

Digital Child Development Monitoring Application and E-Portfolio in Enhancing PAUD Student Management Services

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ABSTRACT

This study aims to examine digital-based management innovation in improving the quality of early childhood education services. The research employs a qualitative approach with descriptive methods through literature study, utilizing secondary data from journals, books, and relevant scientific articles published between 2020-2025. The findings indicate that conventional student management still faces various obstacles, including manual data management, limited communication between teachers and parents, and suboptimal monitoring of child development. The implementation of digital innovations such as student management applications and e-portfolios provides solutions by enabling more structured data management, real-time development monitoring, and more transparent communication. These innovations not only improve administrative efficiency but also strengthen collaboration between schools and parents in supporting child development. Additionally, digitalization enhances the accessibility and flexibility of educational services. However, implementation requires infrastructure support, human resource competencies, and adequate policies. Thus, digital-based student management innovation plays a crucial role in improving the quality of early childhood education services that are more effective, efficient, transparent, and oriented toward children's developmental needs.

Keywords: Digital Innovation, Student Management, Early Childhood Education, Educational Technology, Service Quality.

INTRODUCTION

Early childhood education (PAUD) constitutes the foundational stage of education that is critically important before children proceed to subsequent levels of schooling. During the golden age period of 0-6 years, children experience rapid growth and development across multiple domains. The educational process is conducted through the provision of various stimuli appropriate to each child's developmental stage, enabling children to attain optimal development and readiness for further education (Saputra, 2018). This developmental period represents a unique window of opportunity where the brain develops at its fastest rate, making early interventions and appropriate educational practices particularly impactful on long-term outcomes.

According to Law Number 23 of 2002 concerning Child Protection, particularly Article 4, every child has the right to live, grow, and develop optimally. Children also

have the right to participate fairly in accordance with their human dignity and worth. Furthermore, every child is entitled to protection from all forms of violence and discrimination in their daily lives (Etivali & Kurnia, 2019). These legal provisions underscore the state's commitment to ensuring that early childhood education services are delivered with the highest quality standards and that every child's developmental rights are protected and fulfilled.

Education constitutes a fundamental aspect of national development, as its quality fundamentally determines societal progress, particularly in today's digital era. The development of information and communication technology has brought about significant changes across various domains of life, including education. In the digital age, technologies such as the internet, mobile devices, and digital-based applications have become integral parts of daily life, influencing how individuals interact, communicate, and access information. Consequently, learning processes have undergone transformation with the increasing utilization of technology in educational activities (Arum, 2023). The digital transformation of education represents a paradigm shift that requires educational institutions to adapt their management practices accordingly.

Student management constitutes an essential component of educational management with strategic importance, as all educational services fundamentally focus on learners. Both within and outside the school environment, all educational activities are designed to meet student needs. These activities encompass academic management, academic support services, human resources, financial resources, and infrastructure management (Santriati, 2019). Effective student management ensures that the educational process runs smoothly and that students receive the support they need to achieve their full potential.

In practice, student management in PAUD still encounters various challenges. These include manual student data management, limited communication between teachers and parents, and suboptimal monitoring of child development (Putri et al., 2022). The conventional systems currently in place have not been fully capable of addressing the demands of education in the digital era. The reliance on paper-based records and face-to-face communication creates significant barriers to efficient information sharing and timely intervention when developmental concerns arise.

Field observations reveal that many PAUD institutions continue to rely on traditional methods for recording student attendance, tracking developmental milestones, and communicating with parents. Teachers often spend excessive time on administrative tasks that could be automated, reducing the time available for direct interaction with children. Parents, particularly those with demanding work schedules, frequently find it difficult to stay informed about their children's progress and to engage meaningfully with the educational process. These challenges are compounded in institutions serving communities with limited technological infrastructure.

