assess how effective the curriculum is, identify the competencies most needed in the job market, and improve learning outcomes on an ongoing basis. Thus, AI not only contributes to curriculum implementation, but also becomes a strategic tool for the formulation and assessment of education policy at the national level. (Efendi et al., 2025)

The impact of the application of AI in education in Indonesia can be seen from increased student motivation, better learning effectiveness, and higher teacher work efficiency. AI can provide an interactive learning experience through simulations, intelligent educational games, and data visualization, making the learning process more engaging and contextual. AI also helps ease the administrative burden on teachers through automated evaluations, student ability analysis, and more organized classroom management. Another positive impact is the increase in digital literacy among students. By using AI technology frequently, students not only become users of technology, but also understand the logic and ethics in its use. (Pratama et al., 2023)

Overall, the results and analysis show that the development of AI technology has a significant impact on the education system in Indonesia. The Merdeka Curriculum is a solid foundation for integrating AI into learning, but it requires infrastructure readiness, teacher competence, and supporting policies to be implemented properly. With the proper use of AI, the curriculum in Indonesia has great potential to produce a generation that is competitive at

the global level, innovative, creative, and ready to face challenges in the digital world. AI technology is not only complementary in education, but has become a very important part of the transformation of the future-oriented curriculum.

CONCLUSION

Based on the results of research on the development of the curriculum and the advancement of artificial intelligence (AI) technology in Indonesia, it can be concluded that the application of AI in the education sector is now an urgent necessity and a strategic opportunity to improve the quality of human resources. Curriculum changes from time to time show that the national education system is increasingly able to adapt to the changing times, especially in the digital era which is marked by rapid technological advances. The Merdeka Curriculum as the latest curriculum is an important step to prepare the younger generation to face the challenges of the industrial revolution 4.0 and 5.0 through flexible, competency-based, student-focused, and digital literacy learning methods.

The development of AI has a great impact on the learning process, both in terms of effectiveness, efficiency, and equitable distribution of education quality. AI technology can provide customizable learning, automated assessment, student data analysis, and personalized educational services, allowing each student to learn according to their abilities and needs. This is in line with the principle of differentiation which is part of the Independent Curriculum. In addition, the strengthening of Informatics and digital literacy subjects shows Indonesia's seriousness in building 21st-century competencies, such as critical thinking, creativity, problem-solving, data literacy, and the ability to collaborate—competencies that are very important in a work ecosystem that is increasingly dependent on technology.

However, the application of artificial intelligence in learning programs still faces a number of problems, especially related to the lack of infrastructure, the low digital capabilities of some teachers, and ethical and data security considerations. Inequalities in access to technology between developed and disadvantaged regions remain a major challenge in equitable distribution of digital-based education quality. Therefore, measures to improve teachers' capabilities, provide adequate technology facilities, and formulate data protection policies are essential to be strengthened so that AI integration can be carried out in an optimal, inclusive, and sustainable manner. (Batubara et al., 2024)

Overall, the integration of artificial intelligence in education in Indonesia not only improves the quality of learning, but also creates great opportunities to improve the nation's competitiveness at the global level. The Independent Curriculum serves as the main basis for carrying out a more human, adaptive, creative, and educational transformation in accordance with the development of artificial intelligence technology. With a strong commitment from the government, educators, and all related parties, Indonesia can build a superior education system, produce competitive graduates, and be able to contribute to an increasingly complex and interconnected artificial intelligence ecosystem.

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