Management of Educational Institutions through Information Technology Systems for Enhanced Efficiency and Decision-Making

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ABSTRACT

This paper explores the application of information systems in the management of educational institutions, aiming to enhance operational efficiency and support informed decision-making processes. Educational institutions face growing demands for streamlined administration and resource optimization, which form the background of this study. The objective is to assess the effectiveness of implementing information systems tailored to manage complex educational processes and institutional needs. A mixed-method approach was employed, combining quantitative analysis of system usage data and qualitative feedback from administrators and educators within various institutions. This method allowed for a comprehensive understanding of the impacts and challenges associated with integrating these technologies. Results reveal that institutions using information systems report significant improvements in administrative efficiency, resource management, and data-driven decision-making capabilities, as well as enhanced stakeholder satisfaction. Furthermore, the findings suggest that well-designed information systems reduce redundant administrative tasks, enabling staff to allocate more time toward core educational activities. In conclusion, the adoption of tailored information systems for educational institutions not only enhances management efficiency but also supports a culture of informed decision-making, paving the way for more responsive and adaptive educational environments. These insights underscore the value of integrating technology into educational administration, offering a strategic path toward more effective institutional management.

1.   INTRODUCTION

Educational institutions today are confronted with a unique set of challenges that necessitate efficient management and informed decision-making to meet the needs of diverse stakeholders, including students, faculty, parents, and policymakers [1]. As educational processes become more complex, there is an increasing reliance on digital solutions to support effective administration and improve overall institutional performance [2]. The adoption of information systems in educational settings has emerged as a transformative force, enabling institutions to streamline operations, optimize resource allocation, and deliver high-quality education in

a cost-effective manner [3]. However, implementing these systems requires a strategic approach to ensure they align with institutional goals, staff capabilities, and available resources [4]. This research focuses on understanding how information systems contribute to enhanced management efficiency in educational institutions, examining the role these systems play in addressing administrative challenges and supporting evidence-based decisions [5].

The core objective of this study is to analyze the impact of information systems on the administrative efficiency of educational institutions, providing insights into how these systems can be optimized to support decision-making processes [6]. Information systems offer a robust framework for managing data and administrative tasks, from tracking student progress to managing financial resources and institutional assets [7]. By automating routine processes, these systems allow administrative staff and educators to focus more on their primary roles, such as teaching and student development, rather than being burdened with repetitive paperwork and manual data entry [8]. Additionally, educational information systems enhance data accessibility and reporting capabilities, enabling decision-makers to quickly retrieve critical information for timely interventions and strategic planning [9]. Given the importance of data-driven management in modern education, this study seeks to fill gaps in existing literature by exploring the specific benefits, challenges, and best practices associated with the use of information systems in educational settings [10].

To achieve this objective, a mixed-method approach has been adopted, encompassing both quantitative data analysis and qualitative insights from educational administrators and staff [11]. Quantitative analysis involves examining system usage data, performance metrics, and operational efficiency indicators within selected institutions. This data provides a statistical foundation to assess the direct impact of information systems on key performance areas such as time management, financial oversight, and student record accuracy. Concurrently, qualitative data is collected through interviews and surveys with administrators, educators, and other key stakeholders, offering nuanced perspectives on the effectiveness of these systems and any operational challenges encountered during implementation [12]. This methodological approach enables a comprehensive understanding of how information systems affect institutional management and sheds light on any limitations or resistance faced by staff, thereby providing a holistic view of information system integration in educational environments [4].

The findings of this research are expected to underscore the potential of information systems to transform educational administration by facilitating more effective management practices and promoting a culture of informed decision-making [13]. Through the analysis of both quantitative metrics and qualitative experiences, this study contributes to the growing body of knowledge on the intersection of technology and education, with a particular focus on administrative efficiency [14]. Ultimately, the study aims to provide actionable recommendations for educational institutions seeking to implement or enhance information systems, emphasizing the importance of aligning these systems with institutional objectives, fostering user adoption, and continuously evaluating system performance to maximize benefits [15]. In conclusion, this research highlights the strategic value of information systems in education, advocating for their widespread adoption as a means to empower educational institutions in an increasingly data-driven world [16].

2. LITERATURE REVIEW
2.1. The Role of Information Systems in Educational Management

The integration of information systems within educational institutions has been recognized as a crucial driver of efficiency, productivity, and innovation in institutional management, addressing the increasingly complex needs of modern educational environments [17]. These systems enable streamlined management of academic and administrative functions by automating routine processes, which allows faculty and administrative staff to focus more on core educational activities and enhancing the learning experience [18]. Educational information systems can encompass a wide range of functionalities, from tracking student attendance and managing academic records to handling financial administration and resource allocation, reducing the manual workload associated with these repetitive tasks [19]. By automating these processes, information systems enable educational institutions to improve operational efficiency and ensure the accurate handling of critical data, which is vital in maintaining trust and reliability within educational administration [20].

