Early Childhood Education Teachers' Perceptions of the Use of Artificial Intelligence Technology

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A B S T R A K

Penelitian ini bertujuan untuk menggali persepsi guru pendidikan anak usia dini terkait pemanfaatan teknologi *artificial intelegence* (AI) guna menjawab tantangan perkembangan zaman di era society 5.0. Penelitian ini menggunakan pendekatan kualitatif deskriptif, dan pengumpulan data melalui survey yang diberikan kepada 103 orang responden dari kalangan guru pendidikan anak usia dini dan kajian literatur yang relevan. Selanjutnya seluruh data yang terkumpul baik dari kajian literatur maupun hasil survei dianalisis untuk dideskripsikan. Adapun hasil penelitian menunjukkan bahwa lebih dari setengah yaitu sebanyak 54,9% responden mengaku belum mengenal bahkan belum menerapkan teknologi AI, khususnya dalam mendukung pembelajaran yang lebih menarik di dalam kelas. Bagi sebagian responden lain yang sudah pernah mengenal dan menerapkan aplikasi AI seperti Canva, sosial media dan google search menyatakan bahwa aplikasi AI telah terbukti memberikan manfaat besar dalam meningkatkan keterlibatan dan pengalaman belajar anak. Sebagian besar responden yaitu sebanyak 46 orang menunjukkan sikap positif terhadap teknologi ini dan bersedia mengadopsinya dalam pembelajaran di kelas jika diberikan pelatihan serta dukungan yang cukup. Penelitian ini menyarankan perlu adanya kolaborasi antara stake holder yang ada yaitu pemerintah, lembaga pendidikan, dan masyarakat untuk menyediakan pelatihan serta fasilitas teknologi yang memadai guna memastikan penerapan AI yang efektif dalam pendidikan anak usia dini. Dengan demikian, AI diharapkan dapat memperkaya pengalaman belajar bagi anak usia dini sekaligus mampu menjawab tantangan perkembangan zaman di era society 5.0.

A B S T R A C T

This research aims to explore the perceptions of early childhood education teachers regarding the use of artificial intelligence (AI) technology to answer the challenges of current developments in the era of society 5.0. This research uses a descriptive qualitative approach, and data collection through literature reviews and surveys given to 103 respondents from early childhood education teachers. Next, all the data collected from the literature review and survey results are analyzed to be described. The research results show that more than half of the respondents admitted that they were not familiar with or even had not implemented AI technology, especially in supporting more interesting learning in the classroom. Some other respondents who have been familiar with and implemented AI applications such as Canva, social media and Google Search stated that AI applications have been proven to provide great benefits in increasing children's engagement and learning experiences. Most respondents showed a positive attitude towards this technology and were willing to adopt it in classroom learning if provided with sufficient training and support. This research suggests that there is a need for collaboration between existing stakeholders, namely the government, educational institutions and the community to provide adequate training and technological facilities to ensure the effective implementation of AI in early childhood education. In this way, it is hoped that AI can enrich the learning experience for young children while also being able to answer the challenges of current developments in the era of society 5.0.

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1. INTRODUCTION

The use of Artificial Intelligence (AI) technology continues to increase significantly and develops rapidly from year to year. Modern technology with increasingly sophisticated features, (Mira et al., 2024) AI has become a key component in the development of educational technology, facilitating innovation in teaching and learning methods. The use of AI in education allows the development of more personalized and adaptive learning models, influencing the way material is delivered and simplifying the role of teachers in the classroom (Sari et al., 2024).

AI technology originates from a concept that allows computers and computing systems to carry out complex tasks and is usually carried out using human intelligence (Anwar, 2024). Since the 1950s, when the concept of AI was first introduced, its development has experienced a significant surge in various fields (Handoko et al., 2024). The increasingly rapid development of technology creates its own challenges for the world of education in responding to it.

