



Conceptualizing Artificial Intelligence for Elementary School Teachers to Enhance Students Digital Literacy

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Abstract. The digital world has entered the 4.0 era along with the rapid development of artificial intelligence. But there are still many teachers who do not understand the concept of artificial intelligence to be used in designing learning. In addition, students are required to have good digital literacy. This study aims to conceptualize the use of artificial intelligence to teachers to be able to design learning that can improve the digital literacy of elementary school students. This research uses the literature review method by collecting, reviewing, and analyzing various library sources relevant to artificial intelligence, and elementary school digital literacy. The use of artificial intelligence for teachers in designing learning to improve students' digital literacy involves utilizing AI technology to create a more adaptive, interactive, and effective learning experience. Elementary school teachers need to pay attention to several aspects that utilize artificial intelligence to improve students' digital literacy, namely (1) Personalization; (2) Content adaptation; (3) Automated monitoring and evaluation; (4) Material recommendations; (5) Simulation and game-based learning; (6) Predictive analytics; and (7) Quick feedback.

Keywords: Artificial Intelligence, Digital Literacy, Elementary Teacher, Enhance Student Literacy.

1 Introduction

The development of technology in the 21st century is increasingly rapid. The rapid development of technology requires everyone to have certain skills to be able to face the challenges that will be faced in everyday life. That's because technology has profoundly changed the way we think, feel, act, and how we communicate and interact with each other [1].

Meanwhile, the education sector is undeniably significantly affected by AI [2]. Technological advances are rapidly and tremendously changing the way we learn and teach. The world is currently moving towards the fifth generation of Internet of Things jobs in education, and there has been an increased interest in the integration of artificial intelligence (AI) applications in teaching and learning. As a result, the educational landscape is changing gradually. Such technologies aim to adapt to the various needs and situations of learners and to increase competition in the global world of education.

AI is increasingly campaigned because it has strategic value for education. AI was developed to be dedicated to addressing cognitive problems commonly associated with human intelligence. According to recent research in the field of AI-based learning, the more space available to learn using modern applications, the more opportunities there are to improve the education system and keep up with developments. Because AI plays various important roles in the teaching-learning process and its components, it has the potential to play a significant and real role in the present and future of students [3].

The widespread use of AI in education may not guarantee teachers' ability to use it in the classroom, nor does it guarantee the quality of teaching because teachers may not be fully prepared to implement AI-based teaching. There is still a group of teachers who view the application of technology in the classroom negatively and do not tend to use it but rather continue to use traditional teaching materials and methodologies [4]. Concerns about the use of new techniques may hinder teachers' efforts to apply technology in their work [5]. Therefore, a basic understanding and knowledge of AI should be a critical component in student education to encourage the formation of successful global citizens. For this reason, it is necessary to understand elementary school teachers about the concept of artificial intelligence in digital literacy.

3.1 Artificial Intelligence

Artificial intelligence (AI) is a concept and tool that is prevalent and already found throughout society and is an integral part of everyday life. AI is one such computer system inspired humans use their nervous system to understand, learn, think, and take appropriate actions [4]. In its most advanced form, AI may have skills like learning, recognizing situations, solving problems, and communicating in natural language like humans [6].

The implementation of AI in education has begun to be considered a fundamental pillar in teaching and plays an important role in assisting teachers in their role as facilitators and assessors of learning. This is indicated by the possibility to analyze large data about the learning process collected from students, teachers, and schools [7]. An example is a chatbot, which is an AI-based program with technology that recognizes and understands speech and then responds appropriately, providing personalized learning support through tools as diverse as computers, mobile devices, and speakers. The interaction between chatbots and classroom learners can aid learning by providing a platform for new educational paradigms in various disciplines [8].

AI can be an effective learning tool that reduces the burden on teachers and students and offers an effective learning experience for students. AI applications can facilitate students in computer-powered collaborative learning, teaching automation and evaluation, detect learners' emotions, and recommend useful pairs for students [9]. There are four categories of AI applications that have common roles, including intelligent tutors, tutees, learning tools/partners, and policy-making advisors [10].

Supported by current educational transformations such as digitization of educational resources, and personalized learning experiences, so there are many opportunities for the utilization of AI applications in education and teaching [11][12].

