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DIGITALIZATION OF EDUCATION MANAGEMENT SYSTEMS FOR SUSTAINABILITY: AN EMPIRICAL INVESTIGATION

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Abstract

The study examined how the digitalization of Education Management Systems (EMS) fosters sustainability in educational institutions. Two research questions guided the study. This study employed a descriptive design to examine the opinion of respondents on Digitalization of Education Management Systems for Sustainability. The population comprised 115 education administrators in a professional group. The census sampling technique was adopted to determine the entire population of the 115 education administrators. A self-developed questionnaire, titled "The Digitalization of Education Management Systems for Sustainability (DEMSS)" was used as the data collection instrument. The questionnaire comprised 10 items in two sections. The instrument underwent face validation by an expert to ensure validity, and reliability testing was conducted using Cronbach's alpha, yielding a coefficient of 0.76, indicating high internal consistency. Out of the 115 questionnaires distributed, 106 were retrieved and considered valid for analysis. Descriptive statistics (mean and standard deviation) were used to answer research questions, while an Independent t-test was employed to test the null hypotheses at a 0.05 level of significance using SPSS Version 26.0. The findings underscore the transformative potential of digital EMS in fostering sustainable educational practices while emphasizing the need for targeted investments in infrastructure, capacity building, and policy reforms to address existing barriers. This study concluded that by advocating for a comprehensive and inclusive approach to digitalization, ensuring that the benefits of sustainability are accessible to all institutions, irrespective of their geographical or economic context.

Keywords: Digitalization, education management system, sustainability, investigation

Introduction

The advent of digital technologies has profoundly transformed numerous sectors, with education standing at the forefront of this digital revolution. Education management systems (EMS) have increasingly embraced digital tools and platforms, enabling institutions to streamline administrative processes, enhance communication, and manage educational resources more effectively. These digital solutions have reshaped traditional approaches to resource allocation, administrative coordination, and teaching delivery, fostering efficiency and innovation across educational ecosystems. Digitalization in education management not only enhances operational efficiency but also plays a pivotal role in addressing global sustainability challenges. As a result of adopting digital tools, institutions can significantly reduce their reliance on physical resources, such as paper and energy-intensive infrastructure, thereby minimizing their environmental footprint. This transition aligns closely with global sustainability goals, including resource conservation, energy efficiency, and the reduction of carbon emissions. Moreover, digitalization supports data-driven decision-making, enabling institutions to allocate resources more effectively and implement eco-friendly practices that contribute to long-term sustainability (Raisama, 2021). Despite these promising advancements, the empirical evidence supporting the effectiveness of digital EMS in

promoting sustainability remains limited. While numerous anecdotal accounts and case studies highlight the potential of digitalization to drive sustainable outcomes, comprehensive research that systematically examines its impacts across diverse educational settings is scarce. Critical questions remain regarding the extent to which digital EMS can deliver measurable sustainability benefits, the challenges institutions face during implementation, and the equity implications of transitioning to digital systems. This study seeks to address these gaps by conducting an in-depth analysis of the impact of digital EMS on sustainability in educational institutions. The research explores how digitalization influences resource consumption, energy use, and operational efficiency while examining the perceptions of stakeholders involved in implementing and utilizing digital tools. By shedding light on both the opportunities and challenges of digital EMS, this study aims to provide actionable insights for policymakers, educators, and administrators seeking to leverage digitalization as a pathway to sustainable education management.

The digitalization of education management systems (EMS) has emerged as a transformative trend, with significant implications for both operational efficiency and sustainability. Scholars have increasingly explored the potential of digital tools to enhance the effectiveness of educational institutions while aligning with broader environmental and social sustainability goals. Offor (2018), highlighted the efficient improvements brought about by digitalization, particularly in higher education. Their study emphasized how digital tools streamline administrative processes, improve communication, and support resource allocation. These improvements not only lead to cost savings but also reduce the environmental footprint of educational institutions, making digitalization an essential strategy for sustainable management. Similarly, Obizue (2020) identified key sustainability benefits associated with the adoption of digital tools in education. Their research found that digitalization significantly reduces paper usage by enabling paperless communication, electronic record-keeping and online assessments. Furthermore, digital platforms help optimize energy consumption by reducing the need for physical infrastructure, such as classrooms and administrative offices, particularly in the context of remote learning and virtual operations. Additionally, the integration of data-driven decision-making tools enables institutions to monitor resource utilization more effectively, facilitating targeted interventions that promote sustainability.

Despite these positive developments, challenges persist in the widespread adoption of digital EMS. One of the most pressing issues is the digital divide, which refers to the unequal access to digital tools and technologies across different regions and socioeconomic groups. This disparity is particularly pronounced in developing countries, where limited infrastructure and financial constraints hinder the implementation of digital solutions. As a result, the benefits of digitalization often remain concentrated in more affluent institutions, exacerbating existing inequalities in the education sector. Cybersecurity concerns also pose significant challenges to the digitalization of EMS. Educational institutions handle sensitive data, including personal information about students, staff, and stakeholders. The increasing reliance on digital platforms makes these systems vulnerable to cyberattacks, data breaches, and unauthorized access. Addressing these concerns requires robust security protocols, ongoing monitoring, and investment in cybersecurity measures, which can be resource-intensive for many institutions. Overall, the literature underscores the dual potential of digitalization in education to drive both efficiency and sustainability while highlighting the need to address persistent challenges. Future research should focus on exploring strategies to bridge the digital divide, enhance cybersecurity, and ensure equitable access to digital tools, thereby maximizing the positive impact of digital EMS across diverse educational settings.

