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# TEACHERS' ETHICAL SKILLS IN THE USE OF AI: A LITERATURE REVIEW ON PRACTICES, CHALLENGES, AND DEVELOPMENT DIRECTIONS IN INDONESIA

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**Abstract**
Artificial Intelligence (AI) technology has developed rapidly and significantly influenced various aspects of life, including education. One of its impacts is on the role of teachers in utilizing AI within the learning process. The use of AI in education requires teachers to possess ethical skills to ensure that the technology is applied safely, responsibly, and in alignment with moral principles. This study aims to systematically examine the ethical skills of teachers in Indonesia in the context of AI utilization within educational settings. The research employed a literature review method with a qualitative descriptive approach, drawing from various scholarly sources such as accredited journals, academic books, and articles from reputable repositories relevant to the topic. The findings reveal that: (a) teachers' understanding of AI ethical principles remains limited, (b) AI ethical competencies are not explicitly stated in the national teacher competency standards, (c) schools or educational institutions lack specific policies on AI usage, and (d) access to facilities and technology remains uneven across schools. These findings highlight the need to strengthen AI ethics literacy through training programs and the formulation of clear policies to support ethical and inclusive AI implementation in Indonesian education.

**Keywords:** artificial intelligence, education, ethical skills

## Introduction

The era of Society 5.0 marks a significant paradigm shift in human life. In this era, humans, as the central actors of civilization, coexist harmoniously with science and technology. This vision aligns with Indonesia Emas 2045 and its 17 pillars of national development, which include digital transformation and the strengthening of science and technology. Digital technology has advanced rapidly and become widely recognized within society, one of the most prominent examples being Artificial Intelligence (AI).

Artificial Intelligence (AI) was developed with the aim of assisting humans in addressing challenges and performing complex tasks. AI is a computational technology designed to think and solve problems based on data provided by its users (Yani, 2024). The use of AI has expanded rapidly and become an integral part of various sectors, including education. The integration of technology into education is a key factor in building a technology-oriented society, as education serves as the foundation for mastering skills relevant to contemporary demands (Zebua, 2024).

The utilization of AI in the Society 5.0 era presents both opportunities and challenges. In practice, AI can enhance learning effectiveness by providing access to broader, more comprehensive, and easily understandable information and materials (Arifdarma, 2023; Zebua, 2024). Moreover, AI can serve as a learning medium that increases academic productivity and supports adaptive learning that accommodates individual needs and learning styles.

While AI offers significant benefits to education, it also brings potential drawbacks. For instance, tools such as ChatGPT can lead to dependency, addiction, and reduced creativity, potentially replacing human roles in some professions (Akbar, 2025; Farwati et al., 2023). Therefore, the use of AI must be carefully monitored, as excessive dependence may diminish critical thinking skills. Ibad (2024) also highlights that the overuse of AI can raise ethical concerns in academia, including issues of plagiarism.

Teachers play an essential role as facilitators to ensure that AI use in education remains wise and effective. They must address ethical concerns such as student data privacy, algorithmic transparency, equitable access to technology, and the long-term cognitive, social, and emotional effects of AI-based learning. The successful implementation of AI in education requires collaboration among teachers, AI developers, policymakers, students, and communities. Accordingly, ethical skills are essential for teachers to use AI safely, responsibly, and in accordance with moral values. These skills ensure that AI is applied with fairness, inclusivity, and accountability, allowing it to serve as a supportive educational tool without compromising human values.

Several teachers encounter challenges in obtaining sufficient access to technological resources that support the integration of Artificial Intelligence (AI) in education. Essential devices such as computers and other hardware required to operate AI-based platforms are not yet evenly distributed across schools, creating disparities in implementation. In addition, slow or unstable internet connectivity further hinders the development and utilization of AI-driven online learning materials. Beyond access issues, time management also presents a significant obstacle. The adoption of AI-based learning requires additional time for teachers to design and develop instructional materials, which are often more complex and time-consuming than traditional methods. Teachers, who already face tight schedules and numerous teaching responsibilities, must balance these demands alongside administrative duties and other educational activities. Consequently, limited time and unequal technological access remain key barriers to the effective integration of AI in the teaching and learning process.

Ethical skills refer to a set of competencies and ethical awareness that teachers, students, and technology users must possess to ensure that AI utilization is not only effective but also responsible. Teachers play a pivotal role in overseeing AI implementation in educational settings. According to UNESCO (2024), essential teacher competencies related to ethical skills include: understanding ethical principles and responsible AI use, ensuring safety and accountability in AI applications, and formulating regulations and boundaries for AI use. Therefore, this study aims to review literature related to Indonesian teachers' ethical skills in AI utilization while identifying best practices, challenges, and directions for developing teachers' ethical competencies within an AI-based educational ecosystem.

