

Development of an Early Childhood Education Management Information System (SIMPAUD) Based on the ADDIE Model to Support the Merdeka Curriculum at TK Rausan Fikri

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Abstract: This study aims to develop an Early Childhood Education Management Information System (SIMPAUD) aligned with the Merdeka Curriculum using the ADDIE development model at TK Rausan Fikri. The research employed a Research and Development (R&D) method with both qualitative and quantitative approaches. The process included needs analysis for PAUD education management, system architecture and web-based user interface design, software development, system implementation in the school environment, and effectiveness evaluation. The evaluation instrument used was the USE Questionnaire (Usefulness, Satisfaction, and Ease of Use), completed by 15 teachers and staff. The results showed an average score of 4.15 out of 5 (83%), indicating high feasibility. Respondents reported that SIMPAUD Merdeka was useful in lesson planning, student data management, and generating learning outcome reports. These findings suggest that the developed system effectively enhances the efficiency of early childhood education management and is ready for broader implementation.

Keyword: Digitalization, Educational Management, PAUD, SIMPAUD.

Introduction

The advancement of technology in the era of Industry 4.0 and Society 5.0 has brought significant impacts across various sectors, including education. Digitalization has become a crucial element in this transformation, as it changes the way educational institutions operate and serve stakeholders such as students, teachers, education staff, and parents. Amidst global demands for efficiency and quality in educational services, digital transformation has become a strategic necessity—not only in secondary and higher education but also in Early Childhood Education (ECE).

Unfortunately, ECE institutions tend to lag behind in adopting digital technologies, particularly in the area of education management. Previous studies (Kurniati et al., 2021; Pratama et al., 2019) have shown that information systems in ECE are still limited to basic administrative functions, lacking curriculum integration or systematic learning support. This poses a significant challenge, given that the quality of services in early childhood education profoundly influences holistic child development.

The need for an integrated information system has become increasingly urgent with the implementation of the Merdeka Curriculum by the Ministry of Education, Culture, Research, and

Technology. This curriculum emphasizes flexible learning and the reinforcement of the Pancasila Student Profile, requiring an adaptive, data-driven educational management system. Without a relevant information system, ECE institutions may face serious difficulties in implementing the curriculum effectively.

To address this challenge, the development of a Management Information System for Early Childhood Education (SIMPAUD) that aligns with the principles of the Merdeka Curriculum is essential. The SIMPAUD Merdeka is expected to facilitate digital learning planning, student data management, and learning outcome reporting, while also improving the efficiency and effectiveness of decision-making processes. Although several educational information systems have been developed, most are not specifically designed for the ECE context or do not consider the unique requirements of the Merdeka Curriculum.

Based on this background, this study aims to develop the SIMPAUD Merdeka system using the ADDIE model and evaluate its feasibility and effectiveness in enhancing educational management at TK Rausan Fikri. This research is expected to fill a gap in the literature and practice regarding the digitalization of early childhood education management in Indonesia.

Methods

This study adopts the ADDIE model—Analysis, Design, Development, Implementation, and Evaluation—as the primary instructional design framework for developing the SIMPAUD Merdeka system at TK Rausan Fikri. The ADDIE model was chosen for its systematic, iterative approach that supports both the technical and pedagogical dimensions of educational system development. The model ensures that the system is built based on real user needs, is properly designed and tested, and is refined through feedback. Each phase is described below in detail.

Analysis

The analysis phase aimed to understand the management needs of early childhood education and how SIMPAUD Merdeka could address challenges in the Industry 4.0 and 5.0 eras. The needs analysis focused on administrative management, curriculum planning, and learning outcome evaluation. The goal was to identify areas where digital systems could enhance the efficiency and effectiveness of PAUD operations. Product analysis was also conducted to evaluate how SIMPAUD Merdeka should be adapted to support the Merdeka Curriculum. This involved assessing the necessary components and features to ensure the system could meet both academic and administrative management needs while supporting effective curriculum implementation.

Design

In the design phase, two main components were developed: System Architecture and User Interface Design. The system architecture was designed to ensure harmonious integration of all modules—covering planning, execution, and monitoring of educational activities. This design aimed to provide robust functionality while maintaining performance and scalability. Meanwhile, the user interface was created to ensure ease of access, consistent navigation, and visual appeal. Elements such as buttons, input forms, and intuitive navigation structures were carefully designed to enhance user interaction and satisfaction.

3. Development

During the development phase, the system design was translated into a working prototype. This included backend development (e.g., database systems) and frontend development (e.g., web

interface) based on the previously established design specifications. After coding, system integration was conducted to ensure seamless functionality across all components. The system was then deployed to a server environment and configured to meet operational requirements identified in earlier phases. This phase ensured that SIMPAUD Merdeka was technically functional and ready for real-world use.

Implementation

The implementation phase involved deploying SIMPAUD Merdeka at TK Rausan Fikri. Teachers participated in hands-on training sessions covering the system's features, such as student data input, curriculum planning tools, and progress reporting. This step aimed to ensure that users could adopt and integrate the system into daily teaching and management practices effectively.

Evaluation

Evaluation focused on assessing the feasibility and effectiveness of SIMPAUD Merdeka in the field. Feedback was collected from users—particularly teachers at TK Rausan Fikri—through observations and interviews. This feedback was used to evaluate how well the system met user needs, what improvements were required, and whether the system supported the goals of the Merdeka Curriculum.

