



The Age of Full AI in Education: Redefining Learning through Intelligent Technology

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Abstract

This research aims to identify and evaluate how the use of Artificial Intelligence and machine learning can be optimized in the educational context and its impact on educational development. The focus of this research is to analyze how Artificial Intelligence can be used to enhance student understanding and engagement through visual-based learning materials. Assessing the potential of artificial intelligence in personalizing learning experiences and providing adaptive feedback for students. Identifying challenges and barriers in the implementation of these two technologies in the educational context. Evaluating the impact of integrating Artificial Intelligence on the quality of learning and student learning outcomes. This research examines the transformative potential of full AI implementation across various aspects of education, ranging from personalized learning, automation of teaching processes, enhancement of assessment accuracy, to the creation of adaptive learning environments. Based on recent developments in machine learning, natural language processing, and intelligent tutoring systems, this study provides a comprehensive review of how AI is revolutionizing the educational landscape. This analysis also addresses crucial challenges accompanying full AI adoption, including ethical issues, data privacy, algorithmic bias, and the shifting roles of educators. By analyzing current implementations and future trends, this research proposes a conceptual framework for inclusive, ethical, and resilient smart education in the face of changing times. Ultimately, this study asserts that the comprehensive utilization of AI in education is not merely an option, but an urgent necessity to redefine the meaning of learning in a constantly changing world.

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Introduction

In today's digital era, technological advancements are playing an increasingly important role in the world of education (Rahmatullah et al., 2022). This transformation is driven by ever-evolving technological innovations, including the use of interactive media and artificial intelligence (AI) (Nasser El Erafy, 2023). Two technology tools that are getting more and more attention, Artificial Intelligence (E. R. Dewi & Tyas, 2024). Both offer great potential to enhance the learning experience and optimize the teaching process (L. Ma et al., 2021).

Artificial intelligence learning media, such as the one presented by *Artificial intelligence*, has revolutionized the way learning materials are delivered (Gofur et al., 2024). *Artificial intelligence*, with its ability to produce whiteboard animation videos, enables the delivery of information in an engaging and easy-to-understand visual manner (Pranata & Jayanta, 2021). This technology provides an advantage in terms of engagement and retention of materials, as visualization helps clarify complex concepts and increase students' interest in learning (Molino et al., 2020).

Artificial intelligence is an app that allows the creation of whiteboard-based animated videos in an easy way (Zaini et al., 2022). The tool makes it easy to convey complex information through compelling visuals and clear narratives (Lorensa et al., 2022). In the context of education, *Artificial intelligence* can be used to create learning materials that are more interactive and easy to understand, help students visualize abstract concepts and make the learning process more interesting (N. K. R. Dewi & Yudiana, 2023).

Artificial intelligence also plays a crucial role in modern education. AI can be used for a variety of applications, from personalizing learning, analyzing educational data, to developing adaptive teaching materials (Zhao et al., 2021). By leveraging AI, educators can create learning experiences that are more tailored to students' individual needs, detect areas where students may be struggling, and provide faster and more precise feedback (Chen et al., 2020). Artificial Intelligence has shown great potential in various aspects of education. AI technology can be used to personalize learning, provide automated feedback, and analyze data to tailor the learning experience to students' individual needs (Dwivedi et al., 2021). AI can also support the development of more adaptive and interactive teaching materials, as well as provide efficient tools for educators in designing and delivering learning materials (Pedro et al., 2019).

The use of technology in education not only brings benefits in the academic realm, but also has a significant economic impact (Altbach et al., 2019). Investment in education technology can drive innovation in the education sector, create new job opportunities, and improve the efficiency of the teaching and learning process (Orifovich, 2024). For the community, especially among the people, this technology can open wider access to quality education, reduce educational gaps, and facilitate the development of skills relevant to needs (Feijóo et al., 2020).

