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INTRODUCTION OF COMPUTER DEVICES IN EARLY CHILDHOOD AT NAHDATUL ULAMA KINDERGARTEN PALEMBANG

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Abstract: The introduction of computer devices in early childhood is a crucial issue in education in the digital era. The lack of access to appropriate methods for early childhood education is a challenge in applying technology in the educational environment. This study aims to identify effective computer device recognition methods for early childhood, analyze their level of understanding after being given learning, and examine the obstacles faced in their implementation. This study uses a qualitative approach with a descriptive method, where data is collected through observation, interviews with teachers and parents, and documentation of learning activities. The study results show that playing while learning with the active guidance of teachers can improve children's understanding of computer devices. However, the limited infrastructure and educators' readiness are still a challenge. Therefore, further support is needed to integrate technology into early childhood education.

Keywords: early childhood education, computer devices, technology in learning, digital literacy.

Abstrak: *Pengenalan perangkat komputer pada anak usia dini menjadi isu krusial dalam pendidikan di era digital. Kurangnya akses serta metode yang sesuai untuk anak usia dini menjadi tantangan dalam penerapan teknologi di lingkungan pendidikan. Penelitian ini bertujuan untuk mengidentifikasi metode pengenalan perangkat komputer yang efektif bagi anak usia dini, menganalisis tingkat pemahaman mereka setelah diberikan pembelajaran, serta mengkaji kendala yang dihadapi dalam implementasinya. Penelitian ini menggunakan pendekatan kualitatif dengan metode deskriptif, di mana data dikumpulkan melalui observasi, wawancara dengan guru dan orang tua, serta dokumentasi kegiatan pembelajaran. Hasil penelitian menunjukkan bahwa metode bermain sambil belajar dengan bimbingan aktif guru dapat meningkatkan pemahaman anak terhadap perangkat komputer. Namun, keterbatasan infrastruktur dan kesiapan tenaga pendidik masih menjadi tantangan. Oleh karena itu, diperlukan dukungan lebih lanjut dalam integrasi teknologi di pendidikan anak usia dini.*

Kata Kunci: *pendidikan anak usia dini, perangkat komputer, teknologi dalam pembelajaran, literasi digital.*

INTRODUCTION

Technology has become an integral part of everyday life, including in education. Early childhood children today are growing up in the digital age, where technological devices such as computers, tablets, and smartphones are the tools they often encounter. Therefore, early childhood education cannot ignore the role of technology in learning. One way to prepare children for the digital era is to introduce them to computer devices from an early age (Achmad Leofaragusta K K et al., 2025).

Introducing computer devices in early childhood has many benefits, significantly improving their cognitive, motor, and social skills. Using computers, children can learn to recognize letters, numbers, and colors and develop logical thinking and problem-solving skills. In addition, research shows that early introduction to technology can increase children's motivation to learn and help them be better prepared for digital-based learning at the next level of education (Hatidah et al., 2025; Irawan et al., 2024).

At Nahdlatul Ulama Kindergarten in Palembang, computer introduction is still a challenge. Some children are already familiar with technology because they often use their parents' devices at home, while others are still unfamiliar. The lack of adequate facilities and limited training for educators in teaching technology to children are obstacles to implementing this program. Therefore, this study aims to explore an effective method for introducing computer devices to early childhood in Nahdlatul Ulama Kindergarten Palembang.

Based on this background, several research questions want to be answered: (1) What is the proper method of recognizing computer devices for early childhood? (2) How much does the child understand computer devices after being introduced? (3) What obstacles are faced in implementing computer device recognition in Nahdlatul Ulama Kindergarten Palembang? These questions are the basis for further understanding technology implementation in early childhood education.

The primary purpose of this study is to identify effective methods for introducing computer devices to early childhood. By understanding the correct method, teachers can more efficiently deliver technology-related materials to children. In addition, this study also aims to analyze the extent of children's understanding of computer devices after they are introduced, as well as identify the challenges faced in implementing this program.

This research has significant benefits both from a theoretical and practical perspective. From a theoretical perspective, the results of this study are expected to be an additional reference in the field of technology-based early childhood education. This study will provide insights into how technology can be applied in children's education and the most effective approach to introducing it (Muhammad Iqbal et al., 2025; RA Rodia Fitri Indriani et al., 2024). Meanwhile, from a practical perspective, this research can provide valuable recommendations for educators and managers of Nahdlatul Ulama Kindergarten Palembang in implementing technology-based learning.