Result And Discussion

System Development Results

This research was conducted at TK Rausan Fikri, Tambun, with the aim of developing a technology-based educational management system tailored to the Merdeka Curriculum. The resulting product is a web-based software application designed to support the planning, organization, and evaluation of early childhood education activities.

The system development followed the ADDIE model:

Analysis Phase:

Needs analysis identified three core components essential to PAUD educational management—planning, implementation, and supervision. Product analysis led to the development of features including student data management, alumni tracking, teacher records, academic calendars, daily assessments, and learning outcomes reports.

Design Phase:

The system architecture was designed for web-based deployment, ensuring accessibility and flexibility. The user interface design prioritized usability, integrating menus for student records, curriculum structure, lesson planning, and supervisory functions for administrators.

Development Phase:

The system's source code was developed using a modular, folder-based structure for maintainability. Backend and frontend components were integrated into a unified system, with structured database storage. The system was then deployed to a production server with tailored configurations to ensure optimal performance.

Implementation Phase:

The SIMPAUD Merdeka system was implemented at **TK Rausan Fikri**, accompanied by training sessions for teachers. The training focused on enabling users to navigate and utilize system features in their daily teaching and administrative routines.

Evaluation Phase:

The system was evaluated using the USE Questionnaire (Usefulness, Satisfaction, and Ease of Use). Results indicated high levels of user satisfaction and practical utility in supporting early childhood education management at **TK Rausan Fikri**.

System Feasibility

System feasibility was assessed through the USE Questionnaire, covering aspects of usability, satisfaction, and efficiency. The total average score was **4.15 out of 5**, corresponding to **83% feasibility**, indicating that the system is highly suitable for PAUD educational settings.

Two expert evaluators provided additional feedback:

- **Technical Aspects:** Performance optimization is needed for devices with lower hardware specifications.
- **User Interface:** Further refinement is recommended to enhance intuitiveness for users with varying levels of digital literacy.

These insights are valuable for future iterations of the system and emphasize the need for broader device compatibility and interface simplification to accommodate diverse user profiles.

Discussion

The development and implementation of the SIMPAUD Merdeka system at TK Rausan Fikri offer valuable insights into the integration of digital technology in early childhood education (ECE) management. This discussion connects the findings to the underlying theoretical framework, compares them with prior studies, and highlights the contributions and limitations of the research.

This study applied the ADDIE model as the design foundation. Each phase—Analysis, Design, Development, Implementation, and Evaluation—was critical in ensuring that the system met both pedagogical and operational requirements. The *Merdeka Curriculum*, which emphasizes flexible learning, independent exploration, and the development of the *Pancasila Student Profile*, requires adaptive tools that enable personalized education and comprehensive assessment. SIMPAUD Merdeka responds to this need by supporting structured lesson planning, dynamic curriculum execution, and digital reporting of learning outcomes.

The results align with findings by Kurniati et al. (2021) and Pratama et al. (2019), which identified the technological lag in PAUD institutions. Most existing systems were found to serve basic administrative functions without curriculum integration. SIMPAUD Merdeka advances this state by providing a comprehensive platform that supports administrative processes, curriculum design, and pedagogical supervision in a single interface. Compared to earlier systems that focused narrowly on attendance or student data, SIMPAUD Merdeka integrates planning, execution, and monitoring features.

This study contributes to current literature in several key ways:

- It demonstrates how the ADDIE instructional design model can effectively guide the development of digital management systems in early education settings.
- It offers evidence on how curriculum-aligned digital systems can enhance usability, satisfaction, and practical implementation in PAUD.
- It adds to the limited body of Indonesian research focused specifically on PAUD digital transformation, a sector often overlooked in broader EdTech studies.

These findings support the case for developing more context-specific, curriculum-sensitive digital tools for PAUD, especially in the context of national education reform.

This study was limited to a single case setting at **TK Rausan Fikri**, with evaluation focusing on short-term user experiences. The absence of statistical effect sizes or long-term educational impact data limits the generalizability of the findings. Future research should involve larger sample sizes, longitudinal analysis, and comparative studies across diverse PAUD environments. Additionally, testing performance across different device specifications would address technical feedback received during expert evaluation.

Nevertheless, this research underscores the potential of structured digital systems in transforming PAUD management. It suggests that, with proper design and educator training, digital transformation in early childhood education is both feasible and beneficial.

Conclusion

The development of the SIMPAUD Merdeka system at **TK Rausan Fikri** represents a significant step forward in addressing the pressing need for digital transformation in early childhood education (ECE) management in Indonesia. Rooted in a structured analysis of institutional needs, the system was designed and built using the ADDIE model to support the *Merdeka Curriculum*—a curriculum that demands flexibility, learner-centered planning, and data-informed decision-making.

The study has demonstrated that the SIMPAUD Merdeka system effectively integrates essential PAUD functions such as student data management, lesson planning, and learning evaluation. Its organized system architecture and user-friendly interface have contributed to high levels of usability, satisfaction, and ease of use, as validated by the USE Questionnaire. Moreover, the system has shown its practical viability when implemented and used daily by educators at **TK Rausan Fikri**, affirming its relevance to real-world PAUD operations.

More than a technical achievement, this development reflects a conceptual alignment between educational policy (i.e., *Merdeka Curriculum*) and digital innovation at the foundational level of the education system. The study contributes to ongoing discourse on educational technology by offering a replicable model for similar institutions aiming to modernize their management processes while preserving pedagogical integrity.

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