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RESEARCH ARTICLE

Data-Driven Decision-Making in Educational Leadership: A Systematic Literature Review (2019-2023)

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ABSTRACT

Data-Driven Decision Making (DDDM) has emerged as a key focus in educational research and practices, gaining attention globally, including in Malaysia, where it is being used to refine educational strategies and policies. Despite its importance, the implementation of DDDM in schools frequently requires attention and improvement. However, the understanding of the implementation of DDDM needed to be clarified. The gap between theory and practice highlights the necessity of improving the decision-making skills of school leaders. Therefore, this study aimed to explore the DDDM in educational leadership and identify its challenges and strategies. This study employed the Systematic Literature Review (SLR) method on the existing literature from 2019-2023. A total of 13 articles were selected and analyzed to answer the research questions. The study found that successful implementation requires strong leadership, professional development, and a commitment to data literacy to ensure that data is used effectively and ethically to improve educational outcomes. The findings of this study pave the focus of future research directions. In conclusion, DDDM holds great promise for transforming school leadership and improvement.

INTRODUCTION

In a BANI (Brittle, Anxious, Nonlinear, and Incomprehensible) environment, leaders are continually confronted with complex and unpredictable challenges. To navigate these effectively, leaders require robust administrative skills, including problem identification and resolution capabilities. These skills are crucial for understanding and addressing the unique problems that arise in such dynamic settings, where traditional linear approaches may fall short. Effective decision-making, a core element of leadership, is essential in this context. Leaders have to select appropriate actions from multiple options, balancing individual and team decision-making processes. Their choices, especially in educational leadership, are reflected in tangible actions like the development and implementation of School Improvement Plans (SIP) (Bickmore, Roberts, & Gonzales, 2020).

SIPs are instrumental in enhancing both school and student outcomes. They embody a strategic approach to educational leadership, where leaders play a pivotal role in shaping policy and practice (Bickmore et al., 2020). Through these plans, leaders assess and improve school performance, focusing on quality education and student success. This necessitates a holistic view of leadership, blending administrative competencies with a deep understanding of the educational landscape and its inherent complexities. Key to navigating these complexities is the effective use of data to inform practices. Data-Driven Decision Making (DDDM) is central to this approach, involving the systematic collection and analysis of various data types, including achievement test results and other indicators, to guide decisions aimed at improving student and institutional success. DDDM is the application of an inquiry process that uses multiple schools and student-level data sources to develop plans of action that lead to improved school and student performance (Bickmore et al., 2020).

Data-Driven Decision Making (DDDM) has emerged as a key focus in educational research and practices, gaining traction globally, including in Malaysia, where it is being used to refine educational

strategies and policies. DDDM in educational settings involves more than mere data collection and reporting; it encompasses a deep analysis of various data types, such as achievement test results, to aid in formulating informed decisions on complex educational issues. This approach has shown promise in enhancing outcomes in the educational sector. Mandinach and Gummer (2013) emphasize the necessity for educators to be data literate to engage effectively in DDDM. Data literacy encompasses various dimensions, including declarative knowledge (understanding what the data is), schematic knowledge (comprehending why the data is important), procedural knowledge (knowing how to use the data), and strategic knowledge (understanding when, where, and how to apply data effectively). These components are vital for educational leaders to use data efficiently and effectively.

Despite the recognized value of data in influencing decisions about curriculum, instruction, policies, and school practices, the practical application of DDDM in schools often needs to be improved. This discrepancy between theory and practice highlights the need for developing and enhancing DDDM skills among school leaders, as noted by Mandinach and Gummer (2013) and Bowers et al. (2014). Addressing this gap is critical for realizing the full potential of data-driven approaches in improving educational outcomes. Data-driven decision-making is increasingly recognized as a fundamental shift in school leadership and educational practices. The critical analysis of DDDM indicates that it requires school leaders to gather and use various types of data effectively to make informed decisions. This approach moves away from traditional educational leadership methods, focusing instead on using data to drive improvements in teaching methods and educational outcomes (Simmie, 2021). While DDDM presents a paradigm shift with potential benefits, it also brings challenges and tensions, especially in aligning it with existing educational practices and objectives. Thus, this study aims to understand the data-driven decision-making, its challenges, and strategies.

