

Ethical and Digital Literacy Challenges in the Utilization of Artificial Intelligence in Pancasila Education: A Systematic Literature Review

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Abstract

The rapid expansion of artificial intelligence (AI) in education includes its use in Pancasila Education, which emphasizes values, character, and citizenship. While AI offers opportunities for innovative learning design, it also raises ethical and digital literacy challenges. This study aims to systematically review research on these challenges. A Systematic Literature Review (SLR) method following PRISMA guidelines was employed. Relevant articles were selected from national and international databases using predefined criteria and analyzed through thematic synthesis. The findings reveal key challenges, including teachers' dependence on AI, potential algorithmic bias in value representation, weak content verification, and the risk of dehumanizing learning processes. Additionally, teachers' digital literacy levels significantly influence responsible AI use. Limited understanding of digital ethics often leads to pragmatic use that neglects reflective value internalization. This study concludes that strengthening ethical awareness and digital literacy is essential to ensure responsible AI integration aligned with Pancasila values and humanistic education principles.

Keywords: Artificial Intelligence, Digital Ethics, Digital Literacy, Pancasila Education.

Abstrak

Perkembangan pesat kecerdasan buatan (AI) dalam pendidikan mencakup penggunaannya dalam Pendidikan Pancasila, yang menekankan nilai-nilai, karakter, dan kewarganegaraan. Meskipun AI menawarkan peluang untuk desain pembelajaran yang inovatif, AI juga menimbulkan tantangan etika dan literasi digital. Studi ini bertujuan untuk meninjau secara sistematis penelitian tentang tantangan-tantangan ini. Metode Tinjauan Literatur Sistematis (SLR) yang mengikuti pedoman PRISMA digunakan. Artikel-artikel yang relevan dipilih dari basis data nasional dan internasional menggunakan kriteria yang telah ditentukan dan dianalisis melalui sintesis tematik. Temuan menunjukkan tantangan utama, termasuk ketergantungan guru pada AI, potensi bias algoritmik dalam representasi nilai, verifikasi konten yang lemah, dan risiko dehumanisasi proses pembelajaran. Selain itu, tingkat literasi digital guru secara signifikan memengaruhi penggunaan AI yang bertanggung jawab. Pemahaman yang terbatas tentang etika digital seringkali menyebabkan penggunaan pragmatis yang mengabaikan internalisasi nilai reflektif. Studi ini menyimpulkan bahwa penguatan kesadaran etika dan literasi digital sangat penting untuk memastikan integrasi AI yang bertanggung jawab yang selaras dengan nilai-nilai Pancasila dan prinsip-prinsip pendidikan humanistik.

Kata kunci: Kecerdasan Buatan, Etika Digital, Literasi Digital, Pendidikan Pancasila.



INTRODUCTION

The use of artificial intelligence (AI) in education has developed rapidly alongside the increasing availability of learning data, advances in computational capacity, and the proliferation of algorithm-based applications capable of providing recommendations, automating assessment, and personalizing learning. In a systematic review of AI in higher education, Zawacki-Richter et al. (2019) demonstrate that research on Artificial Intelligence in Education (AIED) encompasses a wide range of functions, including intelligent tutoring systems, learning analytics, and decision-support systems. Nevertheless, the review also highlights the persistence of fundamental questions regarding pedagogical impacts and the position of educators within AI-based learning ecosystems. More recent state-of-the-art reviews of AIED add that AI is often promoted as a solution for improving learning efficiency and effectiveness; however, the pedagogical assumptions embedded in the design of AI systems must be critically examined to prevent educational objectives from shifting toward mere performance optimization and technical outcomes (Holmes et al., 2022b). Thus, the adoption of AI in education is not solely a technological issue but also a value-laden one, concerning what knowledge is considered important, who benefits, and how human–technology relationships are shaped in the learning process.

