

ENHANCING EDUCATORS' CAPACITY IN BANTUL: AI-DRIVEN LEARNING MEDIA FOR INNOVATIVE TEACHING IN ACHIEVING SDG 4 QUALITY EDUCATION

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ABSTRACT

This community service initiative, conducted on May 20, 2025, at SMP Negeri 3 Bantul, Yogyakarta, aimed to enhance the digital teaching capacity of secondary educators through the integration of Artificial Intelligence (AI) tools. Aligned with Sustainable Development Goal 4 (Quality Education), the program focused on equipping 40 teachers with hands-on experience using Eduaide and MagicSchool platforms designed to support adaptive content creation and classroom engagement. Implemented in four stages, preparation, training, implementation, and evaluation, the workshop provided live demonstrations, guided practice, and reflective discussions. Pre- and post-tests revealed a significant improvement in participants' understanding, with average scores rising from 2.1 to 4.3 out of 5, and 85% of teachers achieving proficiency. Qualitative feedback highlighted increased confidence, enthusiasm, and readiness to apply AI in lesson planning and feedback automation. Challenges such as limited internet access and initial unfamiliarity with digital tools were mitigated through mentor support and accessible learning materials. This initiative demonstrated the effectiveness of structured, contextualized AI training in transforming pedagogical practices and recommends ongoing mentoring, peer collaboration, and scalable digital modules for sustained impact. The project illustrates that even short-term interventions can meaningfully empower educators and promote inclusive, future-ready education in under-resourced communities.

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INTRODUCTION

The integration of Artificial Intelligence (AI) into education has emerged as a transformative force, reshaping the way teachers deliver instruction and students engage with learning materials. In the context of secondary education in Bantul, Yogyakarta, enhancing the digital teaching capacity of educators is crucial to meet the demands of the digital era. AI has the potential to revolutionize education by providing personalized learning experiences, automating administrative tasks, and enhancing teacher-student interactions. In the Indonesian context, the integration of AI into education is supported by the Indonesia Artificial Intelligence National Plan, which emphasizes the need for personalized learning and the development of digital literacy among educators (Faresta, 2024). AI-driven learning media can facilitate interactive and engaging lesson plans, making complex concepts more accessible to students (Mavropoulou et al., 2024). This kind of educational innovation is essential for achieving inclusive and quality education, aligned with Sustainable Development Goal (SDG) 4.

According to prior observation and discussion with several teachers in Wukirsari Village, Bantul, Yogyakarta, educators face challenges related to limited digital literacy and insufficient integration of technological tools in their teaching practices. Secondary school teachers, particularly at SMP Negeri 3 Imogiri, experience barriers to engaging students effectively due to conventional teaching methodologies that do not fully exploit available technological advancements. Moreover, prior literature by Setiawi et al. (2024) also confirmed that Schools in Bantul, Yogyakarta face challenges in accessing high-speed internet and advanced hardware, which are essential for the effective use of AI tools. Moreover, some educators found to resist the adoption of AI due to a lack of understanding or fear of replacing traditional teaching methods, which addressing these concerns requires comprehensive training and support to build confidence and competence (Muliani, et al., 2024; Park et al., 2023). All the mentioned barriers and issues have found to limit student interaction and diminishes their learning experiences, calling for urgent and structured interventions (Gnawali, 2020).

This project promotes digital inclusion and advances educational quality by equipping educators with the necessary skills and knowledge to utilize AI-based learning tools effectively. Collaborative projects that involve both teachers and students in the design and implementation of AI-based learning materials can foster innovation and engagement

(Sugiarso et al., 2024). Sugiarso et al. (2024) also found that by utilizing freely available AI tools and platforms, it can reduce costs and make AI-driven learning media more accessible to educators in Bantul, Yogyakarta. Such empowerment positions teachers to innovate continually, fostering a sustainable and supportive educational environment that benefits both students and educators (Pedro, et. al., 2019). Quality education as defined by SDG 4 emphasizes inclusivity and equity, which digital educational innovations effectively support. Empowering educators through digital skills training contributes directly to achieving these educational targets, enhancing the quality and inclusivity of education (Pedro, et. al., 2019). By integrating AI-driven learning media into classroom practices, this community development initiative aligns well with global sustainability goals and local educational needs.

