

Management Information Systems Dynamics in Education Amid Disruptive Technological Shifts: A Review

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ABSTRACT

This research provides a systematic review of the influence of Management Information Systems (MIS) in the education sector, especially amidst technological shifts that are changing the educational landscape. Three research questions (RQs) were directed at exploring the impact of MIS on operational efficiency, strategic decision-making, and supporting educational innovation. The research findings imply that MIS is a key element in spurring positive change in the education sector. RQ1 highlights the role of MIS in improving the operational efficiency of educational institutions. Effective MIS integration makes it easier to automate administrative processes, improve resource management, and optimize financial processes. RQ2 focuses on the role of MIS in supporting strategic decision-making. Analysis shows that MIS facilitates data-driven strategic planning, provides better visibility into performance, and improves responsiveness to technological change. Meanwhile, RQ3 examines the integration of MIS in supporting educational innovation, showing that MIS becomes a catalyst for the development of new learning platforms, increasing student engagement, and creating a responsive learning environment. In conclusion, MIS is considered important in managing education in an era of technology that continues to develop. The implications of this research include the need to increase the understanding and application of MIS in educational institutions, as well as recommendations to guide practitioners, policymakers, and further study in efforts to maintain efficiency, sustainability, and innovation in the education system.

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1. INTRODUCTION

Currently, information is one of the necessities of life that is in great demand by society, apart from the need for clothing, shelter, and food. As we know, information has an important role as a communication tool between various interested groups. Through data, someone can increase their knowledge and insight [1], [2]. Information has spread to multiple groups in society, such as in the economic, socio-cultural, technological, and also in the world of education [3], [4].

Information is very important and basic for an organization. Information is data that is processed in various ways and models to become the information needed. Likewise, in the world of education, information is required by leaders in educational institutions. To improve work, information must be available to solve problems [5], [6], and valuable information will be used as material in decision-making [7], [8]. Currently, technology is developing very quickly and cannot be avoided; humans must be able to adapt to these developments, including in educational institutions; technological developments continue to emerge and require educators (teachers) and students to be able to master them. In the process of rapid technological development, from initially mostly using classical methods in learning to computerized methods, many educators and students find it difficult to use technology [9], [10].

In an era of rapid technological change, education is one of the sectors most affected. Management Information Systems (MIS) are emerging as the driving force behind this transformation, changing the educational landscape amidst earth-shaking technological shifts [11], [12]. This is usually called disruption, in this era of disruption, old methods are replaced with new techniques that use computers or go online. This means that the education sector must be technologically savvy. Otherwise, it will lose out in the education sector. With the change in everyone using computers, an interesting topic to research is online learning, or e-learning. Apart from having the advantages of being effective and efficient, online learning also has weaknesses and disadvantages that educators and students must face [13], [14].

Due to globalization, regular face-to-face (offline) meetings in the world of education have been replaced by freer (online) education. Education will be flexible, open, and accessible to anyone who needs it, regardless of age or previous learning experience [15], [16]. Education will be more supported by information networks that facilitate dialogue and cooperation rather than just focusing on school buildings. The wave of change and innovation in the world of education will continue and progress now in the 21st century [17], [18]. Education, as the foundation of societal development, needs to adapt to the dynamics of change brought about by technology. Effective use of Management Information Systems can form a strong foundation for overcoming challenges and exploiting emerging opportunities [19], [20]. In recent years, we have witnessed tremendous technological developments, such as artificial intelligence, machine learning, and the Internet of Things [21], [22]. How education integrates and responds to these changes is the essence of this research.

This article aims to provide a comprehensive overview of how the dynamics of Management Information Systems affect education amidst technological shifts. Through a systematic literature review, we seek to detail the impact and role of MIS in the educational context during this disruptive period. The conceptual framework of this research includes an in-depth understanding of Management Information Systems and their integration with the education system. We will involve key concepts such as operational efficiency, decision-making, and educational innovation. Previous research has provided valuable insights, but there are still knowledge gaps that need to be filled. This article builds on previous research to explore new and in-depth dimensions of the impact of MIS in educational contexts. Change and innovation in the education sector have a significant effect on society as a whole. Therefore, a better understanding of how MIS can shape education amidst technological shifts is a must for creating an educated and innovative society.

This research contributes by detailing how MIS can be adapted and optimized to support sustainable education in facing today's technological challenges. It is hoped that this contribution can provide direction to practitioners and policymakers in the field of education. To achieve the research objectives, this study will use a systematic literature review method to collect and analyze current findings related to the role of MIS in

education. This article is structured by presenting a conceptual framework, systematic literature review, analysis of findings, and conclusions to provide a comprehensive view of how dynamic Management Information Systems impact education in this era of technological shifts.

2. METHOD

This paper was prepared systematically by following several stages. Section 2 describes the methods used to conduct the review, from the collection process to the analysis of the selected studies. Section 3 discusses the findings and provides answers to the research questions posed in this Systematic Literature Review. Finally, Section 4 presents the conclusions of the Systematic Literature Review (SLR), along with an explanation of its benefits, weaknesses, and implications for future research.

