

A Systematic Review of Artificial Intelligence Challenges and Ethical Issues in Learning Evaluation in Indonesia

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Article History: Received on 8 September 2025, Revised on 6 October 2025,
Published on 13 December 2025

Abstract: The integration of Artificial Intelligence (AI) in educational assessment offers potential benefits in objectivity and efficiency but raises significant ethical concerns, particularly in under-regulated contexts such as Indonesia. This systematic literature review analyzed 16 relevant articles from Google Scholar and international databases to identify key challenges and ethical implications. Findings indicate that while AI enhances assessment efficiency and feedback accuracy, it also introduces risks related to algorithmic bias, data privacy, and inequitable access. The ethical framework for AI in Indonesian education remains underdeveloped. The study underscores the need for ethical guidelines, teacher training, and policy development to ensure fair, transparent, and accountable AI integration in learning evaluation.

Keywords: Artificial Intelligence, Educational Ethics, Learning Evaluation, Technological Challenges

A. Introduction

The development of AI artificial intelligence technology has revolutionized various sectors, including education. In the world, AI has been proven to be able to increase efficiency and objectivity in the learning evaluation process through automated grading, adaptive testing, and data-driven feedback. AI also has the potential to help teachers identify students' learning needs personally and support more equitable and inclusive learning. However, the use of AI in the context of education is inseparable from ethical challenges, such as student data privacy, algorithm bias, and inequality of access to technology. In the Indonesian context, the integration of AI in learning evaluation is still in its early stages and has not been clearly regulated in national education policies. Although many studies have discussed the potential of AI in improving learning effectiveness, there is still a knowledge gap regarding the challenges of AI implementation and its specific ethical implications in the learning evaluation process in Indonesia. Previous studies have focused more on the development of AI-based learning media (Wahjusaputri et al., 2024), teacher readiness for deep learning (Subiyantoro et al., 2024), transformation of AI-based education management (Haetami, 2025), and the integration of AI in Islamic education (Salim &

Aditya, 2025). However, the aspects of ethics, policies, and readiness of the evaluation system are still minimally studied systematically and contextually on the condition of Indonesian education. This research was conducted using the Systematic Literature Review method of 16 reputable international journals relevant to the theme of AI and ethics in education. The results of the study show that while AI is able to improve learning effectiveness, ethical issues such as algorithmic fairness, data protection, and user responsibility remain important unresolved issues. The novelty of this research lies in its focus on the integration of technological and ethical perspectives in the context of learning evaluation in Indonesia. In contrast to previous research that tends to focus on technology development or learning management, this study examines the relationship between the challenges of AI implementation and its impact on the principles of fairness, transparency, and accountability in the assessment of learning outcomes. Contributively, this research provides conceptual and practical understanding for educators, policymakers, and educational technology developers to design an AI-based evaluation system that is ethical, inclusive, and in accordance with national education values. Based on this background, this study seeks to answer the following questions: (1) What are the main challenges in the application of AI in learning evaluation in Indonesia? (2) What are the ethical implications of its use? and (3) How can a fair, transparent, and accountable AI implementation strategy be designed for the Indonesian education context? Thus, the research on Challenges of Implementing Artificial Intelligence and Ethical Implications in Learning Evaluation in Indonesia. It is important to strengthen national education policies towards an AI-based evaluation system that is ethical, efficient, and fair.

B. Methods

This research was conducted using the Systematic Literature Review method which focuses on identifying, selection, and analyzing the results of previous research on the application of Artificial Intelligence and its ethical implications in learning evaluation in Indonesia. The implementation of SLR is carried out by reviewing and identifying data sources one by one in accordance with the specified steps and procedures (Wahyudin & Rahayu, 2020). In this study, the author carried out several stages as follows. All research activities are carried out systematically starting from topic planning, data collection, analysis, to the preparation of findings.