The application of AI technology in education, especially in early childhood education, is able to provide a learning environment that involves children's learning experiences, this is in accordance with the constructivism theory put forward by Vygotsky and Piaget (Sugrah, 2020). A meaningful learning experience for children is when they can interact directly with material that is appropriate to their level of understanding (Subroto et al., 2023). AI technology is able to provide interaction between children and technology while providing material according to the child's abilities (Aslan & Arnadi, 2024). Apart from that, AI technology can act as a digital teacher in the classroom, providing learning materials that can suit children's needs. For example, applications that can assess reading ability and then adjust the level of difficulty of reading or activities according to each child's development, so that learning can take place at the pace and needs of each individual (Riana et al., 2025), so AI technology is increasingly in demand because it can help realize various aspects of learning that were previously difficult to implement through general learning methods.

AI technology is also very beneficial for Early Childhood Education teachers because by implementing AI technology, teachers can get real-time feedback that is useful for quickly adjusting teaching strategies based on children's needs (Zawacki-Richter et al., 2019). In addition, there is research that states that the application of AI technology can ease the administrative burden of teachers, such as automatic assessment and monitoring of child development (Kritandani et al., 2024). Thus, teachers have more time to develop curriculum and interact personally with children in class.

The world of education, including early childhood education, needs to innovate in teaching and learning methods to face the challenges of the 5.0 society era (Amalia & Munif, 2023). Children are not only equipped with basic skills, but also the ability to think critically, creatively, and solve problems. According to (Wijaya et al., 2016) technology plays an important role in creating adaptive and dynamic learning needed to develop skills in the 5.0 society era, so that children are ready to face the challenges of the times. Therefore, the application of AI technology in early childhood education is expected to be a solution to overcome these challenges by creating a more personal and interactive learning environment. Although AI has enormous potential, its application in education is still not optimal (Fauziddin & Ningrum, 2024). Many educational institutions, especially in developing countries like Indonesia, still face obstacles in integrating this technology into the learning process. One of the obstacles faced is that the application of AI technology in education must be accompanied by strict regulations to ensure the protection of student data, considering that children are a group that is vulnerable to data misuse (Miao et al., 2023). Another obstacle is the digital divide, where access to AI technology is not evenly distributed across educational institutions and teachers' lack of understanding in understanding and implementing AI in learning (Solihat & Wulandari, 2023).

The existing problems are further exacerbated by the lack of adequate training for teachers and the uneven distribution of technological infrastructure in various schools, especially in early childhood education, and there have even been many studies on the application of AI technology for elementary and secondary school teachers to higher education. The research includes research conducted by (Asbara et al., 2024) entitled "Application of AI as a Learning Process Aid at Elementary School Education Level" where this study examines the provision of training to elementary school teachers so that with the help of AI, teachers can improve soft skills in the learning process, for example making learning materials more interesting and easier for students to understand through learning media and videos, and integrating AI into daily teaching and learning activities. Likewise, research conducted by (Mira et al., 2024) entitled "Application of AI in Learning to Improve the Quality of Education at SMAN 3 Bukittinggi" where this research discusses the impact of implementing AI technology at SMAN 3 Bukittinggi, for example in making learning plans and implementing several applications such as AI Virtual Mentor, Voice Assistant, Smart Content, Presentation Translator, Global Subjects, Automatic Assessment, and Personalized Learning so that it can improve teaching standards for students.

In addition, there is also research on the application of AI also conducted in universities, for example research conducted by (Mustika et al., 2024) entitled "Utilization of Artificial Intelligence (AI) in the Learning Process in Basic Science Courses for Science Education Students, Semarang State University" where in this study the researcher wanted to examine the application of AI during learning science courses which have great potential to increase the efficiency and effectiveness of the education system. Several types of AI that can be used in the world of education include Canva, Google Meet, Zoom, Mozilla Firefox, ChatGPT, and so on. However, the use of AI technology also has a negative impact if it is not used wisely so that it can reduce critical, creative, and innovative attitudes in students, so strict regulations are needed in handling the negative impacts of the application of AI technology.

Based on the results of various studies above, it appears that the application of AI technology in elementary, secondary and higher education has shown significant results in improving the quality of education, especially in terms of personalization of learning and increasing children's involvement in learning. However, research that specifically examines the application of AI technology in the context of early childhood education is still very limited. In addition, further research is needed to explore the introduction and application of AI technology in early childhood education environments. Therefore, this study aims to determine the perceptions of Early Childhood Education Teachers on the Use of Artificial Intelligence Technology.