The research method in this article was carried out systematically, starting with identifying research questions and determining the contribution of the paper [23]. Next, a search strategy was carried out, selecting relevant and quality documents and data mining to produce output in this research [24], [25]. The stages of SLR are presented in Figure 1.



Figure 1. Stages of systematic literature review for this research.

2.1. Research Questions

This research has three main research questions, which are formulated sequentially to help understand the research focus. These Research Questions (RQ) aim to collect the necessary data and form the contribution of the paper. The research questions asked are as follows:

- 2.1.1. RQ1: How do Management Information Systems (MIS) concretely influence operational efficiency in an educational context in an era of technological shift?
- 2.1.2. RQ2: Does MIS play a role in making strategic decisions in education management amidst ongoing technological dynamics?
- 2.1.3. RQ3: How does MIS integration support educational innovation and adaptation to technological change in an effort to create a more effective and responsive educational environment?

These research questions serve as a research framework to answer a comprehensive view of how dynamic Management Information Systems influence education in the current era of technological shifts.

2.2. Research Design

The study search process was carried out following a certain strategy by using the identification of terms that are relevant and applied to the study, such as "MIS Dynamics," "Educational Transformation," "Disruptive Technology," "Management Information Systems," and "Education Technology." The use of research questions becomes a reference in developing this strategy. The selection of databases used includes digital library sources that have a high reputation, namely ACM Digital Library, IEEE, Scopus, and Science Direct. The search process was carried out by looking for information based on title, keywords, abstract, introduction, results, discussion, conclusions, and relevant research topics from 2018 to 2023. This information is presented in Table 1.

Table 1. The Database Search Process

Searching Index	Content Specific
Database	ACM Digital Library, Scopus, IEEE, and Science Direct
Article Type	Scientific or technical articles publish in reputable peer-reviewed journals conferences
Search Strings	"MIS Dynamics", "Educational Transformation", "Disruptive Technology", "Management Information Systems" dan "Education Technology"
Language	English
Search Period	2018 – 2023
Screening Procedure	The title, abstract, introduction, discussion, and conclusion of each article are all relevant to the research topic

2.3. Study Selection



Table 2 shows the Inclusion and Exclusion criteria formulated to select articles that are relevant and related to the research topic.

Table 2. Inclusion and Exclusion Criteria in Research

Criteria	Description
Inclusion	Articles from journals or relevant conferences Articles with content in the English language Articles which make answer a comprehensive view of how dynamic Management Information Systems influence education in the current era of technological shifts
Exclusion	Articles prior to 2018 Articles from secondary sources Articles duplicated in other databases Articles that were not done about how dynamic Management Information Systems influence education in this era of technological shifts Articles that do not have a relationship with how dynamic Management Information Systems influence education in the current era of technological shifts Articles that only mention the terms "MIS Dynamics," "Educational Transformation," "Disruptive Technology," "Management Information Systems," and "Education Technology" without applying them to the research..

2.4. Quality Assurance and Extract Data

At this stage, an assessment and evaluation is carried out on the quality of the articles included or excluded. So from the many articles found, several articles will be selected that are definitely relevant to this research topic.

3. RESULTS AND DISCUSSION

This section presents the findings and discussion related to the three research questions formulated in this systematic literature review. The main aim of this research is to explore how dynamic Management Information Systems influence education in the current era of technological shifts.

3.1. How do Management Information Systems (MIS) concretely impact operational efficiency in an educational context in an era of technological shift?

The research results highlight the significant impact of Management Information Systems (MIS) on operational efficiency in the educational context during the era of technological shift. An in-depth analysis of relevant literature shows that MIS implementation can optimize administrative processes and resource management in educational institutions.

In line with RQ1, the findings show that MIS concretely helps operational efficiency through automating administrative processes. The use of automation systems reduces the need for manual work, increases speed [26], [27], and reduces the risk of errors, opening up opportunities to increase productivity and allocate resources more effectively [28], [29]. In this context, research supports that MIS has a positive impact on resource management in educational institutions. These systems enable real-time monitoring of assets and personnel, facilitating informed decision-making regarding resource allocation to support more strategic educational goals [30], [31]. Apart from that, MIS also helps optimize financial processes in educational institutions. These systems are able to simplify the processing of financial transactions, enable accurate tracking of budgets, and provide better visibility into expenditures, helping institutions gain better financial control [32], [33]. Nonetheless, the findings also highlight several challenges in implementing MIS to achieve optimal operational efficiency. Difficulty in system integration, lack of stakeholder involvement, and resistance to change are factors that require further attention in designing successful MIS implementation strategies [34], [35].

In the context of the influence of MIS on operational efficiency in education during the era of technological shift, these findings have significant implications for practitioners and policymakers. Strategic recommendations can be proposed to increase the success of MIS implementation, including

active stakeholder involvement, effective training, and system design that is more adaptive to technological changes.

