

MANAGEMENT OF THE BASIC EDUCATION DATA SYSTEM (DAPODIK) ADMINISTRATION IN TOLIKARA REGENCY: CHALLENGES AND STRATEGIES FOR STRENGTHENING DATA-DRIVEN EDUCATIONAL GOVERNANCE

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ABSTRACT

Digital transformation in education has encouraged the utilization of information systems as a primary instrument for data-driven educational governance. One of the strategic systems is the Basic Education Data System (Dapodik), which serves as the main source of educational data for planning, implementation, evaluation, and policy-making processes in Indonesia. However, the implementation of Dapodik in remote areas continues to face various challenges that may affect data quality and the effectiveness of educational policies. This article aims to analyze the strategic role of Dapodik in educational governance, identify challenges in managing Dapodik administration in Tolikara Regency, and formulate strategies to strengthen digital-based educational data management. This study employs a literature review method with a descriptive qualitative approach by analyzing scientific publications, government regulations, policy documents, and previous relevant studies. The synthesis of the reviewed literature identified four interrelated dimensions that hinder effective Dapodik management in remote areas: limited human resource competencies, inadequate digital infrastructure, weak organizational governance, and the underutilization of educational data in decision-making processes. The review further indicates that these challenges reduce data quality and limit the effectiveness of evidence-based educational policies. Based on these findings, this study proposes an integrated strengthening strategy that combines continuous operator capacity building, digital infrastructure improvement, standardized governance mechanisms, enhanced monitoring and evaluation, and the development of a data-driven organizational culture. Strengthening Dapodik management is expected to improve educational governance and support more effective, accurate, and sustainable educational policy formulation.

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INTRODUCTION

Digital transformation has become one of the primary agendas in educational reform across many countries, including Indonesia. The rapid advancement of information and communication technologies has shifted educational management paradigms from conventional administrative systems toward more integrated, efficient, and accountable data-driven systems (OECD, 2021). In this context, data has emerged as a strategic asset that serves as the foundation for

educational planning, implementation, monitoring, evaluation, and decision-making processes (UNESCO, 2018). The availability of accurate, up-to-date, and reliable data is therefore a fundamental prerequisite for achieving quality educational governance (UNESCO International Institute for Educational Planning, 2021).

As part of its efforts to establish data-driven educational governance, the Indonesian government, through the Ministry of Education, Culture, Research, and Technology, developed the Basic Education Data System (Dapodik) as the national educational data management system (Kementerian Pendidikan, 2023). Dapodik functions as an integrated information system that collects and manages various educational data, including student records, teachers and educational personnel, educational institutions, infrastructure, and other supporting information (Kementerian Pendidikan, 2022). From an information systems perspective, Dapodik can be viewed as an integrated information system that facilitates the collection, processing, storage, and dissemination of educational data to support organizational decision-making. An effective information system should integrate technological components, data, procedures, and users to produce reliable information that supports organizational objectives (Hartono, 2017). The data stored within the Dapodik system serves as the primary basis for numerous strategic government policies, such as the allocation of School Operational Assistance (BOS), the Indonesia Smart Program (PIP), teacher workforce planning, educational quality mapping, and the formulation of national education policies (Harahap et al., 2022). Within the broader perspective of educational governance, Dapodik represents Indonesia's implementation of an Education Management Information System (EMIS), which UNESCO defines as an integrated system involving people, technology, institutions, and procedures to generate reliable educational data for planning, monitoring, evaluation, and evidence-based decision-making (UNESCO, 2018). The effectiveness of an EMIS depends not only on technological infrastructure but also on institutional governance, human resource capacity, and the ability of organizations to utilize data effectively (UNESCO Institute for Statistics, 2020).