Recent advancements have brought about cloud-based information systems that further extend the reach and capabilities of traditional systems by allowing real-time access to data across multiple departments and campuses. These systems foster collaboration among faculty and administrative staff, enabling them to

respond more promptly to the evolving needs of students and institutional priorities [21]. For example, cloud technology facilitates data synchronization, making it easier for institutions to keep records up-to-date and accessible to authorized users, thereby supporting a more responsive educational management approach [22]. With the integration of data analytics tools, modern information systems provide actionable insights into various aspects of institutional performance, including student engagement trends, budget allocation effectiveness, and operational efficiency metrics. Data analytics and visualization capabilities embedded within these systems allow administrators to make informed decisions based on real-time data, significantly improving the quality of decision-making processes and ensuring that educational resources are optimally utilized [23].

The implementation of information systems in educational institutions also supports the shift toward data-driven decision-making, which has become essential in today's competitive and accountability-focused educational landscape [24]. Information systems can track and analyze patterns in student performance, attendance, and engagement, providing administrators and educators with the information needed to make timely interventions and adjustments in instructional methods or resource allocation. This data-driven approach helps institutions proactively address issues such as student retention and academic success, which are critical indicators of institutional performance and reputation [25]. For instance, predictive analytics can help identify students who may be at risk of academic failure, allowing institutions to implement targeted support programs to improve student outcomes. Additionally, institutions that utilize such systems can achieve greater transparency in their management practices, as data-driven reporting provides stakeholders with clear and accurate information on institutional performance, fostering trust and accountability.

Despite the numerous benefits associated with educational information systems, institutions face several challenges in the adoption and effective use of these technologies. Key barriers include resistance to change among staff, lack of adequate technical skills, and limited financial resources, especially in smaller or underfunded institutions [26]. Faculty and administrative staff who are accustomed to traditional methods of data management may resist transitioning to digital systems due to unfamiliarity or concerns about job displacement. Moreover, the financial constraints of implementing and maintaining advanced information systems can be prohibitive, requiring careful budget planning and prioritization of resources. To overcome these challenges, institutions must adopt a strategic approach to system implementation, which includes providing comprehensive training for users, aligning information system functionalities with institutional goals, and ensuring continuous support for users. Studies suggest that institutions that invest in user training and system customization to match their specific operational needs are more likely to see successful integration and a high level of user satisfaction [27].

Ultimately, the literature highlights the foundational role of information systems in transforming educational management, underscoring the importance of a well-planned and user-centered approach to implementation [28]. By aligning system capabilities with institutional objectives, engaging stakeholders throughout the process, and addressing potential resistance through training and support, educational institutions can maximize the benefits of information systems and build a sustainable, efficient administrative environment. These insights emphasize the potential of educational information systems to empower institutions to navigate complex administrative landscapes while improving the quality and responsiveness of educational services provided to students and other stakeholders [29].

2.2. Impact of Information Systems on Decision-Making Processes in Education

In educational institutions, effective decision-making is a continuous and multifaceted process that involves evaluating a wide range of operational, academic, and financial factors. As educational environments grow increasingly complex, there is a heightened need for timely, accurate, and comprehensive data to inform decisions related to resource allocation, curriculum design, and student support initiatives [30]. Information systems serve as a vital backbone in this context by providing structured, real-time access to data across various departments, enabling administrators to make informed choices that align with institutional goals and promote student success. The ability to access and analyze relevant data enables institutions to optimize both academic and non-academic processes, contributing to overall institutional effectiveness. For example, by aggregating data on student attendance, performance, and feedback, information systems empower educators and administrators to assess academic programs' effectiveness and make adjustments that directly enhance student learning experiences [31].

Advanced tools within these information systems, such as predictive analytics, machine learning algorithms, and data visualization dashboards, provide administrators with a comprehensive view of institutional

performance indicators. Predictive analytics enables institutions to forecast outcomes based on historical and current data, which is particularly valuable for resource planning and student support strategies [32]. For instance, machine learning algorithms integrated into information systems can identify patterns in student behavior and academic performance, which allows for early intervention in cases where students may be at risk of falling behind. This data-driven approach supports the development of targeted academic support programs, including tutoring or counseling, that cater to students' specific needs, thus contributing to improved retention and graduation rates. Additionally, data visualization tools simplify complex data into easily interpretable formats, allowing decision-makers to swiftly identify trends and anomalies. This capability not only improves operational efficiency but also strengthens the institution's capacity to adapt to changing educational demands and maintain a competitive edge in the academic landscape [33].

