

UTILIZATION OF ARTIFICIAL INTELLIGENCE TECHNOLOGY FOR CURRENT CURRICULUM DEVELOPMENT AND DISTANCE LEARNING

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Abstract: This article explains about the idea of how Artificial Intelligence (AI) technology has brought paradigm-changing innovations in curriculum development and distance learning in the contemporary era by using the literature review method. The literature review method is prominent as the result of the rapidly growing volumes of publications since the research of AI is greatly raising since 2010. The literature review method that used in this article involves searching, reading, analyzing, and summarizing the information regarding the utilization of AI technology for curriculum development and distance learning. This article also explores how AI provides a more personalized learning experience by recommending material that matches students' interests and levels of understanding. Furthermore, AI made it possible to monitor student progress in real-time and provide instant feedback, which is an important aspect of distance learning that is becoming increasingly popular. However, the use of AI in education also raises a number of ethical and privacy issues that need to addressed carefully. This article outlines the benefits of AI in bridging the distance learning accessibility gap, thereby improving the quality of education today. In conclusion, the use of AI in curriculum development and distance learning is a significant step towards education that is more inclusive, responsive, and relevant to the demands of the modern world.

Keywords: Artificial Intelligence; Curriculum; Distance Learning

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INTRODUCTION

Artificial Intelligence (AI) is the ability of computers and computing systems to execute tasks that typically require human intelligence, such as pattern recognition, decision-making, and natural language understanding. The term AI was formally established in 1956 by John McCarthy, along with Minsky and Shannon, researchers came together at Dartmouth College (Warwick, 2012). However, the chronological history of understanding that machines can think began much before that. In the present, AI already known worldwide as the total number of AI research publications has greatly risen, more than doubling since 2010 across the board. Especially on specific AI topics include pattern recognition, machine learning, and computer vision (Maslej, et al., 2023). Nevertheless, based on a survey conducted by PEGA (2022) to 6,000 respondents from 6



countries, only 33% of respondents acknowledge that they are using AI technology. But in fact, they use 77% of services and devices with AI technology in their daily lives. This proves that whether we realize it or not, AI technology has become part of our daily lives. For example, a virtual assistant in e-Learning.

In the field of education, AI has opened new opportunities to improve curricula, enhance learning experiences, and overcome challenges in distance education. In the present, especially after the COVID-19 pandemic, distance education has become a top choice for students around the world who seek flexibility, accessibility, and the opportunity to learn without having to be physically present at a classroom location. However, there are several challenges to overcome, including each student's study phase and ability, challenges in evaluating and monitoring student progress, and how to make the learning process more interesting. AI offers potential solutions to some of these issues by providing curriculum personalization capabilities, sophisticated data analysis, and more active engagement in the learning process.

The purpose of this article is to explore the current utilization of AI technology in curriculum development and how it can enhance the learning experience in distance education. It will also explore the challenges that may arise in this process and identify future opportunities in the application of AI in education. Through an in-depth analysis of AI utilization in distance education and curriculum development, it is expected that this article can provide valuable insights to educational decision-makers, teachers, and curriculum developers to optimize teaching and learning methods in the ever-changing digital era.

METHOD

This article is written using the literature review method which involves the process of searching, reading, analyzing, and summarizing information regarding the utilization of AI technology for curriculum development and distance learning. All processes are started by pointing to the research objectives: (1) AI as a paradigm-shifting innovation in curriculum development and distance learning in the contemporary era; (2) AI in creating a responsive curriculum; (3) AI in designing a more personalized learning experience by recommending materials that match students' interests and level of understanding; (4) AI in monitoring student progress in real-time and providing instant feedback; and (5) Issues on the AI implementation.

First step, the searching process was conducted on Google Scholar using keywords: 'Artificial Intelligence in Curriculum Development and Distance Learning'; 'Artificial Intelligence on Formulating Curriculum'; 'Personalized Learning with Artificial Intelligence'; 'Learning Feedback with Artificial Intelligence'; and 'Issues on Artificial Intelligence'. Second, the articles that appeared were read and selected based on the title, overview, or abstract. Next step, the selected article was analyzed to find a representative idea related to the research objectives. The last step was summarizing all the ideas and information gathered from all the articles selected.





Image 1. The literature review process

RESULT AND DISCUSSION

AI as a paradigm-shifting innovation in curriculum development and distance learning in the contemporary era

Research conducted by Holmberg in 1983 (Belawati et al., 2020), a distance education expert who always emphasizes the importance of interaction, concluded that although interaction in the form of real conversation is very difficult to do in distance education, it does not mean that the atmosphere of conversation cannot be presented to students. He then developed a concept known as *guided didactic conversation* which is a two-way conversation in written form or over the phone. In practice, this shortcoming of distance education can be overcome by the implementation of AI in its learning activities aligned with its abilities such as chatbots or virtual assistants that can be used to provide live assistance to students in real-time.