MATERIALS AND METHODS

A Systematic Literature Review (SLR) is a valuable method for identifying existing research gaps in a certain field of study and evaluating the extent of work conducted by other researchers on the subject (Kraus et al., 2022). Watson et al. (2018) utilized the Systematic Literature Review (SLR) methodology in their research and followed a three-step process. This study employs three processes, as described by Hossain et al. (2020), which include planning, screening, and reporting. Firstly, the researchers looked for comprehensive information from the literature.

The initial phase involved utilizing one of the widely used databases, Scopus, to gather relevant research papers. These papers were then subjected to thorough reviews. The researchers entered keywords for searching data-driven decision-making and educational leadership. A number of 20 papers were discovered when searching using the specified keywords on June 20, 2023. In the second phase, 5 papers, which accounted for approximately 25% of the total, were eliminated due to the absence of published publications prioritizing book chapters and conferences. During the third step, over 10% (2) of the total papers were excluded because they were not relevant to the subject areas. This was achieved by applying filters to include only articles and journal papers in the management and leadership field, written in English, and with appropriate titles. After carefully examining the individual abstracts, duplicate papers and those that did not align with the study's context were eliminated. After a thorough screening process, a total of 13 research publications were chosen as depicted in Figure 1.

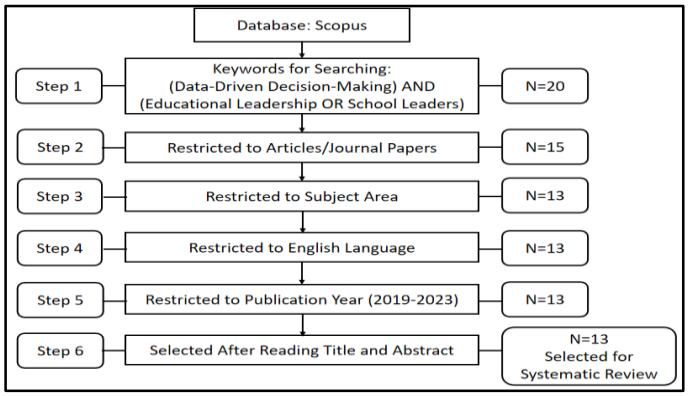

Figure 1: Steps involved in the SLR Process employed by this study

RESULTS

Overview of Data-Driven Decision Making (DDDM)

In elementary education, Data-Driven Decision Making (DDDM) has been an emerging field of research and practice. Researchers devoted numerous efforts to developing theoretically sound and evidence-based frameworks that may inform principals and teachers (Mandanich, 2012; Marsh & Farrell, 2014). For example, a series of studies have focused on K-12 teachers' DDDM at the classroom level, or so-called instructional leadership (Gummer & Mandinach, 2015; Mandanich, 2012; Mandinach et al., 2011; Mandinach et al., 2008; Marsh & Farrell, 2014). Marsh et al. (2006) stated that data-driven decision-making (DDDM) involves systematically collecting and analyzing various types of data to guide decision-making that helps improve student and institutional success. Bickmore (2014) defined DDDM as "the application of an inquiry process that uses multiple schools and student-level data sources to develop plans of action that lead to improved school and student performance". Dodman et al. (2023) defined DDDM as a process encompassing various iterations and components, including systematic collection, analysis, and application of data to make informed decisions. Therefore, Data-Driven Decision Making (DDDM) is a dominant practice in schools that focuses on using data to identify problems, seek solutions, examine consequences, and determine the next steps (Wang, 2021). It involves valuing and utilizing data to make influential decisions about curriculum, instruction, policies, and practices within schools (Wang, 2021).

