

EVALUATION OF THE IMPACT OF ARTIFICIAL INTELLIGENCE ON EDUCATIONAL EQUALITY

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Abstract

In this study, an assessment of the impact of artificial intelligence (AI) on educational equality was carried out. Through the analysis of literature and related research, the aim of this research is to identify how AI can contribute to improving accessibility, personalization, and equality in education. The research methods used involve searching for articles and scientific journals related to artificial intelligence and education, as well as in-depth analysis of such findings. The results of this study show that AI has great potential in supporting personalised learning approaches, reducing gaps in access to education, and identifying and addressing biases in the education system. Careful and sustained AI evaluation is important to ensure that the implementation of this technology has a positive impact on educational equality.

Keywords: Evaluation, Artificial Intelligence, Education Equality.

Introduction

Artificial intelligence has undergone significant development in education over the years. Its history can be traced back to the 1950s when the concept of AI was first introduced (Chen, L., Chen, P., & Lin, Z. 2020). AI in education has undergone significant developments, driven by technological advances, paradigm shifts in learning, and anticipation of possible futures. (Chen et al., 2020).

In the early stages, AI was more focused on the creation of intelligent machines capable of imitating human intelligence. Alan Turing's contributions in the 1950s formed the foundation of AI development through his exploration of the question of machine intelligences. Over time, AI technology has evolved, and its applications in education have begun to emerge. The use of AI in education covers a wide range of areas, such as personal learning, adaptive assessment, intelligent tutoring systems, and virtual assistants. (Luan et al., 2020).

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AI has the potential to enhance education by providing a personalized learning experience, tailored to the individual needs of students and their learning styles. Intelligent tutor systems can offer tailor-made support and feedback to students, helping them develop according to their learning speed. Virtual assistants supported by AI can provide immediate answers to student questions and help them solve problems. (Zhai et al., 2021).

The benefits of AI in education include improved efficiency and effectiveness of teaching and learning processes, enhanced analysis of student behavior patterns, and the ability to reveal insights for personalized instruction. (Knox, J. 2020). AI also has the potential to support teachers by automating administrative tasks, allowing them to focus more on teaching activities.

Overall, the development of AI in education has a rich history, starting from its initial foundations in the 1950s. This evolution has led to applications that can enhance teaching and learning processes, personalize education, and support teachers in their work. With continued technological advances, AI can play a more significant role in education in the future (Knox, J. 2020). So, with this era of rapid technological development, artificial intelligence has become an increasingly important topic in a variety of fields, including education. (Ouyang, F., & Jiao, P. 2021). AI can refer to systems and technologies designed to mimic human intelligence and perform tasks that previously only humans could do. Used in educational context, it can improve learning efficiency, provide a personal and adaptive learning experience, and support teachers and students in achieving learning goals.

1) Personalized learning: AI can analyze student performance data and provide a personalised learning experience. AI can identify the strengths and weaknesses of each student, allowing teachers to customize learning according to their needs. 2) Intelligent guidance: AI-supported learning systems can simulate human interaction and provide immediate feedback to students. These systems can help students understand complex concepts and help them overcome challenges in the learning process. 3) Automatic assessment: AI can automate the assessment process, saving time and effort for teachers. AI can evaluate duplicate choices, essays, and other tasks, providing objective and consistent assessment. 4) Intelligent Content Creation: AI can create content and learning resources automatically, making it easier for teachers to create interesting and relevant materials. It includes the creation of lesson plans, quizzes, and interactive exercises. 5) Enhanced Accessibility: AI can provide support for students with special needs. AI can help in voice recognition, text-to-voice conversion, and other tools that facilitate learning for students with disabilities. 6) Data analysis: AI can analyze large amounts of educational data to identify patterns and trends that can be used in decision-making. This includes predicting student performance, identifying areas that require intervention, and improving overall educational outcomes (Ouyang, F., & Jiao, P. 2021; Huang et al., 2021).

However, in the application of AI in education, it is necessary to understand and evaluate the wider impact that may arise, especially in relation to justice and equality in education. (Huang et al., 2021). Education equality is essential to creating equal access to

quality education for all individuals, regardless of social, economic or other backgrounds. Therefore, an assessment of the impact of AI on educational equality becomes extremely relevant and essential to ensure that the application of AI in education does not increase the educational gaps that have already existed. (Chen et al., 2022; Hwang et al., 2020).