Despite the great benefits, technology integrations like *Artificial intelligence* in education also faces challenges. Accessibility issues, the need for training for educators, and implementation costs are some of the obstacles that need to be overcome (L. Ma et al., 2021). However, with the right approach and support from various parties, these challenges can be overcome and the opportunities that exist can be maximized (Ahmad et al., 2021). In this context, research on the use of *Artificial intelligence* in educational technology is essential to explore how these two tools can be optimally utilized (Mafazah & Jabar, 2020). This will not only provide insight into how to improve the quality of learning, but also about its impact on ease of learning.

Therefore, it is important to explore how *Artificial intelligence* can be effectively integrated in the education system. This study aims to understand the potential and challenges of using these two technologies, as well as to evaluate their impact on the advancement of educational technology. By understanding how to optimize the use of *Artificial intelligence* it is hoped that we can improve the quality of learning, drive innovation in teaching, and prepare students to face future challenges with relevant and *up-to-date skills*. Integration *Artificial Intelligence* in education has the potential to revolutionize the way learning is done by presenting a more modern and adaptive approach (Diana & Khofifah, 2023).

Uses of *Artificial intelligence* In the creation of teaching materials, it can increase student engagement by presenting information through attractive visual media. Videos created with *Artificial intelligence* can clarify concepts that are difficult to understand through visual and dynamic explanations, as well as increase the attractiveness of teaching materials. Meanwhile, AI offers the opportunity to present a more personalized and data-driven learning experience. With AI, the education system can analyze student performance, provide appropriate learning recommendations, and adjust teaching materials according to individual student needs. This allows for a more purposeful approach to education, where each student can learn at a pace and style that suits them.

Although there is great potential, the application of these two technologies also faces several obstacles. These challenges include the need for training and skill development for educators to utilize these tools effectively (Rasheed et al., 2020). In addition, there are also challenges in terms of access and costs that may limit the ability of some educational institutions to adopt technology (Murgor, 2015). In addition, the application of technology must be done with careful consideration related to the curriculum and the specific needs of students (Lauridsen, 2020). However, not all technology is suitable for every educational situation or context, and it is important to assess how *Artificial intelligence* can be integrated in a way that supports the overall educational goals (Wahyudi & Mz, 2022).

This study aims to identify and evaluate how the use of *Artificial intelligence* can be optimized in an educational context. The focus of this research is to analyze how *Artificial intelligence* can be used to improve student understanding and engagement through visual-based learning materials. Assess the potential of AI in personalizing the learning experience and providing adaptive feedback for students. Identify challenges and obstacles in the application of these two technologies in the context of education. Assessing the Economic Implications of the Use of Educational Technology. By conducting this research, it is hoped that the best strategies for integrating *Artificial intelligence* in education can be found, as well as provide recommendations for educators, policymakers, and technology developers to harness the full potential of this technology. Thus, education can be more innovative, and effective in facing the challenges and opportunities that exist in this digital era.

Methods

Qualitative research methods are approaches that focus on an in-depth understanding of social and cultural phenomena by collecting descriptive and non-numerical data (Sari et al., 2022). In the context of research on Media Use Artificial Intelligence in Welcoming the Advancement of Educational Technology offers great potential to improve the quality of learning and have an impact on the people's economy. Qualitative methods can provide deep insights into the experiences, views, and applications of such technology in education. To facilitate understanding, the following research flow is presented:

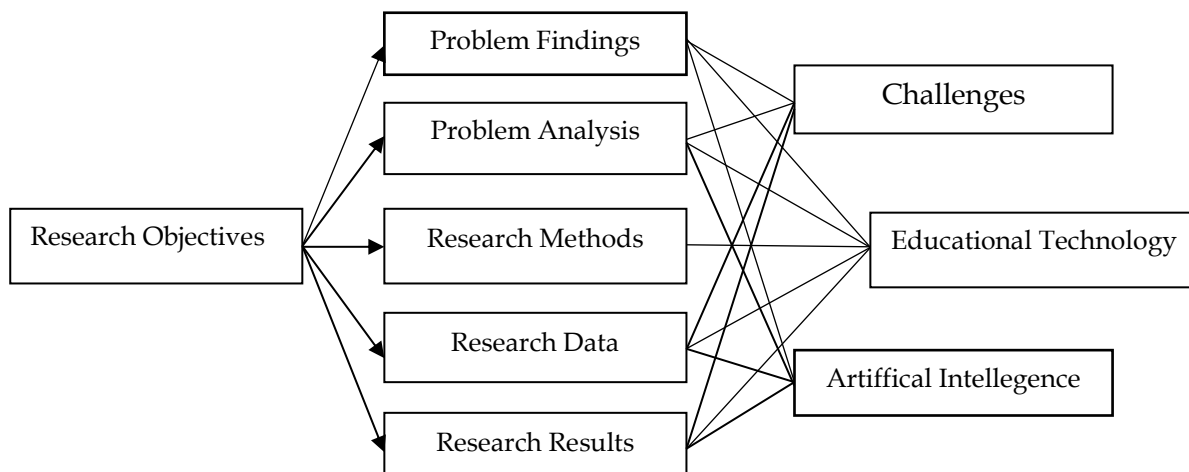


Figure 1. Research Flow on the Use of *Artificial Intelligence* in Education

The research samples used in this study are the Abuya Salek Sarolangun Islamic Religious Institute, the Muhammadiyah Kotamobagu Islamic Religious Institute, the Riyadlotul Mujahidin Islamic Religious Institute, and the Pangeran Dharma Kusuma Islamic Religious Institute. The selection of this sample is based on the application of media in the form of *Artificial Intelligence* that have been used by lecturers at the institution.

Data collection uses Participant Observation to directly observe the application of *Artificial Intelligence* in an educational context. Observe in the learning classroom where this technology is used. By recording the interaction of students and educators with technology, as well as changes in teaching and learning methods. How technology is applied, student reactions, and adaptations made by educators. Data Collection uses interviews to gather in-depth information about individuals' experiences and views regarding the use of *Artificial Intelligence* in education. By conducting semi-structured interviews with educators, students, and managers of educational institutions. Related "What are the perceived benefits of using *Artificial Intelligence* in the classroom?" or "How does AI affect teaching methods?"

The data analysis used, namely, Transcription and Coding aims to organize and interpret the data collected from interviews, group discussions, and observations. With the technique of transcribing interviews and discussions, then coding to identify themes, patterns, and categories that emerge from the data. By using qualitative analysis software, namely NVivo to support the data analysis process. Meanwhile, thematic aims to identify and organize the main themes of qualitative data. By grouping the data into relevant themes, such as benefits, challenges, and changes in teaching methods. Interpret the meaning and implications of these themes. Member Checking aims to verify the findings with the study participants to ensure that the interpretation of the data is accurate, by returning a summary of the findings or a transcript of the interview to the participant for feedback and clarification. Writing and Presenting Reports Aims to prepare research reports that describe the findings and implications of qualitative research. By writing a report that presents the results of data analysis, including direct quotes from participants, key findings, and recommendations based on the findings. context, process, and impact of using *Artificial Intelligence* in education. With this qualitative approach, it is hoped that in-depth insights can be gained on how *Artificial Intelligence* can be integrated in education, as well as understand the challenges and benefits associated with technology.

Result

1. Benefits of Learning Using Artificial Intelligence

Results and Discussion for the research on "The Use of Artificial Intelligence in Welcoming the Advancement of Educational Technology" will present the main findings of the qualitative analysis and discuss the implications. Based on the results of interviews with several lecturers at several Islamic Religious Institutes Abuya Salek Sarolangun, Muhammadiyah Islamic Religious Institute Kotamobagu, Manado, Islamic Religious Institute Riyadlotul Mujahidin, Islamic Religious Institute Prince Dharma Kusuma. Related to the benefits of using sparkol videoscribe media and artificial intelligence in learning. The following are the names of agencies and types of Artificial Intelligence that are often used:

