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Implementation of Deep Learning in the IPAS Subject at Islamic elementary school

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Abstract: The purpose of this study is to analyze the implementation of deep learning in the IPAS (Integrated Natural and Social Sciences) subject at Madrasah Ibtidaiyah Al-Mukarromah. This research uses a qualitative approach with a phenomenological method. Data collection techniques include interviews, observation, and documentation. The data analysis technique uses the Miles, Huberman, and Saldana model, which consists of data condensation, data display, and data verification. The research findings show that the implementation of deep learning in the IPAS subject has applied the principles of conscious learning, meaningful learning, and joyful learning. IPAS learning also applies learning experiences, including understanding, applying, and reflecting. The obstacles faced in IPAS learning include limited time allocation, lack of technology-based facilities and infrastructure, and insufficient funds for teaching aids. The methods used in implementing deep learning include discussion, project-based learning, and problem-based learning.

Keywords: Deep Learning, IPAS, MI Al-Mukarromah.

Introduction

Indonesia faces complex future challenges due to technological advancement and increasing social diversity. Education must prepare a generation that is independent, creative, adaptive, and capable of critical thinking. Although access to education has increased, the quality remains low, as reflected in PISA results and disparities between regions. Teaching methods are still traditional and do not yet foster 21st-century competencies. To realize Indonesia Emas 2045 and take advantage of the demographic bonus, educational transformation is needed through Deep Learning, which emphasizes conscious, meaningful, and joyful learning. Deep Learning encourages critical thinking, creativity, and collaboration, and serves as the foundation for new policies to improve the quality and equity of national education (Fairuz Nida Salsabila, 2024).

The definition of deep learning implementation in the grade 3 IPAS subject refers to the changes in the Merdeka Curriculum, where Natural Sciences (IPA) and Social Sciences (IPS) are combined into a single subject called IPAS. IPAS contains integrated content from both IPA and IPS, and the textbook is provided in a unified IPAS format. The subject matter in IPAS is closely related to nature and human interaction. Therefore, IPAS learning must present relevant contexts related to the students' environment and real-life situations (Fairuz Nida Salsabila, 2024). The advantages of the IPAS subject include encouraging students to connect new information with prior knowledge, developing conceptual understanding, fostering critical reflection, and applying knowledge in real contexts (Nasution et al., 2024). This approach aligns well with science learning because it emphasizes inquiry, problem solving, and contextual understanding.

Deep learning must be implemented at all education levels, especially in the IPAS subject. The learning objectives of IPAS in the Merdeka Curriculum include developing students' curiosity, encouraging active participation, enhancing

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inquiry skills, enabling students to understand themselves and their environment, and strengthening conceptual understanding (Rasmani et al., 2023). With these objectives, IPAS is expected to equip students with knowledge and skills needed to face future challenges.

Based on observations and interviews with Ustadzah Muslimatun, IPAS learning at MI Al-Mukarromah has implemented the principles of deep learning, namely conscious, meaningful, and joyful learning. This is supported by school policies and teacher readiness, along with adequate learning facilities. Teachers apply varied learning approaches such as using learning media, group discussions, and Problem-Based Learning (PBL), enabling students to learn through real-world problem solving and direct experience. However, the implementation still faces obstacles, especially limited funding for teaching aids and limited availability of technology-based learning facilities. Teacher and student readiness also influence the process, especially since IPAS learning requires exploration and experimentation. Overall, the implementation of deep learning in IPAS at MI Al-Mukarromah shows a positive direction toward more meaningful learning.

Previous research has discussed innovations and the use of learning media in IPAS. A study by Donna Meylovvia and Alfin Julianto (2023) explains that innovation in IPAS learning under the Merdeka Curriculum has influenced teaching media and methods, and improved students' critical thinking. Another study by Dhella Angelina Fitri et al. (2024) shows that technology-based learning media create an interactive and innovative learning environment, and increase student motivation and creativity, although challenges remain due to the digital literacy of teachers and limited facilities. However, both studies did not examine the implementation of deep learning specifically in IPAS at SD/MI. Therefore, this study focuses on exploring the implementation of deep learning in IPAS at Madrasah Ibtidaiyah.