Evolution of Data-Driven Decision Making (DDDM) in Educational Settings

The approach to decision-making in educational settings has undergone significant evolution over time. Traditionally, educational decisions were often made based on hierarchical leadership, with school leaders and administrators relying on their experience and intuition to guide their choices. This method was less systematic and often lacked a rigorous evidence base. As the field of education progressed, there was a shift towards more collaborative and consultative decision-making processes, where the insights and opinions of teachers and other stakeholders began to be valued and incorporated (Jimerson, et al., 2020). With the advent of the accountability movement and the increasing availability of educational data, there has been a substantial shift towards data-driven decision-making (DDDM) in schools (Murakami & Hernandez, 2019). This approach emphasizes the use of data to inform and guide decisions about curriculum, instruction, and student support services (Wang, 2021). The current literature indicates that educators are now expected to interpret data at both macro and micro levels, connecting student performance to instructional strategies. Researchers have developed frameworks to support school leaders and teachers in adopting DDDM in instructional practices, highlighting the need for data to be organized, analyzed, and transformed into actionable information (Abrams et al., 2020).

Moreover, recent iterations of school improvement planning emphasize the continuous and cyclic nature of using data for the ongoing refinement of educational practices (Bowers & Krumm, 2021). For example, Bernhardt (2017) suggests that school improvement planning should be cyclic, mimicking elements of the organizational change model popularized by Deming (2018) as Plan, Do, Study, Act (PDSA). This reflects a broader trend in organizational management, where data is used not only for immediate decision-making but also for long-term strategic planning and improvement. The role of leadership in supporting DDDM is crucial, as leaders must facilitate the use of data while also ensuring that professional development and capacity building are in place to enable effective data analysis and interpretation (Murakami & Hernandez, 2019; Schildkamp et al., 2019; Park & Desimone, 2019; Gonzales et al., 2020). In summary, the historical trajectory of decision-making in educational settings has moved from a reliance on traditional, experience-based methods to a more structured, data-driven approach that leverages empirical evidence to improve educational outcomes and institutional success.

DDDM holds great promise for transforming school leadership and ultimately teaching and learning. Applying real-time data to shape school and classroom interventions has the potential to allow schools to calibrate their interventions to their school context and to help with the identification and reduction of inequalities in schools (Bryk et al., 2015; Finnigan et al., 2013), in a way other reforms

do not. Integrating data into decision-making processes can significantly enhance school improvement efforts and the effectiveness of educational leadership. By turning vast volumes of data into a resource, schools can develop a more comprehensive understanding of their successes and challenges, which is crucial for informed decision-making. Leaders who effectively use data can drive changes in core program elements, ensuring that instructional strategies are aligned with student needs. Moreover, data-driven decisions can foster a shared understanding among stakeholders, which is essential for collaborative school improvement (Bowers & Krumm, 2021). In line with that, Bernhardt (2017) suggests that school improvement planning should be cyclic, mimicking elements of the organizational change model popularized by Deming (2018) as Plan, Do, Study, Act. Therefore, educational leaders, educators, and practitioners across all institution types must emphasize the DDDM issues in their daily practice.

However, the application of DDDM in schools can be problematic if it promotes deficit thinking and overlooks the historical and contemporary forces that shape educational outcomes (Schildkamp et al., 2019). Today, districts, administrators, and teachers are inundated with various forms of data and increased expectations for using data-driven practices. However, there is mixed and inconsistent evidence demonstrating data use is associated with improved student outcomes (Carlson, Borman, & Robinson, 2011; Konstantopoulos, Miller, & van der Ploeg, 2013; Lai & McNaughton, 2016; Oláh, Lawrence, & Riggan, 2010). This disconnect between data use practice and improved student learning has been attributed in part, to limited teacher preparation and professional development to understand, interpret, and apply data-based information to decisions about instruction (Mandinach & Gummer, 2016). To address this, there is a need for leaders to be data literate. By being data literate, leaders can ensure that their decisions are not based on assumptions or biases, but on solid evidence that can be communicated and justified.