This research aims to investigate and evaluate the impact of artificial intelligence on educational equality. In this study, it will be analyzed how AI has been applied in the educational environment and whether such application can really promote equality and reduce gaps in learning outcomes. In addition, the research will also explore the potential challenges that may arise with the use of AI in education and how such challenges can be overcome to ensure better educational justice.

This research is important because it can provide a deeper understanding of the implications and impact of the use of AI in education on educational equality. It is expected to serve as a reference point for decision-makers in designing inclusive and equitable education policies. In addition, it is also expected to contribute to the development and improvement of AI use in the context of more equitable and sustainable education.

Thus, this research will provide a better insight and understanding of how artificial intelligence can contribute to educational equality, as well as the challenges and benefits associated with its use.

Research Method

The method of research carried out in this research is literature. Literature research method is an approach to researching and analyzing various literary sources related to a particular research topic (Bungin, 2001; Moleong, 2007). Literary research enables researchers to gather and use existing knowledge to develop a better understanding of research topics. (Arikunto, 2013; Reay, 2014). This method involves the search, collection, identification, and analysis of various literary sources, including books, journal articles, research reports, and other relevant sources. (Graue, 2015; Sgier, 2012).

Researchers, in conducting literary research, use methods; keyword search, selection and selection, reading and analysis, synopsis and concept mapping, synthesis and interpretation, critical evaluation, and writing and reporting (Noble & Smith, 2014; Grbich, 2012).

Result and Discussion

Applications of AI in education

The goal of computer science's artificial intelligence (AI) field is to build computer systems that are able to carry out activities that call for human intelligence. 2019's Pedro et al. Artificial intelligence (AI) systems enable computers to "learn" from data, spot patterns, and make judgments automatically. These systems use techniques including machine learning, natural language processing, and computer vision. Artificial Intelligence has been

implemented in numerous domains, such as natural language processing, industrial automation, trip scheduling, and facial recognition. (M. A. Chaudhry & E. Kazim, 2022).

Artificial intelligence (AI) is closely related to education so it is not apart from the history that encompasses it. Here are some important points in the history of the use of AI in education, among them; first, the 1960s: In 1967, Weizenbaum created an ELIZA computer program that could conduct simple conversations with users. Although it is not a specialized application of education, ELIZA paves the way for the development of technology related to human-machine communication. Second, the 1970s: In 1973, the MYCIN program was developed to help in the diagnosis of disease. Although not directly related to education, this work shows the potential of AI in supporting decision-making. Third, the 1980s: AI research is growing and is beginning to be applied in education, especially in the development of AI tutoring systems that can help students learn independently. Fourth, the 1990s: The development of computer technology and artificial intelligence is increasingly enabling more sophisticated AI applications in education. AI tutoring systems, automated evaluation, and personalized learning are the focus of development. Fifth, the 2000s to the present: AI applications in education are increasingly widespread, including in learning personalization, virtual tutors, automated evaluation, and educational data analysis. More edtech platforms and applications that use AI technology to enhance learning experiences (Chaudhry, M. A., & Kazim, E. 2022; Ouyang, F., & Jiao, P. 2021).

The role and possibility of applying AI to education is expanding along with technological advancements, with the goal of enhancing student management, learning efficacy, and overall educational quality.

As technology develops, the use of AI (Artificial Intelligence) in education has grown in popularity. AI has a wide range of uses that can improve and assist learning, increasing its usefulness and efficiency (Ouyang, F., & Jiao, P. 2021).

Here are some examples of how AI is applied in education: 1) Virtual Mentors: AI-supported virtual mentors can provide personalized guidance and support to students, helping them in the learning process. 2) Learning Materials Creation and Lesson Planning: AI Tools can help teachers in creating learning materials and designing a lesson plan, making the process more efficient and tailored to individual needs of students. 3) Adaptive Learning: A platform supported by AI can customize learning material and methods based on individual student progress, ensuring a personalized learning experience. 4) Intelligent Tutor Systems: A AI-backed tutor system can provide interactive and personalized mentoring for students, offering feedback and direct guidance. 5) Automatic Assessment and Feedback: AI can automate the assessment process, save teacher time and provide timely feedback to students. 6) Data Analysis and Predictive Analysis: AI algorithms can analyze large amounts of educational data to identify patterns, trends, and insights that can help improve educational outcomes. 8) Natural Language Processing: AI-supported language processing tools can help in language learning, provide speech feedback and language practice (Chen et al., 2022; Joshi et al., 2021).

