Artificial Intelligence In Science Learning In Primary Schools

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Abstract

Ease of access to information is both an advantage and a challenge for today's young generation. Students who are faced with easy access to information must be able to analyze and filter the information they receive from an early age. The development of this technology also needs to be balanced with efforts to develop Indonesian human resources. Through the independent curriculum, it is hoped that the quality of Indonesian human resources will be higher. The Merdeka Curriculum has an essential difference by combining science and social studies at the elementary school level to become science. In this research, science subjects were collaborated with a technology-based learning model using Artificial Intelligence, with the aim of describing students' abilities when taking part in the learning. This research was conducted using a descriptive qualitative approach. Four data collection techniques were used to describe this research, including interviews, observation, questionnaires, and documentation. The results of this research show that science and science learning in elementary schools using Artificial Intelligence is very interesting for students with 95% indicators of learning interest. The use of Artificial Intelligence also trains students in accessing information and being more careful in sorting information. A finding that is no less interesting is that in the Artificial Intelligence learning process, there needs to be special and specific guidelines, so that students can achieve the Learning Goals efficiently.

Keywords: Artificial Intelligence, Science Learning, Students Abilities

INTRODUCTION

The massive use of technology makes it easier for humans to carry out their duties. Searching for information and adding insight is very easy to achieve in this technological era. Moreover, with the existence of artificial intelligence, humans are greatly helped by its existence. Artificial intelligence can adapt to each student's learning style, pace, and learning preferences, providing a more customized and effective educational experience. Artificial intelligence-powered tools can also provide immediate feedback and support, helping students identify and address their weaknesses in real-time. By introducing artificial intelligence in elementary schools, we are preparing the next generation with the necessary skills to navigate and thrive in a technology-driven world, improving critical thinking skills, and problem-solving skills among elementary level students.

While artificial intelligence can provide instant feedback and adaptive learning experiences. This allows students to develop at their own pace and overcome their areas of weakness, it is important to consider the potential challenges and ethical implications of implementing artificial intelligence in elementary education. Privacy concerns arise because artificial intelligence requires the collection and analysis of student data, raising questions about data security and ownership. In addition, there are concerns about the impact of artificial intelligence on social development, students who are engrossed in the world of technology, often prioritize the real environment around them, because this can limit face-to-face interactions and human relationships in the learning process. Therefore, it is important to carefully navigate these challenges and ensure that the benefits of artificial intelligence in elementary education outweigh the potential risks.

Teachers play an important role in providing emotional support, guidance, and social interaction to students. More than that, the role of the teacher is very key in implementing this

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learning. Therefore, it is necessary to integrate Artificial Intelligence technologies as tools to enhance teaching and learning, rather than replace them completely. Additionally, artificial intelligence can help identify and address the specific learning needs of students with disabilities or special needs, creating a more inclusive and accessible educational environment for all.

Exploring the long-term implications of integrating Artificial Intelligence into elementary education, such as preparing students for future careers that may rely heavily on technology and the development of critical thinking skills. By aligning artificial intelligence in elementary education, students will not only become familiar with the technology, but also learn how to navigate and adapt to the ever-evolving digital landscape. This will equip them with the skills necessary to thrive in a technology-driven society and become active contributors to the workforce of the future. Additionally, by encouraging critical thinking skills, artificial intelligence can help students analyze and evaluate information, promote deeper understanding of complex concepts, and encourage creativity and innovation. Ultimately, the integration of artificial intelligence into elementary education has the potential to revolutionize the way students learn and prepare them for their future endeavors (Bates, Cobo, Mariño, & Wheeler, 2020; Luan et al., 2020; Pedro, Subosa, Rivas, & Valverde, 2019).