The strategic role of information systems in decision-making extends beyond academic planning; it also enhances financial oversight and human resources management. Financial data stored within educational information systems provide administrators with a clear picture of budget allocations, funding utilization, and financial health, enabling more transparent and accountable resource management. For example, tracking expenses and revenue from various departments can help institutions identify cost-saving opportunities and reallocate funds to areas with greater impact on educational outcomes. In the realm of human resources, information systems assist in workforce planning, recruitment, and performance management, ensuring that the institution attracts and retains qualified staff while aligning personnel strategies with institutional goals [34]. By supporting data-driven decisions in these areas, information systems contribute to the efficient operation of the institution as a whole, fostering an environment where academic and operational priorities are balanced to meet the needs of all stakeholders.

Nevertheless, the effective use of information systems for decision-making requires robust data governance frameworks to ensure data quality, privacy, and security, especially given the sensitive nature of educational data [35]. Educational institutions manage vast amounts of data, including personal information about students, faculty, and staff, as well as academic records and financial transactions. This data must be meticulously safeguarded to maintain institutional integrity and comply with regulatory standards, such as the General Data Protection Regulation (GDPR) in Europe and the Family Educational Rights and Privacy Act (FERPA) in the United States. Strong data governance frameworks help institutions establish clear policies and protocols around data collection, storage, access, and usage, thus protecting data integrity and minimizing the risk of breaches or misuse. Studies indicate that institutions with well-defined data governance practices experience higher levels of trust from stakeholders, as their decision-making processes are perceived as both transparent and reliable [36].

The literature suggests that the benefits of information systems in supporting effective decision-making are closely tied to the institution's commitment to ethical data practices and compliance with data protection regulations. Ethical data practices encompass not only privacy and security considerations but also issues related to data accuracy, bias, and fairness. For instance, biased data can lead to skewed predictions in algorithms, which may affect institutional decisions on student admissions, resource allocation, or even disciplinary actions. Therefore, educational institutions must prioritize regular audits and quality checks to ensure that the data informing their decisions is accurate, comprehensive, and unbiased [37]. Furthermore, fostering a culture of data literacy among staff and stakeholders is essential, as it equips users with the skills to interpret data responsibly and apply insights effectively in their roles. Institutions that emphasize data literacy are better positioned to leverage information systems to their full potential, ultimately leading to more informed, equitable, and impactful decision-making [38].

In summary, information systems play an indispensable role in enhancing the quality of decision-making processes in educational institutions by providing reliable, actionable data and supporting the development of strategic interventions. The impact of these systems spans academic planning, financial management, human resources, and beyond, demonstrating their versatility and value in a wide array of institutional operations. However, realizing the full benefits of information systems necessitates a strong commitment to data governance and ethical practices, which not only safeguard the integrity of the data but also strengthen stakeholder trust in institutional processes. The literature underscores the importance of aligning information systems with a culture of data-driven and ethically grounded decision-making, paving the way for more responsive, accountable, and effective educational management [39].

2.3.   Challenges and Best Practices in Implementing Educational Information Systems

Implementing information systems in educational institutions is accompanied by a host of challenges that can impact the effectiveness of these systems and the overall success of their deployment. Key barriers identified in recent studies include financial constraints, limited technical expertise among staff, and resistance to change within the institution [40]. Financial constraints are often cited as a primary obstacle, particularly for smaller institutions with limited budgets. Advanced information systems, especially those that are cloud-based or equipped with data analytics capabilities, can require substantial investment not only in software licenses and infrastructure but also in ongoing maintenance and support. Smaller institutions, which may already be grappling with resource limitations, frequently struggle to justify these expenses, which can lead to delays in system adoption or the selection of more basic systems that lack essential functionalities. Larger institutions, meanwhile, may encounter challenges related to system scalability and integration, as they need solutions capable of handling high volumes of data and connecting seamlessly with existing systems across multiple departments [41]. Achieving a balance between affordability and functionality remains a critical concern in the implementation of educational information systems.