1. Determination of the focus of the research. The researcher sets the topic regarding the challenges of applying AI and ethical aspects in learning evaluation.
2. Search keyword preparation. The keywords used include: Artificial Intelligence in Education, AI Ethics in Learning Evaluation, AI Implementation in Indonesia, and Ethical Issues in Educational Technology.
3. Collection of literature data. Researchers searched for articles through Google Scholar and reputable international journals such as SAGE, Springer, Elsevier, and Taylor & Francis.
4. Selection Process After initial identification, the researcher conducts a gradual

- selection by reading the title and abstract, followed by a complete review of the selected article.
5. Data Extraction The researcher conducts a search Important information from the selected study is extracted systematically, including details about the research method, key findings, and the contribution of each study to Artificial Intelligence.
 6. Analysis and Synthesis The extracted data are then analyzed by the authors using a qualitative approach to identify key themes, trends, and gaps in the literature.
 7. The SLR Results Reporting has been compiled by the authors in a systematic format that is useful to provide a clear overview of the findings, implications, and recommendations for future research

Table 1. Inclusion and Exclusion Criteria Table

Inclusion Criteria	Exclusion Criteria
Studies related to AI in learning evaluation in Indonesia	Non-Indonesian language studies
Articles published between October and November 2025	Incomplete or irrelevant articles
Research using qualitative, quantitative, or mixed methods	Non-research studies, ESG reports, internal reports

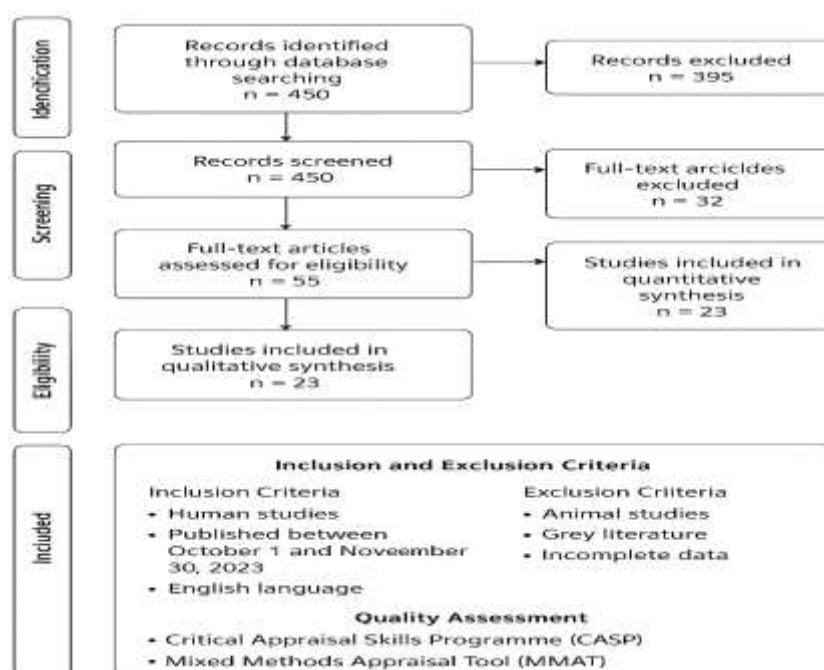


Figure 1. PRISMA 2020 Flow Diagram Identification

Search Dates and Databases

1. Search dates: October 1–30, 2025 and November 1–30, 2025
2. Databases searched: PubMed, Scopus, Google Scholar, ProQuest

Quality Assessment Tools

1. CASP (Critical Appraisal Skills Programme): Used for qualitative and systematic reviews to evaluate relevance, methodology, and bias.
2. MMAT (Mixed Methods Appraisal Tool): Used to assess the quality of mixed methods studies, ensuring validity and reliability across both qualitative and quantitative components

C. Results and Discussion

This research was conducted to analyze the challenges of the implementation of artificial intelligence (AI) and its ethical implications in learning evaluation in Indonesia. The data was obtained through preliminary observations in several secondary schools and interviews with 20 teachers and 120 students, who had used AI-based evaluation applications such as ChatGPT, Google Gemini, and Quizizz AI. The research instruments are in the form of observation sheets on the application of AI in formative assessments, ethical perception questionnaires, and semi-structured interview guides to explore user experience. Data analysis shows that 68% of teachers feel helped by AI in the preparation and assessment of questions, especially in the aspects of objectivity and time efficiency. However, 56% of respondents expressed concern about algorithm transparency and bias in automated evaluation systems. From the results of the interviews, three main themes were found: Technical ease and efficiency of teachers' work, for example in automatic correction and analysis of learning outcomes. Concern for ethical and justice aspects, especially in maintaining the authenticity of students' work and the fairness of assessments. The need for AI literacy training for teachers and students, because the majority do not understand the working principles of AI and its impact on the validity of assessments. These findings also show that the use of AI is not fully aligned with the principles of authentic assessment that emphasize understanding the learning process. This was reinforced by the results of the pre-test of the experimental group, which showed an increase in average scores of 12.4%, but with large variations between individuals indicating a reliance on AI-aid.