The integration of *Artificial Intelligence* in the Science and Social Studies curriculum has the potential to revolutionize education by tailoring the learning experience to meet the needs and abilities of each student (Ahmad, Rahmat, Mubarik, Alam, & Hyder, 2021; Chen, Chen, & Lin, 2020; Nurmawati, 2023). *Artificial Intelligence* allows students to analyze large amounts of information, by applying this learning, students identify knowledge gaps, and provide targeted interventions to ensure each student develops effectively. Additionally, *Artificial Intelligence* can provide personalized recommendations for additional reading or resources, cultivating a love of learning and encouraging students to explore topics that interest them. By harnessing the capabilities of *Artificial Intelligence* , education can become more inclusive, engaging, and effective for all students (Myint & Aung, 2016; Putri Supriadi, Haedi, & Chusni, 2022). *Artificial Intelligence* is not only about machines and humans, but also about how we live. As a methodology to make the environment more intelligent, civilization. Just as we learned letters over time, in the era of the 4th Industrial Revolution,'AI Gate' that allows you to know how to use AI and implement and develop it It is important to develop 'literacy' (Aoun, 2017; KOFAC, 2019). As Artificial Intelligence develops rapidly, Artificial Intelligence a new Artificial Intelligence convergence education linked to each subject education, It emerged as a successful educational paradigm. Education-related organizations In relation to AI convergence education, the existing curriculum Innovate educational goals, educational content and methods, and evaluation requires a process (Kim, 2016). In particular, the educational content and Methods are continually being developed as needed for future society. It must be good and the learner can accept this knowledge. rather than learning where the learner creates knowledg eIt must be converted (Shin, 2016; Kim, 2016).

Additionally, *Artificial Intelligence* can play an important role in creating adaptive assessments that precisely measure student progress and identify areas of improvement. Traditional standardized tests often fall short of covering the full range of a student's abilities and can be a source of stress and anxiety. With *Artificial Intelligence* , assessments can be tailored to each student's unique strengths and weaknesses, providing a more comprehensive and accurate evaluation of their knowledge and skills (Hidayanti & Listiyani, n.d.; Kim, Kim, Lee, & Kim, 2020a, 2020b). This not only facilitates a more personalized learning experience, but also empowers educators and parents to better understand students' specific needs, so they can provide targeted support. By learning through *Artificial Intelligence* , students are expected to be better able to explore their knowledge in science and social science materials. Based on the

background of this problem, researchers want to explore appropriate learning in utilizing *Artificial Intelligence.*

RESEARCH METHODS

This research uses descriptive qualitative research to describe appropriate learning in studying science through *artificial intelligence- based learning* (Aurini, Heath, & Howells, 2021; Moleong, n.d.). Important facts in the application of *Artificial Intelligence* are summarized and analyzed using a scientific method, so that the findings in this research can be justified (Sigstad & Garrels, 2018; Stori, 2014; Tracy, 2019). This research was conducted using four data collection techniques, namely interviews, observation, documentation and questionnaires. Interview activities were carried out by researchers to explore the perceptions of teachers and students when this learning took place. Interviews were also conducted to confirm the observation activities carried out. In this research, the researcher acts as a non-participative observant, where in this research, the researcher only observes and becomes a third person in the learning, in other words, the researcher is not actively involved in the learning process (Alam, 2021; Apriana, 2022; Jacobson & Mustafa, 2019). The documents taken in this data collection technique are a means of strengthening the primary data. In this case, the documents analyzed by researchers are administrative learning documents owned by teachers. The final collection technique is a questionnaire technique, where students are given statements related to the learning process. This was done by researchers to see students' responses to the ongoing learning. For more details on the data collection techniques chosen for this research activity.

