



Journal of Educational Sciences

Journal homepage: <https://jes.ejournal.unri.ac.id/index.php/JES>



P-ISSN
2581-1657

E-ISSN
2581-2203

Transforming Student Data Governance through a Web-Based Management Information System (MIS): A Systematic Literature Review

Sep Arinda Risa Kamal*, Desi Rahmawati, Siti Zulaikha, Syafaat Ariful Huda

Master's Program in Educational Management, Jakarta State University, East Jakarta, 13320, Indonesia

ARTICLE INFO

Article history:

Received: 16 Dec 2025

Revised: 26 Jan 2026

Accepted: 27 Feb 2026

Published online: 05 March 2026

Keywords:

Data Governance,
Digital Transformation,
Educational Management,
Student Information System
Web-based MIS

* Corresponding author:

E-mail: separindarisakamal@gmail.com

Article Doi:

<https://doi.org/10.31258/jes.10.3.p.416-426>

This is an open access article under the [CC BY-
SA](https://creativecommons.org/licenses/by-nc-sa/4.0/) license.



ABSTRACT

In the era of Industrial Revolution 4.0 and Society 5.0, educational data governance demands speed, accuracy, and real-time accessibility. Manual student data management often leads to redundancy, inefficiency, and delays in strategic decision-making. This study aims to analyze the effectiveness and impact of transforming student data governance through the implementation of Web-based Management Information Systems (MIS). The research method employs a Systematic Literature Review (SLR) using the PRISMA protocol on 32 reputable scientific articles (Scopus and SINTA 1-2) published between 2015 and 2025. The synthesis analysis shows that the transformation to web-based MIS has a significant impact on four main dimensions: (1) Operational efficiency of school administration through automation; (2) Improvement of data validity and integration (interoperability); (3) Support for data-driven decision making for school principals; and (4) Improvement of public services to parents. However, challenges related to cybersecurity and human resource (HR) readiness remain major obstacles. These findings confirm that the digitalization of data governance is not just a change of tools, but an organizational cultural transformation towards an accountable and futuristic school.

1. Introduction

The rapid advancement of information and communication technology has fundamentally reshaped the governance and management of educational institutions. In recent decades, data have become a strategic asset that supports planning, accountability, and decision making in schools. Student data, including personal information, academic records, attendance histories, and administrative documentation, must be managed accurately and efficiently to meet increasing demands for transparency and service quality (Al-Mubaid, 2019; Rahmawati &

Rusdiana, 2021). Inadequate data governance can lead to inefficiencies in administrative processes, limited access to reliable information, and delayed institutional responses to educational challenges.

Despite these demands, many schools continue to rely on conventional data management practices, such as paper based documentation or fragmented digital systems that operate independently across administrative units. These approaches frequently result in data duplication, inconsistencies, and a high risk of data loss, particularly when information is transferred manually between units (Setiawan et al., 2020). Furthermore, limited system integration restricts the ability of school leaders to obtain comprehensive and real time data, which is essential for informed decision making and effective educational governance.

Web based Management Information Systems have emerged as a strategic response to these challenges. Unlike stand alone or desktop based applications, web based MIS provide centralized data storage, real time accessibility, and greater interoperability across administrative functions (Nugroho, 2022). Previous studies indicate that the implementation of web based MIS can improve administrative efficiency by automating routine processes such as student registration, attendance management, and academic reporting (Johnson & Smith, 2021; Pratama & Wibowo, 2021). Within the framework of School Based Management, MIS adoption is also associated with enhanced transparency, accountability, and service delivery, particularly in the governance of student data as a core organizational resource (Hidayat & Junianto, 2018).

Along with the growing adoption of MIS in schools, scholarly attention to school information systems has increased. Numerous studies have examined system design, usability, user satisfaction, and technology acceptance among teachers and administrative staff (Arifin & Wulandari, 2022; Budi & Hartono, 2020). These studies contribute valuable insights into the technical and operational aspects of MIS implementation. However, the existing literature remains largely tool oriented, focusing on system performance and short term efficiency gains rather than examining broader governance implications.

More specifically, the governance dimension of student data management remains insufficiently explored. Only a limited number of studies address how web based MIS reshape organizational workflows, support leadership decision making, or improve data validity and integration across systems. Research on interoperability, for example, highlights the importance of integrating school MIS with national education databases such as Dapodik, yet this issue is often treated as a technical matter rather than a governance concern related to coordination and accountability (Kurniawan, 2023). Similarly, studies on data validation emphasize error reduction during data entry but rarely link these improvements to institutional governance outcomes (Nusa & Hidayat, 2022).