2. METHOD

This research is a descriptive qualitative research that uses data collection techniques through surveys, where descriptive qualitative research is a type of research that processes descriptive data based on interviews (Yuliani, 2018). The survey was conducted from January 13 to February 13 2025 and was attended by 103 Early Childhood Education teachers in East Java as respondents to this research. These teachers were selected with the consideration that they experienced digital transformation as a result of the society 5.0 era. This questionnaire was distributed to respondents in the form of a Google form via social media, namely WhatsApp. The contents of the questionnaire consist of questions asked to Early Childhood Education teachers regarding getting to know AI-based applications and the types of applications they have accessed. Questionnaire data were analyzed using descriptive statistics. Next, all data collected from the literature review and survey results were analyzed for description.

3. RESULT AND DISCUSSION
3.1 RESULT
This research aims to determine the perceptions of Early Childhood Education Teachers regarding the Use of Artificial Intelligence Technology. Based on the results of a questionnaire filled out by 103 respondents, it was stated that more than half of the respondents stated that they had never accessed an AI-based application as shown in Figure 1.
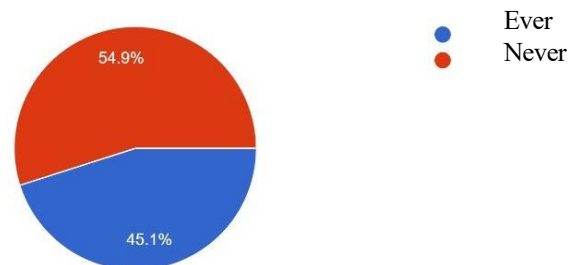

Figure 1

Early Childhood Education Teachers' Introduction to AI-Based Applications

Based on the data above, 54.9% stated that they had never accessed an AI application, while another 45.1% stated that they had never accessed an AI application. Of the 45.1% of respondents who had accessed AI applications, they said that the Google Search application was the most frequently accessed application, namely 74.1%, next was the GPS application (Google Maps, Waze, etc.) at 70.2%. Meanwhile, the Employee Presence application is the application that is least frequently accessed by respondents, this application is only accessed by around 5 people out of 103 respondents or 10.6%, as shown in figure 2.

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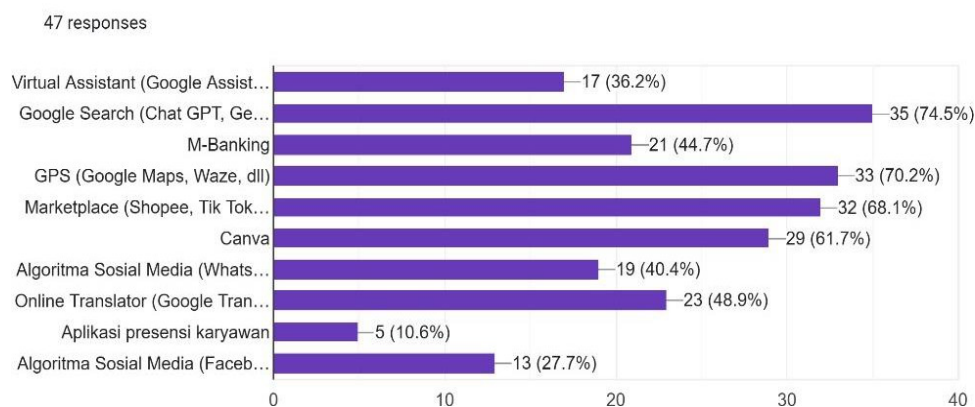

Figure 2.

Ever Accessed AI Applications

Apart from that, researchers also obtained data from respondents regarding the applications that are most liked/interested by early childhood education teachers, which can be seen in Figure 3, where this application is really liked by respondents. The application is Canva which is the most preferred application by 27.7% of respondents, the Social Media Algorithm application including WhatsApp, Facebook, Instagram, etc. is in second place at 25.5% and the Google Search application is in third position with an acquisition of 21.3%. Meanwhile, the Google translate, Virtual Assistant and GPS applications are the AI applications that are least liked because only 1 respondent each or 2.1% said they liked the application.

Figure 3.