These are just a few examples of how AI is applied in education. As technology continues to evolve, AI has the potential to revolutionize the education system and improve learning outcomes for students.

AI for education equality

Education equality refers to the principle that recognizes that every individual has an equal right to quality education, regardless of background or other personal differences. Equality education is generally provided through non-formal education, which provides educational services to individuals who cannot access or attend formal education such as school education. (Sutisna, A. 2016; Sitopu et al., 2024; Guna et al., 2024).

Equality education offers programmes such as Package A Programme equivalent to basic education (SD), Package B Programme equal to primary secondary education (SMP), and Package C Programme corresponding to secondary higher education (SMA). These programmes aim to improve the academic capabilities, skills, and attitudes of learners in a holistic way. (Nurson, N. L. 2024; Hairiyanto et al., 2024).

Equality education becomes an option for those who do not have the opportunity or access to formal education, such as those who have left school or never had the opportunity to attend school. (Febriani et al., 2023).

The use of artificial intelligence or Artificial Intelligence (AI) in education can have a significant effect on educational equality. AI can play an important role in improving the quality and accessibility of education at the global level (Yang et al., 2021). Often, equality in education is not achieved due to economic gaps, time slopes, distances, and accessibility in educational institutions. However, with the use of AI, students no longer have to follow a study schedule that is consistent with their fellow students. AI can improve their individual learning experiences, because it is able to recognize different learning data and behaviors. (Pedro et al., 2019).

AI can also help address equality gaps in accessibility or geographical location. With distance learning via the Internet, online tests, and AI used to set schedules for example, students who are away from campus or remote areas can access quality education just like students in urban areas. (Huang et al., 2021).

However, there are also some concerns about the use of AI in education that could exacerbate the inequality. Inappropriate use of AI can lead to bias in data and test results. If the data used to develop the algorithm does not represent a large enough population, or the data already includes differences in adverse access to education, then the results that appear may not really represent the ability of the student. (Alam, A. 2021).

In order to use AI to enhance educational equality effectively, advanced research is needed to find ethical values in the use of technology and to identify situations in which use of artificial intelligence can have adverse effects on the most vulnerable students.

Theoretical perspectives on education equality and AI

Theoretically, perspectives on the equality of education and the use of Artificial Intelligence (AI) in education can be studied from a variety of theories and concepts. Some relevant theoretical prospects include: 1) The Theory of Education Equality: The theory of education equality examines the factors that influence access, participation, and educational outcomes. The use of AI in education may be analyzed from the perspective of the theories of educational equality to see whether these technologies can help reduce educational disparities between different groups. 2) Critical Theory: The critical perspective in education emphasizes the importance of understanding the structure of power, inequality, and disparities in the education system. In the context of the use of AI, it is important to analyse how this technology can affect the distribution of power and access to education. 3) AI Based Learning Theory: AI-based learning theory studies how AI can be used to recognize student learning styles, provide personalized feedback, and design learning experiences that fit individual needs. This can be seen in the context of improved educational equality by emphasising more equal access to education, and reducing learning disparities. 4) Ethics and Justice Theory: A theoretical perspective on ethics and justice can help in evaluating the impact of the use of AI in education from a moral and justice perspective. Ethical analysis such as equality of access and fair treatment can be applied to discuss the implications of using AI in the context of education. (Arruda, E. P., & Arruda, D. P. 2024; Li, H. 2023).

By understanding these various theoretical perspectives, research and implementation of AI in education can be analyzed in greater depth to understand how this technology can contribute towards achieving greater educational equality or leading to greater inequalities.

Evaluation of the impact of AI on educational equality

Evaluation can be defined as a systematic and comprehensive process carried out to assess, measure, and evaluate the performance, effectiveness, efficiency, and impact of an activity, programme, project, or policy. The objective of the evaluation is to gain an in-depth understanding of the extent to which a programme or activity has achieved its objectives, to which extent it is running according to the plan, as well as to provide insights that can be used to improve or make decisions about the programme in the future (Arifah, I. 2023). The evaluation can be carried out using various methods and techniques, such as surveys, interviews, observations, data analysis, and policy analysis. The results of evaluations are used to provide objective and measurable information to stakeholders about the performance of the program or activity, and provide a basis for better decision-making. (Supriadi et al., 2022).