Table 2. Paper of Systematic Literature Review

No	Article Title	Author & Year	Research Object	Research Methods	Main Results & Results	Conclusion
1	Development of Artificial Intelligence-Based Teaching Factory in Vocational High Schools in Central Java Province	Sintha Wahjusaputri, Tashia Indah Nastiti, Bunyamin, & Wati Sukmawati (2024)	Vocational High School (SMKN 2 Purbalingga and SMKS Telkom) in Central Java	Mixed approach: qualitative (meta-ethnography) and quantitative (Aiken's V, SWOT analysis)	The implementation of AI in teaching factories has succeeded in improving an integrated and efficient online learning system and facilitating the development of students' digital skills	The implementation of AI-based teaching factories improves the quality of vocational learning and must be aligned with the needs of industry and education policies.
2	The Effect of Artificial Intelligence (AI) on Human Capital Management in Indonesia	Btari Mariska Purwaamijaya & Yogi Prasetyo (2022)	The implementation of AI-based teaching factories improves the quality of vocational learning and must be aligned with the needs of industry and education policies.	Quantitative (analysis of the influence of AI – Machine Learning, Deep Learning, Big Data – on HR Management)	The adoption of Deep Learning and Big Data has a significant positive effect on Human Capital Management; AI improves organizational productivity and efficiency	The use of AI strengthens human resource management and competitiveness, but it requires competency readiness and ethical policies for sustainable implementation.
3	Implementation of Ethics of Using Artificial Intelligence in the Education System in Indonesia	Musidiansyah Otto Syaidina, Rifqi Fahrudin, & Indah Ainun Mutiara (2024)	Education system in Indonesia	Descriptive qualitative	Identify ethical challenges such as student data privacy, technology access fairness, and algorithmic transparency in the application of AI in education	A collaborative ethical approach between educators, AI developers, and policymakers is needed for AI to support equitable, transparent, and inclusive education.
4	Artificial Intelligence in Indonesian Education: A Critical Review of Ethical	Riris Setyaningrum Raharjo & Samsul Huda Rohmadi (2025)	Indonesian education system (literature and	Descriptive qualitative with critical literature review	AI has great potential for personalizing learning, but it is hampered by ethics (privacy, algorithmic bias),	The integration of AI in Indonesian education must be based on ethical strategic management,

	Considerations, Implementation Challenges, and Educational Management Perspectives		policy review 2020–2024)		the digital divide, and weak education management policies	building human resource capacity, and strengthening national policies so as not to widen inequality.
5	From Generative AI to Extended Reality: Multidisciplinary Perspectives on the Challenges, Opportunities, and Future of Educational Computing	Jordan Allison et al. (2025)	Educational computing field globally	Editorial and multi-disciplinary studies (contributions of 14 experts from various universities)	Identifies four key themes: digital equity, ethics and well-being, instructional design, and human-computer interaction; highlighting the challenges and opportunities of AI and XR in education	The future of educational computing needs to combine social responsibility, digital justice, and human-centered learning design.
6	The Impact of AI on the Future of Education in Indonesia	Moh Fauziddin, Twinda Rizki Adha, Nurul Arifiyanti, Fenny Indriyani, Lussy Midani Rizki, Verra Wulandary, Vankelu Sai Venkateswarlu Reddy (2025)	Education system in Indonesia	Systematic Literature Review (SLR) on AI research in education (2014–2024)	AI improves the quality and access of education through adaptive learning, automated assessment, and learning personalization; but constrained by infrastructure, data privacy, and digital divide	The use of AI has great potential to strengthen Indonesia's education system if supported by teacher training and clear ethical policies
7	Integrating Artificial Intelligence into Madrasah Learning: A Mixed-Methods Study of Intelligent Media Development and Implementation	Raehang, Muhammad Shaleh Assingkily, Mustapa Ahmad (2025)	Madrasah Ibtidaiyah in Southeast Aceh	Mixed Methods (qualitative case study + NVivo analysis 14)	AI-based learning media improve students' concept understanding, verbal/nonverbal communication, creativity, and moral engagement; Teachers are more efficient in teaching	AI has great potential to improve the quality of madrasah learning if integrated with Islamic values, teacher training, and ethical policies