The increasingly strategic role of Dapodik requires educational institutions to manage educational data accurately and sustainably. Nevertheless, the implementation of Dapodik across different regions in Indonesia continues to face numerous challenges. Previous studies have indicated that the quality of Dapodik management is influenced by several factors, including human resource competencies, technological infrastructure availability, institutional support, and the organizational culture of data utilization (Mutmainah et al., 2024). When one or more of these factors are inadequate, the quality of educational data may be compromised, potentially affecting the accuracy and effectiveness of policy formulation and implementation (Saputra & Subroto, 2024). The importance of Dapodik can also be explained through the Information Systems Success Model proposed by DeLone & McLean (2003), which states that the effectiveness of an information system is influenced by system quality, information quality, service quality, system use, user satisfaction, and net benefits. This framework has been widely applied to evaluate educational information systems, including Dapodik implementation in Indonesia (DeLone & McLean, 2003; Yunis et al., 2017). In addition, technology acceptance among system users also influences the effectiveness of information systems. According to Davis (1989), users are more likely to adopt and utilize a system when they perceive it as useful for improving their performance and easy to operate. Therefore, improving the usability and accessibility of Dapodik is essential for encouraging consistent system utilization by school operators, particularly in remote areas. Therefore, improving Dapodik management requires not only technological improvements but also the enhancement of information quality and institutional support to maximize organizational benefits.

These challenges become more complex in remote areas characterized by limited infrastructure and restricted access to technology. Tolikara Regency, located in the Papua Highlands Province, represents one such region with challenging geographical conditions. Most areas of Tolikara consist of mountainous terrain with limited transportation and communication access. These conditions have significant implications for various aspects of educational administration, including the management of digital-based educational systems such as Dapodik (Badan Pusat Statistik, 2023). In the context of Dapodik management, limited internet connectivity, inadequate technological facilities, and insufficient operator competencies are among the most common challenges encountered in remote areas (Harahap et al., 2022). Consequently, the processes of data entry, updating, and synchronization are often unable to operate optimally. Such conditions may create discrepancies between the data recorded in the system and the actual conditions in the field. Meanwhile, the quality of educational data plays a critical role in determining the effectiveness of planning and decision-making processes at both regional and national levels (UNESCO Institute for Statistics, 2020).

From the perspective of Data-Driven Decision Making (DDDM), educational data should function not merely as administrative records but as strategic resources that guide educational planning, implementation, monitoring, and

evaluation (OECD, 2021). Consequently, strengthening Dapodik management is expected to improve the quality of evidence-based educational policies and enhance educational governance at both regional and national levels (Sa'diyah et al., 2024). Beyond technical issues, Dapodik management is also closely related to managerial and organizational governance aspects. Effective educational data management requires not only reliable technological systems but also competent human resources, clear operational procedures, adequate supervision mechanisms, and an organizational culture that recognizes the importance of data in decision-making processes (Daft, 2016). Therefore, strengthening Dapodik management should be viewed as an integral component of broader efforts to improve the quality of educational governance (Terry, 1977).

Previous studies have examined Dapodik implementation from various perspectives, including system effectiveness, information service quality, educational data utilization, and the implementation of the One Data Education policy. For example, Harahap et al. (2022) primarily discussed the implementation of the One Data policy in Dapodik management, while Kirmadi et al. (2023) focused on the effectiveness of Dapodik in supporting school administration. Likewise, Saputra & Subroto (2024) emphasized the utilization of Dapodik data for evidence-based educational decision-making, whereas Mutmainah et al. (2024) examined the integration of educational information systems to improve school governance. However, these studies mainly addressed the functional, administrative, or policy aspects of Dapodik in general educational settings and paid limited attention to the combined influence of human resource capacity, technological infrastructure, organizational governance, and data utilization culture in geographically remote regions. Research specifically addressing the challenges of Dapodik management in remote areas with limited infrastructure, particularly in Tolikara Regency, remains limited. Consequently, there is still insufficient understanding of how these interrelated factors collectively affect the implementation of Dapodik and the formulation of effective strategies for strengthening educational data governance in remote contexts.

Unlike previous studies that generally focused on a single aspect of Dapodik implementation, this article adopts an integrated perspective by synthesizing evidence from the literature to examine the interaction among human resource capacity, digital infrastructure, organizational governance, and data-driven decision-making within the context of remote regions. The novelty of this article lies in its comprehensive synthesis of these interconnected dimensions and the development of an integrated framework of improvement efforts that links capacity building, infrastructure enhancement, governance strengthening, monitoring and evaluation, and the cultivation of a data-driven organizational culture. By focusing on Tolikara Regency as a representative case of geographically disadvantaged areas, this study extends the existing literature beyond system effectiveness toward a broader understanding of how Dapodik management can support sustainable educational governance in remote settings.