Another benefit of this research is that it helps parents understand the importance of introducing technology to their children. Many parents are worried about the negative impact of technology, such as dependence on digital devices. However, with proper introduction and accompanied by an adult, computers can be a

valuable tool for children's learning. Therefore, this research is also expected to guide parents in supervising and guiding their children in the use of technology.
Computers must be introduced in early childhood and adapted to the cognitive and psychosocial development stage. Early childhood makes it easier to understand things through a play and exploration approach. Therefore, using game-based learning methods can effectively introduce computers to children (Purwanto & Umar, 2024). In this way, the child learns to recognize computer devices and how to use them in a fun way.

However, the application of computer introduction in early childhood also has challenges. One of the main obstacles is the lack of resources and facilities available in schools, especially in areas that do not have adequate access to technology. In addition, educators also need to get sufficient training to teach technology in a way that is by the characteristics of early childhood (M. Bambang Purwanto, 2024; Purwanto, Yuliana, et al., 2024). Without adequate training, the computer recognition process can become less effective and confusing for children.

Overall, this research is expected to provide new insights into the application of technology in early childhood education. By identifying effective methods and understanding the challenges faced, this research can be the foundation for schools and educators in designing better computer introduction programs. Thus, children can get the maximum benefit from technology without neglecting the overall aspects of their development.

METHODOLOGY

This study uses a qualitative approach with a descriptive method. This approach was chosen because it aims to deeply understand the process of introducing computer devices to early childhood at Nahdlatul Ulama Kindergarten Palembang. Descriptive methods describe phenomena in the field, including children's interaction with computer devices, teachers' responses to technology-based learning, and challenges that arise in its application.

The research subjects comprised 25 students at Nahdlatul Ulama Kindergarten in Palembang who participated in the computer device introduction program. In addition, this study involved three teachers and one educator who played a role in teaching children the use of computers. The selection of this subject aims to obtain a more comprehensive perspective on the effectiveness of computer introduction methods in the early childhood education environment.

To obtain valid and relevant data, this study uses three main data collection techniques: observation, interviews, and documentation. Observations were made to observe how children interact with computers, how they understand the device's essential functions and the challenges faced during the learning process. Observation is carried out directly in the classroom during the computer introduction activity.

In addition to observations, interviews were conducted with teachers and parents. The interview with the teacher aims to explore information about the teaching strategies used, the obstacles faced, and the children's response to computer-based learning. Meanwhile, interviews with parents aimed to discover how children interact with technology at home, whether they were familiar with computers before entering school, and their expectations for their children's introduction to technology.

Documentation techniques are also used to complete the research data. This documentation includes photos or videos of learning activities, teachers' diaries regarding children's development in understanding computer devices, and teaching materials used in introducing technology. This documentation helps confirm the findings from observations and interviews and provides a visual overview of the program's implementation at Nahdlatul Ulama Kindergarten in Palembang.

The data obtained from observations, interviews, and documentation were analyzed using qualitative data analysis techniques, consisting of three main stages: data reduction, data presentation, and conclusion. Data reduction is done by sorting and filtering information obtained from the field, so only relevant data is used in this study. The presentation of data is carried out in the form of narrative descriptions, tables, or charts to facilitate understanding of the research results. Conclusions are drawn based on patterns that appear in the data that have been compiled and analyzed.

RESULTS AND DISCUSSION

RESULT

1. Computer Device Recognition Methods

The introduction of computer devices to early childhood at Nahdlatul Ulama Kindergarten in Palembang is carried out using various media and aids adapted to children's development characteristics. One of the leading media used is a computer with a simple interface equipped with input devices such as a keyboard and mouse specially designed for children. In addition, engaging and interactive educational software is also used to help children gradually understand the basic concepts of using computers.

In addition to using appropriate hardware and software, a multisensory approach is applied in learning. Children are not only introduced to the theory of computers but are also allowed to interact directly with the devices. Game-based learning methods often attract children's attention and make learning more enjoyable. For example, children can play an educational game that trains hand-eye coordination using a mouse or keyboard.

Teachers also apply demonstration strategies and direct guidance. The teacher shows you how to turn the computer on and off correctly, use the mouse to click icons on the screen, and type letters or numbers on the keyboard. After the demonstration, the children were allowed to try themselves under the teacher's guidance. This approach ensures that children not only passively understand concepts but also have hands-on computer experience.