Previous research has examined various aspects of technology integration in early childhood education. Studies have demonstrated that digital tools can enhance learning outcomes when appropriately implemented (Kim, 2020). Research on e-portfolio systems has shown their potential to improve assessment practices and parent-teacher

communication (Hooker, 2020). Investigations into digital transformation in educational management have highlighted the importance of information systems in improving administrative efficiency (Masinambow et al., 2025). Studies on parent-school communication have revealed that digital platforms can strengthen partnerships between families and educational institutions (Wilke et al., 2024). Furthermore, research on digitalization in early childhood education has explored teachers' experiences with technology adoption (Lindeman et al., 2021).

Despite these contributions, significant gaps remain in the literature. Most studies have focused either on the pedagogical applications of technology or on administrative systems in higher education, with limited attention to integrated digital solutions specifically designed for PAUD student management. Few studies have comprehensively examined how digital monitoring applications and e-portfolios can be systematically implemented to address the unique challenges of early childhood education management. Additionally, there is a lack of research that explicitly links digital innovation in student management to improvements in service quality and developmental outcomes for young children.

The novelty of this research lies in its comprehensive examination of digital innovation in PAUD student management, specifically focusing on the integration of child development monitoring applications and e-portfolio systems. Unlike previous studies that have treated these tools separately, this research explores their synergistic potential in creating a holistic digital ecosystem for early childhood education management. The study also contributes to the literature by identifying practical implementation strategies and addressing the contextual factors that influence the success of digital transformation in PAUD institutions.

The urgency of this research is underscored by the rapid pace of digitalization in Indonesian education and the government's commitment to accelerating technology adoption in schools (Novita Sari & Miyono, 2023). As the Ministry of Education continues to promote digital literacy and the use of technology in education, there is a pressing need for evidence-based guidance on how PAUD institutions can effectively implement digital innovations in their student management practices. This research aims to fill this gap by providing a comprehensive analysis of digital-based student management innovations and their impact on service quality.

Based on the foregoing discussion, this article aims to examine digital-based student management innovations and provide creative ideas for teachers and parents through various applications to improve the quality of early childhood education services. Additionally, the study seeks to understand the role of technology in supporting student management in PAUD institutions. This research utilizes a qualitative method with a descriptive approach, analyzing various library sources such as scientific journals, books, and previous research findings relevant to the topic. Through this approach, it is expected to obtain a comprehensive overview of the role and implementation of digitalization in PAUD student management.

RESEARCH METHOD

This study employs a qualitative research approach with a descriptive method. Qualitative research is appropriate for understanding complex social phenomena in their natural settings, allowing researchers to explore meanings, experiences, and perspectives that cannot be captured through quantitative measures alone (Sugiyono, 2016). The descriptive approach enables a detailed and systematic description of digital innovation practices in PAUD student management, providing rich insights into how these innovations are implemented and their perceived benefits and challenges.

The method used in this research is literature study (library research), which involves reviewing various written sources relevant to the research topic. Library research is a systematic approach to collecting, analyzing, and synthesizing existing knowledge from published sources (Fatha Pringgar & Sujatmiko, 2020). This method is particularly suitable for examining digital innovation in PAUD student management as it allows for the comprehensive synthesis of findings from multiple studies, identification of patterns and themes across the literature, and development of theoretical frameworks that can guide future research and practice.

The data sources in this research consist of secondary data derived from scientific journals, books, articles, and other documents related to student management, educational digitalization, and early childhood education. The selection of sources was conducted selectively with consideration of relevance, credibility, and currency of information (Fatha Pringgar & Sujatmiko, 2020). Only sources published between 2020 and 2025 were included to ensure the timeliness and relevance of the findings. The following table summarizes the data sources utilized in this research:

Data Source Type	Number Sources	of Key Topics Covered	Year Range
Scientific Journals	20	Digital innovation, student management, educational technology	2020-2025
Books	5	Research methodology, early childhood education foundations	2020-2024
Conference Proceedings	3	Technology integration, e-portfolio implementation	2021-2024
Government Documents	2	Education policy, child protection regulations	2019-2023
Research Reports	10	Digital transformation, parent-teacher communication	2020-2025

The literature search was conducted using multiple academic databases including Google Scholar, Scopus, and DOAJ, employing keywords such as "digital innovation in education," "student management," "early childhood education," "educational technology," "e-portfolio," and "digital transformation." The search strategy involved both broad searches to capture the full scope of relevant literature and focused searches targeting specific aspects of digital innovation in PAUD.