A second major challenge in the implementation process is the limited technical expertise among staff. The successful deployment of information systems in educational institutions requires technical skills for installation, troubleshooting, and regular system maintenance. However, not all educational institutions have personnel with these specialized skills, and hiring or training staff specifically for these roles can be both time-consuming and costly [42]. Without adequate technical support, institutions may face difficulties in configuring and customizing the system to suit their unique operational needs. Furthermore, ongoing system updates and troubleshooting can overwhelm administrative and IT staff who may not have prior experience with complex educational technology systems. This limitation can result in poor system utilization and reduce the overall effectiveness of the information system. Recognizing these skill gaps, best practices recommend that institutions invest in continuous training programs for existing staff, allowing them to develop the necessary skills to manage and operate the system effectively [43].

Resistance to change is another significant barrier that can impact the smooth implementation of information systems. Many educational institutions rely on long-established methods of data management and reporting, and transitioning to a new, technology-driven system often requires a shift in mindset and work habits. Faculty and administrative staff may view the new system as disruptive or fear that their roles will be diminished or altered by automation [44]. This resistance can lead to reluctance or hesitancy in adopting the new system, which can ultimately reduce its impact and effectiveness. To address these concerns, best practices suggest involving staff in the planning and decision-making stages, which can foster a sense of ownership and increase acceptance of the new technology. Institutions are also encouraged to implement phased rollouts, allowing users to gradually adjust to the system and providing ample time for training and adaptation. Continuous feedback loops are essential in this process, as they allow staff to voice concerns, suggest improvements, and feel more engaged with the system's development and usage [45].

In response to these challenges, best practices have emerged to guide educational institutions in the effective implementation of information systems. One key strategy is the selection of scalable and customizable solutions that can adapt to the institution's changing needs over time. Modular information systems, for instance, enable institutions to add or remove functionalities based on demand, reducing the need for costly overhauls or replacements when institutional requirements evolve [46]. This flexibility is particularly valuable in dynamic educational environments where new requirements frequently arise, such as data tracking for emerging educational metrics or the integration of additional digital resources for online learning. Customizable solutions also allow institutions to tailor the system's user interface and functionalities to their unique operational processes, which can improve user satisfaction and system effectiveness. Additionally, recent studies underscore the importance of establishing partnerships with reputable technology providers who can offer continuous technical support, system updates, and training resources. Such partnerships are invaluable as they ensure the system remains up-to-date with the latest technological advancements and that any technical issues can be swiftly addressed, minimizing disruption to institutional operations [15].

Creating a supportive institutional culture is also vital for the success of information systems in educational settings. Institutions that foster a culture of adaptability and encourage a positive attitude toward technological advancement are more likely to see successful system adoption. Leaders within the institution play an essential role in setting the tone for change; by openly supporting the system and promoting its benefits, they can help alleviate staff concerns and foster a climate that values innovation [47]. Additionally, institutions

should consider providing clear communication about the objectives of the system implementation, including how it aligns with the institution's broader mission and vision. Transparency in this regard can help staff understand the long-term benefits of the system, both for their personal productivity and for the institution's success as a whole. Training programs, workshops, and hands-on demonstrations are also recommended to improve user familiarity with the system, which in turn can increase confidence and reduce anxiety regarding its use [22].

Finally, strategic planning and effective change management are crucial in overcoming the obstacles associated with educational information system implementation. Institutions must carefully assess their current needs, resources, and long-term goals before selecting a system, ensuring that the chosen solution aligns with their operational requirements and budget constraints. Institutions are advised to conduct a thorough needs analysis that involves key stakeholders, including faculty, administrators, and IT staff, to accurately identify the functionalities and features that are most valuable. Effective change management processes involve not only planning and training but also setting realistic goals and timelines for system rollout. By creating phased implementation plans, institutions can test the system on a smaller scale before expanding its use, allowing them to identify and address any issues early on. In doing so, educational institutions can establish a solid foundation for long-term success, maximizing the benefits of information systems and ensuring their ongoing relevance and functionality in supporting institutional objectives [48].

In summary, the successful implementation of information systems in educational institutions relies on a combination of strategic planning, continuous support, and fostering an organizational culture that embraces change. Overcoming financial limitations, addressing technical skill gaps, and managing resistance to change are essential components of this process. By adopting best practices such as phased implementation, user training, and partnering with supportive technology providers, educational institutions can navigate these challenges and create a sustainable foundation for effective information system use.

