

The Role of Teachers in Leveraging AI to Foster Civic Literacy in the Digital Era

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Abstract

This study aims to examine the role of teachers in utilizing Artificial Intelligence (AI) to develop digital literacy and to analyze the impact of that role on strengthening students' digital civic literacy. This study employs a descriptive qualitative method using a literature review approach. Data were collected through a systematic search of indexed scientific sources and analyzed using interactive qualitative analysis techniques, which include data collection, data reduction, data presentation, and drawing conclusions. The findings indicate that the role of teachers in utilizing AI has shifted from merely being technology users to becoming designers of adaptive learning, facilitators of critical thinking, and strategic guardians of digital ethics. Through the integration of AI platforms, teachers can functionally enhance digital literacy while delivering civic education content that is contextual, interactive, and relevant to the dynamics of digital society. This role has a significant impact on strengthening students' cognitive development, particularly in their understanding of rights, obligations, social responsibilities, and awareness of privacy and cybersecurity. However, the internalization of values into the affective and behavioral domains remains heavily dependent on intensive teacher guidance, the integration of Pancasila values, and learning based on critical reflection to prevent technology dependency, maintain academic originality, and ensure the ethical and responsible use of AI—all aimed at fostering digital citizens of good character. It is concluded that the success of building digital citizenship literacy in the AI era requires a transformative and humanistic role for teachers, grounded in national values.

Keywords: Role of Teachers; Digital Citizenship Literacy; Artificial Intelligence

Introduction

Teachers play a strategic role as facilitators of digital literacy and digital citizenship so that students are able to evaluate information critically, ethically, and responsibly (Masduki et al., 2025). Education is a conscious and planned effort to create a learning environment and learning process in which students actively develop their potential to possess religious and spiritual strength, self-control, character, intelligence, noble moral values, and the skills necessary for both themselves and society (Pay, 2023). Artificial Intelligence (AI) can be defined as a machine's ability to perform tasks that typically require human intelligence. In the field of education, AI can help in many ways, such as enhancing the learning process and personalizing the learning experience (Jannah et al., 2025).

The benefits of AI in creating this adaptive learning can be optimized as a

strategic tool to enhance *civic literacy* amidst the complexity of digital information. This aligns with the very essence of *civic literacy* that is, citizens' knowledge and ability to participate effectively in civic life, such as knowing how to stay informed and receive the latest information, understanding the government of their country, and knowing how to exercise their rights and fulfill their duties as citizens, both at the national and global levels (Suryaningsih, 2020).

Its application in the education sector is increasingly receiving attention, particularly regarding how prospective teachers can utilize AI to design more effective learning experiences, in this context (Siswanto et al., 2024). However, not all educators possess the knowledge and skills necessary to make optimal use of this technology in the learning process; teachers often face challenges in understanding the features of AI technology

and integrating it into their daily teaching practices.

Teachers serve as motivators in the learning process, aiming to foster students' motivation to learn in accordance with the context of the material being taught. As educators, teachers are responsible for providing support and encouragement, as well as for supervising and guiding students to ensure they adhere to school rules and the norms prevailing within their families and communities. Additionally, teachers are responsible for directing students' activities to ensure they remain in line with prevailing norms and do not deviate from established values (Rosmawardani & Patmisari, 2023).

The integration of AI into teaching practices opens opportunities for teachers to design learning experiences that are more personalized, interactive, and data-driven, while also requiring teachers to enhance their professional competencies in using digital tools effectively and responsibly. However, although artificial intelligence holds great potential, challenges also arise in its implementation. One of the main challenges is student data privacy and security. It is crucial to safeguard the confidentiality of students' personal data to prevent its misuse or exploitation (Purba & Azizah, 2021).

Artificial intelligence has a significant impact on the field of education. Through personalized learning, interactive learning experiences, accurate assessment, and efficient management, education can become more effective and inclusive. However, it is important to remember that the use of AI in education must also consider ethics, privacy, and student data security to ensure optimal benefits (Efendi et al, 2025).