Data analysis was conducted using content analysis techniques, which involve systematic categorization and interpretation of textual data (Sugiyono, 2016). The

analysis process included several stages: (1) data collection and organization, (2) initial reading and familiarization with the sources, (3) identification of key themes and patterns, (4) coding and categorization of findings, (5) synthesis and interpretation of results, and (6) drawing conclusions and recommendations. To ensure the trustworthiness of the findings, multiple sources were cross-referenced and triangulated, and the analysis was conducted systematically with clear documentation of the decision-making process.

RESULTS AND DISCUSSION

Current State of Student Management in PAUD

The findings from the literature review reveal that conventional student management in PAUD institutions continues to face significant challenges. Student management encompasses all activities planned and implemented deliberately and continuously to enable students to participate in learning effectively and efficiently (Asih & Hasanah, 2021). However, in practice, many PAUD institutions still rely on manual systems for recording student data, tracking attendance, and documenting developmental progress. These manual systems are characterized by paper-based records, handwritten notes, and face-to-face communication, which create substantial barriers to efficient information management and timely intervention.

The reliance on manual systems has several documented consequences. First, administrative tasks consume excessive teacher time that could otherwise be devoted to direct interaction with children. Teachers spend significant hours maintaining records, preparing reports, and managing communications, reducing the quality and quantity of instructional time. Second, manual systems are prone to errors, data loss, and inconsistencies, compromising the accuracy and reliability of student records. Third, the lack of systematic data organization makes it difficult to track developmental progress over time and to identify children who may need additional support.

Communication between teachers and parents represents another area of significant challenge in conventional PAUD management. Research has shown that limited communication and lack of transparency in reporting student progress create barriers to effective collaboration between schools and families (Kusumaningrum et al., 2024). Parents often receive information about their children's development only during scheduled parent-teacher conferences, which occur infrequently and may not provide sufficient detail about day-to-day progress. This limited communication is particularly problematic for working parents who cannot visit the school regularly.

Digital Innovation Solutions

The literature identifies several digital innovation solutions that address the challenges of conventional PAUD student management. Digital transformation in education can be understood as the ability to transform various aspects and processes of education into digital formats (Novita Sari & Miyono, 2023). This process has far-reaching impacts, particularly in transforming organizational systems and leadership

toward more transformative approaches. Digitalization is considered inevitable and represents a solution for addressing future educational challenges.

Student Management Applications: The implementation of student management applications enables more structured, transparent, and accessible data management. These applications typically include features for student registration, attendance tracking, academic records management, and communication tools. Research has demonstrated that information technology applications in education can improve the quality of communication between schools and parents and make student progress information more transparent (Kusumaningrum et al., 2024). These systems enable real-time monitoring and more effective data management, facilitating the efficient delivery of student progress reports and important information.

Child Development Monitoring Applications: Digital applications designed specifically for monitoring child development help teachers record student developmental progress in a structured manner on a daily basis. These applications typically cover multiple developmental domains including cognitive, language, religious and moral values, social-emotional, physical-motor, and artistic development. The systematic tracking of these domains enables early identification of developmental delays and timely intervention. Furthermore, parents gain access to information about their children's development, creating transparency and fostering collaboration between teachers and parents.

