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Implementation of Deep Learning in The Kurikulum Merdeka using AI as An Innovative Learning Companion for The Yos Tech Community

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Abstract. The rapid growth of information and communication technology has reshaped educational practices and supported the implementation of Indonesia's Independent Curriculum (Kurikulum Merdeka), which emphasizes a deep learning approach. However, many schools still struggle to integrate technology and Artificial Intelligence (AI) meaningfully into classroom practice. This community service program was conducted at SDK Yos Sudarso Kepanjen to strengthen teachers' and students' technological literacy and to apply deep learning principles using AI-based tools. The program adopted the Information System Project Management framework, comprising five stages: initiating, planning, execution, monitoring and controlling, and closing. Activities included a needs analysis, the development of training modules, online Training of Trainers (TOT) for student facilitators, four onsite training sessions for teachers and students, a digital product showcase, and ongoing evaluation. The program involved 22 students (grades IV–V) and six teachers over an eight-month period. Pre- and post-training questionnaires indicated a 35% increase in digital skills and a 42% rise in student learning motivation. Teachers became more confident in utilizing tools such as Canva and ChatGPT, while students showed greater engagement and creativity in technology-supported learning tasks. The revitalized YosTech club emerged as a school-based digital learning community that fosters 21st-century skills. The findings suggest that structured AI-supported training can effectively bridge the gap between policy expectations of deep learning and actual practice at the elementary school level.

Key Words: artificial intelligence, deep learning, digital literacy, independent curriculum, primary education

INTRODUCTION

The rapid expansion of information and communication technology (ICT) has significantly influenced modern education systems, including the implementation of Indonesia's Independent Curriculum (Kurikulum Merdeka), which emphasizes a deep learning approach. The Directorate General of Primary and Secondary Education encourages the use of deep learning to create learning experiences that are meaningful, reflective, and student-centered (Ministry of Education and Culture, 2022) (Suyanto, 2023). This approach requires the systematic integration of technology into teaching and learning so that students can think critically, creatively, and adaptively in response to social and technological change (Zhao, 2021).

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In practice, however, observations at SDK Yos Sudarso Kepanjen indicate a number of constraints that hinder the optimal implementation of deep learning. The school does not yet have sufficient teaching staff with strong competencies in information technology, particularly in the educational use of Artificial Intelligence (AI) (Afrita, 2023). Students' technological literacy is also relatively low; many still struggle with basic skills such as using email and navigating simple digital platforms. The situation is compounded by infrastructural limitations, as only around eight computers are available for shared use by all students.

Teachers encounter similar obstacles in adopting technology for pedagogical purposes. The use of digital learning media remains minimal; facilities such as LCD projectors are underutilized, and high teacher turnover disrupts continuity in instructional planning and implementation (Darling-Hammond et al., 2020). These conditions underscore the need for targeted interventions to strengthen teachers' and students' capacity to adopt educational technology in ways that align with deep learning principles (Alvarez et al., 2022).

Despite these challenges, SDK Yos Sudarso Kepanjen possesses promising potential through its "YosTech" computer club, an extracurricular program intended to nurture students' interest in technology. Unfortunately, participation is still limited due to a lack of structured support and technological resources. Given the relatively small student population, the school actually has strong opportunities to implement more personalized, project-based, and participatory learning models (Darling-Hammond et al., 2020).

Based on this context, the community service program described in this article was designed to enhance technological literacy and support the implementation of deep learning for teachers and students at SDK Yos Sudarso Kepanjen. The training emphasized the use of AI-based applications such as Canva, ChatGPT, and other generative AI tools as innovative learning media. Activities were conducted face-to-face through direct school visits using laptops and computers as the main learning facilities. The program was expected not only to strengthen participants' digital competencies but also to revive students' interest in technology by reinforcing the YosTech community as an inspiring and sustainable learning hub.