Table 1. Institutions and Technologies Used

No	Name of Agency	Utilization of media	Artificial Intelligence
1	Abuya Salek Sarolangun Islamic Religious Institute	Applying Media in learning	Humata AI (Review Article) ChatGpt (Ask Anything) Slidesai (Automatic PPT) Connected Papers (Background)
2	Muhammadiyah Kotamobagu Islamic Religious Institute	Applying Media in learning	Connected Papers (Background) ChatGpt (Ask Anything) Humata AI (Review Article)
3	Riyadlotul Mujahidin Islamic Religious Institute,	Applying Media in learning	Shortly AI (Create Essays and Articles) Leonardo AI (Crane image) Humata AI (Review Article)
4	Islamic Religious Institute of Prince Dharma Kusuma	Applying Media in learning	Copy AI (Create Script) ChatGpt (Ask Anything) Humata AI (Review Article) Steve AI (Text to Video)

Based on the table above, each of the four institutions studied has implemented Artificial Intelligence in their daily learning process practices. The diversity of Artificial Intelligence used is tailored to the needs and learning objectives of the institution, from the experience experienced by lecturers and students directly is innovative learning time efficiency by utilizing all Applied Artificial Intelligence Technologies.

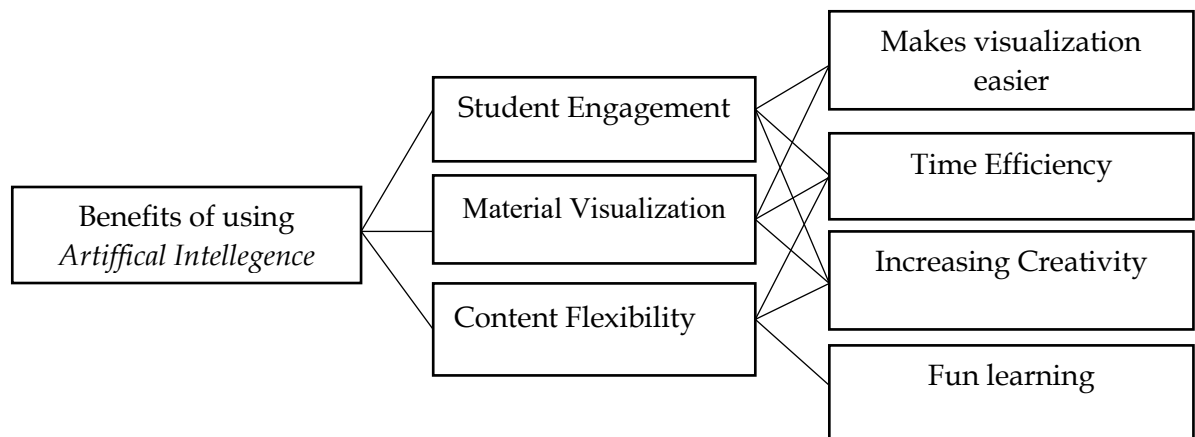


Figure. 2 Advantages of Learning Artificial Intelligence

Based on the results of the analysis on four different institutions, the Abuya Salek Sarolangun Islamic Religious Institute, the Muhammadiyah Kotamobagu Islamic Religious Institute, the Riyadlotul Mujahidin Islamic Religious Institute, and the Prince Dharma Kusuma Islamic Religious Institute. From the findings of the advantages of Artificial Intelligence it is drawn that understanding using Artificial Intelligence can increase student engagement, Artificial Intelligence has been proven to be effective in increasing student engagement by providing a more visual and interesting learning experience. Animated videos make complex concepts easier to understand and can increase student motivation. Then as an option in increasing creativity in teaching, educators reported "that Artificial Intelligence allows them to deliver material in a creative and innovative way, which has the potential to improve the quality of learning".

2. Challenges of Using Artificial Intelligence

This media is an alternative choice when carrying out learning, but this media is also not free from challenges and obstacles when applied by educators, one of the obstacles is about limited knowledge, limited access, and data security privacy issues. Not all agencies have adequate access to use this technology. Technological limitations, technical constraints and limitations in video production skills are the main challenges. Educators need additional training to make the most of Artificial Intelligence. Training needs Educators and education managers need to be trained to utilize this technology effectively.