Teachers are now trying to explore the use of AI Technology to facilitate their work and enhance student learning. As [13] interact with a dialogue system that allows students to interact with chatbots to improve language learning and visualization training.

1.2 Digital Literacy

In today's digital world, AI has a relationship with literacy which can be called AI literacy. AI literacy has become an essential literacy skill necessary for everyone to know and use AI as a tool to live, learn, and work in the digital world, and it should be taught since elementary school [14][15]. Recent researchers propose the term "AI literacy" to bring up the importance of adding AI to 21st-century digital literacy skills for everyone, including children [16]. AI literacy is a set of competencies that enable people to evaluate, communicate, and critically collaborate effectively with AI [17].

2 Method

The narrative Literature review method was used in writing this article. Study materials are obtained from various sources such as google scholar, semantic scholar and Science Direct. Various papers were obtained to be reviewed in the form of research articles in journals and review articles sourced from proceedings. The collected library materials are then reviewed and analyzed. The study materials obtained are certainly related to artificial intelligence in education and digital literacy.

3 Findings and Discussion

3.1 AI Challenges in Learning

There is a lot of concern among teachers about whether AI is challenging their jobs or even replacing teachers as many other jobs are being replaced by automation [18]. There is an emerging recognition that teachers' professional roles will need to adjust as AI advances, and this will trigger new forms of organization [19]. Emerging challenges also include students' attitudes towards these changes [20].

In the classroom case, there are several challenges to using artificial intelligence. These challenges include (1) relevant learning resources offered by AI are still lacking; (2) teachers' understanding in applying AI technology effectively in learning is still limited; (3) AI technology is limited to a discipline so that it is relatively inappropriate for use in all learning; (4) AI technology can increase the digital divide in the student environment, meaning that this AI technology can only be utilized by certain students (competent students) [21]so the ability of teachers needs to be improved in order to be able to utilize technology effectively.

Although AI displays and predicts intelligent computing in the educational domain, it generally fails to bring "added value" to large-scale students due to cost concerns, and the mainstream is still occupied by "basic values [22]. Some researchers are finding that many AI techniques are designed for general situations that cannot meet

specific domain needs, specific learning activities, or teaching objectives. This will prevent the actualization of personalized learning experiences [23].

When understanding AI, students will focus on basic AI concepts, skills, attitudes and even knowledge. In this case, students know the technology and even the working process such as when AI props/learning tools are run. In addition, students are also taught the application of AI concepts in solving a problem [24].

Another challenge is that teachers' attitudes towards AI have a significant influence on the effectiveness of using AI in education. Teachers can swing from a complete rejection of over-dependence. The former can arise from inadequate, inappropriate irrelevant, or outdated professional development. The latter may be due to the teacher's unrealistic expectations. These teachers may focus too much on emerging AI technologies rather than learning itself [18].

From a student's perspective, AI techniques can provide smart and efficient tools that cause students to avoid doing the knowledge processing work teachers expect them to do. For example, AI translators can offer ready-made illustrations pronunciations, fixed phrases, and even a series of examples. Students are thus unwilling to engage in processes of inquiry that facilitate deep learning.

To some extent, students as digital citizens can leverage AI for their digital literacy. Nonetheless, they may fail to use appropriate AI techniques appropriately for a particular learning context, which will result in negative attitudes towards learning [10]. AI can threaten the safety of teachers as well as students when providing false and misleading information or suggestions [25]. Even so, AI provides many ready-made software for self-study or teacher-assisted learning. The software can be used in discussions and exchanges, which is reflected in the development of the educational process as a whole [22]. As a result, AI applications contribute to the educational process through their impact on content, teaching methods, calendars, and communication.

3.2 Aspects of Utilizing Artificial Intelligence to Improve Digital Literacy of Students

AI is used as a development tool for the construction of intelligent learning environments, which can focus on developing algorithms including classification matching, recommendation, and deep learning for teaching and learning purposes [7]. That way the use of AI can support learning that occurs in the classroom by combining AI and various learning sciences aimed at stimulating and advancing the development of AI-based educational applications that display flexibility personalization, adaptiveness and effectiveness.

