

Utilizing Digital Interactive Boards and Student Room Platforms in Early Childhood Education: The Opportunities and Challenges

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ABSTRACT: This study aims to analyze the opportunities and challenges of utilizing Digital Interactive Boards (PID) and the Ruang Murid Platform (Student Room Platform) in the digitalization of Early Childhood Education (ECE). This study employed a qualitative approach using a library research method. Data were obtained from scientific journals, books, and relevant research articles, then analyzed descriptively and analytically. The findings show that the utilization of PID and the Ruang Murid Platform is able to create more interactive and varied learning, support children's learning engagement, and strengthen communication between teachers and parents. However, the implementation of digitalized learning in ECE still faces challenges, including limited teachers' digital competence, inadequate facilities and infrastructure, and low parental involvement in the use of digital platforms. In addition, the use of technology in ECE needs to be implemented proportionally so that it does not reduce children's social interaction, play activities, and concrete learning experiences. Therefore, collaboration among teachers, parents, and educational institutions is needed to optimize sustainable digital-based learning in ECE.

KEYWORDS: digitalized learning; Digital Interactive Board; Early Childhood Education

INTRODUCTION

The development of digital technology in the era of globalization has brought about significant changes in various aspects of life, including the field of education. Digital transformation is driving educational institutions to adapt by leveraging technology as an integral part of the learning process (Kusayang & Pranata, 2025; Muhtarom et al., 2025; Mustafa et al., 2025; Ramdani et al., 2025). Early Childhood Education, as the foundation for children's character development and growth, is also expected to adapt to these technological advancements (Azizah et al., 2023; Fadila et al., 2025; Nizrina et al., 2022; A. M. Sari et al., 2026). The digitization of early childhood education is a strategic initiative aimed at creating an innovative, interactive learning process that meets the educational needs of the 21st century.

However, the implementation of digitization in early childhood education cannot be done haphazardly, as young children have learning characteristics that emphasize play-based activities, direct interaction, and concrete stimulation

(Budiarti & Susanti, 2024). On the one hand, the use of digital technology can improve the quality of learning through more engaging and interactive media; on the other hand, however, the inappropriate use of technology also has the potential to reduce children's social interaction and exploratory activities (Imroatun et al., 2024; Muti et al., 2026). Therefore, the use of digital technology in early childhood education must be managed appropriately so that it can enhance the quality of learning without neglecting the fundamental principles of early childhood education.

The use of technology in early childhood education can be achieved through the use of digital devices such as interactive whiteboards and the Platform Ruang Murid learning platform. An PID is a touchscreen-based learning tool that integrates various functions—such as a whiteboard, projector, computer, and internet access—into a single device (Prayitno et al., 2026). Through interactive features and multimedia visualizations, PID enables children to actively engage in the learning process, creating a more engaging and participatory learning experience. Meanwhile, the Student Space platform serves as a tool for communication, learning management, and documentation of children's progress, which teachers and parents can access on an ongoing basis (Mukti & Muslikhati, 2022).

The integration of these two technologies demonstrates that the digitization of learning is not only focused on the use of digital media in the classroom, but also involves strengthening collaboration between schools and families to support children's development (Lubis, 2026). Thus, the use of PID and the Student Space Platform is expected to support the creation of early childhood education that is more effective, interactive, and responsive to advancements in educational technology (A. R. Hidayat et al., 2023).

Several previous studies have shown that the use of interactive digital media has a positive impact on the learning process. A study by Afifah Ulya Ainurrohman DCG, et al. (2024) explains that the use of smartboards as an interactive digital medium can build students' self-confidence and create a collaborative and enjoyable learning environment. In line with this research, Oscar Aristan Selan, et al. (2026) revealed that learning using Digital Interactive Whiteboards (DIW) is an effective strategy for improving the quality of learning. In addition, research by Syafi'ul Hamidani et al. (2026) indicates that supporting teachers in the use of interactive digital learning media can help improve the quality of learning and digital literacy among early childhood education teachers. Several of these studies show that the use of interactive digital learning media has great potential for creating more effective and innovative learning experiences. However, previous research has largely focused on the effectiveness of digital media in the learning process and has not yet comprehensively examined the challenges of implementing digital learning in early childhood education.

Research on the use of digital platforms in early childhood education has also shown that they significantly contribute to improving the quality of learning and teachers' digital literacy. A study by Annisa Fahmi Mannassai et al. (2026) shows that the use of student-centered platforms helps improve early childhood education teachers' digital literacy and facilitates the learning process through various available digital content. Additionally, the existence of student-centered platforms also provides opportunities for teachers to create more varied learning experiences and support more effective communication with parents. Several recent studies indicate that the use of digital media and platforms can support the transformation of early childhood education toward a more interactive and technology-adaptive approach. However, previous research has tended to discuss digital media or learning platforms separately. Studies that specifically analyze the simultaneous use of Digital Interactive Boards and student space platforms in the context of learning digitization, particularly regarding the opportunities and challenges of their implementation, are still scarce.

