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Data-Driven Decision Making for School Improvement in the Indonesian Context: A Literature Review

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Abstract

This literature review examines the application of data-driven decision making (DDDM) for school improvement within the specific context of Indonesia. It examines the theoretical foundations, empirical evidence, and practical considerations related to implementing DDDM in educational settings. The review synthesizes research from various sources, including journal articles, book chapters, and proceedings published within the last 15 years, to provide a comprehensive overview of the current state of knowledge. The analysis focuses on key themes, including the role of leadership, the importance of data literacy, the impact of technology, and the cultural considerations relevant to the Indonesian educational landscape. The aim is to identify best practices, highlight gaps in the existing literature, and suggest directions for future research aimed at enhancing the effectiveness of DDDM in improving educational outcomes in Indonesia.

Keywords: Data-Driven Decision Making; School Improvement; Indonesian Education; Educational Technology;

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INTRODUCTION

The global emphasis on improving educational outcomes has led to a growing interest in data-driven decision making (DDDM) as a strategy for school improvement. DDDM involves the systematic collection, analysis, and use of data to inform decisions related to teaching, learning, and school management (E. B. Mandinach, 2012). This approach is predicated on the belief that evidence-based practices can lead to more effective and equitable educational outcomes (Fernandes, 2018). While DDDM has gained traction in various educational contexts, its implementation and effectiveness can vary significantly depending on the specific environment, including cultural, economic, and technological factors (Sergis & Sampson, 2016). This literature review focuses on the application of DDDM for school improvement within the unique context of Indonesia, a country characterized by its diverse geography, cultural richness, and rapidly evolving educational landscape.

Indonesia, as a vast archipelago nation, faces unique challenges in its education system, including disparities in access to quality education, teacher training and professional development, and the integration of technology (McBurnie et al., 2021). The Indonesian government has implemented various reforms aimed at improving the quality of education, often emphasizing the importance of accountability and evidence-based practices. DDDM is increasingly seen as a crucial tool to support these reforms by providing educators and administrators with the

information and insights needed to make informed decisions (Parham, 2015). However, the successful implementation of DDDM in Indonesia requires careful consideration of the local context, including cultural norms, technological infrastructure, and the capacity of educators to effectively use data.

The primary objectives of this literature review are to: examine the theoretical foundations of DDDM and its application in educational settings, analyze the current state of research on DDDM in the context of school improvement, identify the key factors that influence the successful implementation of DDDM, explore the specific challenges and opportunities related to DDDM in the Indonesian educational context, highlight gaps in the existing literature and suggest directions for future research.

This review encompasses literature published in English and Indonesian, focusing on studies that address the use of DDDM for school improvement. The scope includes research on educational leadership, data literacy, technology integration, and the cultural factors that shape the implementation of DDDM. The review considers a variety of sources, including peer-reviewed journal articles, book chapters, dissertations, and government reports. The focus is on studies that provide empirical evidence or offer practical insights relevant to the Indonesian educational context.

METHODS

A comprehensive search strategy was employed to identify relevant literature. The following databases were searched: ERIC (Education Resources Information Center), Scopus, Web of Science, Google Scholar, and ProQuest. The search terms included: "Data-Driven Decision Making," "School Improvement," "Indonesian Education," Educational Leadership", "Data Literacy", "Educational Technology," and combinations of these terms. Boolean operators (AND, OR) were used to refine the search and ensure relevant results. Additionally, citation tracking was used to identify key publications and relevant studies.

The following inclusion criteria were applied: studies that focus on the use of DDDM in educational settings, studies that address school improvement initiatives, studies that provide empirical evidence or offer practical insights, and studies published in English or Indonesian.

The following exclusion criteria were applied: studies that do not focus on education, studies that are not directly relevant to DDDM or school improvement, and studies that are not available in Indonesian.

LITERATURE REVIEW

DDDM is rooted in the principles of evidence-based practice and continuous improvement. It draws on various theoretical perspectives, including systems thinking, organizational learning, and the science of improvement (James et al., 2008). Systems thinking emphasizes the interconnectedness of various components within a school and the importance of understanding how different factors interact and influence one another. Organizational learning highlights the need for schools to adapt and improve based on feedback and data analysis continuously. The science of improvement provides a framework for systematically testing and refining interventions to achieve desired outcomes (Fernandes, 2018). (Mandinach, 2012) emphasizes that DDDM has become an essential component of educational practice, with increasing attention from policymakers and financial support. The principles of educational psychology are crucial in informing how educators use data and examining its impact on practice (E. B. Mandinach, 2012).