Literacy with AI is important for learners to improve many aspects of child development, such as theory of mind skills, creative inquiry, emotional inquiry, and collaborative inquiry [26][27].

Nowadays it is important to equip children with digital skills and mindsets to prepare them for future studies and facilitate their daily lives. For this urgency, AI can provide support in terms of literacy. That's because AI applications can receive, store and process information and promote self-directed learning, which helps teachers to account for individual differences among students, thereby improving students' ability to process the information they obtain.

The adaptive learning environment is based on the plurality and diversity of content presentation according to each student's learning methods and preferences.

(1) personalization can be done by leveraging AI to provide personalized learning experiences in four main ways: monitoring student input, assigning appropriate assignments, providing effective feedback, and implementing interfaces for human-computer communication. Human-computer interaction is generated to enhance characteristics such as creativity, responsibility, and critical thinking that can affect learners' performance and perception [7]. By utilizing AI such as visualization techniques can be applied to encourage learners' reasoning [28].

(2) content adaptation. With AI, teachers can create smart Content. This concept is very important because educational robots can develop digital content at a high level and AI can help digitize textbooks or create viable digital learning interfaces [23]. AI-based VR tools and applications can also be integrated into teaching, thus providing multi-sensory stimuli, and greatly assisting in mastering learning and reaching previously unimaginable depths of knowledge and providing learners with an interactive and lively learning environment and allowing them to explore freely and learn independently [29].

(3) automated monitoring and evaluation can also be applied to AI-based assessments. This is driven by using the application of AI in the design and correction of tests and performance tasks. Therefore, the next step in the learner path is determined [29]. With AI can help learners to be used as a form of evaluation to assess whether students have captured enough concepts for a given topic [18].

(4) material recommendations. AI includes those involving human factors as important variables for identifying and analyzing learners' personal features [7] Therefore, by utilizing AI, teachers can more easily compile literacy-based teaching materials according to the needs of students.

(5) Simulation and game-based learning. It is about using AI methods and applications in simulating human teaching and providing learning activities that are compatible with the learner's knowledge needs along with constructive and direct feedback [22]. AI can provide an application dimension consisting of compassion computing, role-playing, immersive learning, and gamification [7]. This AI simulation approach can be used to mimic thoughts that track reasoning visually in real time. The findings suggest that the sequence of connected arguments is chained together for learners to make a conclusion [20] That way students can be more involved in learning. Engaged learners can better understand different levels of organization in complex systems [10]. Therefore, student engagement is an important aspect that must be considered for learning design that aims to support digital information processing.

(6) Predictive analytics can also be done by utilizing AI to assist teachers in designing learning and overcoming problems that exist in learning. For example, the modeling potential of AI techniques has been systematically harnessed to develop reactive and adaptive tutorials for the construction of a divided learning environment as compensation for teacher shortages using intelligent guidance systems [30].

(7) Quick feedback. One of the challenges that interfere with learning is improper content order. The restructuring of the presentation sequence seeks ways to redefine the organization of knowledge according to student reactions. In this situation, feedback is an important approach to meet learners' proximal learning patterns [30].

Therefore, the application of developed AI needs to be based on algorithms to offer feedback, reasoning, and adaptive learning to students [7].

4 Conclusion

The use of artificial intelligence for teachers in designing learning to improve students' digital literacy involves utilizing AI technology to create a more adaptive, interactive, and effective learning experience. From the student side, when understanding AI, students will focus on the basic concepts of AI, skills, attitudes and even knowledge. In this case, students know the technology and even the work process such as when AI teaching aids / learning are run. Elementary school teachers need to pay attention to several aspects that utilize artificial intelligence to improve students' digital literacy, namely (1) personalization; (2) content adaptation; (3) automated monitoring and evaluation; (4) material recommendations; (5) Simulation and game-based learning; (6) predictive analytics; (7) Quick feedback. Based on this paper, it is recommended to conduct further research on how the picture of elementary school teachers in Indonesia in utilizing artificial intelligence technology to carry out learning. This paper is limited to providing a conceptual understanding of the use of artificial intelligence in digital literacy in primary schools. So further research is still needed related to the extent of the ability of elementary school teachers to use artificial intelligence in learning, especially in improving student literacy.

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