Another critical issue that has not been adequately synthesized is data security and human resource readiness. Several studies identify cybersecurity risks and limited digital competencies among school staff as major barriers to effective MIS

utilization (Handayani & Prasajo, 2018; Fauzi & Arifin, 2022). From a governance perspective, weak data protection undermines institutional trust and accountability, particularly given the sensitive nature of student data. These challenges indicate that digital transformation in schools is not merely a technological shift but also an organizational and cultural process that requires sustained capacity building.

Furthermore, while some studies report improvements in leadership decision making through the use of dashboards and data visualization features, empirical evidence on how MIS function as strategic decision support systems remains fragmented (Wijaya, 2021; Santoso & Putra, 2024). As a result, there is still limited understanding of how web based MIS contribute to data driven leadership and strategic management in schools over time. This gap becomes more pronounced as schools increasingly rely on data to monitor performance, allocate resources, and engage with stakeholders.

Given these limitations, there is a clear need for a systematic synthesis of existing research that moves beyond technical evaluations and examines the governance related impacts of web based MIS implementation. A Systematic Literature Review provides an appropriate methodological approach to address this need, as it enables a transparent and structured analysis of empirical findings across diverse contexts and time periods. By synthesizing results from multiple studies, an SLR can identify consistent patterns, dominant themes, and persistent challenges related to student data governance in the digital era.

Therefore, this study aims to systematically examine how the implementation of web based Management Information Systems contributes to the transformation of student data governance in schools. Specifically, this study analyzes the impact of web based MIS on administrative efficiency, data validity and integration, leadership decision making, and the key challenges associated with digital transformation through a Systematic Literature Review approach.

2. Methodology

Research Design

This study employed a Systematic Literature Review to systematically examine how the implementation of web based Management Information Systems contributes to the transformation of student data governance in schools. The SLR approach was selected because it enables a structured, transparent, and replicable synthesis of empirical evidence, which aligns with the objective of identifying impacts, recurring patterns, and implementation challenges related to MIS within the context of educational governance (Kitchenham & Charters, 2007). To ensure methodological transparency and reporting rigor, the review process followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines (Moher et al., 2009).

Literature Search Strategy

The literature search strategy was designed to be operational and precise in order to ensure comprehensive coverage and relevance of the selected studies. Searches were conducted in four academic databases, namely Scopus and Google Scholar for international publications, as well as SINTA and Garuda for national level studies. These databases were selected to capture both global and local perspectives on the implementation of web based Management Information Systems in school settings. The publication period was limited to studies published between 2015 and 2025 to reflect recent developments in web based technologies and educational data governance.

Search terms were derived directly from the core constructs of the study, namely management information systems, student data, and educational governance. Boolean logic was applied using combinations such as “Student Information System” OR “School Management Information System” OR “Web-based MIS”, combined with “Data Governance” OR “Educational Administration” OR “Decision Support System”. For national publications, Indonesian keywords including “sistem informasi manajemen sekolah”, “data peserta didik”, “tata kelola data”, and “pengambilan keputusan kepala sekolah” were used. All keywords were applied to titles, abstracts, and author provided keywords to enhance search precision.

Inclusion and Exclusion Criteria

Inclusion and exclusion criteria were defined in direct alignment with the research objectives. Studies were included if they were empirical research articles examining the implementation or evaluation of web based Management Information Systems in the management of student data, reported impacts on administrative efficiency, data validity or integration, leadership decision making, or school governance outcomes, and were available in full text in English or Indonesian. Studies were excluded if they focused on non web based systems, did not explicitly address student data or data governance, were purely conceptual without empirical evidence, or lacked sufficient methodological clarity. These criteria were applied to ensure that all included studies were directly relevant to the purpose of the review and contributed meaningful evidence to the analysis.