Effective leadership is crucial for the successful implementation of DDDM. School leaders play a vital role in creating a data-driven culture, providing support and resources for data use, and fostering a shared vision for school improvement (Sergis & Sampson, 2016). They must be able to articulate the importance of data, build capacity among staff, and model the use of data in their own decision-making processes. (Wang, 2019) raises critical questions about whether DDDM

aligns with moral decision-making, especially in the context of school accountability. Furthermore, the technological leadership behaviors of school principals significantly impact DDDM (Çevik & Doğan, 2023). (Parham, 2015) suggests that DDDM can be a model for distributive leadership and shared decision-making. (Simpson, 2011) examined promising practices in the use of DDDM by school leaders in charter schools. Viera & Freer (2015) identified that supportive leadership is a key enabler for DDDM.

Data literacy, defined as the ability to collect, analyze, interpret, and use data effectively, is a fundamental requirement for successful DDDM (Ellen B Mandinach & Gummer, 2013). Educators need to develop a range of data literacy skills, including the ability to identify relevant data sources, use data analysis tools, interpret findings, and communicate results to stakeholders. Training and professional development are crucial for building data literacy capacity among teachers and administrators. (Donhost & Anfara Jr., 2010) highlight the importance of data-driven decision-making and the need for supportive middle grades school environments. The development of data competence maturity is also a key factor (Cech et al., 2018). (Nnorom J. N. et al., 2023) recommended providing principals with adequate training to enhance their data literacy skills. The study by (Pagan et al.2019) indicated a strong positive relation between a Data Support Model and improved Data Literacy.

Technology plays a critical role in supporting DDDM by providing tools for data collection, analysis, and visualization. Schools need to invest in appropriate hardware, software, and data infrastructure to facilitate the effective use of data. However, the mere presence of technology is not sufficient; educators must be trained to use the tools effectively and integrate them into their practice (McBurnie et al., 2021). The use of AI is also being leveraged for school improvement (Alsbou & Alsaraireh, 2024). (Roegman et al.,2021) examined how teachers use data in instructional decision making, highlighting the influence of overlapping systems.

The successful implementation of DDDM in Indonesia requires careful consideration of the cultural and contextual factors that shape educational practices. This includes understanding the values, beliefs, and norms that influence the way educators and administrators approach data use. Factors such as the availability of resources, the level of technological infrastructure, and the capacity of educators to use data effectively can significantly impact the success of DDDM initiatives. The diverse geography and cultural richness of Indonesia also pose unique challenges and opportunities for implementing DDDM. (Jafari & Safa, 2023) studied data use in language schools. The study by (Doğan, 2023) examined the perceptions of school administrators regarding DDDM.

Despite the potential benefits, several challenges and barriers can hinder the effective implementation of DDDM. These include a lack of data literacy among educators, limited access to reliable data, insufficient resources for data analysis, resistance to change, and a lack of support from school leadership (Viera & Freer, 2015). (Roegman et al., 2021) highlight challenges in data use within the context of test-based accountability. Furthermore, the overemphasis on standardized testing can lead to a narrow focus on test scores, potentially overlooking other important aspects of student learning (Dudley-Marling & Baker, 2012). (Datnow et al. 2013) examined the affordances and constraints in teacher collaboration for data use.

DDDM can be applied in various ways to improve schools. These include using data to monitor student achievement, identify areas for improvement, inform instructional practices, personalize learning, and evaluate the effectiveness of interventions. (James et al., 2008) advocate for participatory action research as a tool for school improvement. (Park & Datnow 2016) examined teacher decision-making about differentiation and ability grouping in the context of DDDM.

FINDING AND DISCUSSIONS

Results

The literature review reveals several key findings. First, DDDM is increasingly recognized as a crucial strategy for school improvement, with strong support from policymakers and researchers (E. B. Mandinach, 2012). Second, effective leadership is essential for creating a data-driven culture and supporting the use of data in decision-making (Sergis & Sampson, 2016). Third, data literacy is a critical skill for educators, and professional development is needed to build capacity (Ellen B Mandinach & Gummer, 2013). Fourth, technology plays a vital role in supporting DDDM, but its effectiveness depends on proper implementation and training (McBurnie et al., 2021). Fifth, the successful implementation of DDDM requires careful consideration of the cultural and contextual factors within the specific educational setting (Jafari & Safa, 2023)

Despite the growing body of research on DDDM, several gaps remain. There is a need for more research that specifically addresses the implementation of DDDM in the Indonesian context. While some studies have explored the general principles of DDDM, there is a lack of research that examines the unique challenges and opportunities in Indonesian schools. Furthermore, there is a need for more studies that focus on the role of cultural factors, technological infrastructure, and the capacity of educators to use data effectively. There is also a need for more research on the long-term impact of DDDM on student outcomes in Indonesia.