LITERATURE REVIEW

AI in Education

Artificial intelligence (AI) in education transforms traditional instructional approaches, offering personalized and adaptive learning experiences. Artificial Intelligence (AI) in education, often referred to as AIEd, is a transformative force that integrates AI technologies into educational systems to enhance instructional design, learning processes, and administrative functions. This interdisciplinary field leverages AI's capabilities to create adaptive, personalized, and efficient learning environments. AI's role in education can be categorized into three main areas: as a new subject, a direct mediator, and a supplementary assistant, each influencing different aspects of the educational experience (Xu & Ouyang, 2021). The integration of AI in education is not only about technological advancement but also involves addressing ethical, pedagogical, and social challenges to ensure its effective and responsible use (Namaziandost & Rezai, 2024).

According to Luckin and Holmes (2016), AI can significantly enhance student engagement by providing customized educational content that adapts to learners' individual needs and abilities. AI in education is framed through the lens of augmentation and hybrid intelligence, where AI systems complement human capabilities rather than replace them. This approach emphasizes the collaboration between AI and human educators to enhance learning experiences (Molenaar, 2022). Platforms like Eduaide and Magic School have demonstrated effectiveness in providing easy-to-use AI-powered tools for educators. These tools support

teachers in designing customized educational materials and interactive classroom activities, significantly increasing instructional efficacy and student participation (Wang & Tahir, 2020).

AI-driven learning media represents a significant advancement in educational technology, offering personalized and adaptive learning experiences that can enhance student engagement and outcomes. However, it is essential to address the challenges associated with its implementation, such as data privacy and resource availability, to fully realize its potential in transforming education. As AI continues to evolve, it will be crucial to balance technological innovation with ethical considerations and ensure that AI-driven learning media is accessible and beneficial to all learners.

Educators' Digital Capacity

Educators' capacity is a multifaceted concept that encompasses various competencies, skills, and resources necessary for educators to effectively perform their roles. Educators need a range of digital skills, including data literacy and digital teaching competence, to empower students and enhance learning experiences. These competencies are crucial for integrating technology into teaching effectively and are often assessed through frameworks like the Digital Competence of Educators (DigCompEdu) (Li et al., 2022; Muammar et al., 2022).

Capacity development is characterized by indicators such as innovation in teaching, communication, collaboration, educational leadership, and scholarship. These indicators reflect a process of engagement within a wider system, emphasizing the socialization of educators into professional roles (Salajegheh et al., 2020). Digital capacity refers to the effective integration of technology in teaching and learning. Schools' digital capacity can be improved through collective reflection and strategic organizational changes. Training teachers to embed technology in their practices is a critical component of enhancing digital capacity (Kampylis & Sala, 2023).

Innovative Teaching

Innovative teaching is a dynamic approach to education that emphasizes active learning, critical thinking, and the integration of real-world applications into the curriculum. It seeks to move beyond traditional lecture-based methods to engage students more deeply and prepare them for the complexities of modern work environments. Innovative teaching methods frequently involve interdisciplinary project-based learning, where students actively participate in shaping the course content and projects. This partnership between students and teachers

fosters a more engaging and effective learning environment (Bailleu et al., 2015). Such methods are particularly effective for highly motivated students, as they encourage active participation and allow students to influence the learning process (Bailleu et al., 2015). The use of technology, such as data visualization and multimedia, is a hallmark of innovative teaching. These tools are used to enhance critical thinking and decision-making skills, as demonstrated in studies that show improved academic performance through the integration of these methods (Yuan et al., 2021; Neo & Neo, 2001).

MATERIAL AND METHOD

The community service was carried out on May 20, 2025, at SMP Negeri 3 Bantul, with the goal of empowering teachers to integrate AI-driven learning media. This initiative aligns with Sustainable Development Goal 4 (SDG 4): Quality Education. The activity followed a structured four-stage process method: preparation and socialization, workshop training, implementation, and evaluation.