E-Portfolio Systems: E-portfolios represent a significant innovation in documenting and assessing children's learning and development. Digital portfolios allow for the collection, organization, and presentation of evidence of children's progress over time, including photos, videos, work samples, and teacher observations. Research has shown that e-portfolios can enhance assessment practices, support parent-teacher communication, and promote child engagement in the learning process (Hooker, 2020). The digital format enables easy sharing with parents, provides a comprehensive record of development, and supports reflective practice among teachers.

Implementation Models and Best Practices

The literature reveals several models for implementing digital innovation in PAUD student management. One effective approach involves the phased implementation of digital tools, starting with basic systems for attendance and communication before progressing to more comprehensive applications for developmental monitoring and e-portfolios. This phased approach allows teachers and parents to gradually build their digital competencies and reduces the risk of overwhelming users with too many new technologies simultaneously.

Another successful model involves the integration of multiple digital tools into a cohesive ecosystem. For example, a student management system can be linked with a child development monitoring application and an e-portfolio platform, creating a seamless flow of information between different aspects of student management. This integration ensures that data collected in one system can inform practices in another, creating a holistic approach to supporting child development.

Table 1. Digital Innovation Models for PAUD Student Management

Model	Key Features	Benefits	Challenges
Integrated Digital Ecosystem	Unified platform for student data, development monitoring, and e-portfolio	Seamless data flow, holistic view of child development	High implementation cost, requires technical expertise
Phased Implementation	Gradual introduction of digital tools over time	Builds user competency, reduces overwhelm	May create temporary fragmentation of systems
Parent-Centric Model	Focus on tools that enhance parent-school communication	Strengthens family engagement, increases transparency	Requires parent digital literacy and access
Teacher-Professional Model	Emphasis on tools that support teacher assessment and planning	Improves instructional quality, reduces administrative burden	Requires ongoing teacher training and support

Impact on Service Quality

The implementation of digital innovation in PAUD student management has been shown to significantly impact service quality across multiple dimensions. First, administrative efficiency is substantially improved through automation of routine tasks such as attendance tracking, report generation, and data management. Teachers report spending less time on paperwork and more time on direct interaction with children (Masinambow et al., 2025). This reallocation of time from administration to instruction represents a significant improvement in the quality of educational services. Second, transparency and accountability are enhanced through digital systems that provide clear records of student progress and school activities. Parents can access information about their children's development in real-time, enabling them to be more informed and engaged partners in the educational process. This transparency builds trust between schools and families and supports more effective collaboration in supporting child development.

Third, the quality and timeliness of developmental monitoring is substantially improved through digital tools that enable systematic tracking and early identification of developmental concerns. When teachers can easily record and analyze developmental data, they are better positioned to identify children who may need additional support and to plan appropriate interventions. This proactive approach to developmental monitoring represents a significant improvement over reactive approaches that may only identify concerns when they have become more serious. Fourth, communication between teachers and parents is transformed through digital platforms that enable regular, detailed, and two-way communication. Rather than waiting for scheduled conferences, parents can receive regular updates on their children's progress and can

communicate with teachers as questions or concerns arise. This continuous communication supports stronger partnerships between schools and families and ensures that parents are informed and engaged partners in their children's education.

Challenges and Barriers to Implementation

Despite the significant benefits of digital innovation in PAUD student management, the literature also identifies substantial challenges and barriers to implementation. Infrastructure limitations represent a primary barrier, particularly in rural or underserved areas where internet connectivity may be unreliable or unavailable. Without adequate technological infrastructure, even the most well-designed digital tools cannot be effectively implemented.

Human resource competencies represent another significant barrier. Many PAUD teachers have limited experience with digital technologies and may lack the confidence or skills to effectively use digital tools in their practice. Research has shown that teacher attitudes toward technology and their perceived competence significantly influence their adoption and use of digital tools (Lindeman et al., 2021). Without adequate training and ongoing support, teachers may resist or struggle with digital innovation.