Literature Selection Procedure Based on PRISMA

The literature selection process followed the technical stages of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses framework to ensure transparency, methodological rigor, and replicability of the review. This procedure was conducted through four sequential stages, namely identification, screening, eligibility assessment, and final inclusion of studies. During the identification stage, the initial search across the selected databases yielded a total of 145 articles. Duplicate records were then removed to obtain a set of unique studies. At the screening stage, titles and abstracts were reviewed to assess their relevance to the focus of the study. Articles that met the initial relevance criteria proceeded to the

eligibility stage, where full text assessments were conducted based on the predefined inclusion and exclusion criteria. Through this systematic process, 32 articles were determined to be eligible and included in the final synthesis. The entire process of narrowing down the literature from the initial search results to the final set of analyzed studies is visually presented to enhance transparency and methodological clarity. Figure 1 presents the flow diagram of the literature selection procedure based on the PRISMA framework, illustrating each stage of the selection process and the number of studies retained or excluded at each step.

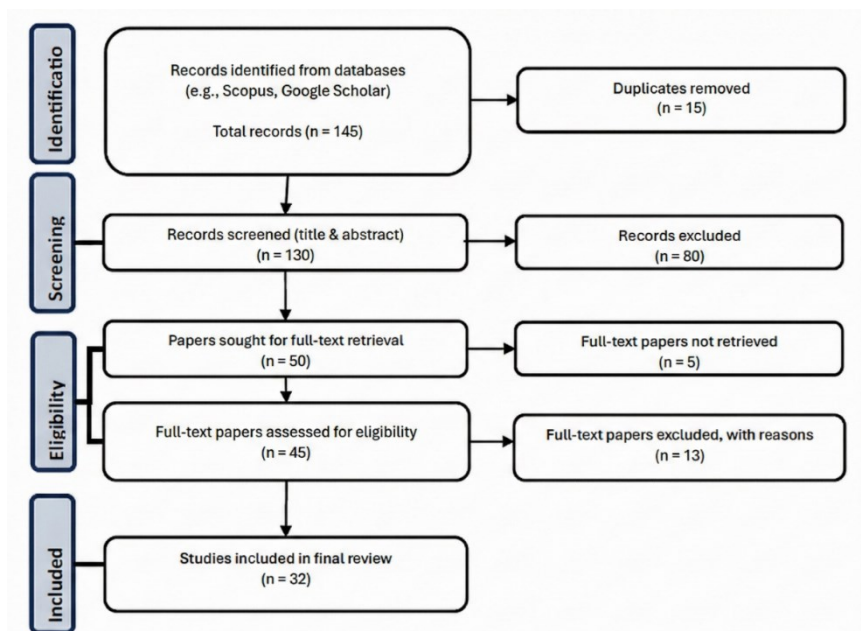


Figure 1. The PRISMA flow diagram

Quality Appraisal of Studies

To ensure the credibility and validity of the synthesized findings, a quality appraisal was conducted for all included studies. Each article was evaluated based on the clarity of research objectives, appropriateness of research design and methods, transparency of data collection and analysis procedures, and relevance of findings to student data governance. This appraisal process was implemented to minimize bias and ensure that the synthesis was grounded in methodologically sound empirical evidence, in accordance with established guidelines for systematic reviews in the social sciences (Petticrew & Roberts, 2006).

Data Analysis Technique

Data analysis was conducted using a thematic synthesis approach. Findings from each selected study were coded and grouped into overarching themes that corresponded with the research objectives, namely administrative efficiency, data validity and integration, decision support for school leadership, and implementation challenges including data security and human resource readiness. Thematic synthesis enabled the systematic integration of findings across diverse studies and contexts, facilitating the identification of consistent patterns, contextual variations,

and governance implications of web based MIS implementation in schools (Thomas & Harden, 2008).

3. Results and Discussion

This systematic literature review examines how web-based Management Information Systems (MIS) contribute to the transformation of student data governance in educational institutions. The synthesis of 32 selected studies reveals that student data governance is no longer positioned merely as a technical or administrative function, but as a strategic component of school management that directly influences decision making, accountability, and institutional performance. The reviewed literature demonstrates a clear shift from fragmented and manual data practices toward integrated, web-based MIS architectures that support accuracy, transparency, and efficiency in managing student information.

Web-Based MIS as a Structural Foundation for Student Data Governance

The results indicate that web-based MIS plays a foundational role in restructuring student data governance by centralizing data management processes and reducing dependence on manual record keeping. Several studies emphasize that centralized student databases enable schools to maintain consistency, reduce redundancy, and improve data reliability across administrative units. These findings align with earlier conceptualizations of MIS as an organizational control and coordination mechanism within educational institutions (O'Brien & Marakas, 2017; Rahmawati & Rusdiana, 2021).