Based on the foregoing discussion, this article aims to analyze the strategic role of Dapodik in educational governance, identify the major challenges associated with Dapodik administration in Tolikara Regency, and formulate strategies for strengthening educational data management to support effective, accurate, and sustainable educational policymaking.

METHOD

Research Design

This study employed a qualitative literature review using a descriptive approach to examine the administration and management of the Basic Education Data System (Dapodik), particularly the challenges and strategies for strengthening educational data governance in remote areas such as Tolikara Regency. A qualitative literature review enables researchers to synthesize existing knowledge, identify recurring issues, and develop a comprehensive understanding of a research topic through critical interpretation of relevant literature rather than statistical analysis (Creswell, 2018; Moleong, 2018). The literature search was conducted between May and June 2026 using Google Scholar, Scopus-indexed publications, ERIC, and official institutional websites, including the Ministry of Education, Culture, Research, and Technology, UNESCO, and the OECD. The search employed combinations of the keywords "Dapodik", "Basic Education Data System", "Education Management Information System", "educational governance", "data-driven decision making", "educational information system", and "remote education". To ensure the relevance of the reviewed literature, the search primarily focused on publications published between 2017 and 2024, while seminal theoretical works were included regardless of publication year.

The initial search identified 86 publications. After removing duplicate records and screening titles and abstracts for relevance, 54 publications remained for further evaluation. Subsequently, the full texts were assessed according to

predetermined inclusion criteria, resulting in 22 references being selected for qualitative synthesis. The inclusion criteria comprised: (1) publications discussing Dapodik, educational information systems, educational governance, or data-driven decision-making; (2) peer-reviewed journal articles, scholarly books, official government regulations, or institutional reports; (3) studies providing conceptual, empirical, or policy-related evidence relevant to educational data management; and (4) publications relevant to educational administration in geographically remote regions. Publications lacking academic credibility or not directly related to the research objectives were excluded from the analysis.

The selected literature was analyzed using qualitative thematic analysis. The analytical process involved four stages: literature identification, source screening, data extraction, and thematic synthesis. Information extracted from each publication was coded and categorized into major themes, including the strategic role of Dapodik, challenges in educational data management, human resource capacity, technological infrastructure, organizational governance, data utilization culture, and strategies for strengthening educational governance. The synthesized findings were then interpreted descriptively to explain the relationships among these themes and to formulate integrated strategies for improving Dapodik management in remote areas (Miles et al., 2014; Sugiyono, 2019). To enhance the credibility of the findings, source triangulation was applied by comparing evidence obtained from academic publications, government regulations, and international policy documents, thereby minimizing potential bias arising from reliance on a single source of information (Creswell, 2018).

RESULTS AND DISCUSSION

The Strategic Role of Dapodik in Educational Governance

The findings of this literature review indicate that the Basic Education Data System (Dapodik) has become the cornerstone of educational governance in Indonesia. Beyond functioning as an administrative database, Dapodik serves as the primary source of educational information supporting planning, implementation, monitoring, evaluation, and evidence-based policymaking (Kementerian Pendidikan, 2023). Educational data stored in Dapodik are extensively utilized to support strategic government programs, including the allocation of School Operational Assistance (BOS), the Indonesia Smart Program (PIP), teacher workforce planning, educational quality mapping, and infrastructure development (Harahap et al., 2022).

From the perspective of the Education Management Information System (EMIS), Dapodik reflects the implementation of an integrated educational information system designed to improve educational governance through reliable data management (UNESCO, 2018). Effective educational governance depends on the availability of accurate, complete, and timely information, enabling policymakers to formulate responsive and evidence-based educational policies (UNESCO International Institute for Educational Planning, 2021). Consequently, Dapodik has evolved beyond an administrative application into a strategic instrument for strengthening accountability, transparency, and efficiency within Indonesia's educational management system.

These findings are consistent with the concept of Data-Driven Decision Making (DDDM), which emphasizes that educational decisions should be supported by reliable data rather than intuition or subjective judgment (Saputra & Subroto, 2024). Therefore, improving the quality of Dapodik directly contributes to better educational governance and more effective public policy implementation.