Role of Educational Leadership in DDDM

Educational leadership plays a pivotal role in the implementation and success of data-driven decision-making (DDDM) in schools. Educational leadership is shaped by (1) leaders' decisions, which are made by individual leaders, and (2) organizational decisions, which are made by organizational members who are subject to the influence and authority of leaders in terms of how organizational members collect and process information for decision-making. Endowed with power, decisions made by leaders have higher stakes than other organizational members. Leaders' decisions are influenced by an array of factors, including individual predispositions (e.g. risk-averse vs. risk-seeking), leaders' core values (e.g. group interest over self-interest), data and information available at the moment of making decisions, and social influence (e.g. an aggressive, demanding school board or a deferential board).

Leaders are responsible for setting the vision and creating an environment that values and effectively uses data to inform decisions about curriculum, instruction, and school policies. They must be adept at facilitating data use by scheduling time for accessing, analyzing, and reflecting on data, as well as providing training related to data use. A transformational leadership approach is particularly beneficial in this context, as it involves behaviors and strategies that support teams in achieving organizational goals, such as implementing data-use practices and solving specific educational problems. Leaders must also be capable of stimulating the intellectual growth of teachers by challenging their beliefs and assumptions and modeling data use practices. This includes engaging teachers in discussions about data and encouraging them to reflect on how their assumptions may affect their daily work. Moreover, leaders should demonstrate intellectual stimulation by collaborating with teachers, being role models for data use, providing access to data, and distributing leadership roles within the data team. To survive in this digital age, leaders have to be data literate. By being data literate, leaders can navigate complex organizational systems and process massive amounts of information, which is essential for making informed decisions in today's educational landscape.

In implementing and sustaining data use in schools, school leaders initiate constant communication of school management's beliefs about data use, related goals, and the approach to achieving these goals with educators. By committing to these goals, school leaders provide direction for teachers to participate in data use. Transformational school leaders facilitate data use through scheduling time

(including accessing, analyzing, and reflecting on data) and providing training related to data use (Schildkamp & Kuiper, 2010). Leaders can also show that they recognize and are trying to satisfy teachers' learning needs related to the implementation of data use by establishing structures that promote regular, consistent, and collaborative data use in schools (Schildkamp & Kuiper, 2010). Furthermore, school leaders could challenge teachers' beliefs and assumptions about their daily practice, for example, by modeling data use practices (Wayman et al., 2012). A skilled and data-literate school leader who acts as a role model for data use can stimulate teachers to use data, lead discussions about data and data use, and engage teachers in meaningful discussions. Moreover, school leaders actively participate in the school improvement plans, and share and develop knowledge with the teachers will form a sense of togetherness among teachers.

Besides practicing transformational leadership, instructional leadership is also a critical aspect of educational leadership that focuses on guiding teachers toward improving their pedagogical practices through the use of data. School leaders, as instructional leaders, are expected to go beyond administrative tasks and engage in activities that promote teacher professional development and school improvement. This involves documenting teacher performance for accountability and providing feedback to improve teaching skills. Instructional leaders are also tasked with understanding and using data to inform school improvement efforts, integrating the educational community with educational expectations. However, implementing organizational changes incurs evolving relationships between teachers and school leaders. To ensure smooth implementation, instructional leadership plays a pivotal role by embracing the dual impact of change (Murakami & Hernandez, 2019). For example, in the Galapagos Islands, principals are transitioning from traditional managerial roles to instructional leaders, fostering pedagogical improvements among teachers amidst emerging accountability systems. This shift necessitates managing teacher resistance and integrating performance documentation with constructive feedback, while also learning to utilize data for school enhancement.

In the context of K-12 education, instructional leadership is closely tied to the adoption of DDDM in classroom-level practices (Gummer & Mandinach, 2015; Mandanich, 2012; Mandinach et al., 2011; Mandinach et al., 2008; Marsh, 2012). Theoretical models developed by researchers like Mandinach and colleagues suggest that raw data collected at the classroom level must be organized, analyzed, and transformed into information and knowledge before it can be used for instructional purposes (Mandanich, 2012; Mandinach et al., 2011). This process is supported by leadership that emphasizes the importance of building DDDM capacity among teachers and teachers can use their data literacy skills to cope with organizational changes and a new wave of data-informed decision-making in schools which is studied and implemented in numerous countries, including Belgium, Canada, New Zealand, Norway, Germany, Sweden, England, South Africa, Trinidad and Tobago, the United States, and the Netherlands (Schildkamp et al., 2019). Data is used in schools, not just for narrow academic achievements but for a variety of educational goals. Therefore, transformational and instructional leadership are important for successfully implementing and sustaining data use in schools.