Several emerging trends are evident in the literature. One trend is the increasing use of technology, including data analytics and artificial intelligence, to support DDDM (Alsbou & Alsaraireh, 2024). Another trend is the growing emphasis on building data literacy capacity among educators (Ellen B Mandinach & Gummer, 2013). A third trend is the recognition of the importance of cultural and contextual factors in shaping the implementation of DDDM (Jafari & Safa, 2023). The DCMM model is also emerging as a framework to improve DDDM (Cech et al., 2018).

The future of DDDM in Indonesian schools is promising, with the potential to transform the way schools operate and improve student outcomes. Especially in the increased Use of Technology and Artificial Intelligence (AI). The integration of technology and AI is likely to play an increasingly important role in DDDM. AI-powered tools can be used to automate data analysis, identify patterns, and provide insights that would be difficult or time-consuming to uncover manually. (Alsbou & Alsaraireh 2024) discuss leveraging AI for school improvement. This can free up educators' time and allow them to focus on more strategic tasks, such as instructional planning and student support. Schools can use technology to create interactive data dashboards that provide real-time information on student performance and school operations. They can also use AI-powered tools to personalize learning, identify students who are at risk of failing, and provide targeted interventions. As (Çevik & Doğan, 2023) show, technological leadership is important in implementing DDDM.

In the context of Indonesian education, DDDM is known as Data-Driven Planning (DDP). The basic concept of DDP involves collecting, analyzing, and interpreting data to inform decision-making (Muthalib et al., 2025). Data can come from various sources, including student exam results, attendance data, student and parent satisfaction surveys, and teacher and school performance data.

In the Indonesian context, the Education Report platform launched by the Ministry of Education, Culture, Research, and Technology since 2021 is a concrete example of efforts to utilize data to improve education quality (Musakirawati et al., 2023). This platform provides data on education system evaluation results, which can be used by schools and local governments to identify areas for improvement. DDP training has also been conducted to improve the skills of supervisors, principals, and teachers in using data for planning (Prasetyono et al., 2023).

DDP in Indonesia uses the Identify, Reflect, and Improve (IRI) method, one approach used in DDP (Muthalib et al., 2025). This method involves identifying problems, reflecting on their causes, and formulating action plans for improvement. This method helps schools design more targeted and effective solutions.

Discussion

This literature review has several implications for educational practice in Indonesia. First, school leaders need to prioritize the development of a data-driven culture by providing support and resources for data use and modeling the use of data in their decision-making processes (Sergis & Sampson, 2016). Second, schools need to invest in professional development to build data literacy capacity among teachers and administrators (Ellen B Mandinach & Gummer, 2013). Third, schools need to ensure that they have access to reliable data and the technological infrastructure necessary to support DDDM (McBurnie et al., 2021). Fourth, schools need to consider the cultural and contextual factors that may influence the implementation of DDDM. Finally, schools should utilize participatory action research to involve teachers in the process of school improvement (James et al., 2008) The use of data should go beyond test scores and include other aspects of student learning (Roegman et al., 2021).

Policymakers can play a crucial role in supporting the implementation of DDDM in Indonesian schools. They should prioritize the allocation of resources for data infrastructure, professional development, and technical assistance. Policymakers should also create policies that encourage the use of data in decision-making and promote a culture of accountability. Furthermore, policymakers need to consider the cultural and contextual factors that may influence the implementation of DDDM and adapt policies accordingly. The government should encourage collaboration and knowledge sharing among schools and districts (Pagan et al., 2019). Policies should also address the potential for data-driven test-taking and its negative impacts (Roegman et al., 2021). Policies should also include the implementation of the DCMM model to assist with the integration of data into the decision-making process (Cech et al., 2018)

Several areas warrant further research. There is a need for more empirical studies that examine the implementation of DDDM in Indonesian schools, focusing on the specific challenges and opportunities in the local context. Research is needed to investigate the impact of DDDM on student outcomes in Indonesia. Longitudinal studies are needed to assess the long-term effects of DDDM initiatives. Further research is needed on the role of cultural factors, technological infrastructure, and the capacity of educators to use data effectively. Research should also focus on how to use data to inform instruction beyond standardized tests (Roegman et al., 2021) Research is needed on the implementation of the DCMM model in Indonesian schools (Cech et al., 2018)

Creating a school culture that values data, encourages collaboration, and supports continuous improvement is essential for the successful implementation of DDDM. School leaders play a critical role in fostering this culture by promoting data-driven practices and encouraging educators to work together to analyze data and make decisions. (Parham, 2015) suggests, the model for data-driven decision making should promote distributive leadership and shared decision making.