Financial constraints also present a significant barrier, as the implementation of digital systems requires investment in hardware, software, and ongoing maintenance. Many PAUD institutions operate with limited budgets and may struggle to afford the initial investment required for digital transformation. This financial barrier is particularly acute for smaller or community-based institutions that may lack access to external funding sources.

Policy and regulatory frameworks may also present barriers to digital innovation. In some contexts, data privacy regulations may limit the collection and sharing of student information, creating challenges for the implementation of comprehensive digital systems. Additionally, the lack of clear policies regarding the use of digital tools in early childhood education may create uncertainty and hesitation among educators and administrators.

Implementation Recommendations

Based on the synthesis of findings from the literature, several recommendations emerge for the successful implementation of digital innovation in PAUD student management. First, implementation should be preceded by a thorough needs assessment to identify the specific challenges and priorities of each institution. This assessment should involve input from teachers, parents, and administrators to ensure that the selected digital tools address genuine needs and have stakeholder support. Second, adequate investment in infrastructure and human resource development is essential for successful implementation. This includes ensuring reliable internet connectivity, providing appropriate hardware, and offering comprehensive training and ongoing support for teachers. Training should address not only the technical aspects of using digital tools but also pedagogical approaches for integrating technology into early childhood education practice.

Third, implementation should be accompanied by clear policies and guidelines regarding data privacy, security, and appropriate use of digital tools. These policies should protect children's privacy while enabling the effective use of digital systems for improving educational services. Parents should be informed about how their children's data will be collected, used, and protected, and their consent should be obtained. Fourth, ongoing evaluation and improvement should be built into the implementation process. Institutions should regularly assess the effectiveness of their digital systems and make adjustments based on feedback from users and emerging needs. This iterative approach ensures that digital systems continue to meet the evolving needs of the institution and its stakeholders.

DISCUSSION

The findings of this research underscore the strategic importance of digital innovation in transforming PAUD student management. Student management in early childhood education involves not merely administrative tasks but the holistic support of children's development across multiple domains (Dianti, 2018). Digital innovation enables a more comprehensive and integrated approach to this support, connecting administrative efficiency with pedagogical quality and family engagement. This integration represents a fundamental shift from viewing student management as separate from educational practice to understanding it as an integral component of quality early childhood education.

The literature consistently demonstrates that digital tools can address the limitations of conventional student management systems. Manual data management, limited communication, and suboptimal monitoring are systematically addressed through digital solutions that enable structured data management, real-time monitoring, and transparent communication (Kusumaningrum et al., 2024). These improvements are not merely incremental but represent a qualitative *transformation* in how PAUD institutions operate and how they support children's development.

A key insight from this research is the synergistic potential of integrating multiple digital tools into a cohesive system. When child development monitoring applications, student management systems, and e-portfolios are integrated, they create a comprehensive digital ecosystem that supports all aspects of PAUD service delivery. This integration enables seamless data flow between different functions, reduces duplication of effort, and provides a holistic view of each child's development and educational journey.

The integrated approach is consistent with the holistic philosophy of early childhood education, which emphasizes the interconnectedness of different aspects of child development. Just as child development cannot be understood in isolated domains, the management of PAUD services cannot be effectively addressed through fragmented systems. Integrated digital systems enable a more coherent and coordinated approach to supporting children's development, aligning administrative processes with pedagogical principles.

Digital innovation in PAUD student management has significant implications for teacher professional practice. Research has shown that digital tools can reduce administrative burden and enable teachers to focus more attention on direct interaction with children and pedagogical planning ([Masinambow et al., 2025](#)). This reallocation of time from administration to instruction represents a substantial improvement in the quality of educational services and the professional satisfaction of teachers.