Based on preliminary findings at an early childhood education center in Palangka Raya, the Digital Interactive Whiteboards provided approximately six months prior had not yet been optimally utilized in the learning process. Teachers were still not making full use of these facilities, even though the government had provided various platforms to support digital learning, including the "student room" platform. This situation indicates that the presence of digital technology in education does not automatically guarantee optimized learning if it is not balanced with teacher readiness, digital literacy skills, and appropriate learning management. Therefore, this study is important to analyze the opportunities and challenges of utilizing DIBs and student room platforms in the digitalization of early childhood education. The research questions in this study are: (1) what are the opportunities for utilizing PID and student room platforms in the digitization of PAUD learning? and (2) what are the challenges faced in implementing PID and student room platforms in PAUD learning?

METHOD

This study employs a qualitative approach in the form of a literature review (Zed, 2014). This approach is used to analyze the opportunities and challenges of utilizing Digital Interactive Whiteboards and student-centered platforms in the digitization of early childhood education through various relevant concepts, theories, and research findings. Data sources were obtained from scientific journals, books, research articles, and supporting documents related to the research topic (N. M. Sari et al., 2025). The literature used consists of scientific articles from 2022–2026 that are indexed in Google Scholar and relevant to the digitization of early childhood education. The reason the researcher used only literature indexed in Google Scholar was due to time constraints in gathering multiple sources and limitations in finding sources relevant to the research topic. The literature search

procedure was conducted in several stages. First, the researcher used Harzing's Publish or Perish software to access the Google Scholar database as the primary source. The search was conducted using a combination of keywords in Indonesian such as "Digital Interactive Board," "utilization of PID," "digitalization of early childhood education," and "digital learning." The criteria used were: (1) articles published in accredited or indexed journals, (2) available in full-text versions, (3) research findings or studies relevant to the focus of this research, and (4) published between 2022 and 2026. Data collection was conducted through a literature review by identifying, reading, categorizing, and analyzing various sources in accordance with the research focus. The research model used in this study is the PRISMA model (Fitri, 2025; Suhud & Puspita, 2026). Next, a descriptive-analytical data analysis was conducted through the stages of data reduction, data presentation, and drawing conclusions to gain an understanding of the opportunities and challenges associated with the use of PID and the student space platform in improving the quality of early childhood education.

RESULT

This study analyzed 31 articles obtained through a structured search using Harzing's Publish or Perish software and the Google Scholar database. Of these, 11 articles were selected as the primary focus based on their relevance to the topic of opportunities and challenges in utilizing Digital Interactive Whiteboards and student-centered platforms in the digitization of early childhood education. These articles were analyzed to identify opportunities and challenges in the utilization of digital learning in early childhood education. The results of the analysis of the selected articles are summarized in the following table:

No	Year	Topic	Author	Journal Title
1.	2026	The Relationship Between the Availability of Interactive Flat Panel (IFP) and the Thinking Skills of Group B Kindergarten Children in the Learning Process	Afkarina F dan Nasikhah I.D	Journal of Islamic Education for Preschool Children
2.	2026	Supporting Teachers in the Use of Digital Interactive Whiteboards as an Innovative Learning Tool	Hamidani, S., Alfiarini, Yanto, R., Amalia, V., & Etriyati, E	Journal of Community Service Outcomes
3.	2026	Digital Transformation in Early Childhood Education: Teachers' Strategies for Developing Children's Language Skills	Lubis, F. A. M	Edusmart: Journal of Educational Technology

		Using Interactive Flat Panel (IFP)		
4.	2026	Community Service Through the Introduction of Digital Interactive Media at Pembina Tapa Public Kindergarten	Mannassai, A. F., Jamin, N. S., Sutisna, I., Nur, S., & Hulawa, A. I	Journal of Community Service and Educational Research
5.	2026	Training on Developing Interactive Instructional Materials by Optimizing Interactive Flat Panel Features	Soepriyanto, Y., Lestari, D., Surahman, E., Ariska, E. D., Kesuma, D. W., & Nahri, M. H. A	Scientific Journal of Community Service
6.	2025	Enhancing Preschool Teachers' Digital Skills Through an Educational Video Production Workshop at Citra Al Medina Preschool	Jafnihirda, L., Arsyah, R. H., & Stevany	Mitra Library Journal (Center for Community Service Research)
7.	2025	A Literature Review on the Use of the Ministry of Education and Culture's Rumah Belajar Platform as a Learning Management System to Support 21 st Century Learning	Khoeriyah Rizka Ummu, Maman, S., & Ismaya, B.	Journal of Modern Educational Transformation
8.	2025	Digital Technology-Based Learning Innovations to Boost Early Childhood Learning Engagement: A Case Study at Yaa Bunayya Kindergarten in Bima City	Putri, A., Ahmadin, & Mulyadin, W.	Reslaj: Religion Education Social Laa Roiba Journal
9.	2025	YouTube as an Educational Platform: Opportunities and Challenges for Early Childhood Education	Wahyuningsih, E. T., & Setianingsih, H. P.	Journal PAUD Agapedia
10.	2025	Optimizing the Merdeka Mengajar Platform for Early Childhood Education Teachers in Kutai Kartanegara Regency	Wahyuningsih, T., Putri, A. A. P., Setiawan, A., Halida, Fauzi, C., Adisty, D. I.	Community Service Journal