School leaders should also provide opportunities for educators to share their knowledge and experiences, and to learn from each other. This can involve creating data teams, establishing professional learning communities, and providing access to data resources and tools. Moreover, schools can create a supportive environment by recognizing and rewarding educators who are using data effectively to improve student outcomes. According to (Donhost & Anfara Jr., 2010), supportive school environments are critical for middle grades, and this can be extended to all levels of education.

Data should be integrated into all aspects of school improvement planning. Schools should use data to identify areas for improvement, set goals, and monitor progress. Data should also be

used to evaluate the effectiveness of school improvement initiatives and to make necessary adjustments. As (Sergis & Sampson, 2016) suggest, data-driven decision-making is essential for school leadership and should be supported by strong systems.

School improvement plans should be based on a thorough analysis of data, including student performance data, attendance data, and survey data. Schools should also involve all stakeholders in the planning process, including educators, administrators, parents, and students. By integrating data into school improvement planning, schools can ensure that their efforts are focused on the areas that need the most attention and that their initiatives are having a positive impact on student outcomes. (Nnorom J. N. et al., 2023) examine the use of DDDM in principal leadership and school improvement initiatives, highlighting its importance.

CONCLUSION

This literature review provides a comprehensive overview of the current state of knowledge on DDDM for school improvement, with a specific focus on the Indonesian context. The review highlights the importance of effective leadership, data literacy, technology integration, and cultural considerations in the successful implementation of DDDM. While DDDM holds significant promise for improving educational outcomes in Indonesia, its successful implementation requires a multifaceted approach that addresses the unique challenges and opportunities in the local context. By building data literacy capacity, providing adequate resources, and fostering a collaborative culture, Indonesian schools can leverage the power of data to improve student learning and achieve their educational goals. Future research should focus on addressing the gaps identified in this review and exploring the long-term impact of DDDM on student outcomes in Indonesia.

REFERENCES

Alsbou, M. K. K., & Alsaraireh, R. A. I. (2024). Data-Driven Decision-Making in Education: Leveraging AI for School Improvement. *2024 International Conference on Knowledge Engineering and Communication Systems (ICKECS)*, *1*, 1–6. https://doi.org/10.1109/ICKECS61492.2024.10616616

Cech, T. G., Spaulding, T. J., & Cazier, J. A. (2018). Data competence maturity: developing data-driven decision making. *Journal of Research in Innovative Teaching & Learning*, *11*(2), 139–158. https://doi.org/10.1108/JRIT-03-2018-0007

Çevik, M., & Doğan, E. (2023). The Mediating and Moderating Effects of Knowledge Management in the Relationship between Technological Leadership Behaviors of School Principals and Data-Driven Decision-Making. *Educational Policy Analysis and Strategic Research*, *18*, 50–76. https://doi.org/10.29329/epasr.2023.525.3

Datnow, A., Park, V., & Kennedy-Lewis, B. (2013). Affordances and constraints in the context of teacher collaboration for the purpose of data use. *Journal of Educational Administration*, *51*(3), 341–362. https://doi.org/10.1108/09578231311311500

Doğan, E. (2023). Data-Driven Decision-Making Process In School Management. *Kastamonu Education Journal*, *31*(3), 331–346. https://doi.org/10.24106/kefdergi.910848

Doğan, E., & Demirbolat, A. O. (2021). Data-driven Decision-Making in Schools Scale: A Study of Validity and Reliability conditions of the Creative Commons Attribution license (CC BY-NC-ND). In *International Journal of Curriculum and Instruction* (Vol. 13, Number 1).

Donhost, M. J., & Anfara Jr., V. A. (2010). Data-Driven Decision Making. *Middle School Journal*, *42*(2), 56–63. https://doi.org/10.1080/00940771.2010.11461758

Dudley-Marling, C., & Baker, D. (2012). The Effects of Market-based School Reforms on Students with Disabilities. *Disability Studies Quarterly*, *32*(2). https://doi.org/10.18061/dsq.v32i2.3187

Fernandes, V. (2018). *Investigating the Role of Data-driven Decision-making within Australian School Improvement Processes*. https://doi.org/10.4018/978-1-5225-6155-2.ch010

Nnorom J. N., Egwunyenga, E. J., & Anho, J. E. (2023). Use of Data-Driven Decision Making in Principal Leadership and School Improvement Initiatives in Delta State Mission Schools. *International Journal of Education, Learning and Development*. https://api.semanticscholar.org/CorpusID:260797128