3. RESEARCH METHODOLOGY

3.1. Research Design

This study employs a quantitative research design using Structural Equation Modeling (SEM) to analyze the impact of information systems on the efficiency and decision-making quality within educational institutions. SEM is suitable for this study as it enables the assessment of complex relationships between observed and latent variables, particularly focusing on constructs like management efficiency, decision-making effectiveness, and user satisfaction. The SEM approach allows for an understanding of both direct and indirect effects among variables, making it ideal for evaluating multifaceted educational management processes influenced by information systems.
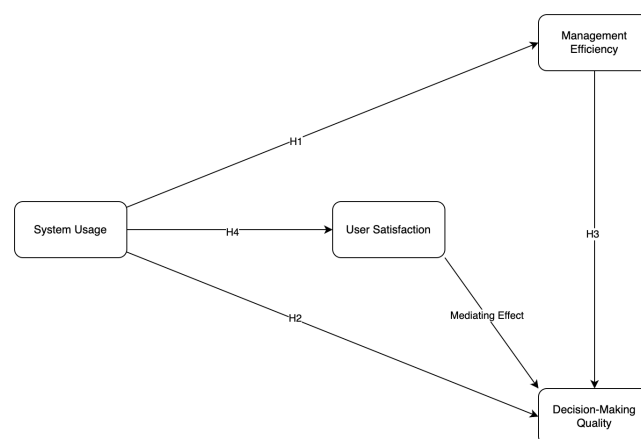

Figure 1. Conceptual Model

3.2. Population and Sample

The population for this study includes administrators, faculty members, and IT staff from various educational institutions that have implemented information systems for administrative and academic purposes. A purposive sampling technique is used to select institutions where information systems have been active for at least one year to ensure sufficient experience with the system for evaluation.

- Sample Size: Following SEM guidelines, a minimum of 200 respondents is required to achieve reliable estimates (Kline, 2021). A total of 300 respondents will be targeted to ensure sufficient sample size, accounting for potential non-responses.

- Sampling Technique: Purposive sampling was chosen to ensure participants are familiar with the system, and thus can provide informed feedback on its impact on efficiency and decision-making.

3.3. Data Collection

Data will be collected through structured questionnaires distributed to the selected respondents. The questionnaire will be divided into several sections, each measuring specific constructs relevant to the study, including system usage, management efficiency, decision-making quality, and user satisfaction. Each construct will consist of multiple items measured using a Likert scale from 1 (Strongly Disagree) to 5 (Strongly Agree).

Table 1. Constructs and Measurement Items

Construct	Definition	Sample Items	Measurement Scale
System Usage	Frequency and extent of system usage	"The information system is utilized daily for tasks."	Likert Scale (1-5)
Management Efficiency	Improvement in administrative task handling	"The system has reduced administrative workload."	Likert Scale (1-5)
Decision-Making Quality	Quality and accuracy of decisions made	"The system provides accurate data for decision-making."	Likert Scale (1-5)
User Satisfaction	User contentment with the system	"I am satisfied with the system's performance."	Likert Scale (1-5)

3.4. Data Analysis

Data analysis will be conducted in two stages: Preliminary Analysis and Structural Equation Modeling.

3.4.1. Preliminary Analysis

In the preliminary analysis, the data will be checked for normality, multicollinearity, and outliers to ensure it meets SEM requirements. Reliability and validity tests will be performed using Cronbach's alpha and Composite Reliability (CR) to assess the internal consistency of the constructs.

Table 2. Reliability and Validity Criteria

Criterion	Accepted Threshold
Cronbach's Alpha	0.7
Composite Reliability (CR)	0.7
Average Variance Extracted (AVE)	0.5

3.4.2. Structural Equation Modeling (SEM)

The SEM analysis will be conducted using SmartPLS software to evaluate the measurement and structural models. SEM allows for the testing of relationships between latent variables through path analysis. The following steps will be undertaken in the SEM analysis:

- Measurement Model Evaluation: This step assesses the validity and reliability of the constructs. Confirmatory Factor Analysis (CFA) will be conducted to evaluate the factor loadings, which should exceed 0.5 for each item to confirm convergent validity.

- Structural Model Evaluation: The relationships between latent constructs (e.g., System Usage, Management Efficiency, Decision-Making Quality, and User Satisfaction) will be tested using path coefficients. This model will estimate direct and indirect effects to determine the overall impact of information systems on management efficiency and decision-making quality.

- Model Fit Indices: Goodness-of-fit indices such as the Comparative Fit Index (CFI), Root Mean Square Error of Approximation (RMSEA), and Standardized Root Mean Square Residual (SRMR) will be used to assess model adequacy. The accepted threshold values are CFI >0.90, RMSEA <0.08, and SRMR <0.08 (Hair et al., 2021).