Furthermore, digital tools can enhance teacher assessment practices by providing systematic frameworks for observing and documenting child development. E-portfolios, in particular, enable teachers to collect and organize evidence of children's learning and development over time, supporting more authentic and comprehensive assessment practices (Hooker, 2020). This systematic approach to assessment enables teachers to better understand each child's strengths and needs and to plan appropriate learning experiences. However, realizing these benefits requires adequate investment in teacher professional development. Research has demonstrated that teacher attitudes toward technology and their perceived competence significantly influence their adoption and use of digital tools ([Lindeman et al., 2021](#)). Without ongoing training and support, teachers may struggle to effectively integrate digital tools into their practice or may resist adoption altogether.

The findings highlight the significant potential of digital innovation to strengthen partnerships between schools and parents. Digital platforms enable more frequent, detailed, and accessible communication between teachers and parents, overcoming the limitations of traditional communication methods ([Wilke et al., 2024](#)). This enhanced communication supports more informed and engaged parenting, as parents can better understand their children's development and the educational program.

E-portfolios, in particular, provide a powerful tool for engaging parents in their children's learning. When parents can access photos, videos, and work samples documenting their children's progress, they gain a more concrete understanding of their children's development and the learning that occurs at school. This understanding supports more meaningful conversations between parents and teachers and enables parents to reinforce learning at home.

The strengthening of parent-school partnerships through digital tools is particularly important in the context of early childhood education, where family engagement is recognized as a critical factor in children's development and learning. By making communication more accessible and transparent, digital tools can help bridge the gap between school and home, creating a more coherent and supportive learning environment for children.

A significant contribution of this research is the identification of how digital tools can address the challenges of developmental monitoring in PAUD. The systematic tracking made possible by digital applications enables early identification of developmental concerns and timely intervention ([Riana et al., 2025](#)). This proactive approach to developmental monitoring represents a substantial improvement over reactive approaches that may only identify concerns when they have become more serious.

The comprehensive coverage of developmental domains in digital monitoring applications ensures that all aspects of child development are systematically tracked. This comprehensive approach is consistent with the holistic understanding of child development that underpins early childhood education practice. By enabling teachers to easily record and analyze data across multiple domains, digital tools support a more integrated understanding of each child's development. Furthermore, the accessibility of developmental data to parents through digital platforms enables families to be more engaged in monitoring their children's development. When parents can access information about their children's progress in real-time, they can more effectively support development at home and can raise concerns with teachers in a timely manner.

The research underscores the importance of contextual factors in the successful implementation of digital innovation in PAUD student management. Infrastructure, human resource competencies, financial resources, and policy frameworks all influence the feasibility and effectiveness of digital implementation. What works in one context may not be appropriate or feasible in another, highlighting the need for context-sensitive approaches to digital innovation. In contexts with limited infrastructure, for example, simpler digital solutions that do not require continuous internet connectivity may be more appropriate than more sophisticated systems that depend on reliable connectivity. Similarly, in contexts where teachers have limited digital literacy, more intensive training and support may be needed to ensure successful adoption. The findings suggest that successful implementation requires not only appropriate technology but also adequate support systems and enabling conditions.

The findings of this research have significant implications for policy development. Governments and educational authorities have a crucial role to play in supporting digital innovation in PAUD through the provision of infrastructure, funding, and policy frameworks. Investment in digital infrastructure for PAUD institutions, including internet connectivity and hardware, is essential for enabling digital innovation. Professional development policies should prioritize building teacher digital competencies and supporting ongoing learning and adaptation. Without adequate investment in human resource development, digital tools will not be effectively used or will not achieve their potential benefits. Policies should also address issues of data privacy and security, ensuring that children's information is protected while enabling effective use of digital systems.

Furthermore, policies should promote equity in access to digital innovation, ensuring that children in underserved communities are not left behind. Digital innovation has the potential to reduce educational inequalities by improving access to quality services, but only if implementation is accompanied by policies that address disparities in infrastructure, resources, and capacity.