Although AI offers significant pedagogical opportunities through adaptive learning, personalized feedback, and assessment automation, its implementation in the field faces various challenges that hinder its optimal utilization. The use of artificial intelligence (AI) in education faces five major challenges that affect students: decreased motivation and academic laziness resulting from taking shortcuts, AI's limitations in understanding context and complex information, a decline in literacy and critical thinking skills due to a loss of reading habits, and the risk of psychological dependence that

hinders the development of professional skills (Prayoga et al., 2025)

This phenomenon is reinforced by the 2022 PISA data, which shows that Indonesia ranks 69th out of 81 countries in reading literacy and problem-solving skills. More than 76% of Indonesian students struggle to distinguish between facts and opinions, evaluate the accuracy of information, and draw logical conclusions from available data. Indonesia's low PISA scores reflect a civic literacy crisis. True literacy is not merely the ability to read text, but the skill to evaluate and interpret information. Difficulties in distinguishing facts from opinions and drawing conclusions highlight the need to enhance teachers' roles in fostering motivation related to literacy.

Various recent studies have highlighted the urgency of integrating *Artificial Intelligence* (AI) into education. From the perspective of educator competencies in the digital era (Nuryadi et al., 2025), it is emphasized that educators are not only required to master pedagogical competencies but also digital literacy and innovation skills. Their research found that the use of AI-based media in Civic Education instruction remains suboptimal due to technical constraints and educators' readiness, which ultimately results in students' weak *civic skills* when facing contemporary challenges. In line with these findings, "demonstrates that AI training and introduction programs directly linked to the values of the Pancasila Student Profile can significantly enhance teachers' digital competencies. This proves that teachers' adaptation to digital transformation through AI is crucial for creating an adaptive and transformative learning environment.

In terms of the impact on students, the use of AI has been shown to make a tangible contribution to civic literacy. (in their community service program demonstrated that the use of AI-based interactive simulations by Civics teachers significantly improves students' *civic literacy* and ethical decision-making skills. AI provides students with opportunities to think critically, understand their rights and responsibilities, and analyze social issues in context. However, a critical observation was raised by (Sari et al., 2026), which found that although AI (such as ChatGPT) is effective in strengthening

students' *social responsibility* and cognitive understanding of civic issues, the internalization of values and the development of empathy cannot be separated from the central role of teachers. AI serves only as a catalyst for *moral awareness (moral knowing)*, whereas the development of social attitudes and behaviors (*moral feeling* and *moral action*) absolutely requires guidance and direct interaction with teachers.

Therefore, the teacher's role as an ethical guide and facilitator is a key element in technology integration. (Ulm & Junaris, 2025) In a study on teacher mentoring in madrasahs, it is emphasized that AI must be positioned as a tool that requires pedagogical wisdom. Teachers play an active role in ensuring that the use of AI for developing instructional materials and learning media does not neglect ethical values, character, and spirituality. Teachers act as filters and guides to prevent students from becoming trapped in a reliance on technology that could degrade their critical thinking and creativity.

Although the integration of *Artificial Intelligence* (AI) offers strategic opportunities to create adaptive learning to enhance civic literacy, the crisis of critical literacy and the threat of disinformation in the digital age demand that teachers serve not merely as content deliverers, but as ethical facilitators and anchors of empathy. Teachers play a crucial role in bridging the limitations of AI which is only capable of addressing cognitive aspects (*moral knowing*) with the process of internalizing values and character development (*moral feeling* and *moral action*), which absolutely require human interaction.

Based on the above discussion, this study aims to examine the role of teachers in utilizing *Artificial Intelligence* (AI) to develop digital literacy and to analyze the impact of that role on strengthening students' digital citizenship literacy.

Literature Review (if any) Study on the Role of Teachers Definition of a Teacher

According to the Kamus Besar Bahasa Indonesia (Great Dictionary of the Indonesian Language), "A teacher is a person whose occupation (livelihood, profession) is teaching." (Indrawan, I., 2020). A teacher is a professional educator whose primary duties

include educating, teaching, guiding, directing, training, assessing, and evaluating students in early childhood education within the formal education system, as well as in elementary and secondary education (Law No. 14 of 2005).