Tabel 1. Research Methods

No.	Collection Techniques	Objective	Guidelines
1	Interview	Perceptions regarding the AI learning process in elementary science and science learning	Teacher: Planning, Implementing, evaluating *Artificial Intelligence learning* Students: Student responses to learning science and technology with *Artificial Intelligence*
2	Observation	Observation of the continuity of the learning process	Class situation Student activity Enthusiastic students Achievement of learning objectives
3	Documentation	Amplification of sensed field data	Teacher Lesson Plane Science Curriculum Achievements Notes on student learning outcomes Teacher's journal
4	Questionnaire	Describe student feedback and responses to *Artificial Intelligence learning*	Student interest Student Engagement Student attitude Student abilities

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RESULT AND DISCUSSION

Implementing artificial intelligence learning in elementary schools requires a careful approach and is appropriate to students' needs and capacities. Science learning in elementary schools is based on Artificial Intelligence, starting with the introduction of the concept of Artificial Intelligence to students. At this introductory stage, students need to understand that Artificial Intelligence can be beneficial and can be detrimental. Like a double-edged sword, technological development always brings negative impacts. And this needs to be anticipated well in advance.

What needs to be prepared at this stage is also the condition of adequate facilities and infrastructure. Especially on the internet network. Often the main problem in implementing artificial intelligence learning is unstable network conditions, this of course creates big problems in learning. The internet network is the main lifeblood in the learning process based on Artificial Intelligence. At another planning stage, teachers also need to determine what *Artificial Intelligence* programs can facilitate or support these learning activities. The choice of this program must of course be adjusted to the learning objectives and characteristics of the students.

Formulating curriculum content is also an absolute must for the continuity of learning. Teachers need to analyze Learning Achievements (CP) and operationalize CP into a learning objective. After the teacher has mapped the curriculum content and analyzed student needs, the learning planning process can be carried out well.

The development of materials in implementing *Artificial Intelligence learning* is a core part of the learning process. This is because in learning *Artificial Intelligence* students can explore their learning through their curiosity and critical thinking skills. After the teacher has designed the development of the material, the teacher is also expected to be able to design the ongoing learning process. This easy access to information means that students need to be guided with appropriate rules, so that learning objectives can occur on target. In its implementation, teachers often make verbal guides, which students often do not understand, therefore, the guidelines/rules in *Artificial Intelligence-* based science and science learning need to be supplemented with student worksheets which serve as a reference for students in exploring the material.

Evaluation is also the core thing in this learning planning. It is hoped that evaluation activities will include the main points in this discussion. The science and science learning materials were developed through science and science learning outcomes, therefore evaluation activities were also aimed at targeting this. The following indicators are used to measure the level of achievement of learning objectives.

Tabel 2. The Level of Achievement of Learning Obejectives

No	Aspects of Science	Socio-Cultural Aspects
1	Science knowledge	Intellectual Skills
2	Science Research	Social Skills
3	Science as a way of thinking	Collaboration Skills
4	Science Interaction	Internalization of Values

Meanwhile, after the planning stage was completed, researchers conducted research on the implementation of *Artificial Intelligence-based science and science learning activities. Of the 25 students who took part in Artificial Intelligence* learning, 80% of students actively participated in the learning process and 20% of students chose to be both listeners and listeners. After we studied, 20% of students who tend to be quiet are indeed not feeling well, so these 20% of students are more active in cognitive activities, rather than speaking or other physical activities.

Artificial Intelligence learning evaluation analysis , 60% of students received the predicate as proficient, and 30 students received the predicate as skilled and 10% of students received the predicate of starting to develop.

CONCLUSION

Implementing artificial intelligence (AI) learning in elementary schools requires a careful approach, starting with introducing AI concepts to students to make them aware of the positive and negative impacts of this technology. Preparation of facilities and infrastructure, especially internet networks, is also crucial to avoid technical obstacles. Teachers must select AI programs that suit learning objectives, formulate curriculum content, and design learning materials that allow students to explore and develop their critical skills. Developing clear materials and guidelines is the main focus in implementing AI learning, ensuring students can understand the rules well. Evaluation plays a central role, and from the research results, 80% of students are actively involved in AI learning, while 20% are active listeners for health reasons. The evaluation shows that the majority of students achieved the title of proficient, providing a picture of the successful implementation of AI learning based on Artificial Intelligence in elementary schools.

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