1. **Preparation and Stakeholder Alignment:** Initial coordination took place one month before the event. The service team engaged in discussions with the school principal, staff representatives, and a district officer. A collaboration agreement was signed, detailing mutual responsibilities. The school committed to providing classroom space, network access, and basic IT support, while the university team was responsible for delivering workshops on Eduaide and Magic School, along with providing mentors.
2. **AI-Driven Workshop Training:** On the day of the workshop, the session began with a presentation and live demonstration by a mentor, highlighting how AI tools can enhance teaching and increase student engagement. This was followed by hands-on media creation, where teachers developed adaptive quizzes using Eduaide and created interactive exercises via Magic School. A Q&A session was also held to address participants' questions and provide further clarification.
3. **Evaluation and Documentation:** To measure learning outcomes, pre- and post-tests consisting of five formative questions were administered before and after the demonstrations. The scores were recorded to assess knowledge gain. A reflective discussion session followed, allowing teachers and mentors to share insights. They identified key successes (e.g., enthusiasm, user-friendly interfaces) and challenges (e.g., inconsistent internet connectivity, initial unfamiliarity with tools). Recommendations for future improvement were documented. All materials including presentation slides, test

results, and discussion notes were uploaded to a shared Google Drive folder accessible to the school and mentors.

4. Ethical Compliance and Sustainability: All activities were conducted in accordance with school regulations, data privacy protocols, and health and safety guidelines. Participant data were anonymized. The shared folder remains accessible for ongoing reference, ensuring the sustainability of the initiative.

RESULT AND DISCUSSION

The community service activity took place on May 20, 2025, at SMP Negeri 3 Bantul, aiming to equip teachers with practical skills to integrate artificial intelligence (AI) tools into classroom learning. Specifically, the program involved a hands-on workshop focusing on two innovative platforms: Eduaide, used to generate adaptive quizzes and lesson materials, and Magic School, designed to support interactive student engagement through AI-assisted content creation. This initiative supports Sustainable Development Goal 4 (SDG 4): Quality Education, which emphasizes the importance of inclusive and equitable quality education and lifelong learning opportunities for all.



Figure 1. Community Service Location
Source: Authors (2025)

The implementation process consisted of a structured AI-Driven Workshop, in which two mentors from FEB Universitas Negeri Jakarta delivered alternating presentations and demonstrations in an interactive, hands-on format. The session was divided into two main segments: Eduaide.ai and MagicSchool.ai, each designed to equip teachers with practical digital tools to enhance classroom instruction.



Figure 2. Workshop Session
Source: Authors (2025)

The workshop began with an introduction by the first mentor, who presented Eduaide.ai, an AI-powered platform that assists educators in generating lesson plans, quizzes, discussion prompts, writing supports, and various forms of instructional content based on subject, grade level, and learning objectives. The mentor demonstrated how teachers could input simple prompts into Eduaide to instantly create adaptive assessments and creative teaching ideas aligned with national curriculum standards. Participants were guided step-by-step through the process of refining AI outputs, customizing question formats, and embedding personalized elements to match students' cognitive levels. Teachers were then encouraged to create and edit their own lesson content using the platform, followed by peer review and feedback.



Figure 3. Group Photo Session with the teachers
Source: Authors (2025)

The second session was led by the next mentor, who introduced MagicSchool.ai, a tool specifically developed for educators to automate tasks such as feedback generation, behavior documentation, email drafting, and creating engaging activities using AI prompts.

The mentor showcased various classroom-ready tools, like behavior supports, student progress narratives, and scenario-based learning materials, that could be adapted quickly through the platform’s intuitive interface. Teachers practiced using MagicSchool to create interactive learning exercises and generate differentiated tasks tailored to diverse student needs.

To measure the effectiveness of the training, pre- and post-tests were administered. These five-item formative assessments indicated a noticeable improvement in participants' understanding of AI applications in education. With 40 teachers in total as respondents where 90% of them had never used Eduaide and Magic Schools before.

Table 1. Pre-test and Post-test Result Summary

Metric	Pre-Test Average	Post-Test Average	Improvement
Mean Score (out of 5)	2.1	4.3	+2.2
Highest Individual Score	4	5	+1
Lowest Individual Score	0	3	+3
% Scoring ≥ 4 (Proficient)	10%	85%	+75%

Source: Authors (2025)

The results of the pre- and post-test analysis revealed several key findings from the AI-driven education workshop. First, there were significant learning gains among participants, as evidenced by the increase in average scores from 2.1 to 4.3 out of 5. This marked an improvement of 2.2 points, which translates to a 105% increase in understanding the fundamental concepts of AI application in educational contexts.