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PROBLEM

A situation analysis and a series of discussions with the partner school identified several core issues that formed the basis of this community service initiative. These challenges are rooted in human resource limitations, inadequate infrastructure, and insufficient understanding of deep learning within the framework of the Independent Curriculum.

First, teachers at SDK Yos Sudarso generally lack sufficient background and skills in information technology. This condition has led to minimal innovation in digital-based learning practices. Most teachers still rely on traditional, teacher-centered methods and have not yet utilized AI-based technologies to enhance the effectiveness and relevance of instruction in today's digital era (Wahyuni & Arifin, 2022).

Second, many teachers have a limited understanding of the concept of deep learning promoted under the Independent Curriculum. They are often unsure how to integrate deep learning principles into classroom activities that foster creativity, collaboration, and higher-order thinking skills (Suyanto, 2023).

Third, the use of AI technology to support learning has not yet been optimized. Tools such as ChatGPT, Canva, and other generative AI platforms could be used as engaging and interactive learning media (Widodo et al., 2024) . However, due to limited technical competence and lack of exposure, teachers and students have not fully explored the pedagogical potential of these technologies (Susanti et al., 2023).

Fourth, students' interest in and skills related to technology are still relatively low. Their digital literacy remains at a basic level, even for tasks such as using email, presentation software, or online learning platforms (Yuliani & Anugrah, 2022). In fact, mastery of these fundamental digital skills is an important prerequisite for implementing deep learning effectively (García-Peñalvo & Corell, 2020; Halimah et al., 2021).

Finally, the potential of the YosTech technology club has not been maximized. Although this club was established as an extracurricular program to cultivate students' interest and talents in technology, its activities have not functioned optimally due to limited guidance and facilities. These conditions indicate a gap between government policy regarding the use of deep learning within the Independent Curriculum and the actual capacity of teachers and students in elementary schools. Structured training and mentoring are therefore needed to support the sustainable integration of AI-based deep learning at SDK Yos Sudarso Kepanjen.

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METHOD OF IMPLEMENTATION

The community service program was implemented using the Information System Project Management (ISPM) approach, which consists of five stages: initiating, planning, execution, monitoring and controlling, and closing (Project Management Institute, 2021) (Trilling & Fadel, 2019). This framework was selected to ensure that activities were conducted in a systematic and outcome-oriented manner.

Figure 1. Implementation Method of the MAG IbM 2025 Program.

The implementation process followed five systematic stages—Initiating, Planning, Execution, Monitoring & Controlling, and Closing—as illustrated in Figure 1. Each stage emphasized participatory collaboration among lecturers, student facilitators, teachers, and students to ensure measurable outcomes and program sustainability (Project Management Institute, 2021).

Initiating Stage

The initial stage began with a kick-off meeting between the project team and the partner school. During this meeting, both parties identified needs, agreed on the content and

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schedule of the training, and outlined the roles and responsibilities of all stakeholders. An initial assessment of participants' baseline technological abilities—both teachers and students—was conducted through simple digital literacy tasks and questionnaires. The results of this assessment served as the foundation for designing an appropriate training strategy.

Planning Stage

The planning stage involved preparing several key components, including:

- Administrative instruments such as attendance forms, activity logs, and documentation templates.
- Pre- and post-training questionnaires designed to measure changes in participants' digital skills and attitudes toward AI-based learning.
- Training modules containing step-by-step guides for using Canva, ChatGPT, Lummi AI, and Quizzes in classroom settings. These modules were designed to be practical, visual, and easily understood by both teachers and students.

Execution Stage

The execution stage focused on knowledge and skill transfer through the following activities:

- Training of Trainers (TOT) for student facilitators, conducted online, to prepare them for supporting activities during onsite training.
- Teacher and student training, held at SDK Yos Sudarso Kepanjen during May–June 2025, divided into four face-to-face sessions. Each session focused on a specific theme, such as AI tools for content generation, creative digital presentation design, and interactive assessment using Quizzes.
- Showcase Day, where participants presented digital products—such as interactive slides, posters, and simple learning media—created during the training. This activity aimed to build confidence and provide opportunities for peer feedback.
- Public dissemination, carried out through social media and university communication channels, to share program outcomes and inspire similar initiatives in other schools.