The need for a critical examination of AI utilization becomes increasingly salient when this technology is applied to value-based education, including Pancasila Education. Pancasila Education is distinctive in its orientation toward value internalization, character formation, and the strengthening of citizenship competencies. Value-based learning requires reflective, dialogical, and humanistic processes; its success is not measured merely by cognitive achievement, but by meaning-making, attitudes, and the practice of virtues in social life. At this point, a fundamental dilemma emerges: AI operates on data patterns and probabilistic models, whereas value education requires moral judgment, cultural context, and sensitivity to human experience that cannot always be reduced to structured data. When AI is used primarily as a “quick-answer” tool—for example, to summarize value-laden content, construct moral arguments, or generate instant case examples—there is a risk that Pancasila Education shifts from a process of meaning-making to one of information consumption, thereby reducing opportunities for reflection and value internalization.

This dilemma is closely related to ethical challenges in the use of AI. The ethics literature on AIED emphasizes that AI implementation in education raises critical issues such as transparency, accountability, personal data protection, and fairness in the impacts of algorithmic decision-making (Holmes et al., 2022a). In the context of Pancasila Education, issues of fairness and bias are particularly important, as value-related content may be represented unevenly due to dataset bias, model design bias, or bias embedded in information-ranking mechanisms. Comprehensive surveys on bias and fairness in machine learning indicate that bias may stem from unrepresentative data, problematic labeling, or historical biases, ultimately reproducing systemic injustice (Mehrabi et al., 2021). If such biases enter the domain of value education—through historical narratives, social case examples, or representations of particular groups—Pancasila Education risks oversimplifying moral complexity, reinforcing stereotypes, or marginalizing perspectives that should be accommodated within inclusive citizenship education.

Beyond issues of bias, ethical challenges in AI utilization are also associated with the potential dehumanization of learning. The dominant use of AI may encourage educational practices oriented toward output optimization, such as task completion speed or automated assessment, thereby diminishing the quality of empathetic and dialogical educational relationships. In value education, teacher–student relationships, role modeling, and social experiences constitute essential elements of character formation. Therefore, when AI mediates learning processes, it must be emphasized that

such technology should function as a supportive tool that strengthens humanistic approaches rather than replacing them. Ethical frameworks for AIED stress the need for shared principles to guide AI use in alignment with educational goals, including learner protection and the prevention of technological impacts that may exacerbate inequality (Holmes et al., 2022a).

At the same time, the ethical dimension of AI utilization is highly dependent on educators' levels of digital literacy. Digital literacy encompasses not only technical skills in using devices and applications, but also cognitive-critical dimensions—such as the ability to assess information credibility and understand how digital systems operate—as well as socio-ethical dimensions related to awareness of risks, norms, and responsibilities within digital ecosystems. Without adequate digital literacy, AI use tends to be pragmatic: educators employ AI to accelerate instructional preparation, while students use it to complete assignments, yet both lack sufficient capacity to verify accuracy, detect bias, and reflect on the alignment of AI-generated outputs with the values being taught. In the context of Pancasila Education, digital literacy must therefore be understood as a fundamental prerequisite to ensure that AI utilization remains within ethical boundaries and aligned with national values.

A number of studies in Indonesia emphasize that Pancasila functions not only as the philosophical foundation of the state but can also be positioned as an ethical paradigm for responding to digital transformation. Research indicates that Pancasila values are consistent with global ethical principles such as justice, transparency, and humanity, which also constitute the core of various international AI ethics frameworks (Yudiono et al., 2023). In the educational domain, studies on Pancasila Education highlight that learning grounded in Pancasila values plays a crucial role in shaping the digital ethics of younger generations, including critical attitudes toward information, respect for privacy, and responsibility in technology use (Fahriel, 2022; Tinambunan, 2022). Furthermore, the development of digital citizenship education models in Indonesia demonstrates that integrating Pancasila values with principles of technology ethics can provide a conceptual foundation for the formation of responsible digital citizenship (Nasoha, 2024).