IPAS learning at the elementary level plays an essential role in shaping students' fundamental knowledge and attitudes toward the natural environment and social life. Through observing, investigating, and discussing, students are trained to think critically and scientifically. Besides broadening their understanding of the interaction between humans and their environment, IPAS also fosters a sense of responsibility and environmental awareness. Therefore, IPAS becomes an important foundation for instilling scientific and social character from an early age.

The purpose of this study is to analyze the implementation of deep learning in the IPAS subject at Madrasah Ibtidaiyah Al-Mukarromah. This study aims to describe the application of deep learning principles, including conscious, meaningful, and joyful learning, and to identify students' learning experiences in understanding, applying, and reflecting on the material. In addition, this study also aims to analyze constraints in implementing deep learning, such as limited time, limited technology-based facilities and infrastructure, insufficient funding for teaching aids, and identify the learning methods used, including discussion, project-based learning, and problem-based learning.

The problem formulation of this research is: How is the implementation of deep learning in the IPAS subject at Madrasah Ibtidaiyah Al-Mukarromah, including the application of deep learning principles, students' learning experiences in understanding, applying, and reflecting, the obstacles encountered such as limited time, infrastructure, and funding, and what learning methods are used, such as discussion, project-based learning, and problem-based learning.

Methods

This study uses a qualitative approach with a phenomenological research design. The phenomenological method, also known as the study of developments, is a method in educational research that seeks to examine and analyze educational issues that are currently developing and of high concern in the field (Muliawan, 2014). The research was conducted at MI Al-Mukarromah. The research subjects include the IPAS teacher and the third-grade students. Data collection techniques used are interviews, observation, and documentation.

Data validity was ensured using triangulation techniques. Triangulation is a key concept in qualitative research that functions to increase accuracy, validity, and depth of data analysis (Arianto, 2024). The data analysis technique follows the Miles, Huberman, and Saldana model, consisting of: Data Condensation, which refers to the process of selecting, simplifying, abstracting, and transforming data from field notes, interview transcripts, documents, and other empirical materials. Data Display, which organizes the information into a structured form that allows conclusion drawing and action. Verification, which involves testing and confirming whether the data collected and the techniques used meet research requirements (Ayu, 2016).

Results

1. Implementation of Deep Learning in IPAS (Integrated Sciences)

Teachers do not merely transfer material but strive to instill deep learning through three main pillars. This implementation is described in more detail as follows:

Conscious LearningThis is the foundation where students realize the "why" behind their learning. The teacher starts at the apperception stage by clearly conveying the learning objectives, not just "Today we will learn about X," but "Today we will investigate X so that we can understand why Y happens around us." For example, when discussing the water cycle, the teacher does not just explain the concept of evaporation but links it to everyday occurrences: "Why do clothes hung out to dry become dry? Where does the water go?" By explaining the purpose (understanding the water cycle) and its relevance (explaining everyday phenomena), students consciously know that the information they are about to receive is useful and important.

Meaningful LearningThis aspect connects theoretical concepts from books with students' real-life experiences. IPAS material that is often abstract (such as food chains or changes in the shape of objects) is turned into something concrete. The teacher actively uses the school environment as a place of learning. For instance, instead of just memorizing the roles of producers and consumers, students are invited to the school garden to directly observe the small ecosystem there: "Try to find out, who acts as the producer in this garden? What would happen if the caterpillar population (primary consumer) became too large?" This direct experience makes the concept feel "alive" and meaningful, as students can see, touch, and analyze within a real context.