			A., & Winanti, S.	
11.	2024	Implementation of the Merdeka Mengajar Platform in Early Childhood Education	Budiarti dan Susanti	Journal of Educational Science

Based on an analysis of the eleven articles reviewed, it can be concluded that the use of interactive digital media and digital learning platforms has a positive impact on early childhood education. Previous studies have similarly confirmed that the use of digital media can enhance children's engagement, motivation, and learning interactions (Afkarina & Nasikhah, 2026; Lubis, 2026; E. T. Wahyuningsih & Setianingsih, 2025). The success of learning digitization depends on teachers' digital competence in using technology-based learning tools (Hamidani et al., 2026; Jafnihirida et al., 2025). In addition, digital platforms play a role in supporting the management of learning and educational communication. The findings of that study are consistent with those of this study, in that both demonstrate that digital technology can support early childhood education that is more interactive, flexible, and adaptable to the evolution of digital-based education (Budiarti & Susanti, 2024; Khoeriyah Rizka Ummu, Maman & Ismaya, 2025; T. Wahyuningsih et al., 2025).

The distinction between this study and previous research lies in its research focus. Most previous studies have only examined the use of interactive digital media or learning platforms separately and have been more oriented toward the effectiveness of technology use in learning. Meanwhile, this study examines the relationship between the simultaneous use of Digital Interactive Whiteboards and the Ruang Murid Platform in the context of the digitization of early childhood education. This study not only highlights the opportunities for using digital technology but also examines implementation challenges, including teachers' digital competencies, infrastructure limitations, parental involvement, and the risk of reduced social interaction and concrete learning experiences for young children. Thus, this study provides a more comprehensive analysis of the opportunities and challenges of digitalizing early childhood education compared to previous research.

DISCUSSION

Opportunities for Utilizing PID and the Ruang Murid Platform in the Digitalization of Early Childhood Education

The digitization of learning in early childhood education opens up opportunities for more interactive and enjoyable learning experiences. The use of digital interactive whiteboards allows children to engage directly through visuals, audio, and touch-based activities that capture their attention throughout the learning process (Lubis, 2026). The use of interactive media is believed to enhance children's focus, motivation, and engagement because learning is no longer a one-

way process; instead, it gives children the opportunity to actively participate in learning activities (Mustafa et al., 2025; Saputri & Jasiah, 2025). In addition, the use of PID helps teachers create a more varied learning environment, making learning more engaging for young children (Afkarina & Nasikhah, 2026).

The use of digital technology also provides teachers with opportunities to implement more flexible and adaptive teaching methods tailored to students' needs. The use of digital media and learning resources allows the material to be tailored to each student's abilities and learning characteristics (Arrasyid et al., 2025; T. Wahyuningsih et al., 2025). These conditions support the implementation of personalized learning, so that children can learn in accordance with their developmental level and learning style (Nugroho & Elvina, 2026). The use of digital technology in early childhood education not only helps improve the effectiveness of learning but also encourages teachers to be more creative in developing innovative and participatory learning activities (Putri et al., 2025).

In addition to supporting classroom learning activities, the Student Space platform offers opportunities to strengthen digital-based learning management in early childhood education. This platform makes it easier for teachers to document children's progress, distribute learning materials, and foster closer communication with parents (E. T. Wahyuningsih & Setianingsih, 2025). Parents can monitor their children's activities and academic progress on an ongoing basis, thereby maximizing family involvement in their children's education (Hikmah et al., 2022; Khusnawati et al., 2026). Collaboration between teachers and parents is a key factor in supporting the success of early childhood education, as the educational process takes place not only at school but also within the family environment (Afkarina & Nasikhah, 2026). The use of PID and the Student Space platform demonstrates that the digitization of early childhood education is not only about the use of technology, but also about efforts to create learning experiences that are more collaborative, innovative, and tailored to children's developmental needs (Lestari et al., 2026). Although it offers many opportunities, the use of digital technology in early childhood education must still be implemented in a balanced manner to ensure that children's social interactions, play activities, and hands-on learning experiences are preserved.

