

DIGITAL REASONING: EMPOWERING ADOLESCENTS' DIGITAL LITERACY IN THE AI ERA

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ABSTRACT This study aims to examine the impact of integrating Artificial Intelligence (AI) into a digital literacy program through a community-based participatory approach. The program focuses on enhancing teachers' instructional practices and adolescents' digital competencies by combining AI utilization with ethical and critical digital awareness. The study involved teachers and adolescents in Indonesia through large-scale training and mentoring activities. The program implementation was structured around four main components: AI training, digital leadership, cybersecurity management, and digital distraction mitigation. Data were collected through observations and participant reflections, and analyzed using a qualitative descriptive approach supported by descriptive statistics. The findings indicate that the integration of AI significantly improved teachers' digital competence and instructional innovation. Teachers experienced a reduction in administrative workload, enabling greater focus on student-centered learning. In addition, student engagement increased through the use of interactive and personalized learning materials. The program also strengthened adolescents' awareness of digital ethics, online safety, and responsible technology use. This study highlights that combining AI integration with community empowerment can create a more holistic digital literacy model. The proposed "Digital Reasoning" framework contributes to the development of critical thinking, ethical awareness, and responsible digital participation. Furthermore, positioning adolescents as "Digital Inspirators" represents a shift toward active and value-driven engagement in digital ecosystems. The study concludes that AI-supported digital literacy programs offer a promising strategy to enhance educational quality and foster sustainable digital competencies in the digital era.

KEYWORDS: *Artificial Intelligence; Community Empowerment; Digital Literacy; Digital Safety; Teenagers.*

1. INTRODUCTION

Digital literacy has become a fundamental necessity for adolescents in Indonesia amid rapid technological transformation. Adolescents spend a significant amount of time interacting within digital environments for communication, entertainment, and learning purposes. This phenomenon positions them as part of the digital native generation, making digital spaces an integral component of their social and academic lives [1].

However, the high intensity of digital technology use is accompanied by increasing exposure to various digital risks. Adolescents face challenges such as misinformation, cyberbullying, personal data breaches, and the misuse of artificial intelligence technologies, including deepfake content, which may affect their emotional well-being and social interactions [2] [3]. These conditions indicate that digital literacy is not limited to technical skills but also includes critical, ethical, and responsible use of technology.

On the other hand, the development of Artificial Intelligence (AI) presents substantial opportunities to enhance the quality of education. The rapid shift toward digital and AI-supported learning environments has further accelerated the need for adaptive and technology-integrated pedagogical practices [4]. The integration of AI in education enables more adaptive, interactive, and efficient learning processes, particularly through personalization and intelligent systems that support learning [5] [6]. Previous studies also highlight that AI can assist teachers in reducing administrative tasks, allowing more focus on student-centered learning [7] [8].

Despite these benefits, challenges such as digital distraction, excessive social media use, and reduced learning focus remain significant issues among adolescents. Without adequate digital literacy, technology use may negatively impact students' learning quality and well-being [9] [10].

Although previous studies have discussed digital literacy and AI integration, limited attention has been given to community-based approaches that combine technological utilization with character development and digital ethics. Therefore, a more holistic approach is needed to strengthen adolescents' competencies in navigating digital environments.

In this context, community empowerment plays an important role in building a sustainable digital literacy ecosystem. Collaboration among schools, families, and communities is necessary to improve access and promote responsible technology use [11]. The "Digital Reasoning" framework is proposed as an approach that emphasizes critical thinking, awareness of AI use, data privacy protection, and the creation of positive digital content.

This program introduces an approach that integrates the use of AI with the development of digital ethics and social responsibility. Adolescents are encouraged not only to use technology but also to contribute positively as active participants in digital environments.

Therefore, this study aims to describe the implementation of a Digital Reasoning-based program in enhancing adolescents' digital literacy through community empowerment activities.

2. METHOD

This study employed a community-based participatory approach integrated with a structured digital education program. The program focused on capacity building through training, mentoring, and the practical implementation of digital literacy and Artificial Intelligence (AI) in educational contexts. This approach emphasizes active participation, empowerment, and sustainable skill development within the community [11].

The program was implemented in Indonesia and involved two main groups: teachers and adolescents. Teachers acted as facilitators in integrating AI into learning activities, while adolescents participated as active learners and digital content creators. Participants were involved through collaboration with educational institutions and community networks to ensure diverse representation in terms of digital access and literacy levels. The implementation of the program was organized into four main components:

1. AI Training

Teachers were introduced to generative AI tools to support the development of instructional materials, interactive learning activities, and more adaptive learning experiences.

2. Digital Leadership

Adolescents received training to develop digital skills and leadership, enabling them to create positive content and contribute to their communities.

3. Cybersecurity Management

Participants were guided to understand basic digital safety practices, including secure password use, awareness of online threats, and responsible data sharing.