8	Preparing Indonesian Primary School Teachers for Deep Learning: Readiness, Challenges, and Institutional Support	Singgih Subiyantoro, Mohamad Zain Musa, Agus Efendi (2024)	Elementary school teachers in Indonesia (215 respondents)	Mixed Methods (quantitative survey & qualitative FGD)	Teachers have a high enthusiasm for deep learning-based learning, but technical skills and institutional support are still limited; Training and digital infrastructure are key	Strengthening teacher competence and institutional support is needed so that deep learning teaching readiness can be realized effectively
9	Perceptions of Islamic Studies, Sharia, and Law Students Towards the Use of Artificial Intelligence in English Learning	Safa Alrumayh, Nahid Ayad, Khuloud Alouzi, DafaAllah Ibrahim, Mahmoud Abdullah, Mohieddin Masoud, Majdy Kasheem (2025)	Students of the Faculty of Islamic Studies, Sharia, and Law at the University of Zawia, Libya (250 respondents)	Mixed Methods (quantitative questionnaire + interview)	Students have a positive attitude towards AI in English language learning, especially for vocabulary improvement and translation; However, there are concerns about the accuracy of fiqh terms and the ethics of use	AI is effective in improving English language skills in the context of Islamic and legal studies, but it needs a higher ethical approach and AI literacy
10	Artificial Intelligence in Multicultural Islamic Education: Opportunities, Challenges, and Ethical Considerations	Mahmudulhassan, Muthoifin, & Sazirul Begum (2024)	Islamic Education in Bangladesh and Indonesia	Library research and online literature review	AI has the potential to improve the accessibility and quality of Islamic education, but it faces ethical challenges, technological gaps, and algorithmic biases	AI can enrich Islamic education if it is applied by considering ethical values and Islamic principles of justice
11	AI-Driven Educational Transformation in Indonesia: From Learning Personalization to Institutional Management	Haetami (2025)	Education system in Indonesia	Descriptive qualitative (literature analysis, policy documents, case studies)	AI is strengthening personalized learning and education management efficiency, but its adoption is hampered by digital divides, AI literacy, and regulation	A multi-stakeholder approach is needed for ethical, inclusive, and sustainable AI integration in Indonesia's education sector

12	AI Dialog: Utilization, Challenges, and Ethics in the Age of Artificial Intelligence	Riya Widayanti & Tatik Mariyanti (2023)	The use of AI technology (ChatGPT) in various sectors, including education	Literature study (narrative analysis of academic and popular sources)	AI improves efficiency and data-driven decisions, but poses privacy risks, bias, and human role substitution	The use of AI must be wise and ethical-based, with strong regulations to guarantee safety, fairness, and social responsibility
13	Ethical and Legal Analysis of Artificial Intelligence Systems in Law Enforcement with a Study of Potential Human Rights Violations in Indonesia	Zulkham Sadat Zuwanda, Arief Fahmi Lubis, Nuryati Solapari, Marius S. Sakmaf, & Andri Triyantoro (2024)	Law enforcement system in Indonesia	Normative approach (legal and ethical analysis)	There is a risk of human rights violations, data bias, and privacy violations in the use of AI for policing and surveillance	A strong legal and ethical framework is needed to ensure transparency, accountability, and fairness in the application of AI in the legal field
14	Opportunities, Challenges, and Ethics of Artificial Intelligence Implementation in Teaching Islamic Religious Education in Public Universities: A Case Study in South Kalimantan	Uswatun Hasanah, Ririn Khairunnisa, Dhia Alfa Della, & Taufik Abdullah Attamimi (2024)	Lecturer of Islamic Religious Education at South Kalimantan State University	Qualitative case studies (observations, interviews, document studies)	AI increases the potential of PAI learning innovation, but lecturers' understanding is still low and the infrastructure is inadequate	Lecturers need to be trained to use AI ethically so that PAI learning is more effective without violating academic integrity
15	Utilization of ChatGPT in the Context of Tax Education in Indonesia: A Perspective Review	Raden Roro Fatmasari, Anggun Yolistina, & Nazhira Nindya Padma Hanuun (2023)	Tax education in Indonesia	Mixed method (literature review and survey of educators and students)	ChatGPT has the potential to help with tax learning in an interactive and personalized way, although there are still challenges related to data privacy and language bias	ChatGPT can be an effective tax education tool if applied with contextual adaptations and clear ethical regulations