## Method

This study employed a literature review method using a qualitative descriptive approach, which aims to provide a detailed overview of AI utilization, teachers' ethical skills in applying AI, and the challenges encountered in this context. The research data were collected from 18 various scholarly sources, including accredited journals, academic books, and articles from official repositories relevant to the research topic. The inclusion criteria for the selected literature comprised publications written in either English or Indonesian, published between 2020 and 2025, and directly related to the themes of ethics and the use of AI within educational settings. To ensure the credibility and validity of the findings, only reputable and peer-reviewed publications were used. Furthermore, literature triangulation was applied by comparing and cross-analyzing findings from previous studies to strengthen the interpretation of results. The data analysis process in this study followed the Miles and Huberman model, which consists of several stages, namely 1) data reduction, involving the selection and simplification of relevant information; 2) data display, which organizes data systematically to facilitate understanding; and 3) conclusion drawing and verification, where patterns, relationships, and insights are identified and validated.

## Findings and Discussion

UNESCO (2024) identifies three essential competencies that teachers must possess in relation to ethical skills: 1) ethical principles, including teachers' understanding of AI use; 2) safety and responsibility in its implementation; and 3) formulation of regulations and usage boundaries. Ideally, the application of AI in education should align with these principles outlined by UNESCO.

### *Ethical Principles*

Teachers are expected to have a foundational understanding of ethical issues related to Artificial Intelligence (AI) and the principles necessary for its responsible use. These principles include the protection of human rights, respect for human autonomy and control, and awareness of ethical dilemmas that may arise in educational contexts, such as privacy, human agency, equality, inclusion, cultural and linguistic diversity, and environmental sustainability.

Teachers should be able to map relationships between ethical principles, regulations, and practical examples of AI use through knowledge-mapping tools, while also assessing whether local regulations keep pace with technological advancements. Furthermore, teachers must be sensitive to potential biases embedded in AI systems that could result in injustice or exclusion, particularly for students with disabilities and those from vulnerable groups. When such risks are identified, teachers should report them to the appropriate authorities. Thus, teachers play a critical role in ensuring that AI usage in schools remains inclusive, transparent, and grounded in strong ethical values, contributing to fair and sustainable education.

A study conducted by Rosyanto et al. (2025) in West Java revealed substantial regional disparities in teachers' understanding of AI ethics. The lack of awareness was attributed to ineffective and inconsistent training programs on AI concepts. This finding suggests that awareness of AI ethics remains relatively unfamiliar in Indonesia. Similarly, teachers in Maluku Province face technological barriers that

restrict their understanding of AI applications (Patty & Lekatompessy, 2024). Vorotnykova (2025) also found that teachers' competencies in using AI remain minimal and require targeted professional development programs to improve their capabilities. Teachers' perspectives on AI use must be enhanced so that they can effectively and efficiently utilize existing digital tools. Nevertheless, Putra et al. (2024) discovered that many teachers have successfully integrated AI technologies into their teaching practices, enabling them to design more effective learning strategies.

These variations can be influenced by the readiness of schools to support teachers and students in using AI. The lack of institutional readiness and limited facilities has contributed to uneven implementation of AI ethics among teachers across Indonesia. Additionally, teachers' understanding of AI's potential as a pedagogical partner remains limited, a situation compounded by infrastructure gaps and low levels of digital literacy (Slamet et al., 2025). This suggests that teachers still lack comprehensive knowledge about the effective use of assistive and AI technologies in education.

***Safe and Responsible Use***

Teachers are expected to understand and apply essential ethical guidelines for the safe and responsible use of AI, including respect for data privacy, intellectual property rights, and legal compliance. They must consistently apply ethical considerations when evaluating and using AI tools, data, and AI-generated content within learning activities. Teachers should also analyze real-world cases to understand threats to AI security both at the design stage (safety by design) and during usage (safety by use). Moreover, teachers must be aware of the legal implications of ethical breaches such as data misuse, copyright infringement, disinformation, and online discrimination. These understandings must be contextualized within local and international regulations to enable teachers to formulate and adapt safe AI-use guidelines suitable for educational settings. In particular, teachers need to ensure data protection for themselves and their students, especially for those with special needs.

Security and responsibility represent key challenges in AI use. Addressing this issue requires collaboration among teachers, parents, and students. Teachers must uphold fairness and ethical principles in developing and applying AI systems to ensure that their benefits are equitably distributed. Through ethical evaluation of AI tools, risk monitoring, and continuous updating of responsible-use guidelines, teachers play an essential role in fostering a safe, ethical, and inclusive learning environment in the age of artificial intelligence. The implementation of AI in Indonesia must therefore prioritize strict privacy management, system transparency, prevention of algorithmic bias, and a balance between technology and human roles, ensuring that education remains human-centered. Furthermore, enhancing digital and AI literacy among both teachers and students is crucial for successful implementation.