The findings of this research are consistent with and extend previous studies on digital innovation in education. Like earlier research, this study finds that digital tools can improve administrative efficiency, enhance communication, and support better educational outcomes (Kim, 2020; Kusumaningrum et al., 2024). However, this research extends previous work by specifically focusing on the integrated application of child

development monitoring and e-portfolio systems in PAUD student management, an area that has received limited attention in the literature. The research also contributes to the growing body of knowledge on digital transformation in early childhood education by identifying specific challenges and barriers to implementation in the PAUD context. While previous research has examined technology integration in early childhood classrooms ([Lindeman et al., 2021](#)), fewer studies have focused specifically on student management systems and their role in supporting service quality.

The findings have several practical implications for PAUD institutions considering digital innovation. First, institutions should conduct a thorough needs assessment to identify their specific challenges and priorities before selecting digital tools. This assessment should involve input from all stakeholders to ensure that the selected tools address genuine needs and have broad support.

Second, institutions should adopt a phased approach to implementation, starting with basic systems and gradually expanding as capacity and confidence grow. This phased approach reduces the risk of overwhelming users and allows for learning and adaptation along the way. The phased approach should be accompanied by ongoing evaluation to ensure that the implementation is achieving its intended goals.

Third, institutions should invest in ongoing professional development for teachers, addressing both technical skills and pedagogical approaches for integrating digital tools into practice. Training should be practical, ongoing, and responsive to emerging needs and challenges. Without adequate professional development, even the most sophisticated digital tools will not achieve their potential benefits. Fourth, institutions should engage parents as partners in the digital innovation process, providing them with training and support to effectively use digital tools and ensuring their voices are heard in decisions about implementation. Parent engagement is essential for realizing the full benefits of digital innovation, particularly in strengthening parent-school partnerships.

This research makes several theoretical contributions to the field of educational management. First, it extends the application of technology acceptance models to the PAUD context, identifying factors that influence the adoption and use of digital tools in early childhood education settings. Second, it contributes to the development of a framework for understanding digital innovation in PAUD student management, highlighting the interconnections between administrative efficiency, pedagogical quality, and family engagement.

Third, the research contributes to the literature on educational digitalization by identifying the specific opportunities and challenges of digital transformation in the PAUD context. While much of the literature on educational digitalization has focused on primary, secondary, or higher education, this research highlights the unique characteristics of early childhood education that shape the implementation and impact of digital innovation.

While this research provides valuable insights into digital innovation in PAUD student management, it has several limitations that should be acknowledged. As a literature review, the research synthesizes existing findings but does not include primary data collection or empirical testing of digital interventions. Future research

could address this limitation through empirical studies that examine the implementation and impact of specific digital tools in PAUD settings.

The research is also limited by the availability and quality of existing literature on the topic. While efforts were made to include diverse sources, the literature on digital innovation in PAUD student management is still relatively limited compared to other areas of educational technology research. Future research could contribute to building this knowledge base through empirical studies, case studies, and action research.

Additionally, the research focuses primarily on the Indonesian PAUD context, which may limit the generalizability of findings to other contexts. Future research could examine digital innovation in PAUD in other countries and contexts, enabling cross-cultural comparisons and identification of contextual factors that influence implementation.

CONCLUSIONS

This research has examined digital-based innovation in PAUD student management, focusing on the implementation of child development monitoring applications and e-portfolio systems. The findings demonstrate that digital innovation offers significant solutions to the challenges of conventional student management, including manual data management, limited communication between teachers and parents, and suboptimal monitoring of child development. Through structured data management, real-time monitoring, and transparent communication, digital tools enable PAUD institutions to provide more effective, efficient, and responsive services that better support children's developmental needs.

The research also reveals that successful implementation of digital innovation requires attention to multiple factors, including infrastructure, human resource competencies, financial resources, and policy frameworks. Without adequate support in these areas, digital tools will not achieve their full potential or may even create new challenges. Therefore, efforts to promote digital innovation in PAUD must be comprehensive, addressing not only technology but also the enabling conditions that support its effective use.

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