Enjoyable LearningFor students to understand well, they must be emotionally and cognitively engaged. The teacher strives to avoid the boredom of passive learning (sitting, listening, taking notes) by using various methods. The "simple media" referred to can be self-made guessing cards to discuss parts of plants, or bringing dry leaves for identification. "Games" can be a group quiz with a scoreboard, or role-plays where students act as planets orbiting the sun. This active form of interaction ensures that learning is a dynamic social process, not a silent individual activity, making the atmosphere in the classroom more positive and the material easier to understand.

Picture 1. *The teacher conveys the learning objectives.*

Picture 2. *Joyful Learning.*

2. Challenges in the Application of Deep Learning

Although the application of these deep learning methods sounds ideal, in practice, teachers face various significant structural and material obstacles:

Time Constraints Deep learning, especially that involving exploration and projects, is very time-consuming. The limited IPAS class hours often force teachers to focus more on achieving material targets (coverage) rather than increasing deeper understanding (depth). Exploration activities, such as long-term monitoring (observing sprout growth) or PjBL projects, often have to be shortened or even ignored. As a result, teachers are forced to return to faster methods (such as lectures) to ensure all curriculum material is delivered, even if this sacrifices the quality of student understanding.

Lack of Technology FacilitiesMany things in IPAS such as blood circulation, the earth's rotation, or photosynthesis are conceptual and difficult to understand just by using a whiteboard. The limitation of LCD projectors in classrooms makes it difficult for teachers to display simulation videos, interactive animations, or high-resolution detailed images. However, dynamic visualization is essential to help students understand complex processes. Without this technology, teachers tend to rely more on textbooks and oral explanations, which may not be enough to meet various student learning styles.

Budget Limitations for Teaching Aids For optimal IPAS learning, teaching aids that meet laboratory standards are needed, such as models of the human body, microscopes to examine cells, electrical experiment kits, or solar system models. However, budget constraints mean schools cannot provide these tools. As an alternative, teachers need to be creative in using simple materials at hand, such as creating a lung model from a recycled bottle and balloons. Although this creativity is to be appreciated, these simple teaching aids often cannot replace the accuracy and functionality of standard teaching aids, so the understanding of scientific concepts becomes less deep.

Picture 3. *Simple teaching aids (animal metamorphosis).*

Picture 4. *Teaching aids (animal reprodiction).*

3. Learning Methods Used to Support Deep Learning

To overcome existing challenges and still apply the principles of deep learning, teachers combine several of the following active methods:

Group Discussion (Simple Case Analysis)This method shifts the focus from the teacher to the students. The teacher does not provide direct answers but presents trigger questions. For example: "What is the reason plants in a room look yellower than those outside?" Students will discuss in groups, debate, and formulate hypotheses. This process trains them to analyze variables (light, water), understand cause-and-effect relationships, and express their ideas these cognitive processes are much higher than merely recalling that plants need photosynthesis.

Project-Based Learning (PjBL)This method aims to create a real product from the application of knowledge. Projects are tailored to the context. For example, a "simple experiment" could involve planting green beans with different treatments (given water, not given water) and making a report on their growth. A "thematic poster" could be the task of creating a campaign poster "Protect the River Ecosystem" after learning about environmental pollution. Through PjBL, students learn about time management, research, collaboration, and most importantly, they see the real application of the IPAS concepts they have learned.

Problem-Based Learning (PBL) Unlike PjBL, which emphasizes the final product, PBL begins with a relevant real problem. The teacher raises an issue close to the students, such as: "Why is garbage piling up behind our school?" To find a solution, students are "pushed" to study various IPAS concepts comprehensively: they must understand the types of waste (organic/inorganic), the decomposition process (biology), and the impact of pollution on soil and water (ecology). Learning occurs based on the need to find solutions, making the material learned highly relevant and easy to remember in the long term.

