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## DEEP LEARNING (DL) AND ARTIFISIAL INTELLIGENCE CODING (AIC) at SMPN 2 MATARAM

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### Abstract

*Artificial Intelligence Coding (AIC) and Deep Learning-oriented Learning (DL) are instructional components introduced in the Merdeka Curriculum to improve learning quality and students' competencies. This study aims to describe the implementation of Deep Learning-oriented Learning and the readiness for implementing Artificial Intelligence Coding at SMP Negeri 2 Mataram. A qualitative research approach was employed using direct interviews with school stakeholders, followed by descriptive data analysis. The findings indicate that Artificial Intelligence Coding has not been implemented as an independent subject but remains integrated within the Informatics course. This situation is influenced by limited human resources, as coding education is relatively new and only one teacher has participated in basic training. Meanwhile, Deep Learning-oriented Learning has been implemented based on the principles of mindfulness, meaningfulness, and joyful learning through the 8-3-3-4 structure. However, its implementation has not been optimal due to large class sizes ranging from 45 to 47 students. These results suggest that the implementation of Artificial Intelligence Coding and Deep Learning-oriented Learning is still at a developmental stage and requires further strengthening to support effective learning practices.*

**Keywords:** Artificial Intelligence Coding, Deep Learning-Oriented Learning, Merdeka Curriculum, Junior High School, Learning Implementation.

### INTRODUCTION

The development of science and technology in the era of the Industrial Revolution 5.0 has brought significant changes to the world of education, especially through the emergence of various innovative learning approaches that emphasize the development of higher-order thinking skills. One such approach is Deep Learning (DL), which is a learning model that encourages students to understand concepts in an essential way, develop analytical skills, and connect knowledge with real situations in a reflective and critical manner.

On the other hand, advances in Artificial Intelligence (AI) have opened up new opportunities in the learning process. AI not only functions as a tool, but also as a technological ecosystem that can personalize material, provide quick feedback, and create a more adaptive learning experience. The integration of DL with AI is expected to strengthen a learning ecosystem that is more effective, humanistic, and relevant to the needs of the 21st century.

SMPN 2 Mataram, as one of the junior high schools in Mataram City, has begun to integrate PM principles and the use of AI into the learning process. This effort is a strategic step to improve the quality of learning and align it with the demands of the Merdeka Curriculum, which emphasizes independence, creativity, and digital literacy skills among students. This situation makes SMPN 2 Mataram an interesting case study, particularly in terms of how DL and AIC are applied in practice, what the supporting and hindering factors are, and to what extent this approach contributes to improving the quality of student learning. Therefore, this article was written to thoroughly examine the implementation of Deep Learning (DL) and Artificial Intelligence Coding (AIC) at SMPN 2 Mataram as part of educational transformation in the digital era.

## METHOD

This study uses a descriptive qualitative approach to describe in depth the application of Deep Learning (DL) and the use of Artificial Intelligence (AI) in the learning process at SMPN 2 Mataram. This approach was chosen because it allows researchers to examine phenomena more deeply in a natural setting, especially those related to learning practices, classroom interactions, and the dynamics of artificial intelligence technology use in the school environment. This research was conducted at SMPN 2 Mataram with the main subjects being teachers directly involved in DL and AI-based learning. In addition, the principal was also involved as a supporting informant to obtain information related to policy and program implementation. The research subjects were determined using purposive sampling, which is the deliberate selection of informants based on their involvement and relevance to the research focus.

Data collection was carried out through observation, semi-structured interviews, and documentation. Observation was used to obtain a direct picture of the DL flow, teacher-student interactions, and the use of AI tools or applications in learning activities. Interviews were conducted to explore the experiences, perceptions, and challenges faced by teachers. Documentation in the form of lesson plans, teaching modules, assignment results, and photos/videos of learning were used as supporting evidence for field findings.

The data were analyzed using the Miles and Huberman model, which includes data reduction, data presentation, and conclusion drawing. Reduction was carried out to select important information related to the implementation of DL and AI, then compiled in a descriptive narrative data presentation to find patterns and relationships between findings. Data validity was tested using source, technique, and time triangulation to ensure the consistency and accuracy of information obtained from various informants and methods.

## RESULT AND DISCUSSION

### A. Deep Learning (DL)

Deep learning is a learning approach that places comprehensive understanding of concepts at the center of learning activities. In this method, students are not only encouraged to memorize or recall information superficially, but are also invited to understand the meaning of these concepts deeply and critically. This approach encourages students to be actively involved in the learning process, enabling them to relate knowledge to real-world experiences and complex situations. Thus, the learning process is not passive, but rather dynamic and meaningful. In practice, teachers act as facilitators, helping students in the process of discovering and developing their own knowledge. Teachers provide guidance and challenges that encourage students to think at a higher level, such as analyzing, evaluating, and creating solutions to various problems they encounter. Through this approach, students are encouraged to develop positive character traits such as creativity, collaboration, and critical and analytical thinking skills. This makes learning not only about filling the brain with information, but also about shaping personalities and life skills that are important in the real world.