When evaluating the use of AI in improving educational equality, there are a number of things to bear in mind: 1) The effectiveness of AI Technology: An evaluation should be made of how effective AI is in achieving the goals of improving education equality. Empirical

research can be carried out to measure the impact of using AI in enhancing accessibility, quality, and learning outcomes. This evaluation may involve collecting data before and after the implementation of AI to compare the differences that occur. 2) Ethics and Justice: An evaluation should be made of the ethical and fairness aspects of the use of AI in education. Questions to be answered include: Does this technology strengthen inequalities or equalize access to education? Is there a gap in accessibility to AI technology? 3) User Participation and Perception: Measuring the participation and perception of users such as students, teachers, and parents is also important. Evaluations can be done through surveys or interviews to find out their views on the use of AI in education, whether they feel more empowered or whether there are barriers to overcome. 4) Sustainable Monitoring and Improvement: Evaluations need to be carried out continuously to monitor the impact of the use of AI in improving educational equality. In this process, findings and input can be used to make improvements to the implementation of AI, identify areas that still need improvement, and ensure that this technology is always relevant to the needs of students and educators. (Supriadi et al., 2022; Masrichah, S. 2023; Pebrian, Y., & Farhat, M. F. 2023).

These evaluations need to be conducted in a comprehensive manner to gain a clearer understanding of the effectiveness, fairness, and impact of the use of AI in improving educational equality. Continuous evaluations are also important to identify new challenges that may arise as technology changes and increase the efficiency of using AI in achieving education equity. (Pebrian, Y., & Farhat, M. F. 2023).

The impact of AI evaluation in an educational context can be very significant, and some of its impacts include: 1) Improving Learning Efficiency: AI evaluations can help measure the effectiveness of AI technologies in improving learning processes, providing personalized feedback, and designing learning experiences that fit individual needs. 2) Facilitating Curriculum Development More Relevant: AI assessments can help in analyzing learning data to see trends and patterns in student needs, so that curricula can be developed accordingly and more relevant. 3) Reducing Learning Gaps and Gaps: AI evaluating can help identify gaps in learning and provide insights to address educational equality issues. By analyzing data, AI can help identify areas where differences in learning performance may occur. 4) Promote Education Personalization: AI Evaluation can help in understanding individual student learning styles, needs, and preferences. It can help teachers and educational institutions in designing personalized learning experiences for each student. 5) Monitoring the Teaching and Learning Process: AI evaluation can help in monitoring and analyzing the interaction between teachers and students, providing insights into effective teaching practices, and improving certain aspects of the learning process. (Rukmana et al., 2023; Khoirunnisa, W., & Najicha, F. U. Tth; Rifky et al., 2024)

By using AI evaluation effectively, educational institutions can leverage this technology to improve learning effectiveness, improve educational equality, and help students reach their learning potential to the maximum.

Conclusion

The conclusion of the evaluation of the impact of artificial intelligence (AI) on educational equality is as follows: 1) AI can play an important role in improving accessibility and equality of education. Using AI technology, programmes and learning platforms can be designed to cover a wide range of student needs from different backgrounds and abilities. This can help reduce access gaps and provide equal opportunities for all students. 2) AI can support educational personalization. By using AI evaluation, student needs and preferences can be better understood, so that learning experiences can be personalized to suit the needs of each student. This will help students to learn more effectively and at their own pace. 3) AI evaluation can help identify and overcome bias in education. Through constant evaluation of algorithms and data used in AI development, bias that may occur can be detected. Thus, fair and equal education can be guaranteed for all students. 4) AI evaluation is also important to monitor the effectiveness of the use of AI in achieving the goal of educational equality. By involving stakeholders, such as students, teachers, and parents, these evaluations can help in understanding user perceptions and experiences so that continuous improvement can be made.

In conclusion, assessments of the impact of artificial intelligence on educational equality reveal great potential and benefits for improving accessibility, personalization, and equality of education. However, comprehensive evaluations, stakeholder participation and sustained monitoring are needed to ensure effective and equitable implementation of AI in the educational context.

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