Most Liked AI Applications

Respondents also stated that they spend several hours a day accessing AI applications. There are 29.8% or 14 people who spend 10-30 minutes a day accessing AI applications. Meanwhile, 19.1% spend 1-2 hours a day accessing AI applications. There were also respondents who stated that it took more than 3 hours a day to access AI applications, namely around 5 people or 10.6%. This can be seen in figure 4 below.
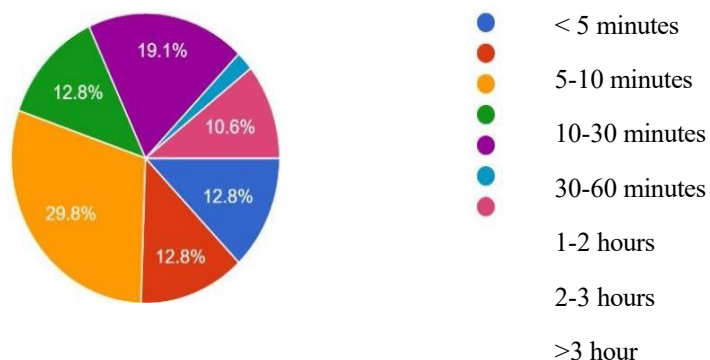

Figure 4.

Duration of Time to Access AI Applications

Based on the questionnaire that was collected, respondents who had accessed the AI application stated that they accessed the AI application because they had gained benefits, for example being able to improve their learning experience and making it easier to complete difficult tasks, feeling like they had received a lot of information, making it easier to obtain information and being able to complete tasks quickly.

3.2 DISCUSSION

From the research that has been conducted, there is data showing that more than 50% of respondents stated that they had never accessed AI-based applications, while other respondents stated that they had accessed these applications. This shows that there are still many early childhood education teachers who do not know and understand the application of AI in classroom learning. Regarding the lack of understanding from early childhood education teachers, this will certainly affect learning in the classroom, especially in making learning more interesting and meaningful so that children can build their own knowledge, this is in accordance with constructivism theory (Suparlan, 2019).

Meanwhile, 45.1% of respondents stated that they had accessed AI applications. These respondents also stated that they had accessed AI applications from minutes to hours. They also stated that there were several AI applications that had been accessed which were their favorites, because these applications had provided many advantages and benefits for teachers. This is in accordance with the statement (Zebua, 2023) that the application of AI in children's education can provide significant benefits in improving the quality of children's learning and development. Some of the benefits they get from accessing AI applications include improving their learning experience and making it easier to complete difficult tasks, feeling like they have received a lot of information, making it easier to obtain information and being able to complete tasks quickly. This is in accordance with the opinion (Mukaromah, 2020) that creating varied ICT-based learning media that can attract students' attention so that students' enthusiasm for learning can increase. With the various benefits obtained from accessing AI applications, it makes the teacher's work easier in teaching and learning activities in the classroom.

Thus, introduction and understanding of AI applications should be carried out by early childhood education teachers considering the many benefits that will be obtained. Artificial Intelligence (AI) has great potential to support the teaching process for Early Childhood Education (PAUD) teachers and the learning process for young children (Anwar, 2023). Dr. Johnson (in Abimanto and Mahendro, 2023) emphasized that AI has the potential to transform language teaching by making it more accessible and efficient for learners from various backgrounds. At the same time, increasing the ability of early childhood education teachers to operate technology that can later be applied in learning is very important. Therefore, there is a need for training activities in implementing this for teachers to ensure the effectiveness of using AI technology (Wati & Nurhasannah, 2024). By following special training provided by the government or educational institutions, teachers will be able to utilize AI technology in learning effectively. The emergence of artificial intelligence technology can also instill an independent nature in students (Daulay, 2025). This training will improve teachers' technical and pedagogical skills, so that they can become facilitators in learning.

4. CONCLUSION

Research on 103 early childhood education teachers shows that artificial intelligence (AI) technology has great potential to improve the quality of learning in early childhood education. Early childhood education teachers welcome this technology because AI can help them create learning that is more suited to the needs of each child. AI enables more adaptive, personalized and interactive learning, for example through the Canva application, Social Media Algorithms and Google Search. These various applications can make children's learning experiences in

early childhood education more enjoyable and meaningful. Apart from that, assistance is needed from the government or educational institutions in assisting early childhood education teachers through providing special training related to technology operation.

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