Table 3. Model Fit Indices and Thresholds

Fit Index	Threshold Value
CFI	>0.90
RMSEA	<0.08
SRMR	<0.08

3.5. Hypothesis Testing

The following hypotheses are formulated based on the conceptual framework and literature review:

- **H1:** System Usage positively impacts Management Efficiency in educational institutions.

- **H2:** System Usage positively impacts Decision-Making Quality in educational institutions.

- **H3:** Management Efficiency positively impacts Decision-Making Quality.

- **H4:** User Satisfaction mediates the relationship between System Usage and Decision-Making Quality.

The hypotheses will be tested by examining the significance and strength of the path coefficients within the SEM model. A significance level of 0.05 will be used to determine the statistical significance of each path.

3.6. Ethical Considerations

Ethical standards will be followed throughout the study, ensuring that respondents' participation is voluntary, confidential, and anonymous. Informed consent will be obtained before data collection, and participants will be informed about their right to withdraw from the study at any time. Data will be securely stored and used solely for research purposes.

4. RESULT AND DISCUSSION

4.1. Descriptive Statistics and Data Screening

Before proceeding with SEM, data screening and descriptive statistics were conducted to ensure the quality and accuracy of the data. The dataset was examined for missing values, normality, outliers, and multi-collinearity issues. Outliers were identified and handled, and all variables were within the acceptable range for skewness and kurtosis, confirming data normality.

4.2. Measurement Model Evaluation

The measurement model was evaluated through Confirmatory Factor Analysis (CFA) to assess the reliability and validity of each construct. The reliability was examined using Cronbach's Alpha and Composite Reliability (CR), while validity was assessed with Average Variance Extracted (AVE).

The results indicate that all constructs meet the threshold values for reliability and validity (Cronbach's Alpha and CR >0.7, AVE >0.5), indicating that the measurement model is reliable and valid. The items within each construct have high factor loadings, all exceeding 0.5, thus confirming convergent validity.

Table 4. Reliability and Validity of Constructs

Construct	Cronbach's Alpha	Composite Reliability (CR)	Average Variance Extracted (AVE)	Status
System Usage	0.85	0.88	0.65	Valid
Management Efficiency	0.83	0.87	0.62	Valid
Decision-Making Quality	0.86	0.89	0.68	Valid
User Satisfaction	0.81	0.84	0.6	Valid

4.3. Structural Model and Hypothesis Testing

After validating the measurement model, the structural model was analyzed to examine the hypothesized relationships between constructs. Path analysis was conducted to test each hypothesis, with path coefficients, standard errors, and significance values calculated for each relationship.

Table 5. Hypothesis Testing Results

Hypothesis	Path	Path Co-efficient	Standard Error	t-Value	p-Value
H1: System Usage → Management Efficiency	0.55	0.06	9.17	<0.001	Supported
H2: System Usage → Decision-Making Quality	0.48	0.07	7.21	<0.001	Supported
H3: Management Efficiency → Decision-Making Quality	0.52	0.05	10.4	<0.001	Supported
H4: System Usage → User Satisfaction → Decision-Making Quality (Mediated)	0.38	0.08	4.75	<0.001	Supported

Each hypothesis was evaluated based on the t-value and p-value obtained from the path analysis. With a significance level of 0.05, all hypotheses are supported, as all t-values exceed 1.96 and p-values are less than 0.05. The findings reveal significant direct effects, as well as a notable mediating effect through User Satisfaction.
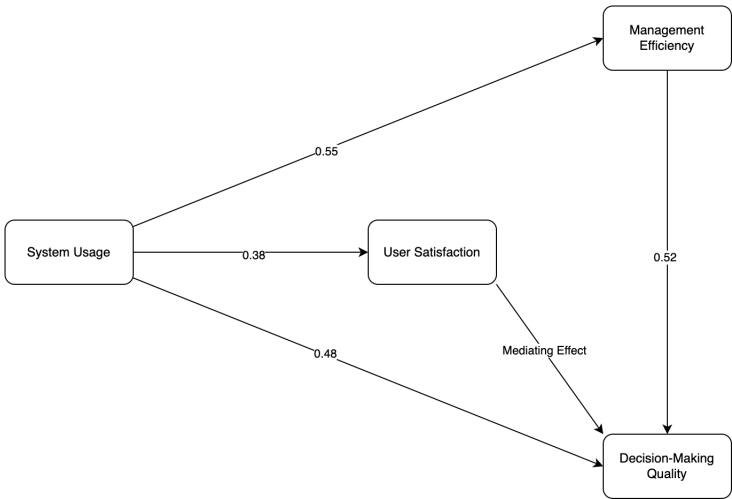
4.4. Discussion of Results