Methods commonly used in DL include problem-based learning and inquiry learning. Problem-based learning encourages students to solve authentic problems that are relevant to their lives. Meanwhile, inquiry learning emphasizes the process of discovery through questioning and independent investigation. Both methods stimulate students' curiosity and develop their research and analysis skills. Thus, students do not merely receive knowledge, but also actively practice and internalize concepts. A simple example of the application of Deep Learning is when students are given the task of understanding the concepts of force and motion. Students are not only asked to memorize the definitions of force and types of motion, but are also invited to conduct simple

experiments, such as pushing and pulling objects around them, such as books or boxes. Teachers can challenge students to observe how objects move when pushed strongly or weakly, then discuss the results of these observations in groups. Students are also asked to explain why objects move differently based on the force applied. Through these activities, students actively experience the concepts of force and motion firsthand, then relate theory to real-world practice. They are encouraged to think critically and express ideas or conclusions based on their observations. With this approach, students gain a deeper understanding of the material because they not only memorize concepts, but also apply them and develop their analytical and communication skills in a simple and enjoyable way.

The results of an interview with Mrs. Dra. Ni Nengah Sri Swathi, Principal of SMP Negeri 2 Mataram (Spendu), revealed that in schools, deep learning is not actually something new, but it is currently being promoted again by the government and has become the basis of the Merdeka Curriculum. The main approach used in this curriculum is the deep learning approach. Previously, we used the scientific approach, but now deep learning has become the main focus. Teachers have actually started to implement it, but it is not yet optimal. Starting from the design or planning stage of learning, teachers have been trained to use the deep learning approach, but the orientation still needs to be improved. In deep learning, there are principles that must be integrated into the learning plan, such as student learning awareness, meaningfulness, usefulness, and whether the learning is enjoyable or not. All of these principles must be incorporated into the learning design. In addition, there are four learning frameworks, as well as the main principles of deep learning, which consist of three parts: conscious, meaningful, and joyful or enjoyable. For learning experiences, there are three stages, namely understanding, applying, and reflecting. Overall, the concept of deep learning is known as the 8-3-3-4 structure, which consists of eight dimensions of the Pancasila Student Profile, three learning principles, three learning experiences, and four learning frameworks. One of the challenges we face in implementing deep learning is the large number of students. One class can have 45 to 47 students. Under these conditions, it is quite difficult for teachers to ensure that each child is truly learning with self-awareness. The large number of students makes it quite difficult to apply the principle of awareness in deep learning.

#### **B. Coding and Artificial Intelligence (AIC)**

The implementation of Coding and Artificial Intelligence (AIC) at SMP Negeri 2 Mataram reflects the school's adaptive stages in responding to the Merdeka Curriculum policy, which emphasizes strengthening 21st-century competencies, digital literacy, and student readiness to face technological developments. The Merdeka Curriculum provides flexibility for educational units to develop learning in accordance with the context, resource readiness, and student needs. In this context, the fact that CA has not yet been implemented as an independent subject can be understood as a form of gradual adjustment to this policy.

The interview results show that AIC learning is currently still integrated into Informatics subjects. This integration is in line with the principles of the Merdeka Curriculum, which encourages cross-concept learning and the strengthening of essential competencies before the formation of new separate subjects. However, limited human resources, particularly the number and competence of teachers with special training in coding, pose a major challenge to the implementation of this policy. This situation highlights the gap between national policy direction and implementation readiness at the school level.

In terms of implications, the integration of AIC into Informatics allows students to continue to gain an initial introduction to the concepts of coding and artificial intelligence

without having to wait for the formal curriculum to be fully ready. This provides an opportunity for schools to gradually build digital literacy and prepare a technology-based learning ecosystem. The school's plan to make coding a standalone subject in the 2026/2027 academic year demonstrates an institutional commitment that is in line with the vision of the Merdeka Curriculum in encouraging learning innovation.

However, the challenges faced are not limited to the curriculum and teacher competencies, but also to the availability of infrastructure and equitable access to technology for students. Although the school has provided around 20 computers in the ICT room, limited internet access and differences in the ownership of learning devices among students have the potential to widen the learning gap. Therefore, the implementation of AIC requires a systemic approach that involves continuous improvement of teacher capacity, adequate infrastructure support, and inclusive school policies so that the objectives of the Merdeka Curriculum in creating fair, relevant, and sustainable learning can be optimally achieved.

## CONCLUSION

Based on the results of the study, it can be concluded that the implementation of Deep Learning (DL) and Artificial Intelligence Coding (AIC) at SMP Negeri 2 Mataram is still in the development stage. PM has begun to be implemented in accordance with the principles of the Merdeka Curriculum, namely conscious, meaningful, and enjoyable, with an 8-3-3-4 framework. However, its implementation is not yet optimal due to classroom limitations. Meanwhile, AI has not been implemented as an independent subject and is still integrated into Informatics lessons. This condition is influenced by the limited number of teachers who have special training in AI, as well as limited supporting infrastructure. Nevertheless, the school has shown its commitment to developing AI gradually through learning integration and long-term planning. Therefore, it is necessary to strengthen teacher competencies, improve infrastructure, and provide sustainable policy support so that the implementation of DL and AIC can run more optimally in accordance with the objectives of the Merdeka Curriculum.

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