Although research on AI, ethics, digital literacy, and Pancasila Education continues to expand, these studies remain largely fragmented. Some focus on the effectiveness of AI technologies, others emphasize ethical risks and algorithmic bias, while research on Pancasila Education tends to prioritize normative and character-based aspects. The absence of a systematic mapping of these findings may result in partial policy recommendations and fragmented educational practices. Therefore, this study adopts a Systematic Literature Review (SLR) approach to comprehensively examine ethical and digital literacy challenges in AI utilization and to synthesize scholarly findings relevant to the development of humanistic, value-based Pancasila Education.

Accordingly, the objectives of this study are to systematically examine: (1) forms of ethical challenges in AI utilization that are relevant to Pancasila Education learning; (2) the roles and challenges of educators' digital literacy in ensuring responsible AI use; and (3) the implications of integrating ethics and digital literacy as prerequisites for AI utilization that aligns with the principles of humanistic education and Pancasila values.

METHOD

This study employs a Systematic Literature Review (SLR) method to systematically examine findings from previous research relevant to the utilization of artificial intelligence in the context of Pancasila Education. The SLR method was selected because it enables researchers to present a comprehensive synthesis of the development of the field, patterns of findings, and existing research gaps (Kitchenham & Charters, 2007; Zawacki-Richter et al., 2019). The systematic review process follows the Preferred Reporting

Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines to ensure transparency and traceability of research procedures (Page et al., 2021).

The research data consist of scholarly articles retrieved from the Scopus, Web of Science, Google Scholar, and Directory of Open Access Journals (DOAJ) databases. The literature search was conducted using combinations of the keywords “artificial intelligence in education,” “ethics of AI,” “digital literacy,” and “Pancasila education,” combined with the Boolean operators AND and OR, as recommended in SLR methodologies (Kitchenham & Charters, 2007).

The article selection process was strictly guided by specific inclusion and exclusion criteria to ensure the relevance and quality of the reviewed literature. These parameters were designed to focus on the intersection of technology and value-based education. The detailed criteria used in this study are summarized in Table 1.

Table 1. Inclusion and Exclusion Criteria for Literature Selection

Criterion Type	Description
Inclusion Criteria	Empirical research articles or conceptual studies discussing AI utilization, AI ethics, digital literacy, or Pancasila Education. Publications released within the last ten years. Availability of full-text access. Published in accredited national journals or reputable international journals.
Exclusion Criteria	Articles irrelevant to the context of value-based education Articles that are non-scholarly in nature. Duplicate articles.

By applying these criteria, the study ensured that only high-quality and contextually appropriate sources were analyzed in accordance with the PRISMA guidelines. This rigorous filtering process was essential to maintain the academic integrity of the systematic review.

The article selection process strictly followed the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) flow to ensure transparency and traceability. In the identification stage, data were retrieved from several reputable databases, including Scopus, Web of Science, Google Scholar, and the Directory of Open Access Journals (DOAJ). The search strategy utilized specific keyword combinations such as "artificial intelligence in education," "ethics of AI," "digital literacy," and "Pancasila education," combined with Boolean operators AND/OR.

Following the initial identification, the screening stage involved evaluating titles and abstracts to filter out duplicates and irrelevant non-scholarly works. The eligibility assessment was then conducted through a comprehensive full-text review based on the predefined inclusion and exclusion criteria. After this rigorous filtering process, a total of 25 scholarly articles were ultimately selected for inclusion in this study. These selected articles were subsequently analyzed using thematic synthesis to identify and categorize the core themes regarding ethical challenges and digital literacy within the utilization of AI in Pancasila Education.

RESULT AND DISCUSSION

As part of the synthesis stage in the Systematic Literature Review (SLR), the articles that had passed the selection process based on the PRISMA guidelines were systematically analyzed and summarized. The following table presents a summary of 25 selected articles relevant to the utilization of artificial intelligence (AI) in education, particularly those addressing issues of ethics, digital literacy, and value-based education. The tabular presentation is intended to facilitate the identification of research patterns, focal areas of study, and key findings that form the basis for further analysis of the challenges and implications of AI utilization in the context of Pancasila Education.

