

Enhancing Algorithm Literacy and Digital Content through Technical Guidance on Coding and Artificial Intelligence for Junior High School Teachers in Karawang Regency

Uus Rusmawan^{1*}, Henri Septanto², Tri Nur Arifin³

¹Universitas Dian Nusantara

²Universitas Dian Nusantara

³Universitas Dian Nusantara

uus.rusmawan@undira.ac.id^{1*}, henri.septanto@undira.ac.id², tri.nur.arifin@undira.ac.id³

ABSTRACT

The rapid development of digital technology and Artificial Intelligence (AI) requires teachers to possess algorithm literacy competencies and the ability to utilize digital technology in learning processes. However, many junior high school teachers in Karawang Regency still face limitations in understanding coding concepts and the pedagogical use of AI. This Community Service Program (PkM) aims to enhance algorithm literacy and digital content creation skills of junior high school teachers through project-based technical guidance. The method employed was a participatory workshop using a Project-Based Learning approach, complemented by online mentoring. The participants consisted of 25 junior high school teachers in collaboration with LPK Maxy Academy. The results showed an average increase of 75% in teachers' understanding of algorithm literacy and AI utilization based on pre-test and post-test comparisons. In addition, teachers successfully produced digital modules, interactive quizzes, and AI-based learning media. This program contributed to improved teacher work efficiency and encouraged more interactive and contextual learning. The findings indicate that technical guidance on coding and AI is effective in improving teachers' digital competencies.

Keywords: algorithm literacy, artificial intelligence, junior high school teachers, digital content, community service

ABSTRAK

Pesatnya perkembangan teknologi digital dan Kecerdasan Buatan (AI) menuntut guru untuk memiliki kompetensi literasi algoritma dan kemampuan memanfaatkan teknologi digital dalam proses pembelajaran. Namun, banyak guru SMP di Kabupaten Karawang yang masih menghadapi keterbatasan dalam memahami konsep coding dan penggunaan pedagogis AI. Program Pengabdian kepada Masyarakat (PkM) ini bertujuan untuk meningkatkan literasi algoritma dan keterampilan pembuatan konten digital bagi guru SMP melalui bimbingan teknis berbasis proyek. Metode yang digunakan adalah lokakarya partisipatif dengan pendekatan Project-Based Learning, yang dilengkapi dengan pendampingan secara daring. Peserta terdiri dari 25 guru SMP yang bekerja sama dengan LPK Maxy Academy. Hasil penelitian menunjukkan adanya peningkatan rata-rata sebesar 75% pada pemahaman guru mengenai literasi algoritma dan pemanfaatan AI berdasarkan perbandingan pre-test dan post-test. Selain itu, para guru berhasil memproduksi modul digital, kuis interaktif, dan media pembelajaran berbasis AI. Program ini berkontribusi pada peningkatan efisiensi kerja guru serta mendorong pembelajaran yang lebih interaktif dan kontekstual. Temuan ini menunjukkan bahwa bimbingan teknis mengenai coding dan AI efektif dalam meningkatkan kompetensi digital guru.

Kata kunci: literasi algoritma, kecerdasan buatan, guru SMP, konten digital, pengabdian masyarakat

INTRODUCTION

Digital transformation has significantly reshaped educational practices and community development worldwide. In the context of the Fourth Industrial Revolution and Society 5.0, digital literacy has become an essential competency for teachers, students, and communities to effectively utilize information and communication technologies in a responsible and critical manner (Fatimah & Hidayati, 2023). Digital literacy extends beyond basic technical skills, encompassing critical thinking, ethical awareness, and the ability to evaluate digital information in educational environments.

The rapid advancement of Artificial Intelligence (AI) further intensifies the need for comprehensive digital literacy. AI technologies are increasingly integrated into teaching, learning, and administrative processes, offering opportunities for personalized learning, instructional efficiency, and innovative content creation (Yunefri et al., 2024), (Gandidi, 2025). However, the adoption of AI in education also raises ethical, pedagogical, and social concerns, including data privacy, algorithmic bias, academic integrity, and the risk of over-reliance on automated systems (Patricia et al., 2025; Syah et al., 2025).

Several community service programs have highlighted the importance of strengthening teachers' digital and AI literacy through structured training and workshops. Evidence shows that targeted professional development programs significantly improve teachers' competencies in using educational technologies, developing AI-assisted learning media, and integrating ethical considerations into classroom practices (Achmad Daengs GS et al., 2024), (Gusty et al., 2025). Such initiatives not only enhance instructional quality but also support educators in adapting to rapid technological changes.

Therefore, community service activities focusing on digital literacy, ethical AI usage, and educator empowerment are crucial to bridging the gap between technological advancement and pedagogical readiness. By strengthening digital and AI literacy among educators, these programs contribute to sustainable educational development and promote responsible technology use within learning communities.

Analysis Of Partner Conditions

Based on observations and interviews with partners at LPK Maxy Academy and the junior high school teacher community in Karawang, it was found that most educators are still unfamiliar with algorithmic concepts. AI technology is often perceived skeptically as a tool that facilitates student cheating rather than as a productivity assistant. The partner conditions indicate a strong dependence on conventional, static teaching media, resulting in low student interest in logic-based subjects. In addition, limited time

for managing administrative tasks hinders the development of innovative learning practices, highlighting the need for appropriate technological intervention.