3.2. Does MIS play a role in making strategic decisions in education management amidst ongoing technological dynamics?

The research results explore the role of Management Information Systems (MIS) in strategic decision-making in education management during technological dynamics. A thorough analysis of the relevant literature reveals the significant contribution of MIS in shaping strategic decisions that can lead to the development of education that is responsive to technological change.

In response to RQ2, the findings indicate that MIS is a key element in educational strategic planning. This system enables more effective data collection, analysis, and interpretation, helping decision-makers to design more adaptive and innovative strategies in the face of continuously developing technological dynamics [36], [37]. A data-driven approach characterizes strategic decisions supported by MIS. System integration allows educational institutions to access and process relevant information, assists in evaluating performance, identifying trends, and designing more effective policies to improve the quality of education [38], [39].

This research shows that MIS plays an important role in increasing the responsiveness of educational institutions to technological change. The system's ability to provide real-time information allows stakeholders to respond quickly to changing trends, student needs, and job market demands [40], [41]. However, there are challenges in applying MIS for strategic decision-making. Difficulties in data integration, the need for information security, and a lack of understanding of data analysis may be obstacles that need to be overcome so that MIS can make a maximum contribution to strategic decision-making [42], [43].

Thus, these findings have significant implications for practitioners and policymakers in the context of education management. Recommendations involve improving data analysis capabilities, improving information security, and training stakeholders to maximize the potential of MIS in strategic decision-making.

3.3. How does MIS integration support educational innovation and adaptation to technological change in an effort to create a more effective and responsive educational environment?

The research results explain the role of Management Information Systems (MIS) integration in supporting educational innovation and adaptation to technological change. The focus of RQ3 is to explore the extent to which MIS can be a catalyst in creating an educational environment that is responsive and effective to technological developments.

Research findings show that MIS integration is a driving force in creating educational innovation. These systems provide the technological foundation necessary to develop new teaching methods, digital learning platforms, and more interactive learning models, taking education to a higher level [44], [45]. MIS integration is proving itself to be a flexible and adaptable tool to support technological changes. The ability of these systems to adapt to new needs and accommodate additional software or applications helps educational institutions to remain relevant and competitive in an era of ever-evolving innovation [46], [47].

The importance of MIS integration is also reflected in increased student engagement. This system facilitates the development of interactive platforms, e-learning, and engaging learning applications, creating a more interesting and adaptive learning environment for students at various levels of education [48], [49]. However, challenges arise in implementing MIS for educational innovation. A lack of understanding of the full potential of MIS, technical barriers, and resistance to change can hinder efforts to create a responsive and effective educational environment [50], [51].

As an implication of these findings, there needs to be special attention to the training of stakeholders in optimizing MIS integration for educational innovation. Increasing technical capabilities

and developing holistic implementation strategies will be key in ensuring that education remains a driving force for change in an era of ever-changing technology.

Overall, the analysis of the three research questions (RQ1, RQ2, and RQ3) reveals the substantial impact of Management Information Systems (MIS) in managing education in an era of technological shift. MIS is a proven force that supports operational efficiency, strategic decision-making, and educational innovation, providing a critical technical foundation for advancing education systems. The implications of this research are very relevant for practitioners and policymakers in the field of education. Increasing operational efficiency through automation, data-driven strategic decisions, and MIS integration for learning innovation are key elements that must be considered in designing educational policies that are responsive to the demands of modern technology.

In closing, it is worth noting that although this research provides valuable insights, there is still room for further research. The next steps could involve empirical studies to test the effectiveness of MIS implementation in real situations, as well as more in-depth research into the factors that influence the success or failure of MIS implementation in educational contexts. Thus, through further development and implementation, the role of MIS in shaping the future of education can continue to be strengthened and renewed.

4. CONCLUSION

In order to face the dynamics of continuously developing technology, this research comprehensively explores the influence of Management Information Systems (MIS) in the educational context. These findings illustrate the contribution of MIS in three critical dimensions: operational efficiency, strategic decision-making, and supporting educational innovation. The effectiveness of administrative process automation, data-based integration for decision-making, and its role as a catalyst for innovation mark the success of MIS in forming the foundation of responsive and adaptive education.

The research results highlight that MIS integration brings positive changes in managing school operations, shaping strategic policies, and creating innovative learning environments. In increasing efficiency, MIS helps educational institutions to allocate resources more intelligently and minimize the risk of administrative errors. Strategic decision-making supported by MIS provides a strong foundation for long-term development, while educational innovation driven by technology integration creates more engaging and adaptive learning experiences for students.

In conclusion, this research confirms that MIS is not just a technological tool but rather is the key to shaping the future of education in an era of technological disruption. The implications of these findings point to the need for investment and a deeper understanding of the implementation of MIS in educational institutions. The strategic recommendations that emerge from these conclusions can guide practitioners, administrators, and policymakers in optimizing the role of MIS to ensure effective, responsive, and innovative education.

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