No	Author(s) & Year	Main Findings	Relevance to the SLR on Pancasila Education
1	Zawacki-Richter et al., 2019	The study comprehensively maps AI applications in higher education, highlighting their pedagogical potential in analytics and adaptive learning systems. However, ethical dimensions such as data bias, teacher autonomy, and moral responsibility remain underexplored.	Provides foundational insight and methodological grounding for AI-related SLRs in education.
2	Holmes, Bialik & Fadel, 2022	The authors argue that while AI can optimize instructional processes, it risks diminishing the humanistic aspects of learning, including empathy and moral reflection. They call for frameworks to balance technological efficiency with ethical values.	Reinforces the importance of ethics and human-centered approaches in values-based learning.
3	Holmes et al., 2022	The paper classifies ethical principles in AI education, focusing on fairness, transparency, accountability, and privacy protection. It stresses the need for educational policies that ensure algorithmic justice.	Provides a theoretical ethical framework applicable to Pancasila-based moral education.
4	Mehrabi et al., 2021	This survey identifies sources of bias in machine learning datasets and models that can perpetuate structural inequalities. It emphasizes the necessity of fairness and representational integrity.	Relevant to the justice principles inherent in Pancasila moral education.
5	Ng, 2012	The research conceptualizes digital literacy as encompassing not only technical competence but also critical and ethical understanding. It highlights educators' roles in shaping reflective and responsible digital citizens.	Offers theoretical grounding for digital literacy development among educators.
6	Yudiono et al., 2023	The study links Pancasila values—justice, humanity, and solidarity—to global AI ethics frameworks. It argues that national ideology can serve as a moral compass for technology use.	Strengthens the integration of local ethical values with global AI ethics.
7	Fahriel, 2022	This study shows that Pancasila Education fosters digital ethics and civic responsibility among students through value-based reflection and moral dialogue.	Demonstrates the connection between value education and digital ethics.
8	Tinambunan, 2022	The paper highlights that civic education teachers require ethical digital literacy to guide students in navigating AI-assisted learning responsibly.	Addresses teachers' preparedness to face AI integration in moral education.

No	Author(s) & Year	Main Findings	Relevance to the SLR on Pancasila Education
9	Nasoha, 2024	The study introduces a digital citizenship education model grounded in Pancasila, emphasizing responsible participation and critical awareness in digital spaces.	Serves as a conceptual basis for developing responsible digital citizenship.
10	Kitchenham & Charters, 2007	This foundational guideline outlines systematic review procedures to ensure transparency, reproducibility, and methodological rigor.	Establishes methodological reliability for this SLR study.
11	Williamson & Eynon, 2020	The authors explore how data-driven AI reshapes educational governance and decision-making, raising ethical questions about control, accountability, and power asymmetries.	Provides ethical insights into AI policy implications in education.
12	Crompton et al., 2022	The study examines teacher readiness for AI integration, identifying gaps in ethical competence and digital awareness. It recommends structured training for educators.	Supports the development of ethical and digital competencies in Pancasila teachers.
13	Luckin, 2018	The author argues that education must maintain a balance between artificial and human intelligence, preserving empathy, reasoning, and moral development in digital learning contexts.	Strengthens the argument for humanization in AI-based pedagogy.
14	Cope & Kalantzis, 2023	The study investigates how AI transforms knowledge acquisition and assessment, calling for epistemological frameworks that preserve human interpretation and ethical meaning.	Relevant for reflective approaches in moral and values education.
15	Ribble, 2015	The author defines nine key elements of digital citizenship—ethics, communication, rights, and security—essential for developing students' moral and civic competencies online.	Provides a foundation for ethical digital character formation.
16	Budiharto & Suhartono, 2020	The paper reviews AI developments in Indonesia, emphasizing both innovation opportunities and ethical risks such as bias, privacy, and cultural implications.	Provides national context for AI ethics in educational transformation.
17	Saputra, 2023	The study stresses that educators must internalize digital ethics when using AI tools to ensure responsible pedagogical practices aligned with educational values.	Illustrates digital ethics application among Pancasila educators.
18	Hidayat & Wulandari, 2023	The findings reveal that digital literacy enhances value internalization in Pancasila learning, strengthening	Demonstrates the pedagogical synergy between AI, digital