Mandatory professional training should include both technical skills and pedagogical approaches to promote responsible AI use. From a governance perspective, the absence of comprehensive AI regulation in Indonesia poses serious risks related to data privacy, algorithmic fairness, and system accountability. Consequently, policy frameworks must establish clear standards for data collection,

storage, and usage in accordance with international privacy principles, ensuring protection from third-party misuse. Teachers also serve as key agents in promoting AI ethics through critical thinking and proactive engagement, such as leading classroom discussions and organizing activities that highlight ethical, social, and environmental issues in AI development and application. Teachers should also participate in drafting and revising ethical guidelines for AI use in education, ensuring that such frameworks reflect inclusivity and social justice.

They are encouraged to investigate how AI influences social equity, economic opportunity, environmental sustainability, and cultural and linguistic diversity, particularly regarding its implications for vulnerable groups. Teachers should critically review AI tool guidelines to ensure that they align with ethical principles and mitigate potential harm, providing constructive feedback for improvement. By participating in ethical policy dialogue and collaborative regulation development, teachers can become pioneers in promoting ethical, inclusive, and responsible AI practices in education.

***Policy Formulation and Usage Boundaries***

The use of AI in Indonesian education particularly the increasing adoption of ChatGPT presents several limitations that must be carefully addressed 1) teachers and students require direct interaction during learning, which ChatGPT cannot provide; 2) creativity is essential in learning; excessive reliance on ChatGPT may reduce originality, as the tool lacks human creativity; 3) ChatGPT cannot accommodate diverse individual learning styles; 4) continuous use may weaken critical thinking and social interaction skills; 5) individuals may become overly dependent on technology, leading to cognitive passivity.

Sucianingtyas et al. (2025) argue that overuse of AI can create social problems, such as increased unemployment, diminished creativity reliant on programmers, reduced human interaction, technological dependency, high implementation costs, and declining motivation among young learners. Similarly, Ibad (2024) notes that AI overuse can result in academic ethical issues, including plagiarism. AI, therefore, cannot fully replace the teacher's role. Instead, teachers should maximize the benefits of AI to enhance the effectiveness and efficiency of learning, helping students reach their full potential. To mitigate negative impacts, clear boundaries must be established. The government and educational institutions must formulate written and enforceable policies to ensure that AI benefits learning without becoming detrimental to teachers or students. At Sekolah Cikal, learning is implemented through a project-based approach, allowing students to spend more time creating and collaborating. Therefore, the use of gadgets is not continuous. The school also provides a gadget storage cabinet so that students only take their devices when technology is truly needed for learning. This approach helps students stay focused and reduces excessive screen dependency. Sekolah Cikal strives to create a learning environment that fosters critical thinking, responsible actions, and the ethical use of technology. The use of AI is carried out carefully and always directed toward clear learning purposes. These simple steps reflect Sekolah Cikal's commitment to ensuring a balanced and responsible use of technology and AI.

Based on the research findings, it was identified that teachers' ethical principles remain relatively low. In terms of safe use, teachers demonstrate awareness and concern in collectively protecting students' personal data and

utilizing technology safely; however, it cannot be denied that some data have been widely disseminated due to negligence by certain parties. Meanwhile, regarding the formulation of regulations and policies, no written guidelines have been found to serve as a reference for teachers in utilizing AI. Teachers have the freedom to use AI without clear boundaries or limitations. The successful integration of AI in Indonesia's education system depends on the synergy between infrastructure policies, digital literacy, ethical governance, and collaboration among multiple stakeholders. Each ethical component, principle, responsibility, and regulation is interrelated and cannot stand alone. Teachers are expected to master all ethical skill principles comprehensively. Through a holistic policy framework, AI can become a transformative tool for achieving equitable, adaptive, and inclusive education for all members of society.

## Conclusion

In the era of Society 5.0, Artificial Intelligence (AI) has rapidly advanced and become increasingly integrated into various aspects of life, including education. The use of AI in education has brought both positive and negative impacts, including within the Indonesian context. Optimal implementation of AI in education must take into account multiple dimensions and competencies, particularly the ethical skills that teachers are expected to possess. The findings of this study indicate that 1) teachers' understanding of AI ethical principles and their ability to use AI safely and responsibly remain limited; 2) ethical and digital safety aspects are not yet explicitly included in the national teacher competency standards; 3) schools lack specific policies regulating AI use; and 4) access to facilities and technology remains uneven across schools. Therefore, it is essential to strengthen AI ethics and safety literacy through teacher training programs, revise competency standards to incorporate ethical and digital responsibility components, and develop AI governance policies that emphasize transparency, data privacy, and equitable access to support inclusive and sustainable education in Indonesia. In addition, a national guideline is needed to regulate the use of AI in schools. Schools should also establish a team to monitor AI implementation to ensure it remains safe and ethical. Collaboration with external partners can further support teachers in developing their technological competencies. It is also important to introduce AI literacy to students from an early stage. These efforts are expected to promote more appropriate and responsible use of AI within the educational environment.

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