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Figure 2. Training session with teachers and students at SDK Yos Sudarso Kepanjen, focusing on Canva and ChatGPT practice sessions

The training phase was conducted in four sessions focusing on practical AI-based applications such as Canva, ChatGPT, and Quizzes. Teachers and students engaged in interactive, project-based exercises designed to enhance creativity, digital literacy, and collaboration in alignment with deep learning principles. This stage represented the most participatory component of the program, encouraging hands-on learning and immediate feedback.

Monitoring and Controlling Stage

Program evaluation was conducted using pre- and post-training questionnaires as well as field observations by the project team. The findings showed improvements not only in participants' technical skills but also in their motivation and confidence to use AI in the learning process. Follow-up discussions with school leaders resulted in two key sustainability strategies: (1) strengthening collaboration with parents as part of the deep

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learning ecosystem, and (2) developing simple educational applications or digital platforms to support continuous AI-integrated learning.

Closing Stage

The final stage focused on summarizing the outcomes of the program, compiling a comprehensive report, and preparing this scientific article for publication in the Journal of Community Practice and Social Welfare (JaCiPS), Universitas Ma Chung.

RESULT AND DISCUSSION

The program was implemented over approximately eight months, from initial planning to final evaluation, involving 22 students in grades IV–V and six teachers from SDK Yos Sudarso Kepanjen. Overall, the activities ran smoothly and achieved more than 80% of the planned targets.

Analysis of the pre- and post-training questionnaires indicated a notable improvement in both technological competence and learning motivation. Participants' technical skills increased by around 35%, particularly in using Canva and ChatGPT to produce digital learning materials. Furthermore, students' learning motivation rose by approximately 42%, as reflected in their enthusiasm, active participation during training, and willingness to engage in AI-assisted tasks (Alvarez et al., 2022) (Afrita, 2023).

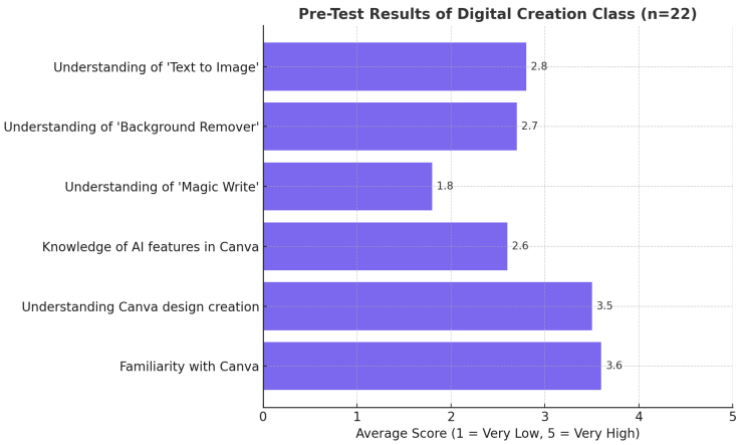

Figure 3. Pre-test results of the Digital Creation Class (n=22)

Pre-test results of the Digital Creation Class (n=22) on Figure 3, showing students' familiarity and understanding of Canva and its AI features before training. The results indicate limited prior knowledge of AI-related tools, highlighting the need for targeted instruction.