Jafari, M., & Ahmadi Safa, M. (2023). Data use in language schools: The case of EFL teachers' data-driven decision making. *Journal of Educational Change*, *24*(4), 897–918. https://doi.org/10.1007/s10833-022-09468-0

James, E., Milenkiewicz, M., & Bucknam, A. (2008). *Participatory Action Research for Educational Leadership: Using Data-Driven Decision Making to Improve Schools*. SAGE Publications, Inc. https://doi.org/10.4135/9781483329369

Mandinach, E. B. (2012). A Perfect Time for Data Use: Using Data-Driven Decision Making to Inform Practice. *Educational Psychologist*, *47*(2), 71–85. https://doi.org/10.1080/00461520.2012.667064

Mandinach, Ellen B, & Gummer, Edith S. (2013). A Systemic View of Implementing Data Literacy in Educator Preparation. *Educational Researcher*, *42*(1), 30–37. https://doi.org/10.3102/0013189X12459803

McBurnie, C., Beoku-Betts, I., Waistell, D., & Nallo, M. (2021). *Advancing Data-Driven Decision-Making for School Improvement: Findings from the One Tablet Per School User Testing Programme in Sierra Leone*. MBSSE, EdTech Hub, Leh Wi Lan. https://doi.org/10.53832/edtechhub.0066

Musakirawati, M., Jemmy, J., Anggriawan, F., Triansyah, F. A., Akib, A., & Tahir, A. (2023). Pemanfaatan Platform Rapor Pendidikan Indonesia Terhadap Perencanaan Berbasis Data. *JDMP (Jurnal Dinamika Manajemen Pendidikan)*, *7*(2), 201–208. https://doi.org/10.26740/jdmp.v7n2.p201-208

Muthalib, A., Abun, A., & Linda, R. (2025). Perencanaan Berbasis Data dalam Meningkatkan Kualitas Layanan Pendidikan di SMP Al Furqon dan SMP Asy Syafaah Kabupaten Jember. *Jurnal Bintang Pendidikan Indonesia*, *3*, 138–151. https://doi.org/10.55606/jubpi.v3i2.3718

Pagan, S., Magner, K., & Thibedeau, C. (2019). Supporting Data-Driven Decision Making in a Canadian School District. *International Journal for Digital Society*. https://api.semanticscholar.org/CorpusID:241432548

Parham, A. (2015). *Data Driven Decision Making for School Improvement Planning: Toward a Model and Process for Distributive Leadership and Shared Decision Making*. https://api.semanticscholar.org/CorpusID:155446119

Park, V., & Datnow, A. (2016). Ability Grouping and Differentiated Instruction in an Era of Data-Driven Decision Making. *American Journal of Education*, *123*(2), 281–306. https://doi.org/10.1086/689930

Prasetyono, H., Nurfarkhana, A., Ramdayana, I., Abdillah, A., & Asikin, I. (2023). Pelatihan Perencanaan Berbasis Data Dan Pengelolaan Sumberdaya Sekolah. *Jurnal PkM Pengabdian Kepada Masyarakat*, *5*, 607. https://doi.org/10.30998/jurnalpkm.v5i6.14973

Roegman, Rachel, Kenney, Rachael, Maeda, Yukiko, & Johns, Gary. (2021). When Data-Driven Decision Making Becomes Data-Driven Test Taking: A Case Study of a Midwestern

High School. *Educational Policy*, *35*(4), 535–565. https://doi.org/10.1177/0895904818823744

Sergis, S., & Sampson, D. G. (2016). Data-Driven Decision Making for School Leadership: A Critical Analysis of Supporting Systems. In R. Huang, Kinshuk, & J. K. Price (Eds.), *ICT in Education in Global Context: Comparative Reports of Innovations in K-12 Education* (pp. 145–171). Springer Berlin Heidelberg. https://doi.org/10.1007/978-3-662-47956-8_8

Simpson, G. H. (2011). *School leaders' use of data-driven decision-making for school improvement: A study of promising practices in two california charter schools*. University of Southern California. https://www.proquest.com/openview/809f1cbe5c1d545fbbbfed9d5f44df08/1?pq-origsite=gscholar&cbl=18750

Viera, C. A., & Freer, K. (2015). Barriers and Enablers to Data-Driven Decision Making by High School Counselors and Advisors. *Performance Improvement*, *54*(10), 30–40. https://doi.org/https://doi.org/10.1002/pfi.21533

Wang, Y. (2019). *Is Data-Driven Decision Making At Odds With Moral Decision Making? A Critical Review of School Leaders' Decision Making in the Era of School Accountability*. *14*, 1–8.