Table 2. Challenges of Using Artificial Intelligence

No	Challenges of Using Artificial Intelligence	Information
1	Limited Access	Not all schools have adequate technology
2	Training Needs	Teachers and education managers need training
3	Data Security Privacy Issues	Using Artificial Intelligence requires training on data security

3. Benefits of Using Artificial Intelligence in Education

Learning Personalization, AI enables better personalization of learning by providing feedback and recommendations tailored to student needs. This helps educators in developing more effective learning strategies. Assessment Efficiency: AI improves efficiency in assessment and data processing, allowing educators to focus on other aspects of teaching. Data Privacy and Security, The use of AI raises concerns about the privacy and security of student data. It is important to ensure that data is managed securely and ethically. Infrastructure Needs, AI Implementation requires adequate technological infrastructure and sufficient support to ensure effective integration in the curriculum.

Table 3. Benefits of Using Artificial Intelligence

No	Benefits of Artificial Use of Intelligence	Information
1	Personalization of Learning	AI can analyze student learning data and tailor educational content according to students' individual needs and abilities
2	Teaching and Assessment Improvement	AI can function as a teaching assistant that provides direct feedback to students, answers questions, and provides assistance

3	Student Support and Guidance	AI can provide academic guidance tailored to students' needs, including helping them with additional practice
5	21st Century Skills Development	AI can support project-based learning by providing tools and resources that allow students to work on projects that require critical thinking skills
6	Interactive Learning Experience	AI can be used to create simulations and educational games that make learning more interactive and fun
7	Provision of Learning Resources	AI can curate and provide access to a wide range of relevant and up-to-date educational resources

4. Challenges of Using Artificial Intelligence

The same is true of the use of artificial intelligence in various fields, including educational technology, offering great potential but also facing a number of challenges that need to be overcome. Regarding data security and privacy, Artificial Intelligence often asks users for access to big and personal data, which certainly poses a risk to Artificial Intelligence users.

Then the next challenge is time and resources, Video production requires time and resources that may not always be available in all educational institutions. This is coupled with the issue of privacy and data security. The use of Artificial Intelligence requires attention to the security of educator and student data. Data security is the most frightening issue for Artificial Intelligence users because at any time there can be a data leak if the wrong use of Artificial Intelligence is used. Here are some of the key challenges that are often encountered:

Table 4. Challenges of Using Artificial Intelligence

No	Challenges of Using Artificial Intelligence	Information
1	Data Privacy and Security	AI often requires access to big and sensitive data. This can pose a risk to individual privacy and data security
2	Bias and Justice	AI can mirror or even exacerbate biases present in training data. This can lead to unfair decisions, especially in contexts such as recruitment, law enforcement
3	Dependency and System Security	The increased reliance on AI systems can increase the risk in the event of a technical failure or cyberattack. The security of AI systems needs to be considered to protect critical infrastructure



Based on the researcher's observation of the challenges of using Artificial Intelligence is indeed fun and makes it easier for an educator to work, but caution is needed in using Artificial Intelligence because data security is at risk of leakage. Addressing these challenges requires collaboration between technology developers, policymakers, and the public to ensure that the use of Artificial Intelligence is beneficial and ethical.

5. Integration of with Artificial Intelligence AI Technology

Based on the findings and understanding of the researcher, if the Artificial Intelligence, it will be a very amazing media and one of the alternative media to be used in the learning process. Considering the advantages and virtues of Artificial Intelligence expertise in overcoming problems and learning needs, this creates conveniences in learning. The advantages are summarized as follows:

- a. Adaptive Content Creation, Artificial Intelligence can be used to analyze student learning outcomes and customize videos created with *Artificial Intelligence* to be more relevant and tailored to student needs.
- b. Interactive Material Delivery, Artificial Intelligence AI can help create interactive elements in animated videos, such as quizzes or simulations that adapt to student progress. On the other hand, *Artificial Intelligence* presents animations to make it easier for students to understand and imagination.
- c. Effectiveness Analysis: Artificial Intelligence AI can analyze students' interactions with videos and provide insights into the effectiveness of content in the learning process
- d. Teacher Training, provides training for teachers on the use of *Artificial Intelligence* and the integration of AI in teaching. The training will increase the understanding and quality of educators in the use of technology.
- e. Content Development, developing and updating content that is in accordance with the curriculum and student needs.
- f. Evaluation and Adjustment, periodically evaluating the effectiveness of using this technology in learning and adjusting strategies based on the results of the evaluation.