In addition, the learning method while playing is one of the most effective approaches in introducing computers to children. Teachers use interactive songs or digital stories displayed through computer screens to introduce various essential functions of the device. In this way, it is easier for children to understand the concepts taught because the material is delivered in a fun and easy-to-understand form.

In its implementation, teachers also apply a collaborative approach, where children are invited to work in small groups to share experiences in using computers. This approach helps them understand technological devices and improves their social skills. They learn to share turns, work together, and help each other when faced with computer difficulties.

In addition to the direct method, teachers also involve parents in learning children's technology. Workshops or discussion sessions with parents are held to provide an understanding of the importance of early computer introduction and how they can support children at home. With the support of parents, the learning process becomes more optimal because children get the opportunity to continue practicing outside the school environment.

The computer recognition method used at Nahdlatul Ulama Kindergarten also adjusts the duration and intensity of learning to suit the concentration level of early childhood. Learning is carried out in short sessions with interludes of physical activity so children do not get bored quickly. With this strategy, children can learn optimally without feeling pressured or losing interest in learning computers. Overall, the computer recognition method at Nahdlatul Ulama Kindergarten Palembang combines various approaches that adapt to the characteristics of early childhood. By relying on interactive media, demonstration strategies, play approaches and parental involvement, computer learning can run effectively and happily for children.

2. Children's Response and Understanding

Children's responses to the introduction of computer devices show a high level of engagement. Most children are enthusiastic when they are first introduced to computers, especially when they can touch and use them independently. Children's curiosity about these new devices is enormous, and they tend to imitate what the teacher is pointing out quickly.

In the observations made, it was found that most children tend to learn exploratory. They enjoy trying out different functions of a computer device, such as randomly pressing keyboard keys or moving the mouse without a clear purpose at first. However, as time went on and with the guidance of teachers, children began to understand how to use the device in a more structured way.

Children's understanding of computer devices also develops gradually. Initially, they only understood the physical aspects of the computer, such as recognizing the shape of the monitor, keyboard, and mouse. However, after a few learning sessions, they began to understand the essential functions of each component, such as how to type letters on a keyboard or click on icons on the screen using a mouse.

Teachers note that some children need more time to understand certain concepts, especially when properly coordinating using a mouse. Children with no previous experience using a computer at home tend to have difficulty controlling mouse movements or understanding the functions of the keys on the keyboard. However, with repeated practice, most children can master essential skills in computer use.

Most children also show positive behavior changes in learning after being introduced to computers. They become more focused when participating in technology-based learning sessions and are interested in trying various educational applications. In addition, children who are initially shy or lack confidence in learning tend to be more courageous when allowed to use a computer independently.

However, there are differences in the level of children's understanding caused by age factors and previous experience. Older children in the kindergarten age group (5-6 years) generally grasp the concept of using a computer more quickly than younger children (4 years). In addition, children who are used to using digital devices

at home show faster development compared to those new to computers at school. From the results of this study, the introduction of computer devices in Nahdlatul Ulama Kindergarten has succeeded in increasing children's understanding of basic technology despite individual differences in learning speed. With the proper methods and constant guidance, children can develop essential digital skills that will benefit their education in the future.

3. Obstacles and Challenges

One of the main obstacles to introducing computer devices at Nahdlatul Ulama Kindergarten is the limitation of facilities and devices. The number of computers available is still limited, so children must take turns using them. This results in limited individual learning time, which can affect the speed of children's understanding of computers. In addition to technical obstacles, there are challenges in terms of educators' readiness. Not all teachers have a strong technological background, so some still have difficulties teaching children how to use computers. Additional training is needed for teachers so that they are more competent in integrating technology into learning.

Another challenge is the ability of children to adapt to technology. Some children still have difficulty operating the device, especially coordinating hand movements when using a mouse or typing on the keyboard. This challenge requires a more individualized approach to learning. In addition, parental involvement is challenging. Not all parents understand the importance of early introduction to technology, so they lack support for children to continue practicing at home. Therefore, it is necessary to socialize with parents about the benefits of computer recognition for children's cognitive development. To overcome this challenge, schools can increase the number of computer devices, provide teacher training, and increase cooperation with parents so that the learning process can run more effectively and sustainably.

DISCUSSION

The introduction of computer devices to early childhood at Nahdlatul Ulama Kindergarten in Palembang shows that children are enthusiastic about learning digital technology. With a learning method combining a play-by-play approach to learning, hands-on demonstrations, and educational software, children can grasp the basic concepts of using computers step by step. This study showed that although children had different readiness levels, they could generally recognize the essential functions of computer devices, such as using mice and keyboards. In addition, the involvement of teachers and parents in supporting the learning process plays an important role in accelerating children's understanding of digital technology (Marsinah, Umar, et al., 2024; Ridayani & Purwanto, 2024).