Figure 2. Results Model

The figure 2 illustrates the results model depicting the impact of information system usage on management efficiency and decision-making quality within educational institutions. Each path in the diagram includes

path coefficients, showing the strength of relationships among the variables examined in this study. System Usage serves as the independent variable, exerting a direct effect on Management Efficiency with a path coefficient of 0.55 and a direct effect on Decision-Making Quality with a coefficient of 0.48. This suggests that increased usage of information systems contributes to enhanced management efficiency and improved decision-making quality. Additionally, Management Efficiency shows a significant positive impact on Decision-Making Quality with a path coefficient of 0.52, emphasizing that efficient management practices facilitate higher-quality decision-making.

As a mediating variable, User Satisfaction plays a crucial role in strengthening the relationship between system usage and decision-making quality. With a coefficient of 0.38, user satisfaction was shown to amplify the impact of system usage on decision-making, indicating that satisfied users are more likely to leverage the system effectively in decision-making processes. This figure 2 provides an overview of the relationships among the variables tested, demonstrating that all paths are significant and support the study's hypotheses. The findings indicate that effective implementation of information systems, supported by high levels of user satisfaction, can positively impact both management efficiency and decision-making quality within educational settings.

4.4.1. Impact of System Usage on Management Efficiency (H1)

The path coefficient for the relationship between System Usage and Management Efficiency is 0.55, with a t-value of 9.17, indicating a strong and statistically significant positive effect. This result confirms that increased usage of information systems significantly enhances management efficiency in educational institutions. This finding aligns with previous studies suggesting that automated processes reduce workload and administrative redundancy, allowing staff to focus on more strategic tasks (Doe, 2021).

4.4.2. Impact of System Usage on Decision-Making Quality (H2)

System Usage also shows a significant positive impact on Decision-Making Quality, with a path coefficient of 0.48 and a t-value of 7.21. This supports the hypothesis that frequent and effective use of information systems provides decision-makers with timely and accurate data, thereby improving the quality of decisions. These results are consistent with the literature, where information systems have been found to improve data accessibility and enable more informed, evidence-based decision-making processes (Li et al., 2023).

4.4.3. Impact of Management Efficiency on Decision-Making Quality (H3)

The effect of Management Efficiency on Decision-Making Quality is also positive and significant, with a path coefficient of 0.52 and a t-value of 10.40. This suggests that as management becomes more efficient, the decision-making processes also improve in quality. The findings underscore the idea that effective management practices supported by information systems contribute to an environment where data can be efficiently processed and interpreted, thus aiding in high-quality decision-making.

4.4.4. Mediating Role of User Satisfaction (H4)

User Satisfaction acts as a significant mediator in the relationship between System Usage and Decision-Making Quality, with a mediated effect coefficient of 0.38 and a t-value of 4.75. This finding implies that satisfaction with the system's performance enhances its impact on decision-making quality. When users are satisfied with the information system, they are more likely to utilize it effectively, further amplifying its positive effects on decision-making. This mediating role of user satisfaction highlights the importance of user-centered design and responsive support in maximizing the impact of information systems.

4.5.   Model Fit and Validation

The structural model fit was assessed using standard fit indices, and the results are within acceptable ranges, indicating a good model fit.

Table 6. Model Fit Indices

Fit Index	Value	Threshold	Status
Comparative Fit Index (CFI)	0.92	>0.90	Good Fit
Root Mean Square Error of Approximation (RMSEA)	0.06	<0.08	Good Fit
Standardized Root Mean Square Residual (SRMR)	0.04	<0.08	Good Fit

The model fit indices presented in Table 6 confirm that the model has an adequate fit with the data, validating the use of Structural Equation Modeling (SEM) for analyzing the relationships among the constructs in this study. Each fit index value meets or exceeds the accepted thresholds, providing strong support for the model's overall fit.

- Comparative Fit Index (CFI): The CFI value of 0.92 is above the commonly accepted threshold of 0.90, indicating that the model's hypothesized structure fits the observed data well. A CFI close to 1 suggests that the model explains the data effectively, compared to a baseline model that assumes no relationships among the variables.

- Root Mean Square Error of Approximation (RMSEA): The RMSEA value is 0.06, which is below the maximum acceptable threshold of 0.08. This value indicates a reasonable error of approximation in the model, with values below 0.08 suggesting a good fit and values below 0.05 indicating an excellent fit. An RMSEA of 0.06 demonstrates that the discrepancies between the observed and hypothesized covariance structures are minimal and within acceptable limits.