The Role of Teachers

The role of a teacher consists of a series of interrelated behaviors performed in specific situations and related to the advancement, behavioral change, and development of students, which are the teacher's objectives.

Based on Law of the Republic of Indonesia No. 14 of 2005 on Teachers and Lecturers, there are four core competencies that teachers must possess: pedagogical, personal, professional, and social competencies. Therefore, a teacher must not only possess teaching skills but also have in-depth knowledge, wisdom in decision-making, and strong interpersonal skills. In general, it can be concluded that: (a) A teacher must have the ability to convey information effectively, which is one of the primary tasks in the educational process to ensure students acquire correct and accurate knowledge. (b) Teachers serve as planners, implementers, and evaluators in the learning process, meaning they are responsible for all stages of that educational process. (c) Teachers are expected to possess the technical skills necessary to organize standard learning materials and present them effectively, with the aim of building students' competencies and abilities. (d) Teachers must be able to create a pleasant learning environment, both for students and for themselves (Putri et al., 2019)

According to Yestiani & Zahwa (2020), in teaching and learning activities, teachers play a crucial role in ensuring that the knowledge being taught is effectively absorbed by students. Teachers do not merely impart knowledge; they fulfill numerous roles in the learning process. Teachers have several roles, including: (a) Teacher as a Facilitator who provides support so that students can easily receive and understand the material effectively and efficiently; (b) Teacher as a Mentor who guides students' physical, mental, moral, emotional, and spiritual development based on their knowledge and experience; (c) Teacher as a Role Model who demonstrates inspiring attitudes for students to emulate; (d) The Teacher as a Manager who maintains control and creates a conducive and

comfortable classroom atmosphere, much like a ship's captain; (e) The Teacher as an Advisor who provides guidance and instills confidence in both students and parents regarding decision-making; (f) The Teacher as an Innovator who translates past experiences into modern language that is meaningful to students; (g) The Teacher as a Motivator who plays a crucial role in fostering students' enthusiasm and motivation to learn; (h) The Teacher as a Coach who trains and develops students' intellectual and motor skills so they can master competencies; (i) The Teacher as an Evaluator who assesses students' learning outcomes while also evaluating their own teaching performance.

Referring to the theoretical discussion regarding the concept of a teacher as a figure who carries out a series of behaviors for the development of students, as well as various specific roles such as facilitator, innovator, mentor, and manager—supported by four core competencies (pedagogical, personal, professional, and social), the role of the teacher in this study is defined as a series of actions and competencies carried out by teachers in integrating artificial intelligence (AI) technology into learning to foster students' civic literacy. The indicators of the teacher's role in this study focus on the implementation of these functions, which include: (1) the teacher's role as a facilitator and innovator in utilizing AI to present interactive citizenship materials and create an enjoyable learning environment; (2) the teacher's role as a mentor and model in guiding students and setting an example in the wise use of AI; and (3) the teacher's role as a planner and evaluator in planning, implementing, and assessing the effectiveness of AI-based civic education to ensure the development of students' competencies.

An Overview of Artificial Intelligence Definition of Artificial Intelligence

Artificial Intelligence (AI) is a system that studies how to enable computers to think, learn, and act like humans (Marsella et al., 2023). Artificial Intelligence (AI) refers to a machine's ability to mimic or replicate human intelligence, including the ability to learn, solve problems, make decisions, and interact with their environment. AI has been applied in various sectors, such as healthcare,

transportation, finance, manufacturing, and many more, with the aim of improving efficiency, productivity, and the quality of human life (Zakiyah et al., 2024)

How Teachers Utilize AI in Schools

Teachers utilize AI in schools to support personalized learning by providing systems that adapt to students' individual needs through real-time analysis of learning data. This technology enables educators to tailor learning materials, methods, and media to students' learning styles, while also encouraging active engagement through interactive content such as visual media and educational games. The use of AI-based platforms such as ChatGPT, Gemini AI, and Canva AI helps educators design creative and contextual learning projects. However, content generated by AI is still modified by educators to align with the curriculum and students' characteristics, thereby reinforcing the teacher's role as a responsive and innovative learning facilitator (Syawaludin, 2025)