Challenges of Implementing Data-Driven Decision-Making in Educational Leadership

Implementing Data-Driven Decision Making (DDDM) in educational leadership comes with several challenges. One of the primary challenges is the reality that, despite its commonsense appeal, the application of DDDM in schools has proven to be deeply problematic. Teachers and school leaders may lack the necessary data literacy skills, which include the ability to understand, interpret, and apply data to instructional decisions. This skill gap can lead to a disconnect between data use practice and improved student learning outcomes. DDDM has its critics and its implementation challenges, including the formatting of data, accessibility, perceptions of validity, self-efficacy regarding data, and data analysis training for teachers (Dunn et al., 2013). Scholars warn that as educators are directed to use data, in the absence of high-quality data and technical assistance, "data may become misinformation or lead to invalid inferences" (Marsh et al., 2006). Jimerson et al. (2020) identified factors that hinder or enable the implementation of an evidence-supported model for collaborative data use through multiple case studies in Texas United States schools. They categorized those enablers and hindrances into two: general/team-oriented factors and leadership factors. For general/team-oriented factors, hindrances are made up of time, restricted process continuity, limited data use capacity, and bias to action or accountability orientation.

A significant challenge found in the study of Jimerson et al. (2020) is the lack of time for educators to fully engage in the data use process, which includes learning how to use data effectively and then applying interventions to see their impact. This concern is echoed by the need for more regular collaboration time and the constant competition of the data use process with other important job tasks. Additionally, structural and organizational issues such as national policies, and hectic workload around the school day constrain the time available for school leaders and teachers to be involved in the data use. Moreover, it can be particularly challenging for districts to engage school leaders in efforts to build capacity for DDDM. District staff themselves may not have the capacity or time to support leaders' professional development (PD), particularly in DDDM (Darling-Hammond et al., 2007). Recent literature supports that schools do not have adequate capability to locate, combine, and analyze data from digital learning environments and learning management systems (LMS) (Agasisti & Bowers, 2017; Farley-Ripple et al., 2020). Another significant hindrance is restricted process continuity, where the data use model's process steps are not consistently followed due to the lack of preparation and follow-through between meetings. This issue is compounded by leadership challenges, such as a lack of depth in inquiry, where school leaders do not sufficiently challenge or extend discussions around data use in schools.

For the leadership hindrances, there is a tendency for data use norms to devolve, with meetings often going off-topic and lacking the necessary discipline to maintain a focus on data (Jimerson et al., 2020). The lack of urgency from leadership to keep the data use work at the forefront of teachers' minds between meetings also contributes to the challenges. The potential for data to become misinformation or lead to invalid inferences if educators are not provided with high-quality data and technical assistance is one of the challenges. The complexity of educational data, which often involves multi-level, processual, contextual, and interactive factors, demands significant cognitive capabilities from school leaders. Moreover, the need for professional development interventions that aid educators in strengthening their data use for equity orientations and skills is critical. These challenges highlight the need for organizational changes to support more effective and sustained data use practices among school leaders and educators.

Strategies for Implementing Data-Driven Decision-Making

To effectively implement Data-Driven Decision Making (DDDM) in educational settings, several strategies are essential. It is important to note that the role of leaders is important in the implementation process because these strategies are connected to administrative aims of encouraging effective instructional change and creating cultures of improvement. First, it is crucial to develop a shared understanding of institutional successes and challenges, which can be achieved through data-driven changes in core program elements. School leaders, for instance, should emphasize DDDM strategies to promote student success and institutional effectiveness. Leaders should constantly communicate with teachers to create a shared understanding by creating and introducing protocols, modeling evidence-based decision-making, and participating in meetings as strategies to grow an improvement and inquiry-based school culture. For example, one school leader detailed how she developed a protocol to illustrate how to approach and discuss data, and model expectations for teachers. principals connected their behaviors and actions with a desire to change teachers' beliefs and attitudes towards practices. Additionally, the integration of real-time data to shape school and classroom interventions allows for the calibration of interventions to the specific school context.