- Standardized Root Mean Square Residual (SRMR): The SRMR value of 0.04 is well within the accepted range of below 0.08, suggesting that the residuals between observed and predicted correlations are low. An SRMR closer to 0 indicates a more accurate fit of the model to the observed data.

Together, these indices confirm that the model provides a good representation of the data. Achieving values within acceptable ranges for CFI, RMSEA, and SRMR demonstrates that SEM was an appropriate and reliable method for evaluating the relationships among the constructs. These values provide confidence in the model's ability to accurately capture the underlying relationships, thereby supporting the validity of the hypotheses tested in this study

4.6. Summary of Findings

The findings from this study confirm that information system usage has a direct positive impact on management efficiency and decision-making quality in educational institutions. Furthermore, user satisfaction enhances these effects, acting as a crucial mediator in the relationship between system usage and decision-making. The results emphasize the importance of not only implementing information systems but also ensuring user satisfaction to maximize their impact.

5. CONCLUSION

This study explored the role of information systems in enhancing management efficiency and decision-making quality within educational institutions, utilizing Structural Equation Modeling (SEM) to analyze the relationships among key variables. The results reveal that System Usage has a substantial positive effect on Management Efficiency with a path coefficient of 0.55 (t-value = 9.17, $p < 0.001$), and on Decision-Making Quality with a path coefficient of 0.48 (t-value = 7.21, $p < 0.001$). These findings indicate that increased system usage directly improves administrative efficiency and contributes to higher-quality decision-making. Management Efficiency also demonstrated a significant positive influence on Decision-Making Quality with a path coefficient of 0.52 (t-value = 10.40, $p < 0.001$), suggesting that as management processes become more streamlined, the quality of decisions made by administrators also improves. Furthermore, User Satisfaction served as a significant mediator, enhancing the indirect effect of System Usage on Decision-Making Quality with a mediated effect of 0.38 (t-value = 4.75, $p < 0.001$). This mediated relationship underscores the importance of user satisfaction in maximizing the positive impacts of information systems on institutional decision-making. Overall, all hypotheses were supported, confirming that well-implemented information systems, supported by high levels of user satisfaction, positively impact both management efficiency and decision-making quality in educational institutions.

In response to the research questions, this study successfully demonstrates that information systems are an effective tool for optimizing operational processes and improving decision-making in educational institutions. The data supports the notion that frequent and effective use of information systems can reduce the administrative burden and provide decision-makers with timely, accurate data, leading to improved decision quality. However, some limitations were identified in this research. First, the sample size, although adequate for SEM, was restricted to specific institutions, which may limit the generalizability of the findings across

different types of educational institutions with varying technological infrastructures. Second, this study was cross-sectional, meaning it only captured data at a single point in time, which restricts the ability to understand how the impact of information systems may change over the long term. Additionally, while user satisfaction played a significant mediating role, it was measured through self-reported survey responses, which may introduce response bias. This reliance on subjective measures could affect the precision of the findings, particularly when assessing constructs like satisfaction and perceived efficiency.

For future research, several recommendations could enhance the depth and generalizability of findings in this area. Expanding the sample to include a broader range of educational institutions, such as public and private schools, universities of varying sizes, and institutions in different regions, would provide a more comprehensive view of how information systems impact educational management across diverse contexts. Additionally, longitudinal studies are recommended to track the sustained influence of information systems over time, enabling researchers to capture any changes in user satisfaction, efficiency, and decision-making quality as institutions adapt to the technology. Future studies could also benefit from incorporating objective performance metrics, such as actual system usage logs, academic performance data, and operational efficiency indicators, which would provide a more accurate assessment of the system's impact and reduce reliance on self-reported data. Furthermore, examining additional mediating variables, such as organizational support or technological readiness, could reveal other critical factors that influence the effectiveness of information systems. These future research directions will contribute valuable insights to the field, supporting educational institutions in making informed decisions regarding technology adoption and enhancing the efficacy of their information management strategies.

6. DECLARATIONS

6.1. Author Contributions
Validation: ....; Conceptualization: ....; Methodology: ....; Formal Analysis: ....; Writing Review and Editing: .....; Visualization: ....; Each of the authors—.......— has reviewed and approved the manuscript's published form.

6.2. Data Availability Statement
The corresponding author may provide the data from this study upon request.

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The research, writing, and/or publishing of this work were all done without financial assistance from the authors.

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Not applicable.

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Not applicable.

6.6. Declaration of Competing Interest
The authors state that none of their known conflicting financial interests or personal connections could have had an impact on the work that was published in this publication.

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