4. Digital Distraction Mitigation

Participants were introduced to simple time management strategies to reduce excessive digital use and improve learning focus.

Data were collected through questionnaires, observations, and participant reflections to capture engagement, learning experiences, and perceived program benefits. The data were analyzed

descriptively, while qualitative insights were interpreted to identify patterns related to participants' experiences during the program.

All participants were informed about the purpose of the program and participated voluntarily. Ethical considerations, including confidentiality and anonymity, were maintained throughout the implementation.

3. RESULT AND DISCUSSION

The implementation of the digital literacy program integrating Artificial Intelligence (AI) demonstrated positive outcomes for both teachers and students. The findings indicate improvements in teaching practices, student engagement, and digital awareness. The program outcomes are summarized in Table 3.1.

Table 3. 1. Impact of AI-Based Digital Literacy Program

Indicators	Achievement Level	Key Outcomes
Teacher participation in AI training	Large-scale participation	Improved digital competence and innovative teaching practices
Reduction of administrative tasks	High	Teachers are able to focus more on student-centered learning
Student engagement	Moderate–High	Increased participation and more interactive learning experiences
Digital literacy awareness	High	Improved understanding of digital ethics, safety, and responsible technology use

The findings suggest that large-scale teacher participation contributes significantly to improving digital competence. Teachers reported increased confidence in integrating AI into their instructional practices, particularly in developing interactive and adaptive learning materials. This finding is consistent with previous studies highlighting the role of AI in supporting instructional innovation.

In addition, the reduction of administrative workload emerged as a key benefit. The use of AI tools enabled teachers to streamline routine tasks, allowing them to allocate more time to meaningful pedagogical interactions. This result aligns with the findings of Luckin et al. (2016), which emphasize the role of AI in supporting teaching efficiency.

The integration of AI also had a positive impact on student engagement. Students demonstrated greater participation in learning activities, particularly when interactive and adaptive materials were

implemented. AI-supported learning environments provided more flexible learning experiences that accommodated students' individual needs and learning pace.

However, the level of engagement varied depending on students' digital literacy skills and access to technology. This indicates that the effectiveness of AI integration is influenced by contextual factors such as infrastructure and user readiness.

Beyond technical skills, the program contributed to improving participants' awareness of digital ethics and online safety. Students became more cautious in sharing personal information and demonstrated better understanding of misinformation and cyber threats. The introduction of basic cybersecurity practices strengthened participants' ability to navigate digital environments safely, in line with UNESCO (2019), which emphasizes that digital literacy includes safety, ethics, and critical thinking competencies.

Despite these positive outcomes, several challenges were identified. Limited access to digital infrastructure remains a barrier, particularly for participants in under-resourced areas. In addition, digital distraction and excessive social media use continue to affect students' learning focus. Some teachers also required additional time to adapt to AI tools, indicating the need for continuous professional development and institutional support.

The findings highlight that integrating AI into digital literacy programs can enhance both teaching and learning processes. More importantly, this study shows that combining AI integration with community empowerment approaches can foster not only technical competence but also ethical awareness and social responsibility. The "Digital Reasoning" framework provides a holistic approach that bridges technological advancement with human values.

Furthermore, positioning adolescents as active contributors in digital environments reflects a shift from passive consumption to meaningful participation. This aligns with the concept of digital citizenship, where individuals are encouraged to engage responsibly and contribute positively to online communities.

In summary, the integration of AI in digital literacy programs offers a promising approach to addressing the challenges of the digital era. However, its implementation should be supported by inclusive strategies, ethical considerations, and continuous capacity building to ensure sustainable impact.

4. CONCLUSION

This study indicates that the integration of Artificial Intelligence (AI) into digital literacy programs contributes positively to both teaching practices and student learning experiences. The implementation of a structured, community-based approach enhanced teachers' digital competencies, supported the reduction of administrative workload, and fostered more engaging and interactive learning environments.

Furthermore, the program improved adolescents' digital literacy, particularly in terms of ethical awareness, online safety, and responsible technology use. The integration of the "Digital Reasoning" framework not only strengthened technical skills but also promoted critical thinking and social responsibility in digital environments.

The findings also highlight the importance of positioning adolescents as active contributors in the digital ecosystem. Encouraging students to move from passive consumption toward meaningful participation reflects a more value-driven approach to digital engagement.

However, several challenges remain, including unequal access to technology, digital distractions, and varying levels of digital readiness. Addressing these challenges requires continuous training, institutional support, and inclusive strategies to ensure sustainable and equitable program implementation.

In conclusion, AI-supported digital literacy programs offer a promising approach to enhancing educational practices and empowering communities in the digital era. Future initiatives should focus on expanding implementation, strengthening collaboration among stakeholders, and reinforcing ethical considerations to maximize the benefits of digital transformation in education.

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CONFLICT OF INTERESTS

The authors declare that there are no conflicts of interest regarding the publication of this article.

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