Empirical evidence from recent studies further confirms that the implementation of school MIS enhances institutional performance by improving access to real-time student data and supporting evidence-based leadership practices. Research focusing on school principals shows that MIS-supported data access strengthens managerial effectiveness and administrative accountability, particularly in areas such as student monitoring, reporting, and academic planning (Nikmah et al., 2025a). This suggests that student data governance is inseparable from leadership capacity, as governance quality depends on how data is interpreted and used by decision makers.

Governance Challenges and Operational Constraints

Despite the reported benefits, the reviewed literature highlights persistent governance challenges in the implementation of web-based MIS. Technical limitations, human resource readiness, and organizational resistance emerge as recurring barriers. Studies conducted in secondary and vocational schools demonstrate that inadequate digital literacy among staff often undermines the effective use of MIS, resulting in underutilization of available system features (Handayani & Prasajo, 2018; Setiawan et al., 2020). From a governance perspective, these challenges reflect gaps between system availability and institutional capability. The literature indicates that governance failures frequently occur not due to technological shortcomings, but due to weak alignment between

system design and user needs. For instance, usability evaluations reveal that complex system interfaces can reduce user satisfaction and compromise data accuracy when teachers and administrative staff struggle to input or retrieve student information correctly (Arifin & Wulandari, 2022; Riansih et al., 2025). This finding underscores the importance of incorporating usability and user-centered design principles into student data governance frameworks.

Data Quality, Security and Accountability

Another major theme emerging from the synthesis concerns data quality and security as core elements of student data governance. Web-based MIS has been shown to significantly reduce human error through automated validation, standardized data formats, and integrated reporting mechanisms (Nusa & Hidayat, 2022). However, the literature also warns that increased data centralization raises new governance risks related to data privacy and cybersecurity. Several studies emphasize that student data governance must extend beyond efficiency concerns to include ethical and legal accountability. Cloud-based MIS platforms, while offering scalability and accessibility, require robust security protocols to prevent unauthorized access and data breaches (Fauzi & Arifin, 2022). The governance dimension becomes particularly salient when MIS is used to support strategic decision making, as inaccurate or compromised data can distort policy decisions and institutional planning. These findings resonate with broader governance theories that frame data as a strategic organizational asset requiring formal oversight mechanisms (Gunawan, 2018; Wijaya, 2021).

MIS, Digital Transformation and Institutional Integration

The review further indicates that web-based Management Information Systems (MIS) play a strategic role as enablers of comprehensive digital transformation within school institutions. Rather than functioning merely as standalone administrative applications, contemporary MIS platforms are increasingly embedded within integrated digital ecosystems that connect academic administration, learning management systems, institutional dashboards, and external education databases. This shift reflects a transition from fragmented data management practices toward more coherent and interconnected institutional governance structures. Research on system integration underscores that interoperability among digital platforms strengthens governance coherence by facilitating real-time data exchange across departments and hierarchical levels within educational institutions (Kurniawan, 2023).

Moreover, recent empirical studies reveal that the integration of MIS with collaborative digital environments, such as Google Workspace and web-based analytical dashboards, contributes significantly to improving transparency, coordination, and shared accountability among school leaders, teachers, and administrative staff (Nikmah et al., 2025b; Santoso & Putra, 2024). Through these integrated systems, student data becomes more accessible, timely, and actionable, enabling institutions to move beyond basic record-keeping functions. As a result, MIS-supported integration enables schools to monitor student performance trends

more systematically, identify early indicators of academic or administrative risks, and evaluate institutional outcomes using evidence-based metrics.

In this integrated digital context, student data governance is no longer confined to compliance with administrative regulations but evolves into a dynamic and analytics-informed governance practice. Data is actively leveraged to support strategic planning, decision-making, and continuous institutional improvement. Consequently, the integration of MIS within broader digital infrastructures reinforces the role of data governance as a core component of digital transformation, aligning technological capabilities with institutional objectives and accountability frameworks.

Theoretical Contribution and Novelty of the Review

Compared to prior systematic literature reviews on educational information systems, this study offers a distinct theoretical contribution by explicitly conceptualizing student data management as a governance issue rather than viewing it solely through technological or administrative lenses. While existing reviews predominantly emphasize system adoption, usability, implementation challenges, or technical efficiency, this review shifts the analytical focus toward governance-related dimensions, including accountability mechanisms, leadership roles, data quality assurance, and institutional integration. This reframing allows student data to be understood not merely as an operational resource, but as a strategic governance asset that shapes organizational behavior and institutional performance, particularly within digitally mediated school administration environments (Susnita et al., 2023; Nurbuana et al., 2025).