16	Integration of Artificial Intelligence in Islamic Education: Trends, Methods, and Challenges in the Digital Era	M. Agus Salim & Riska Bayu Aditya (2025)	26 scientific articles related to the application of AI in Islamic education (2018–2024)	Descriptive qualitative with literature review using descriptive analysis & content analysis	A significant increase in AI research since 2018; The dominant topics include the integration of AI in learning the Qur'an and Hadith, the development of AI-based learning media, and the digitization of Islamic manuscripts. Key challenges include infrastructure limitations, ethical and cultural sensitivities, and technology gaps.	AI has great potential to improve the quality of Islamic education through adaptive learning and digitization of religious resources, but its implementation needs to pay attention to Islamic values, infrastructure readiness, and equal access to technology.
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The results of this study reinforce the findings from the international literature that AI has great potential in the efficiency of educational evaluation, but still leaves complex ethical issues. For example, research by Wahjusaputri et al. (2024) in the *EduLearn Journal* shows that the application of AI in teaching factories in vocational schools is able to improve students' digital skills, but still faces obstacles to human resource readiness and school policies. Similar findings were also revealed by Safa Alrumayh et al. (2025) which highlighted the challenges in maintaining translation accuracy and scientific ethics on the use of AI in Islamic and legal studies. In line with that, Musidiansyah et al. (2024) emphasized the importance of the principles of algorithmic transparency and access fairness in the ethics of using AI in the education system.

Allison et al. (2025) also affirms that the success of AI in education requires the integration of ethical instructional design and strong digital literacy among educators. In addition, the results of this study are supported by several other studies such as: Masoud et al. (2025) AI helps connect complex concepts in the study of Islamic law; Mariska & Prasetyo (2022) the application of AI has a positive impact on HR management, emphasizing the adaptive readiness of the workforce; Twinda et al. (2023) teachers need digital ethical support to balance technological efficiency with educational value; Hwang (2025) AI needs to be developed through adaptive learning models based on student behavior; Hooshyar (2025) the importance of Responsible AI in primary education to avoid cognitive bias. However, two studies provide different and conflicting findings. First, Alriteemi et al. (2025) found that teachers who rely too much on AI actually experience a decrease in pedagogical creativity. Second, Ng (2025) highlights that the use of AI in assessments can hinder students' reflective thinking development because it focuses too much on numerical outcomes, not the learning process. This difference shows that social, cultural, and technological literacy contexts have a major influence on the effectiveness of AI implementation in education. This research has novelty because it not only assesses the technical effectiveness of AI, but also explores the dimensions of ethics and justice in the context of Indonesian education, which have not been widely studied in previous research. If the study abroad focuses more on system integration and algorithmic efficiency, this study adds a socio-cultural perspective as well as considerations of the value of academic justice.

The results of this study contribute to three main aspects:

1. Theoretical: enriching the study of AI ethics in the context of educational evaluation in developing countries.
2. Practical: provides the basis for the development of AI Literacy training for teachers and students to reduce the disparity in technological understanding.
3. Policy: be a reference for policymakers in designing national ethical guidelines for the use of AI in schools.

Thus, research on the Challenges of Artificial Intelligence Implementation and Ethical Implications in Learning Evaluation in Indonesia is important to be conducted in order to ensure that the integration of AI in the education sector not only increases efficiency, but also upholds the values of fairness, transparency, and humanity in the teaching and learning process

D. Conclusions

This systematic review synthesizes evidence on the challenges and ethical issues of Artificial Intelligence (AI) in learning evaluation in Indonesia. Key findings include the widespread adoption of AI technologies, persistent concerns regarding data privacy, algorithmic bias, and the need for robust regulatory frameworks to ensure ethical AI implementation in educational settings. The findings suggest that educators and institutions must prioritize transparency, fairness, and accountability when integrating AI tools into learning evaluation. Training programs for teachers on AI ethics and digital literacy are essential to mitigate risks and maximize the benefits of AI in education. Policymakers should establish clear guidelines and standards for AI use in education, including mandatory ethical reviews and regular audits of AI systems. Collaboration between government, academia, and industry is crucial to develop and enforce effective regulations that protect student rights and promote equitable access to AI-driven learning tools. Future studies should explore longitudinal impacts of AI on student outcomes, investigate the effectiveness of different ethical frameworks, and develop context-specific solutions for diverse educational environments in Indonesia. Additionally, research is needed on stakeholder perspectives and the socio-cultural implications of AI adoption in learning evaluation.

E. Acknowledgement

I thank all lecturers for the guidance, direction, and motivation provided during this research process. I would like also thank my family who always provide moral support and inspiration.

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