A comparison of previous studies indicates that although most researchers consistently recognize Dapodik as a strategic educational information system, they emphasize different aspects of its contribution. Harahap et al. (2022) focused on Dapodik as a policy instrument supporting the One Data initiative, whereas Saputra and Subroto (2024) highlighted its role in evidence-based decision-making. Meanwhile, UNESCO (2018) viewed educational information systems from a broader governance perspective through the EMIS framework. By synthesizing these perspectives, this study argues that Dapodik should not merely be regarded as an administrative database or policy instrument but as an integrated governance system in which data quality, institutional capacity, and organizational commitment interact to determine the effectiveness of educational governance.

Challenges in Dapodik Management in Remote Areas

The literature consistently identifies that Dapodik implementation remains uneven across Indonesian regions, particularly in geographically remote areas such as Tolikara Regency. The first major challenge concerns human resource capacity. Many schools continue to experience shortages of qualified Dapodik operators, while opportunities for

continuous technical training remain limited. Consequently, data validation, updating, and synchronization processes are frequently delayed, reducing the accuracy and reliability of educational information (Mutmainah et al., 2024).

The second challenge relates to technological infrastructure. Stable internet connectivity, adequate computer facilities, and reliable electricity remain fundamental requirements for effective Dapodik implementation. However, these facilities are still insufficient in many remote regions, making regular data synchronization difficult and increasing the possibility of incomplete or outdated educational records (Badan Pusat Statistik, 2023).

Organizational governance represents another significant challenge. In many educational institutions, Dapodik operators simultaneously perform multiple administrative responsibilities, resulting in increased workloads and reduced data management effectiveness. Furthermore, educational data are frequently viewed merely as administrative requirements rather than strategic assets supporting educational planning and evaluation (Sa'diyah et al., 2024).

These findings support the Information Systems Success Model proposed by DeLone & McLean (2003), which argues that the effectiveness of an information system depends upon system quality, information quality, and service quality. Weaknesses in technological infrastructure, organizational support, and human resource competencies reduce the effectiveness of Dapodik implementation and ultimately limit the benefits generated by the system (DeLone & McLean, 2003; Yunis et al., 2017).

The reviewed studies also reveal that these challenges should not be interpreted as isolated problems. Rather, they form an interconnected system in which deficiencies in one dimension reinforce weaknesses in other dimensions. For example, inadequate digital infrastructure limits the effective use of Dapodik even when trained operators are available, while limited human resource capacity reduces the quality of data despite improvements in technological facilities. Similarly, weak organizational governance discourages the systematic utilization of educational data for planning and evaluation. This synthesis suggests that the effectiveness of Dapodik management depends on the interaction among human resource capacity, technological infrastructure, organizational governance, and data utilization culture rather than on any single factor alone.

Strategies for Strengthening Dapodik Management

The reviewed literature suggests that strengthening Dapodik management requires integrated strategies involving technological, organizational, and human resource dimensions. Capacity-building programs should be continuously implemented to improve operators' competencies in educational data management, verification, and system utilization. Continuous professional development is expected to improve data quality and strengthen institutional commitment toward educational information management (Harahap et al., 2022).

Infrastructure improvement is equally essential. Local governments should prioritize expanding internet connectivity, improving computer availability, and ensuring reliable electricity to facilitate continuous data synchronization. Alternative synchronization mechanisms may also be considered for geographically isolated schools experiencing limited internet access (UNESCO Institute for Statistics, 2020).

Institutional governance should also be strengthened through the implementation of standardized operational procedures, regular monitoring, and systematic evaluation mechanisms. Such efforts improve accountability, minimize administrative errors, and ensure consistency in educational data management (Daft, 2016).

Equally important is cultivating a data-driven organizational culture. Educational institutions should utilize Dapodik not only for administrative reporting but also as the primary basis for school planning, performance evaluation, resource allocation, and educational policy formulation. This approach is consistent with the principles of evidence-based educational governance promoted by UNESCO (2018) and supports sustainable educational improvement.