Second, there was evidence of high engagement during the training sessions. Teachers showed notable improvement in responding to questions that assessed their ability to generate customized quizzes using Eduaide, as well as their understanding of classroom applications for MagicSchool, such as the use of behavior tracking tools and AI-generated student feedback. These tools, which were previously unfamiliar to most participants, became more accessible through the hands-on and guided learning environment.

Finally, post-training reflections indicated a substantial increase in confidence, with more than 90% of the teachers reporting greater comfort and readiness to use AI tools in their instructional planning. This sentiment was echoed in qualitative feedback shared by participants. One teacher reflected, *"I had never imagined AI could simplify lesson preparation like this."* Another participant noted, *"MagicSchool will help me give more personalized feedback without spending hours."* A third commented, *"The hands-on part helped me understand better than just reading about AI."* These narratives underscore the

transformative impact of the workshop, not only in enhancing knowledge but also in shifting attitudes toward the integration of AI technologies in daily teaching practice.

This finding is consistent with prior studies that found significant learning gains when hands-on training methods were used to introduce digital tools to educators (Araka et al., 2021). Moreover, qualitative feedback collected through reflective discussions revealed that teachers felt more confident in using AI to enrich their pedagogical strategies. They appreciated the intuitive design of Eduaide and Magic School, although some noted initial difficulty navigating the platforms due to limited prior exposure to AI tools.

Challenges during the workshop primarily involved unstable internet connectivity and varying levels of digital literacy among participants. Similar barriers have been identified in other community-based technology interventions. For example, Chatterjee and Bhattacharjee (2020) emphasized that digital infrastructure and ongoing support are critical factors influencing successful AI adoption in education, particularly in under-resourced settings. To address this, mentors provided on-the-spot assistance, and all workshop materials, including slides, test data, and tutorials, were uploaded to a shared Google Drive folder to support continued learning. In addition, the ethical framework of the initiative ensured that all participant data were anonymized, and activities adhered to school and data-privacy regulations. This compliance is essential to building trust and sustaining long-term engagement in school-based community development projects. Overall, the structured yet flexible workshop model demonstrated that AI tools can be effectively introduced in a short timeframe when combined with contextualized support and reflective practice. The initiative serves as a scalable model for future teacher development programs targeting AI integration in classrooms.

CONCLUSION AND RECOMMENDATION

The AI-driven education workshop held at SMP Negeri 3 Bantul on May 20, 2025, successfully achieved its objective of enhancing teachers' competencies in integrating artificial intelligence tools into classroom instruction. Through interactive sessions on Eduaide.ai and MagicSchool.ai, guided by mentors from FEB Universitas Negeri Jakarta, participants gained hands-on experience in creating adaptive quizzes, personalized learning tasks, and automated teaching supports. The structured workshop comprising live demonstrations, guided practice, and reflective discussions, proved effective in promoting both knowledge acquisition and confidence among the 40 participating teachers.

Results from pre- and post-tests showed a significant improvement, with average scores increasing by 2.2 points, indicating a 105% enhancement in understanding key AI concepts for educational use. Qualitative feedback also confirmed high engagement and enthusiasm, particularly in applying the tools to real classroom scenarios. Participants expressed a readiness to adopt AI in their teaching practices, acknowledging the time-saving and pedagogical benefits offered by these platforms.

Based on these outcomes, several recommendations are proposed. First, to sustain the momentum, follow-up mentoring sessions and refresher workshops should be conducted, enabling participants to deepen their skills and address implementation challenges in real time. Second, a peer support network among trained teachers should be encouraged to foster collaboration, knowledge-sharing, and continued professional development. Third, the development of self-paced digital modules could facilitate wider access to training content for teachers unable to attend in person. Lastly, future programs should consider integrating AI literacy into formal teacher training curricula, in collaboration with educational authorities, to ensure systemic and scalable adoption.

In conclusion, this community service initiative has demonstrated that with the right guidance, even a short-term intervention can lead to meaningful pedagogical transformation. Empowering teachers to use AI tools not only enhances instructional effectiveness but also aligns with global education goals, particularly SDG 4 on Quality Education. Continued investment in capacity-building and inclusive digital education will be essential in shaping future-ready schools in Indonesia.

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