Referring to theoretical discussions regarding the definition of *Artificial Intelligence* (AI) as a technology capable of processing information much like human intelligence, as well as its applications in schools—such as the presentation of interactive materials and personalized learning—civic literacy in this study is defined as students' understanding of the rights, responsibilities, and social-community issues fostered by teachers through the use of AI. Indicators of the teacher's role in this study include: (1) the teacher's ability to use AI to present civic issues that are relevant and engaging for students; (2) the teacher's role in utilizing AI to train students to think critically about information; and (3) the teacher's exemplary use of AI in a wise and responsible manner during instruction.

A Study of Civic Literacy

Civic literacy derives from the Latin word "*littera*," meaning "letter," and in English from the word "*literacy*," which means "discourse literacy" or "literacy in discourse"; when applied to the context of citizenship, it is defined as "*civic literacy*" (Benaziria, 2018).

Raharjo (2017) states that *civic literacy* is urgently needed for the younger generation to keep pace with advancements in information and communication technology. Technological

development must be balanced with an understanding of national identity so that the public is not easily influenced by hoaxes that have the potential to trigger division and so that they are able to distinguish the truth of information. Maximizing *civic literacy* is a concrete step in keeping pace with technological progress while also serving as an important foundation for the younger generation.

According to Milner (2003), there are two indicators used to measure *civic literacy*, namely: (1) *Factual* knowledge related to an understanding of the political system and the specific structure of government in each country, including key political positions, the structure of government, political parties, the democratic system, local government, and the conduct of general elections; (2) *Cognitive proficiency*, which encompasses three levels of literacy performance. According to *the Assessment of Adult Literacy* (NAAL) (Nurgiantoro, *et al.* 2020), there are three levels: prose literacy for obtaining information from narrative or expository texts; document literacy for finding information in maps, forms, or tables; and quantitative literacy for applying basic arithmetic operations. Referring to the explanation above, the definition of *civic literacy* applied in this study is students' ability to understand and acquire democratic knowledge to become a politically literate society capable of engaging in broader discussions in the era of information openness, where students' success in improving this *civic literacy* is marked by an increase in their cognitive abilities.

Based on the above discussion, *civic literacy* in this study is defined as teachers' understanding of the principles of democracy and digital citizenship, implemented through artificial intelligence (AI)-based learning strategies. The indicators of the teacher's role in fostering *civic literacy* in this study focus on the teacher's own capacity, which includes: (1) the teacher's ability to utilize AI as a medium for presenting relevant civic issues; (2) the teacher's role in guiding critical thinking regarding information and technological bias in the digital age; and (3) the teacher's exemplary conduct in applying digital ethics throughout the learning process

This study employs a systematic literature review approach to examine the role of teachers in utilizing Artificial Intelligence (AI) to foster civic literacy in the digital age. Data sources were selected from reputable academic databases, including Google Scholar, Scopus, ERIC, and other scientific repositories. Selection criteria included: (1) Relevance to the topics of the teacher's role, the integration of AI technology into learning, and civic literacy education; (2) Year of publication, with priority given to publications from the past 5 to 10 years to ensure the currency of the AI technology context; (3) Focus on theoretical studies, pedagogical frameworks, or empirical studies addressing teachers' implementation of AI, learning strategies, or civic education outcomes; and (4) Articles published in accredited scientific journals or conference proceedings.

Data Collection The data collection process was conducted systematically through searching, screening, and extracting information from the selected literature. The stages included:

(1) Searching using keywords such as "the role of teachers in artificial intelligence," "the use of AI in civic education," "*civic literacy and artificial intelligence*," and "*the teacher's role in AI integration*." (2) Screening titles and abstracts to evaluate relevance to the study's objectives, particularly those highlighting teachers' actions and strategies. (3) *A full-text review* to ensure that the selected studies met the inclusion criteria and provided in-depth discussion regarding the implementation of AI in the classroom. (4) Extraction of primary data, including research objectives, methodology, findings, and implications related to the role of teachers in using AI, as well as its impact on fostering students' civic literacy.