Discussion

The rapid evolution of artificial intelligence has ushered in a transformative era in education what this paper refers to as the "Age of Full AI." This era is not merely defined by the integration of AI as a supportive tool, but by its central role in redefining pedagogical paradigms, learning environments, and the human AI collaboration in knowledge production (Kavitha & Joshith, 2024). AI technologies such as intelligent tutoring systems, personalized learning platforms, generative content tools, and predictive analytics have transitioned from experimental novelties to core components of educational ecosystems (Bonde, 2024). Platforms powered by machine learning can now analyze student behavior in real-time, adapt content dynamically to match learning styles, and even generate feedback with human-like nuance (F. Ma, 2025).

This disrupts traditional models of education that rely on standardized instruction and static assessment (Meylani, 2024). However, this shift brings both opportunities and ethical tensions. The scalability and personalization offered by full AI systems promise to democratize access to high-quality education reaching underserved communities, supporting learners with special needs, and accelerating skill acquisition (Bulathwela et al., 2024). On the

other hand, it raises concerns about data privacy, algorithmic bias, dehumanization of learning, and the erosion of the teacher's role as a moral and emotional guide (Donatus et al., 2024). Crucially, while AI may outperform humans in information processing and adaptive content delivery, it lacks empathy, cultural context, and ethical reasoning aspects that are fundamental to holistic education (Korteling et al., 2021). This demands a redefinition of the educator's role not as a mere transmitter of knowledge, but as a critical mediator between human values and machine intelligence (Almashour et al., 2025).

Moreover, the global disparity in infrastructure and digital literacy introduces another layer of complexity. Countries or regions with limited access to AI-capable infrastructure risk being left further behind, exacerbating the digital divide and perpetuating educational inequality (Sun et al., 2023). Thus, the age of full AI is also a test of policy foresight, equitable design, and inclusive innovation. In this light, embracing full AI in education is not about surrendering to machines, but about reimagining learning with wisdom (Murtiningsih & Sujito, 2025). It requires the cultivation of new literacies *AI literacy*, *ethical reasoning*, and *human-machine collaboration* to prepare learners not only to survive but to thrive in an automated, intelligent world.

The discussion ultimately calls for a human-centered AI ecosystem in education one that amplifies the best of both intelligence: artificial and human. Only then can we truly redefine learning, not just by what is taught, but by how it empowers learners to think, feel, and act in a world co-shaped by code and conscience.

Conclusion

Based on the findings above, this research has produced several important findings that describe the impacts, benefits, and challenges of the application of this technology in the context of education and the impact on the economy of the people. The following is the conclusion of this study: The use of Artificial Intelligence in educational technology shows significant potential to improve the quality and effectiveness of the learning process. Artificial Intelligence provides visual tools that make it easy to deliver material in a more engaging and easy-to-understand way, while AI offers the ability to personalize and adapt material according to students' individual needs. The integration of these two technologies not only improves student interactivity and engagement but also allows for more accurate and efficient assessments.

However, the application of this technology also faces several challenges, such as the need for training for educators and limited access to technology in some regions. Therefore, it is important to design an implementation strategy that considers these aspects so that the potential of this technology can be utilized to the fullest. Overall, the combination of Media Artificial Intelligence can be an innovative solution that supports the creation of a more dynamic, adaptive, and student-focused learning experience, which can ultimately drive the achievement of better learning outcomes.

Declarations



Author contribution statement

R.D: conceptualization, methodology, validation. methodology, IDM: review editing, validation. AA: review editing, investigation, preparation of the final original manuscript. AKY: data collection, data analysis. visualization, data analysis. YDL: project administration, supervision. All authors have read and approved the final version of the published article.

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Additional information

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