Furthermore, effective educational leadership behaviors and strategies are important for the successful implementation and sustainability of data use in schools. This includes facilitating data use by scheduling time for accessing, analyzing, and reflecting on data, as well as providing training related to data use. For transformational leadership, school leaders can also apply intellectual stimulation by collaborating with teachers, being role models in data use, providing access to data, and distributing leadership by creating a special task force or data team (Schildkamp et al., 2019). Teachers need to feel that the data team has enough autonomy to make decisions that will be implemented. Additionally, teachers are social and emotional learners (Hargreaves, 1994). Leaders are encouraged to provide individualized support for their teachers. Teachers need to know that they can discuss and share their emotions related to data use in schools. Providing individualized support

leads to relational trust among school leaders, teachers, and staff is essential for fostering a collaborative environment where data can be used effectively to inform instructional practices and improve student learning (Abrams et al., 2020). With trust, the emotions of teachers will be supported especially when the relationship between leaders and teachers is evolving during the process of organizational changes (Schildkamp et al., 2019). Teachers need to feel that they can discuss their emotions, concerns, and frustrations with the school leaders so that they can perform well in school.

Another strategy for implementing DDDM in education is knowledge-sharing management (Schildkamp et al., 2019). Knowledge management, a vital aspect of modern educational practices, involves the systematic capture, organization, sharing, and application of knowledge within an institution or context. School leaders can contribute different types of knowledge to the teachers: organizational knowledge, knowledge about data, statistics, and research, and pedagogical content knowledge (PCK). School leaders often have different perspectives on organizational issues and can contribute different types of knowledge teachers can use. Managing effective knowledge sharing will improve organizational effectiveness in problem-solving, enhance collaboration, and stimulate creativity and innovation vertically and horizontally in organizations. For example, shared lesson planning was one way to improve and ensure the alignment of instruction, curriculum, and assessments (Park & Desimone, 2019). Pedagogy expands its learning paradigm beyond individual cognitive processes, encompassing dynamic interactional elements. This emphasizes the pivotal significance of collaborative engagement of teachers within the learning milieu for instructional changes.

Research suggests that how school leaders structure, frame, model, and engage in data use influences the shape, scope, and effectiveness of the practice (Schildkamp et al., 2019; Jimerson et al., 2020). School teams must be introduced to effective models for data use, as this can help teachers move from data to action (Jimerson et al., 2020). For example, Jimerson et al. (2020) suggest an evidence-supported model for collaborative data use. Further, Dodman et al. (2023) suggest a professional development model in data use for equity had a positive impact on participants, enhancing their sense of agency, perceptions of equity and data, and perceived multicultural capacities. Based on the learning experiences of teachers, they suggest the use of scenarios to help them practice handling difficult situations and enhance their data literacy and collaboration skills (Abrams et al., 2020). Thus, it reflects a need for practical, hands-on training that would prepare leaders and teachers for real-world challenges in their schools (Dodman et al., 2023). Along these lines, Chen (2019) suggests that the DDDM area should be added as a new leadership competency area and the DDDM mindsets should be cultivated. These should be conducted not only for senior leaders but mid-level leaders as Chen (2019) found out that mid-level leaders thought this DDDM was only for senior leaders. This discrepancy in leadership creates a need to further examine the perspectives of mid-level leaders in DDDM.