Subsequently, the data were analyzed using the qualitative analysis technique developed by Miles and Huberman, which comprises three main stages: summarizing and selecting key information from each article (data reduction), organizing it into thematic categories (data presentation), and finally drawing conclusions regarding how the role of teachers is transforming to become more adaptive and humanistic in the digital age.

Method (for original research)

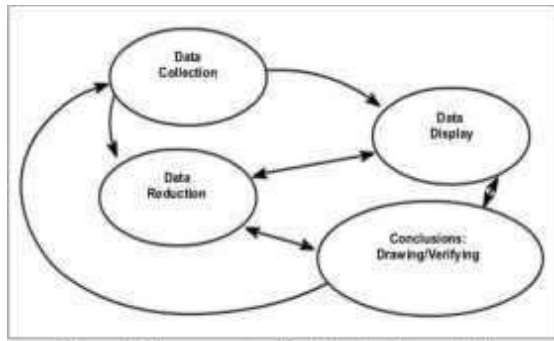


Figure 1. Interactive model of analysis

Results and Discussion

The Role of Teachers in Utilizing AI to Foster Digital Literacy

Currently, teachers play a strategic role in integrating AI into education to design more effective learning experiences. This finding indicates that the success of AI integration depends less on the technology itself and more on the teacher's capacity to function as a facilitator, motivator, innovator, and evaluator. (Siswanto et al., 2024). Teachers should serve as motivators in the learning process, with the goal of stimulating students' motivation to learn in accordance with the context of the material being taught (Rosmawardani & Patmisari, 2023). Although AI offers opportunities for personalized learning, its implementation faces significant challenges, including data privacy issues (Purba & Azizah, 2021) and negative impacts such as academic laziness and a decline in students' critical thinking skills (Prayoga et al., 2025). This phenomenon aligns with the national literacy crisis highlighted by the 2022 PISA data, in which more than 76% of Indonesian students struggle to distinguish between facts and opinions. This situation underscores that the role of teachers is crucial in consciously leveraging AI to foster civic literacy, ensuring students can adapt to technology without losing their critical thinking skills and national character.

To address the challenges of technological disruption and the literacy crisis, the role of teachers must be grounded in comprehensive competencies. Referring to Law No. 14 of 2005 and Naibaho (2025), teachers are required to master pedagogical, personal, professional, and social competencies to plan, implement, and assess learning, while also creating an enjoyable learning environment. In line with this, Yestiani & Zahwa (2020) emphasize that teachers are transforming into facilitators, mentors, demonstrators, managers, advisors,

innovators, motivators, coaches, and

evaluators. In the context of technology integration where Artificial Intelligence (AI) is defined as a machine's ability to process information in a manner akin to human intelligence to present interactive content and personalize learning these theoretical roles are operationalized to foster *civic literacy* that is, students' understanding of their rights, responsibilities, and social and societal issues.

The implementation of teachers' roles in fostering civic literacy through AI is outlined in three main indicators. First, the teacher's ability to use AI to present relevant and engaging civic issues. At this stage, teachers act as innovators and facilitators (Yestiani & Zahwa, 2020) who leverage their professional and pedagogical competencies (Naibaho, 2025) to translate standard curriculum materials into interactive AI-based content, thereby making issues of rights, responsibilities, and social problems more contextually relevant to students. Second, the teacher's role in using AI to train students to think critically about information. Here, the teacher serves as a mentor and coach who actively guides students not only to accept AI *output* at face value but also to analyze, verify, and discuss it. This step directly addresses low PISA scores by training students to evaluate facts and opinions amid the flood of digital information. Third, teachers' exemplary use of AI in a wise and responsible manner during instruction. This indicator reflects the teacher's role as a demonstrator and advisor, supported by personal and social competencies. Teachers not only teach ethics but also directly model how to interact with AI in a way that upholds data privacy, academic integrity, and moral values, thereby providing students with a strong character foundation as they navigate the era of artificial intelligence.