The use of Digital Interactive Boards in early childhood education should be understood not only as the use of technology in learning, but also as an effort to create learning experiences that align with the developmental characteristics of young children. The use of Digital Interactive Boards should remain integrated with play activities, environmental exploration, and direct interaction so that learning does not focus entirely on digital media. Teachers also need the ability to select and manage digital learning media appropriately so that technology can be utilized as a learning support tool, not a substitute for children's concrete learning processes. Therefore, optimizing the use of PID and the Ruang Murid Platform requires support in the form of teachers' digital competencies, parental involvement, and

school policies capable of balancing technology use with the social and emotional developmental needs of young children.

Challenges in Utilizing PID and the Student Portal in the Digitalization of Early Childhood Education

The use of digital technology in Early Childhood Education (PAUD) still faces various challenges in its implementation. Teachers' digital competencies are one of the factors that most influence the effectiveness of learning technology use (Khoeriyah Rizka Ummu, Maman & Ismaya, 2025). Not all ECE teachers possess adequate skills in operating Digital Interactive Whiteboards or in optimally utilizing the features of the Student Room Platform (Damayanti et al., 2024; Son'any, 2026). This situation results in the use of technology in learning remaining limited and not yet fully supporting innovative and interactive learning.

The availability of facilities and infrastructure also poses a barrier to the digitization of early childhood education. Not all institutions have access to adequate technological devices, such as tablets, a stable internet connection, or other supporting equipment (Munir et al., 2021; Rahman et al., 2026). These limitations in facilities mean that the implementation of digital-based learning has not yet been carried out uniformly. In some early childhood education institutions, the use of technology remains sporadic and has not been systematically integrated into the learning process (Maula et al., 2026). Parental involvement in the use of digital platforms is also not yet fully optimized. Some parents still believe that effective learning focuses more on conventional methods than on the use of digital technology. This situation results in low parental participation in monitoring their children's learning activities through the Student Space platform, so communication between teachers and families has not been maximized (Ginting et al., 2025).

The use of digital technology by young children also requires appropriate supervision. Excessive use of digital devices has the potential to reduce children's social interactions, physical activity, and hands-on learning experiences (Soepriyanto et al., 2026). In fact, young children still need play and hands-on exploration as an important part of their developmental process. The use of PIDs and other digital media needs to be tailored to learning needs so that technology can function as a supporting medium without diminishing children's real-world learning experiences (M. K. Hidayat & Musnandar, 2026).

These challenges indicate that the success of early childhood education (PAUD) digitalization depends not only on the availability of technology but also on teacher readiness, facility support, parental involvement, and appropriate instructional management (Jafnihirida et al., 2025). Optimizing the use of PID and the Student Space Platform requires enhancing teachers' digital competencies and providing an educational environment that supports the effective use of technology to improve the quality of early childhood learning.

Given these challenges, the use of Digital Interactive Whiteboards and the Ruang Murid Platform in early childhood education must be implemented in a targeted manner and tailored to the developmental characteristics of young children. Digital technology should not be viewed as a substitute for play and direct interaction, but rather as a supportive tool that helps create more engaging and adaptive learning experiences. This study emphasizes that the success of utilizing PID in the early childhood education context is not solely determined by the availability of technological devices but is also influenced by teachers' digital competencies, the readiness of educational institutions, and parental involvement in supporting digital-based learning processes. Therefore, continuous training for teachers, the provision of adequate supporting resources, and the proportional oversight of technology use are necessary to ensure that the digitalization of early childhood education continues to support children's social, emotional, and cognitive development in a balanced manner.

CONCLUSION

This study aims to analyze the opportunities and challenges of utilizing Digital Interactive Whiteboards and the Ruang Murid Platform in the digitization of ECE. The results indicate that the use of PID and the Student Room Platform can support more interactive, varied, and participatory learning, as well as help strengthen communication between teachers and parents. However, implementation still faces challenges, including limited digital competencies among teachers, uneven infrastructure, and low parental engagement in using digital platforms.

This study indicates that digital technology has the potential to support the quality of ECE learning if used appropriately in accordance with the developmental characteristics of young children. The limitations of this study include the fact that research data was obtained solely through a literature review without direct field observations or interviews; consequently, the findings do not fully reflect the actual implementation of PID and the Ruang Murid Platform in ECE institutions. Furthermore, the research data sources primarily consist of articles indexed in Google Scholar, with a scope of study that remains limited. Therefore, future research is recommended to conduct field studies with a broader scope and utilize more diverse data sources to yield more factual and comprehensive research results.

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