By synthesizing evidence across the intersecting domains of governance theory, management information systems, and educational management, this review extends established MIS governance frameworks into the school context, which has received comparatively limited theoretical attention. In doing so, it bridges a critical gap between organizational governance literature and school-level digital management practices, especially in relation to how innovation-driven information systems support institutional adaptation in the era of Industry 4.0 (Nurbuana et al., 2025). The review further integrates recent empirical studies that illustrate how web-based MIS influences internal power relations, redistributes decision-making authority, and reconfigures accountability structures within educational institutions, including administrative coordination supported by collaborative web platforms (Susnita et al., 2023).

These findings suggest that digital systems not only support managerial functions but also actively mediate leadership practices and institutional control. Importantly, studies emphasizing the role of MIS in strengthening principal performance, enhancing institutional coordination, and supporting evidence-based leadership provide empirical grounding for this governance-oriented perspective (Nikmah et al., 2025a; Zhang & Cheng, 2023). Consequently, the novelty of this review lies in its ability to reposition MIS from a technical infrastructure to a central governance

mechanism, thereby offering a more integrative and theoretically robust framework for understanding student data management in digitally transforming schools.

Implications for Policy and Practice

The findings suggest that successful transformation of student data governance requires more than technological investment. Policymakers and school leaders must prioritize governance alignment by ensuring that MIS implementation is accompanied by capacity building, clear data governance policies, and continuous system evaluation. The literature consistently indicates that governance effectiveness improves when MIS is embedded within institutional strategies rather than treated as an auxiliary administrative tool. Furthermore, the results highlight the need for standardized governance frameworks that integrate technical, organizational, and ethical dimensions of student data management. Such frameworks would enable schools to leverage MIS not only for administrative efficiency but also for strategic governance and sustainable digital transformation.

4. Conclusion

The transformation of student data governance through web-based Management Information Systems has been shown to significantly enhance accountability, efficiency, and strategic capacity in school management. The findings of this systematic literature review demonstrate that web-based MIS shifts student data management from a passive and administrative function into an active governance instrument that supports evidence-based decision making and institutional accountability. Through centralized databases, automated processes, and real-time data access, schools are better positioned to improve coordination, transparency, and service quality. However, the success of this transformation is not determined solely by the sophistication of web technologies. It is strongly influenced by the robustness of data security infrastructures, including access control, data protection mechanisms, and backup systems, as well as by the digital competencies of school personnel.

Without adequate human resource readiness and governance mechanisms, the potential benefits of MIS remain underutilized. Therefore, schools need to move beyond application procurement and prioritize the development of clear standard operating procedures for student data governance, continuous capacity-building programs, and periodic governance audits to ensure data quality and system sustainability. This study also highlights the importance of system interoperability as a foundation for developing integrated smart school ecosystems. Web-based MIS should be positioned as a strategic organizational asset rather than a standalone technical tool. By strengthening governance orientation, schools can leverage MIS to support long-term institutional transformation, improve public service delivery, and reinforce data-driven educational leadership.