This study concludes that teachers play a central and strategic role in the use of AI to foster civic literacy in the digital age. Although the integration of AI offers significant opportunities for personalized learning, challenges such as data privacy issues, academic complacency, a decline in critical thinking skills, and low national literacy scores (PISA 2022) require teachers to undergo a comprehensive transformation. Based on four core competencies pedagogical, personal, professional, and social as well as various multidimensional

roles as facilitators, mentors, demonstrators, innovators, motivators, and evaluators, teachers must operationalize these roles through three key indicators: (1) using AI to present relevant and contextual civic issues, (2) utilizing AI to train students to think critically when evaluating and verifying information, and (3) setting an example in the ethical and responsible use of AI. Thus, the success of fostering digital citizenship literacy in the era of artificial intelligence does not depend solely on technological sophistication, but rather on teachers' capacity to integrate AI in a pedagogically sound, critical, and ethical manner, so that students can become adaptive citizens with sharp critical thinking skills and a strong sense of national character.

Implications of the Teacher's Role in Strengthening Students' Digital Civic Literacy

The implications of the teacher's role in utilizing AI extend beyond the efficiency of content delivery; they have profound implications for strengthening students' digital civic literacy. When teachers act as innovators and facilitators who present civic issues through AI-based interactive content, the direct implication is an enhancement of students' cognitive understanding of concepts such as rights, responsibilities, and social-community issues. Materials that were previously abstract and text-based become more concrete and contextual through simulations, data visualizations, and case studies generated by AI. Students do not merely memorize concepts of citizenship but are able to connect them to the social realities around them, so that digital citizenship literacy is no longer passive knowledge but rather an active awareness relevant to their lives in the digital age.

Further implications are evident in the strengthening of students' critical thinking skills and information literacy. The teacher's role as a guide and coach who assists students in analyzing AI outputs trains them not to accept information at face value. Students become accustomed to verifying facts, identifying algorithmic biases, and evaluating the credibility of information sources. These skills are at the core of digital citizenship literacy, where students are not only able to access information but also possess the

analytical ability to distinguish between valid information and misinformation or hoaxes. Thus, teachers indirectly build students' "intellectual immunity" against the flood of information in the digital age, while simultaneously addressing Indonesia's low literacy scores as indicated by PISA data.

In the affective and character domains, teachers' exemplary use of AI in an ethical and responsible manner has long-term implications for the development of students' digital citizenship character. When teachers consistently demonstrate AI practices that uphold data privacy, academic integrity, and moral values, students internalize these values as part of their digital identity. Consequently, students become not only skilled technology users but also responsible digital citizens they understand that every action in the digital space carries ethical and social consequences. This awareness fosters a strong sense of national character, enabling students to adapt to technological advancements without losing their sense of self or the nation's noble values.

Holistically, the implications of this role for teachers shape a well-rounded profile of a digital citizen: one with a deep understanding of citizenship, sharp critical thinking skills, and strong ethical character. Teachers are no longer merely transferring knowledge but become architects who design learning experiences that foster 21st-century citizenship competencies. In this context, teachers' use of AI is not intended to replace the human role in education, but rather to strengthen teachers' capacity to foster adaptive, critical, and character-based civic literacy, so that students are prepared to face the challenges of the digital age with clear reasoning and hearts grounded in national values.

Conclusion

This study concludes that in the era of artificial intelligence (AI), the role of teachers is no longer limited to that of ordinary instructors; rather, they must evolve into creative learning designers, coaches in critical thinking, and role models in digital ethics. Teachers have three main tasks in utilizing AI: first, presenting civic education material that is engaging and relevant to students' lives through AI-generated interactive content; second, guiding students not to accept

information from AI at face value, but rather to learn to verify facts and think critically; third, providing real-world examples of how to use AI honestly, responsibly, and with respect for privacy. Although AI offers many conveniences, this technology must not replace the role of teachers, as it risks making students lazy in their thinking and overly dependent on machines. Therefore, AI should be positioned as a learning tool, while teachers remain the primary figures responsible for instilling character values, Pancasila, and a sense of national identity. In this way, students will not only become proficient in using technology but will also grow into smart, ethical digital citizens with a strong sense of national identity.

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