The implications of this study on the world of education in Indonesia are significant. In the digital era, basic technological abilities are a much-needed skill, even from an early age. With the introduction of computer devices at the kindergarten level, children can be better prepared to face the development of digital-based education at the next level. This aligns with government policies that encourage technology integration in education, such as through the Merdeka Learning program, which prioritizes digital innovation in the learning process. However, the biggest challenge in

this implementation is the limited access to technology facilities in various regions, especially in remote areas with limited educational infrastructure (Fitria Marisya et al., 2024; Taufiqi & Purwanto, 2024).

The interpretation of the results of this study shows that early computer recognition improves children's technological skills and contributes to their cognitive and motor development. Children who are used to using digital devices correctly tend to have better logical thinking and problem-solving skills. In addition, the interactive learning experience provided by computer devices helps to improve children's concentration and motivation to learn. However, without proper supervision and guidance, early use of technology can also have negative impacts, such as dependence on screens or lack of social interaction. Therefore, a balanced learning strategy between technology and physical activity is still needed (Harapan et al., 2024; Marsinah, Hatidah, et al., 2024).

In comparing this study with other relevant studies, it was found that the results align with the findings of several international studies that highlight the benefits of technology introduction for early childhood. Research conducted by Purwanto, Yuliasri, et al. (2024) in the United Kingdom shows that children who gain access to technological devices early show better digital skill development than those who do not. In Indonesia, similar research conducted in several digital-based schools in Jakarta also showed that technology in early childhood education can improve their digital literacy. However, research in several remote areas in Indonesia shows that limited access to technology is still a significant obstacle to the equitable implementation of digital-based education (Agustina Sari et al., 2024; Purwanto, Despita, et al., 2024).

This study recommends further studies on the effectiveness of various methods of technology introduction for early childhood, especially in the context of education in Indonesia. In addition, research on the long-term influence of computer introduction on children's academic development at the next level of education is needed (M. Bambang Purwanto et al., 2024; Purwanto, Umar, et al., 2024). The study of the best strategy for integrating technology into the kindergarten curriculum in Indonesia is also a key recommendation, taking into account aspects of infrastructure readiness, teacher training, and support from parents (Purwanto, Yuliasri, et al., 2024b; Yuliana et al., 2024). Given that the issue of the digital divide in Indonesia is still a challenge, more inclusive policies and broader access to technology for children from various social backgrounds need to be the main focus of future research and education development.

CONCLUSION

The study results on introducing computer devices in early childhood at Nahdlatul Ulama Kindergarten in Palembang show that the learning method based on direct interaction with computer devices can increase children's understanding of technology from an early age. With a play-by-learning approach, children can recognize the essential functions of computer devices, such as keyboards and mice, and understand the basic concepts of digital technology. These findings also confirm that the involvement of teachers and parents in the learning process significantly impacts the level of understanding and interest in using technology in a positive way. However, there are still challenges in implementing this program, such as differences

in the level of children's readiness and limited support facilities in schools. This research makes an academic contribution to early childhood education and technology integration in learning. Theoretically, this study supports the idea that introducing technology early can benefit children's cognitive and motor development. In addition, the results of this study can be a reference for educational institutions in designing effective technology-based learning strategies for children. In implementing education policies, these findings can also be the basis for the government to design a curriculum more adaptive to technological developments, especially in supporting education digitalization programs at the early childhood level. However, this study has some limitations. One of the main obstacles is limited access to computer devices in some schools with limited infrastructure and resources. In addition, the differences in children's ability to understand technology are also a challenge, considering that not all children have the same background regarding access to digital devices at home. Another limitation is that this study only focuses on one school, so a broader study is needed to get a more comprehensive picture of the effectiveness of computer introduction methods in early childhood in various educational settings in Indonesia. In Indonesia's education context, this research is relevant to issues related to the application of ICT (Information and Communication Technology) in learning, especially at the basic education level. The education digitalization program launched by the government still faces various challenges, such as the gap in access to technology between urban and rural areas and the limitation of educators who have skills in teaching with the help of technology. Therefore, efforts to increase digital literacy from an early age need to be supported by more inclusive policies, training for educators, and the procurement of adequate technological infrastructure throughout Indonesia.

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