No	Author(s) & Year	Main Findings	Relevance to the SLR on Pancasila Education
19	Rahmawati & Kurniawan, 2022	students' critical and ethical awareness in using AI. The authors warn that the uncritical use of AI in classrooms may reduce moral reflection and ethical reasoning among students. Ethical frameworks are essential to maintain integrity.	literacy, and Pancasila values. Highlights the urgency of ethical awareness in AI-based education.
20	Chassignol et al., 2018	The paper reviews global trends in AI education and concludes that ethical concerns remain marginal in current discourse, suggesting a need for stronger normative frameworks.	Identifies a global research gap in AI ethics, relevant for Pancasila adaptation.
21	Floridi & Cowls, 2019	The authors propose five universal AI ethics principles—beneficence, non-maleficence, autonomy, justice, and explicability—that guide moral use of technology in society.	Offers a globally recognized ethical foundation adaptable to Pancasila ethics.
22	Long & Magerko, 2020	The research defines AI literacy as encompassing technical understanding, critical thinking, and ethical awareness necessary for responsible interaction with intelligent systems.	Expands the concept of literacy to include ethical and reflective AI engagement.
23	Susanto, 2023	The paper advocates for embedding digital ethics education within school curricula to foster responsible and morally aware digital behavior among students.	Provides a basis for national digital ethics policy formulation.
24	Gunawan & Putri, 2022	The authors demonstrate that teachers with strong digital literacy sustain humanistic learning practices even when integrating AI technologies.	Reinforces humanization and ethical responsibility in AI-based learning.
25	Schiff, Borenstein & Laas, 2022	The study presents a framework for integrating ethics into AI education, emphasizing responsibility, fairness, and societal impact in technological design.	Provides a practical ethical model applicable to Pancasila-based teacher training.

Based on the mapping of articles presented in the table, research on AI in education demonstrates diverse trends, ranging from technical and policy-oriented approaches to studies focusing on ethics, digital literacy, and citizenship education. These findings indicate a gap between the rapid development of AI technologies and the level of attention given to value-based and humanistic dimensions in education. Therefore, the following section discusses a more in-depth thematic synthesis of the selected articles by highlighting ethical challenges, the role of educators' digital literacy, and the relevance of Pancasila Education as a normative framework for AI utilization in education.

1. General Landscape of Research on AI Utilization in Education

The results of the Systematic Literature Review (SLR) of 25 articles indicate that the utilization of artificial intelligence (AI) in education has expanded rapidly and is

predominantly examined within the contexts of higher education and data-driven educational policymaking. Early studies emphasize the effectiveness of AI in learning analytics, personalization, and data-based decision-making. However, most of the reviewed studies suggest that ethical dimensions and educational values have not yet become central concerns in the implementation of AI in education.

Systematic reviews conducted by Zawacki-Richter et al. (2019) and Chassignol et al. (2018) reveal that research on AI in education tends to adopt a technical and instrumental orientation. Ethical considerations, human relationships, and the value implications of learning remain largely at the margins of scholarly discourse. These findings indicate a significant research gap, particularly when AI is applied to value-based education such as Pancasila Education.

2. Ethical Challenges and Algorithmic Bias in AI Utilization

The second major theme emerging from the literature concerns ethical challenges and algorithmic bias in educational AI systems. International studies emphasize that AI systems are not neutral, as they are constructed from specific data, assumptions, and interests. Mehrabi et al. (2021) demonstrate that data bias and algorithm design can produce systemic injustices that directly affect learning processes and assessment outcomes.

In the context of value-based education, algorithmic bias becomes a serious concern because it may influence the representation of values, moral perspectives, and social narratives encountered by learners. If not ethically regulated, AI may conflict with principles of social justice, humanity, and unity that form the core of Pancasila values. Therefore, AI ethics principles such as fairness, transparency, accountability, and responsibility as articulated by Holmes et al. (2022) and Floridi and Cowls (2019), constitute a relevant normative framework for Pancasila Education.