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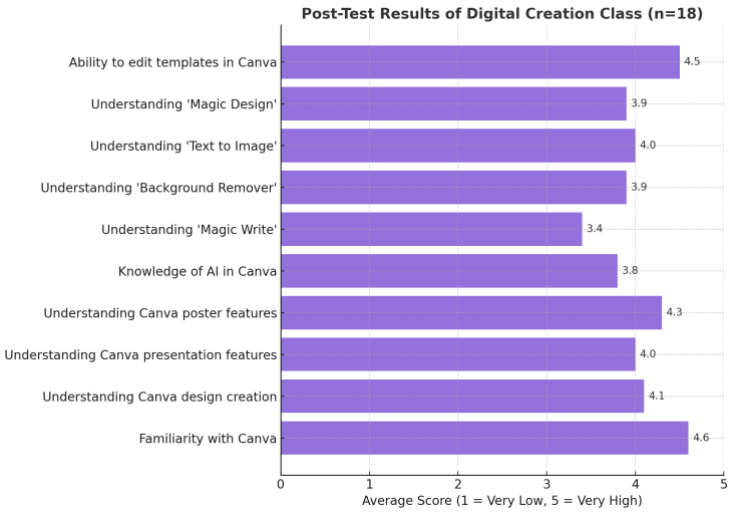

Figure 4. Post-test results of the Digital Creation Class (n=18)

Post-test results of the Digital Creation Class (n=18) on Figure 4, showing significant improvement in students' familiarity with Canva, AI-related features, and digital content creation skills after training.

The pre-training and post-training questionnaire results demonstrated a 35% increase in participants' technical competencies and a 42% rise in learning motivation. As shown in Figure 3 and Figure 4, participants displayed notable progress in understanding digital tools, implementing AI-supported learning, and showing higher engagement levels during classroom activities.

The program also succeeded in revitalizing YosTech as a digital learning community within the school. The club began to function not only as a place to practice basic computer skills but also as a platform for developing 21st-century competencies such as critical thinking, communication, collaboration, and creativity (Trilling & Fadel, 2019). Teachers started incorporating AI-based tools into their classroom practices, and students showed greater interest in technology-driven learning.

Several challenges emerged during implementation, including limited computer availability, variations in participants' initial skill levels, and unstable internet connectivity. These challenges were addressed by organizing small-group rotations for computer use, providing offline versions of learning materials, and applying gamification strategies through Quizzes to maintain engagement. This participatory and flexible

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approach helped ensure that all participants could benefit from the program despite infrastructural constraints.

The findings of this program are consistent with previous research indicating that the use of AI in education can enhance students' engagement, motivation, and higher-order thinking skills (Halimah et al., 2021; Afrita, 2023). Moreover, the collaborative model involving lecturers, university students, teachers, and pupils created a contextual digital learning ecosystem that aligns well with deep learning pedagogy and supports the broader goals of the Independent Curriculum (Xu & Wang, 2023).

The partners of this community service activity were very open and enthusiastic becouse as it met their current needs, as they were still struggling to adopt the Deep Learning concept within the Kurikulum Merdeka. Therefore, they agreed to contribute:

a. Conducting a more detailed discussion regarding this (Implementation of Deep Learning in the Merdeka Curriculum using AI as a Learning Friend Innovation for the Yos Tech Community).
b. Preparing the relevant human resources, like as teachers and students from the Yos Tech community, for the implementation of this activity.
c. Providing devices for student practical needs.
d. Providing tutorial materials to support the implementation of Deep Learning in the Kurikulum Merdeka using AI.

CONCLUSION

The community service program titled Implementation of Deep Learning in the Independent Curriculum Using AI as an Innovative Learning Companion for the Yos Tech Community successfully achieved its main objectives. The initiative significantly improved the digital competencies of teachers and students at SDK Yos Sudarso Kepanjen through AI-integrated training implemented within the Independent Curriculum framework.

Evaluation results showed a 35% increase in participants' technical skills and a 42% improvement in student learning motivation. Teachers became more capable of integrating tools such as Canva, ChatGPT, and other generative AI applications into their teaching practice, while students demonstrated higher levels of enthusiasm, creativity, and participation in technology-based learning activities.

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In addition, the program established a collaborative and participatory model involving lecturers, students, teachers, and pupils in implementing deep learning in a contextual manner. In the long term, this initiative is expected to contribute to the development of a sustainable AI-based learning ecosystem at the elementary school level that can be adapted and replicated by other educational institutions.

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