References

- Al-Mubaid, H. (2019). Data management in educational systems: Challenges and opportunities. *Journal of Information Systems Education*, 30(2), 112–125.
- Arifin, Z., & Wulandari, S. (2022). Evaluasi usability sistem informasi manajemen sekolah menggunakan metode USE questionnaire. *Jurnal Teknologi Pendidikan*, 15(1), 45–56.
- Budi, S., & Hartono, J. (2020). Analysis of factors affecting the acceptance of web-based school information systems. *Indonesian Journal of Information Systems*, 2(2), 88–98.
- Fauzi, A., & Arifin, F. (2022). Keamanan data pada sistem informasi akademik sekolah berbasis cloud. *Jurnal Sistem Informasi Dan Keamanan Siber*, 4(1), 22–30.
- Gunawan, I. (2018). *Manajemen pendidikan: Suatu tinjauan praktis*. Rajawali Pers.
- Handayani, T., & Prasajo, L. D. (2018). Hambatan implementasi sistem informasi manajemen di sekolah menengah kejuruan. *Jurnal Akuntabilitas Manajemen Pendidikan*, 6(2), 198–208.
- Hidayat, R., & Junianto, E. (2018). Sistem informasi manajemen data siswa berbasis web pada SMA Negeri 1. *Jurnal Informatika*, 5(2), 213–220.
- Johnson, M., & Smith, L. (2021). The role of student information systems in school administration efficiency. *International Journal of Educational Management*, 35(4), 890–905.
- Kitchenham, B., & Charters, S. (2007). *Guidelines for performing systematic literature reviews in software engineering*. EBSE Technical Report.
- Kurniawan, D. (2023). Interoperabilitas data pokok pendidikan (Dapodik) dengan sistem informasi internal sekolah. *Jurnal Ilmiah Komputasi*, 22(1), 33–41.
- Moher, D., Liberati, A., Tetzlaff, J., & Altman, D. G. (2009). Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *PLoS Medicine*, 6(7), e1000097.
- Nikmah, S. W., Rasiman, R., & Violinda, Q. (2025a). Development of a school management information system with Linktree and Google Workspace integration. *Journal of Educational Sciences*, 9(5), 3910–3921. <https://doi.org/10.31258/jes.9.5.p.3910-3921>
- Nikmah, S. W., Rasiman, R., & Violinda, Q. (2025b). Effectiveness of using school management information systems to improve principal performance. *Journal of Educational Sciences*, 9(6), 5141–5150. <https://doi.org/10.31258/jes.9.6.p.5141-5150>
- Nugroho, E. (2022). *Transformasi digital sekolah: Strategi dan implementasi*. Andi Offset.
- Nurbuana, & Sirozi, M. (2025). Educational innovation in the era of the fourth industrial revolution to enhance global competitiveness. *Journal of Educational Sciences*, 9(4), 2379–2387. <https://doi.org/10.31258/jes.9.4.p.2379-2387>
- Nusa, P., & Hidayat, W. (2022). Minimizing human error in student data entry using validation algorithms in web-based systems. *Journal of Applied Informatics*, 6(3), 110–119.
- O'Brien, J. A., & Marakas, G. M. (2017). *Management information systems* (11th ed.). McGraw-Hill Education.
-

- Petticrew, M., & Roberts, H. (2006). *Systematic reviews in the social sciences: A practical guide*. Blackwell Publishing.
- Pratama, R., & Wibowo, A. (2021). Rancang bangun sistem informasi akademik berbasis web menggunakan metode waterfall. *Jurnal Rekayasa Sistem Dan Teknologi Informasi*, 5(2), 320–329.
- Rahmawati, E., & Rusdiana, A. (2021). *Sistem informasi manajemen pendidikan: Konsep dan implementasi*. Pustaka Setia.
- Riansih, M. S., Sriati, I., & Iriani, A. (2025). User perceptions of academic service satisfaction at FKIP Sriwijaya University: SIMAK version 3.0. *Journal of Educational Sciences*, 9(4), 2550–2561.
- Santoso, B., & Putra, Y. (2024). Data visualization for education management: A review of web-based school dashboards. *Asian Journal of Education and E-Learning*, 12(1), 10–18.
- Setiawan, A., Yulianto, B., & Susanto, A. (2020). Tantangan migrasi data manual ke digital pada sekolah menengah di daerah terpencil. *Jurnal Pengabdian Masyarakat*, 3(2), 102–110.
- Susnita, D., Jaenudin, R., & Syarifuddin. (2023). Needs Analysis of Teacher Administration Based on Google Sites in Elementary Schools. *Journal of Educational Sciences*, 7(4), 688–698. <https://doi.org/10.31258/jes.7.4.p.688-698>
- Thomas, J., & Harden, A. (2008). Methods for the thematic synthesis of qualitative research in systematic reviews. *BMC Medical Research Methodology*, 8, 45.
- Wijaya, K. (2021). Strategic decision making in schools: The role of management information systems. *Journal of Educational Administration and History*, 53(2), 145–160.
- Zhang, X., & Cheng, Y. (2023). The impact of digital transformation on school governance: Evidence from China. *International Journal of Educational Development*, 92, 102115.

How to cite this article:

Kamal, S. A. R., Rahmawati, D., Zulaikha, S., & Huda, S. A. (2026). Transforming Student Data Governance through a Web-Based Management Information System (MIS): A Systematic Literature Review. *Journal of Educational Sciences*, 10(3), 416-426.