Picture 5. *PBL Activites*

Picture 6. *Group discussion.*

Discussion

1. Implementation of Deep Learning in IPAS Lessons

The findings show that IPAS learning at MI Al-Mukarromah has implemented the core principles of deep learning, namely conscious, meaningful, and joyful learning. Teachers connect IPAS concepts with students' real-life experiences, such as observing the surrounding environment or conducting simple experiments. This approach helps students not only memorise information but also understand, apply, and reflect on the material they learn.

This implementation aligns with the goals of the Merdeka Curriculum, which emphasises critical thinking, creativity, collaboration, and communication. Teachers act as facilitators who

guide students in discovering concepts through questioning, discussion, and hands-on activities. These findings reinforce the argument of Widayanti & Surindra (2022), who state that deep learning is achieved when students are able to connect lesson content with real-life contexts. Similarly, Permatasari (2021) highlights that meaningful learning increases motivation and long-term conceptual understanding.

Overall, IPAS deep learning at MI Al-Mukarromah indicates positive progress, making students more active, improving understanding, and supporting the development of higher-order thinking.

2. Obstacles in Implementing Deep Learning

Despite its successful implementation, several obstacles still hinder the optimal application of deep learning. The most prominent challenge is limited instructional time, which restricts teachers from carrying out all phases of deep learning, such as deeper exploration, experimentation, and reflection. In addition, limited technology-based facilities and infrastructure reduce opportunities to integrate digital media or advanced teaching tools.

Funding limitations also affect the availability of additional equipment needed for experiments or projects. These findings are consistent with Maryani & Fauziah (2020), who found that lack of facilities often disrupts innovative learning implementation in primary schools. Furthermore, teacher and student readiness also plays a significant role. Not all teachers are proficient in using educational technology, and some students are still not used to active learning models that demand more participation and critical thinking.

As Apriani (2023) emphasises, adequate tools and simple learning laboratories are essential to support exploration-based science activities. Without sufficient support, deep learning cannot be fully maximised.

3. Methods Used in Deep Learning

To support deep learning, IPAS teachers at MI Al-Mukarromah apply several active and student-centered learning methods. The methods commonly used include group discussions, Project-Based Learning (PjBL), and Problem-Based Learning (PBL).

Group Discussions, where students exchange ideas, collaborate, and construct understanding together. According to Putri (2022), collaborative discussions strengthen collective knowledge building and improve students communication skills. Project-Based Learning (PjBL), such as creating water cycle models, mini ecosystems, or observation reports. These activities train responsibility, collaboration, and real-world problem-solving. Fitriyani & Setiawan (2021) note that PBL improves conceptual understanding and investigative skills in primary school students. Problem-Based Learning (PBL), where students solve authentic problems related to their environment, such as waste or pollution issues. This aligns with Hmelo-Silver's (2004) view that PBL encourages critical thinking, inquiry, and deeper conceptual understanding.

Through these methods, teachers do not only deliver content but also guide, facilitate, and accompany students in making meaning from every learning activity. This ensures that IPAS learning becomes more engaging, meaningful, and aligned with the principles of deep learning.

Conclusions

This study discusses the application of deep learning in IPAS subjects at Madrasah Ibtidaiyah Al-Mukarromah. The results show that teachers have applied deep learning by creating a conscious, meaningful, and enjoyable learning atmosphere. Students are actively involved in understanding, practising, and reflecting on the material being studied. This learning makes the learning process more lively and helps students understand the relationship between science and everyday life. Although the implementation has been good, there are still several obstacles such as time constraints, lack of technology-based facilities, and a lack of teaching aids due to limited funds. To overcome this, teachers use methods such as discussions, projects, and problem-based learning that help students learn more deeply. The application of deep learning has been proven to

improve students' critical thinking, cooperation, and curiosity. It also helps them learn in a more meaningful and enjoyable way. Therefore, teachers are expected to continue to improve their skills in using learning media and technology, and schools need to provide adequate facilities and infrastructure to optimise learning activities.

Conflict of Interest: The authors declare that there are no conflicts of interest concerning the publication of this article.

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