Based on the synthesis of the reviewed literature, this study proposes an integrated conceptual framework for strengthening Dapodik management in remote regions. The framework assumes that improvements in educational governance can only be achieved when four dimensions are developed simultaneously: competent human resources, adequate digital infrastructure, effective organizational governance, and a strong data-driven organizational culture. These dimensions collectively improve data quality, which subsequently enhances evidence-based educational planning, policy implementation, monitoring, and evaluation. This integrated perspective distinguishes the present study from previous research that generally examined these dimensions independently.

Implications for Educational Governance

This study demonstrates that strengthening Dapodik management contributes directly to improving educational governance in Indonesia, particularly in remote regions. Reliable educational data facilitate more accurate educational

planning, equitable teacher distribution, targeted infrastructure development, and effective allocation of government assistance programs (Kirmadi et al., 2023).

Furthermore, stronger Dapodik management supports the implementation of Indonesia's One Data Education policy while improving transparency, accountability, and efficiency in educational administration Kementerian Pendidikan (2022). Within the broader context of digital transformation, Dapodik should therefore be regarded as a strategic component of educational governance rather than merely an administrative information system.

Within the context of Tolikara Regency, the synthesized literature suggests that geographical isolation amplifies the interaction among the identified challenges. Limited internet connectivity, transportation barriers, and shortages of trained educational personnel reduce the effectiveness of Dapodik implementation more substantially than in regions with better infrastructure. Consequently, strengthening Dapodik management in Tolikara should prioritize integrated interventions rather than isolated technological improvements. Capacity building, institutional support, and sustainable infrastructure development should therefore be implemented simultaneously to achieve meaningful improvements in educational governance. Overall, the literature indicates that sustainable improvements in Dapodik management require balanced investments in digital infrastructure, institutional governance, human resource development, and organizational commitment to evidence-based decision-making. Through these integrated efforts, Dapodik can function more effectively as a foundation for high-quality, transparent, and sustainable educational governance.

CONCLUSION

This study concludes that the Basic Education Data System (Dapodik) plays a strategic role in supporting data-driven educational governance in Indonesia by providing reliable educational information for planning, implementation, monitoring, evaluation, and evidence-based policymaking. As an integral component of the Education Management Information System (EMIS), Dapodik contributes to improving the effectiveness, transparency, and accountability of educational administration at both national and regional levels.

The literature review indicates that the implementation of Dapodik in remote regions, particularly Tolikara Regency, continues to face multidimensional challenges. These include limited human resource competencies, inadequate digital infrastructure, weak organizational governance, and the underutilization of educational data in decision-making processes. Rather than operating independently, these challenges interact with one another, indicating that improvements in educational governance require integrated interventions rather than isolated technological or administrative solutions.

To address these challenges, strengthening Dapodik management should adopt an integrated approach encompassing continuous capacity building for Dapodik operators, improvement of digital infrastructure, implementation of standardized operational procedures, reinforcement of monitoring and evaluation systems, and the development of a data-driven organizational culture. These strategies are expected to improve the quality, reliability, and utilization of educational data while supporting more effective and sustainable educational governance.

Theoretically, this study contributes to the literature by synthesizing previous findings into an integrated conceptual perspective that explains how human resource capacity, digital infrastructure, organizational governance, and data utilization culture collectively influence the effectiveness of Dapodik management in remote areas. This synthesis extends previous studies that predominantly examined these dimensions separately and provides a more comprehensive understanding of educational information system governance within geographically disadvantaged contexts.

Practically, the findings provide recommendations for local governments, school administrators, and Dapodik operators. Local governments should prioritize investments in digital infrastructure and continuous technical assistance, while schools should strengthen internal governance through standardized operational procedures, regular monitoring, and the promotion of data-driven decision-making practices. For Dapodik operators, continuous professional development is essential to improve data quality and ensure that educational information can effectively support planning and policy implementation.

Future studies are encouraged to employ empirical approaches, such as case studies, surveys, or mixed-methods research, to validate these findings and evaluate the effectiveness of Dapodik implementation across different regional contexts in Indonesia. Such studies may also examine how integrated strengthening strategies influence educational governance outcomes in remote regions over time, thereby providing stronger empirical evidence for future educational policy development.

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