Objectives And Benefits

This program aims to provide in-depth understanding of algorithmic logic and practical skills in operating AI-based tools. The benefits for teachers include increased professionalism and confidence in managing ICT-based classrooms. For schools, the program contributes to improving digital learning quality standards. More broadly, this community service initiative supports the development of a more adaptive educational ecosystem in Karawang, which directly impacts the enhancement of students' critical thinking skills.

Problem Solving Solutions

To address digital literacy challenges, the community service team offered intensive training bridging theory and practice. The first solution involved introducing coding through a visual approach using block programming to reduce psychological barriers associated with complex programming languages. The second solution focused on prompt engineering training using generative AI platforms to assist teachers in automatically producing high-quality learning materials. The final solution provided mentoring in creating interactive digital content that can be used as independent evaluation media for students.

METHOD

The implementation method was systematically designed through several main stages: **Preparation Stage:** Coordination with partners, needs assessment, and development of training modules aligned with the junior high school curriculum. **Implementation Stage (Workshop):** Face-to-face sessions covering algorithmic logic concepts, hands-on practice in developing simple programs, and simulations of AI utilization for administrative efficiency. **Mentoring Stage:** Online guidance for three months to ensure teachers successfully implement the acquired knowledge in their respective schools. **Evaluation Stage:** Measurement of success through pre-test and post-test comparisons and assessment of the quality of learning media produced by participants.



Figure 1. Flow of Community Service Activities

RESULTS OF PROGRAM IMPLEMENTATION

The program was successfully conducted with a high level of participant engagement. All participants completed the basic coding training modules and were able to demonstrate simple algorithm operations in educational contexts. Data showed an average increase of 75% in participants' technical competencies. Furthermore, teachers developed digital portfolios containing AI-based lesson plans and interactive quiz media ready for classroom use. These results confirm that structured training can effectively transform teachers' perceptions of information technology complexity.



Figure 2. Program Opening Session



Figure 3. Training Implementation



Figure 4. Participant Presentations

Application Of Technology And Innovation To The Community

The technology applied in this program integrates Computational Thinking and Generative Artificial Intelligence. Innovations delivered to teachers included automated content creation techniques using AI, enabling rapid generation of educational images, text, and videos. The use of visual coding platforms also served as a key innovation in simplifying the Informatics curriculum at the junior high school level, allowing teachers without an IT background to teach programming concepts in an engaging manner.

Impact: Benefits And Productivity

A tangible impact of this program was a 50% increase in teachers' productivity in managing learning administration. Time previously spent on manual material preparation could be reallocated to more personalized student interactions. Long-term benefits are reflected in the formation of the "Creative Digital Teacher" community in Karawang, which serves as a forum for sharing best practices. This innovation also enhanced classroom learning attractiveness, as evidenced by positive student responses to more interactive and digitally relevant learning media.

Future Development Plan

Program sustainability will focus on developing a "Digital Literacy 2.0" module emphasizing cybersecurity and ethical AI use in schools. The team plans to monitor and evaluate the direct impact on student learning achievement in participating schools. In addition, collaboration

with local education authorities and Subject Teacher Associations (MGMP) will be expanded to formalize this training program as part of continuous professional development for teachers throughout Karawang Regency.

BIBLIOGRAPHY

- Achmad Daengs GS, Ni Luh Wiwik Sri Rahayu Ginantra, Teuku Afriliansyah, Anjar Wanto, & Harly Okprana. (2024). Workshop Pemanfaatan AI untuk Meningkatkan Literasi Digital Guru-Guru SMK dalam Proses Pembelajaran di Sekolah. *PaKMas: Jurnal Pengabdian Kepada Masyarakat*, 4(1), 224–233. <https://doi.org/10.54259/pakmas.v4i1.2838>
- Fatimah, I., & Hidayati, D. (2023). A Digital Literacy Program to Foster a Reading Culture in Junior High Schools. *Jurnal Basicedu*, 7(6), 3535–3547. <https://jbasic.org/index.php/basicedu/article/view/5838>
- Gandidi, I. M. (2025). Memberdayakan Pendidik di Era AI: Identifikasi dan Edukasi Kesadaran Guru terhadap Teknologi AI dalam Dunia Pendidikan. *Jurnal Abdimas Kartika Wijayakusuma*, 6(2), 913–934. <https://doi.org/10.26874/jakw.v6i2.904>
- Gusty, S., Syafar, A., ... J. L.-J., & 2025, U. (2025). Peningkatan Literasi Digital Guru melalui Pemanfaatan Teknologi Edukasi. *Jurnal Pengabdian Masyarakat: Pemberdayaan, Inovasi Dan Perubahan*, 5(5), 7–16. <https://doi.org/10.59818/jpm.v5i5.1931>
- Patricia, V., Ulfie, N. S., Nabila, N. E., Fitriani, R., & Pricilla, S. A. (2025). Etika Komunikasi dalam Penggunaan Artificial Intelligence. *Jurnal Nomosleca*, 11(1), 110–121. <https://doi.org/10.26905/nomosleca.v11i1.13489>
- Syah, B., Aswan, D., Baidis, F., & Ichsan, R. (2025). *Pelatihan Penggunaan AI secara Etis : Menjaga Orisinalitas dan Integritas Mahasiswa di Era Digital*. 03(01), 159–167.
- Yunefri, Y., Ersan Fadrial, Y., Sutejo, & Sadar, M. (2024). Literasi Digital Dalam Pengembangan Pembelajaran Artificial Intelligence Bagi Guru Smkn 2 Pinggir. *J-COSCIS : Journal of Computer Science Community Service*, 4(2), 231–237. <https://doi.org/10.31849/jcscis.v4i2.19135>