In a survey held by Pew Research Center (2017), it found that individuals routinely chat with Amazon's Alexa, Apple's Siri, and other virtual assistants (Guzman & Lewis, 2020). In connection with this study, the implementation of AI in the form of virtual assistants as a support for learning activities certainly has enormous potential in distance education curriculum development. Virtual assistants have five main roles as educational tools. The roles are tutors, evaluators, responders, moderators, and peer-learners. These roles or features can be complementary and implemented by the objectives of the bot (Reyes et al., 2020). Further, Gubareva & Lopes (2020) mentioned that chatbots or virtual assistants can support students by providing them with learning analytics and failure prediction. Therefore, AI technology, specifically virtual assistants in education, can be said to be one of the major innovations in distance education.

AI in creating a responsive curriculum

One of the demands in curriculum development is that the curriculum is adequate to deal with time. This includes being able to accommodate the various needs of learners. Whether it is from various ages, ethnic, geographical, even ethnic, and cultural backgrounds. However, developing a curriculum that meets the needs of all demands is certainly a big and complex challenge. In 1962, Taba generally defined curriculum development as developing a learning plan, which is one of the most complex tasks for educators (Vreuls et al., 2022). The responsive curriculum requires a re-thinking of the



nature of the curriculum, particularly of the relationship between the curriculum, everyday life, and the world of work. The reframing of this relationship has profound consequences for teaching and learning, the competences of all actors involved and the type of learning that is privileged (Ameyaw et al., 2019). With this AI technology, it is expected that the curriculum can be selected automatically according to the various characters and backgrounds of students. In simple terms, student background data has been inputted before the learning activity begins so that AI can rapidly decide the curriculum is appropriate to implement to the student. This is supported by a study conducted by Hunter et al. (2019) that demonstrated that AI could support human decision-making and persuasion.

AI in designing a more personalized learning experience by recommending materials that match students' interests and level of understanding

Some of the obstacles related to distance education learning activities are the lack of understanding of the material, ineffective and less interactive learning, learning implementation time not on schedule, and difficulty accessing learning resources (Cerelia et al., 2021). In other words, in distance learning, it is rather difficult for teachers or tutors to observe the progress of each student. Therefore, with AI technology, the learning experience can be adjusted according to the student's ability so that personalized learning can be realized.

AI in monitoring student progress in real-time and providing instant feedback

Evaluation in the learning process is very important to provide information regarding student progress, foster learning activities, determine abilities and difficulties, to encourage learning motivation, and to help develop students' behavior (Magdalena, Fauzi & Putri, 2020). It means in every learning process; students will need feedback that provide information about their study development. AI is one of the technological tools utilized for enhancing educational feedback. It refers to the development of computer systems that can perform tasks associated with education that are conducive to human intelligence. These tasks include grading examinations, generating personalized learning resources, and proposing assignment tasks based on real-time data analysis (Rad, Alipour & Jafarpour, 2023). In practice, AI is able to monitor students in the learning process, the process of working on practice questions, and learning evaluation. The aspects that are monitored include how they complete the task, the time to complete the task, and the interaction that occurs in completing the task. Furthermore, AI can perform automatic assessment related to the exercises that have been done by students. So that AI can provide feedback that is appropriate to each student and be able to recommend improvements for the progress of these learners.



Issues on the AI implementation

However, the use of AI in education also raises a number of ethical and privacy concerns that need to be addressed carefully, which are students' data privacy issues, lack of social interaction, and plagiarism issues. First issue, the use of AI in education inevitably collects and analyzes students' personal data such as name, address, exam results, learning history, and online learner behavior and other information or data. Main issue of those factors is the data security system. How the data is stored, accessed, and secured. It must be concerned that if the students' data is accessed by criminals/hackers, it can be misused for harmful purposes. Second issue is lack of social interaction. The implementation of AI in education can reduce students' social interaction which can impact their social and emotional development. Then, plagiarism issues. AI systems can be used by students to copy or modify other people's work easily. This will certainly raise issues of originality and copyright infringement. Further research should be conducted to prevent or resolve those issues.

CONCLUSION

In conclusion, the use of AI in curriculum development and distance learning is a significant step toward education that is more inclusive, responsive, and relevant to the demands of the modern world. Utilizing AI in distance education curriculum development can bring various benefits, including:

- 1. Learning Personalization: AI can analyze individual student learning data and provide recommendations for curriculum that suits their needs and ability levels.
- 2. Progress Monitoring: AI enables real-time monitoring of student progress, allowing teachers and instructors to provide more effective and timely assistance.
- 3. Learning Material Recommendations: AI can recommend relevant and diverse learning materials, making the curriculum more fulfilling and varied.
- 4. Automation of Administrative Tasks: AI can automate administrative tasks such as scheduling, testing, and grading, allowing instructors to focus more on learning.
- 5. Data Analytics: AI can analyze big data to identify trends and learning needs that may not be apparent in conventional methods.
- 6. Interactive Learning: AI technologies such as chatbots and virtual assistants can be used to provide live assistance to students in real time.
- 7. Rapid Updates: AI allows curriculum to be updated quickly according to changes in the field of knowledge and industry needs.
- 8. Accessibility: AI can be used to create more accessible content, such as automatic translation or text readers for students with various needs.

By integrating AI in distance education curriculum development, we can create more efficient, adaptive, and relevant learning experiences for students, which is especially important in a distance education environment. AI also helps educational institutions to better understand the needs of students and contribute to improving the quality of distance education.



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