Apart from implementing strategies for field school leaders, aspiring school leaders should be taken into consideration. Another strategy involves engaging aspiring school leaders in field experiences that are comprehensive, coherent, and relevant, connecting the school improvement plan with these experiences (Bickmore et al., 2020). Schoolwide data should be organized into areas such as student learning, demographics, school processes, and perceptual data to identify targeted groups for additional support. Abrams et al. (2020) suggest that understanding these structural factors is crucial for creating an environment that supports effective data use practices. In line with this, another strategy is for districts to anticipate and prepare for additional technical requests and the need for assistance from school leaders when new data systems or tools are implemented. This preparation can facilitate smoother transitions, more effective use of data systems, and strengthen the collaboration between districts and schools. In conclusion, promoting DDDM literacy and implementation represents a process of organizational learning, which requires the involvement of every member of the school organizations, including supporting staff and district officers. By adopting these strategies, educational leaders can overcome challenges and harness the potential of DDDM to improve educational outcomes.

DISCUSSIONS

Integrating Data-Driven Decision Making (DDDM) into educational leadership has important implications for both practical application and research. The challenges of integrating DDDM highlight the urgent requirement for focused programs to improve data literacy among school leaders and teachers. School leaders and teachers are required to have the necessary skills to proficiently gather, analyze, and utilize data for making informed choices. To close the gap between data utilization and student learning outcomes, it is crucial to address these deficiencies in skills. Moreover, it is crucial to systematically tackle organizational and structural obstacles, such as limited time availability, insufficient technical assistance, and conflicting priorities within educational institutions. Effective leadership is pivotal in cultivating a life-long learning culture that places importance on data utilization and assists educators in navigating these difficulties. Providing opportunities for professional development and creating collaborative learning are the strategies to maintain the progress of data-driven processes beyond the initial stages of implementation. Furthermore, the importance of data systems' quality and accessibility cannot be overstated. Educational organizations should allocate resources to develop a strong data infrastructure that enables smooth integration and analysis of data in different educational organizations. Ensuring the accuracy and reliability of data is essential to avoid spreading false information and to facilitate well-informed decision-making at every level of the educational system.

Moving forward, several promising avenues for advancing DDDM in educational settings emerge from current research and practice. Firstly, there is a need for continued exploration into effective models and frameworks for collaborative data use. Research should focus on identifying best practices that promote sustained engagement with data among educators, fostering a culture of continuous improvement. Secondly, enhancing the role of educational leadership in DDDM remains critical. Future research should delve deeper into the leadership behaviors and strategies that optimize data utilization and empower educators. This includes investigating the impact of transformational leadership styles, intellectual stimulation and distributed leadership models on data-driven decision-making efficacy.

Additionally, advancing technological capabilities to support DDDM is pivotal. Innovations in data analytics and visualization tools can enhance educators' capacity to derive actionable insights from complex datasets. Future studies should evaluate the effectiveness of these technologies in improving educational outcomes and inform policymaking regarding resource allocation and infrastructure development. Furthermore, promoting equity and inclusivity through DDDM represents a pressing frontier. Research should explore how data-driven approaches can mitigate educational disparities and ensure equitable access to quality education for all students. This includes examining the intersection of DDDM with culturally responsive pedagogies and inclusive practices to foster educational environments that support diverse student populations.

Lastly, longitudinal studies are needed to assess the long-term impact of DDDM on student achievement, school performance, and organizational culture. By tracking outcomes over extended periods, researchers can provide robust evidence of the efficacy and sustainability of DDDM initiatives, informing evidence-based policymaking and continuous improvement efforts in educational leadership. In conclusion, while the implementation of DDDM in educational leadership poses significant challenges, it also holds immense potential to transform educational practices and outcomes. By addressing current limitations and embracing future opportunities, stakeholders can harness the power of data to drive meaningful change in educational settings worldwide.

CONCLUSION

Increasingly, Data-Driven Decision Making is getting attention in educational leadership. This study conducted a systematic literature review (SLR) to analyze the existing publications on data-driven decision-making. This SLR (Systematic Literature Review) aims to provide school leaders and teachers with a comprehensive understanding of data-driven decision-making in educational organizations. This study identified the challenges and strategies for implementing data-driven decision-making in organizations. Furthermore, this study offers valuable insights for scholars. Ultimately, this study has established a pathway for academics for future research.

Authors' Contributions

Goh, Mahaliza, and Dayang Rafidah contributed to the design and implementation of the research, to the analysis of the results and to the writing of the study.

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