3. Risks of Dehumanization and the Shift in the Meaning of Value-Based Learning

Several studies highlight the risk of dehumanization in learning as a result of excessive and unreflective AI use. Holmes, Bialik, and Fadel (2022) argue that while AI has the potential to optimize learning, efficiency-oriented applications may reduce the humanistic dimensions of education. This concern aligns with the perspectives of Luckin (2018) and Cope and Kalantzis (2023), who emphasize the importance of balancing artificial intelligence with human intelligence in learning processes.

In Pancasila Education, value-based learning cannot be reduced to purely cognitive processes. Dialogue, role modeling, reflection, and social experience are essential components of value internalization. The dominance of AI without an ethical framework risks shifting Pancasila learning toward mere information transfer, thereby diminishing the meaning of character and citizenship education.

4. The Role of Teachers' Digital and AI Literacy

The SLR findings indicate that teachers' digital literacy and AI literacy are key factors in ensuring responsible AI utilization. Digital literacy encompasses not only technical competencies but also cognitive understanding and ethical awareness in the use of technology. Ng (2012) emphasizes that ethical dimensions are an integral component of 21st-century digital literacy.

National studies reveal that teachers of Pancasila and Citizenship Education continue to face challenges in digital-ethical literacy readiness. Research by Tinambunan (2022), Saputra (2023), and Gunawan and Putri (2022) demonstrates that teachers require the strengthening of humanistic digital competencies to ensure that AI use does not neglect human values and moral reflection. Without adequate digital literacy, AI utilization tends to be pragmatic and risks weakening the objectives of value-based education.

5. Pancasila Education as an Ethical Framework for AI and Digital Citizenship

An important finding from national studies is the positioning of Pancasila Education as a normative ethical framework for responding to AI development. Yudiono et al. (2023)

show that Pancasila values exhibit strong alignment with global AI ethics principles, such as justice, responsibility, and humanity. This is reinforced by studies by Fahriel (2022) and Hidayat and Wulandari (2023), which emphasize that Pancasila-based learning plays a crucial role in shaping digital ethics and the internalization of national values.

The digital citizenship education model developed by Nasoha (2024) demonstrates that integrating Pancasila values within digital ecosystems can foster critical, responsible, and ethical digital citizens. Thus, Pancasila Education is not only affected by AI but also holds strategic potential to guide AI utilization in ways that align with humanistic and national objectives.

CONCLUSION

Based on the results of the Systematic Literature Review (SLR) of 25 scholarly articles, it can be concluded that the utilization of artificial intelligence (AI) in education has demonstrated significant growth, particularly in supporting learning efficiency, learning analytics, and data-driven decision-making. Nevertheless, the literature consistently indicates that ethical considerations, humanistic values, and digital literacy have not yet become primary focal points in the implementation of AI in the educational sector.

The reviewed studies emphasize that the use of AI without a clear ethical framework may lead to algorithmic bias, injustice, and the dehumanization of learning. These risks become increasingly critical when AI is applied to value-based education, such as Pancasila Education, which emphasizes value internalization, character formation, and the strengthening of citizenship. Pragmatic and instrumental uses of AI risk shifting value-based learning from reflective and dialogical processes toward mere information consumption.

The SLR findings also demonstrate that educators' levels of digital literacy and AI literacy play a central role in determining the quality and responsibility of AI utilization. Digital literacy that extends beyond technical skills to include cognitive-critical and ethical dimensions constitutes an essential prerequisite for ensuring that AI use aligns with the objectives of value-based education. In the Indonesian context, Pancasila values have been shown to align strongly with global AI ethics principles, positioning Pancasila Education as a normative ethical framework for responding to the development of AI in education.

Accordingly, the integration of AI ethics and the strengthening of educators' digital literacy represent urgent needs to ensure that the utilization of AI in Pancasila Education remains oriented toward humanity, social justice, and the formation of responsible citizens.

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