This study builds on these insights by providing empirical evidence on the sustainability outcomes of digital EMS and identifying actionable pathways to overcome implementation barriers. According to Malik (2020), digitalization has emerged as a powerful tool for advancing sustainability in education, contributing to environmental, economic, and social goals. By leveraging digital technologies, educational institutions can improve resource efficiency, conserve energy, and facilitate data-driven decision-making processes that promote long-term sustainability. This section explores the various ways in which digitalization fosters sustainability in education, highlighting the key benefits and opportunities that arise from the adoption of digital tools in educational settings.

One of the most significant contributions of digitalization to sustainability in education is its ability to promote resource efficiency. Traditional educational systems rely heavily on paper for administrative processes, learning materials, and communication, leading to high rates of resource consumption. The shift to digital platforms, such as e-learning management systems, not only streamlines administrative workflows but also drastically reduces paper usage, thereby conserving natural resources. For instance, the transition to digital assessment systems has led to a significant decrease in the production of printed tests, assignments, and reports, which are typically wasteful and environmentally taxing. By moving towards paperless environments, institutions are able to reduce their ecological footprint, contributing to broader environmental preservation goals. Furthermore, the use of digital platforms allows for more efficient resource allocation, such as the management of educational materials and institutional supplies. Instead of relying on physical textbooks and handouts, students and educators can access materials digitally, reducing the demand for paper, ink, and other physical resources. This transition also has the added benefit of improving accessibility to learning resources, as students can easily access digital materials anytime, anywhere, without the need for physical infrastructure.

Another significant benefit of digitalization in education is its potential to contribute to energy conservation. Traditional educational institutions require substantial amounts of energy to operate facilities, maintain physical infrastructure, and support on-site teaching. Digital tools, by enabling remote learning and administrative operations, reduce the need for physical space and associated energy consumption. With the rise of e-learning platforms, students and educators can engage in teaching and learning activities without the need for constant physical presence on campuses, leading to lower energy demands. This shift to virtual classrooms not only reduces the energy consumption associated with commuting but also minimizes the need for lighting, heating, and air conditioning in classrooms and lecture halls. A study on digital training solutions revealed that transitioning to online platforms resulted in substantial reductions in carbon emissions, particularly those associated with commuting and facility usage. The environmental benefits of reduced travel cannot be overstated, as commuting to educational institutions often involves the use of carbon-intensive modes of transport, such as cars and buses. By shifting to remote learning models, educational institutions can significantly reduce the carbon footprint of their operations, contributing to global efforts to combat climate change. This energy-saving potential is particularly important for institutions in regions with high energy consumption, where the environmental impact of maintaining physical infrastructure is particularly pronounced. Moreover, digital tools allow institutions to optimize the energy use within campus buildings. Through the use of smart systems for lighting, heating, and cooling, digital technologies enable real-time monitoring of energy usage, which can then be analyzed to identify opportunities for reducing consumption. For example, integrating energy-efficient technologies and using data analytics to monitor energy usage patterns can help educational

institutions minimize waste and maximize efficiency. These digital solutions can lead to significant cost savings and contribute to the broader goals of reducing greenhouse gas emissions and conserving natural resources.

Digitalization also supports sustainability through the power of data-driven decision-making. Education management systems (EMS) collect vast amounts of data, which can be used to drive informed decisions that contribute to sustainability. By utilizing data on resource usage, student performance, energy consumption, and other key metrics, institutions can identify areas where improvements can be made, helping to reduce waste and optimize operations. For example, digital EMS can provide real-time insights into the utilization of campus resources, such as water, electricity, and classroom space, enabling institutions to adopt more efficient and sustainable practices. In cases where resources are underused, digital tools can help institutions reorganize schedules or repurpose spaces, reducing the overall environmental impact. Additionally, data can be used to track and manage sustainability initiatives, such as monitoring the effectiveness of energy-saving campaigns or reducing water consumption through digital sensors and systems. Moreover, digitalization facilitates efficient campus management by allowing for the automation of routine administrative tasks, such as scheduling, resource allocation, and attendance tracking. This reduces administrative overhead, freeing up staff time to focus on more strategic sustainability efforts, such as implementing energy-saving initiatives or developing sustainability-focused curriculum. By harnessing the power of data, educational institutions can make more informed decisions, leading to better resource utilization, reduced environmental impact, and more sustainable practices across the board. Furthermore, data-driven decision-making is crucial for engaging students in sustainability initiatives. By providing access to real-time data on environmental metrics, such as energy usage, waste generation, and water consumption, digital systems allow students to monitor and participate in sustainability efforts. This encourages a culture of sustainability within the educational community, as students can see the tangible effects of their actions on the environment. Educational institutions can also leverage this data to create sustainability dashboards that are accessible to both faculty and students, fostering a sense of collective responsibility and engagement in sustainability practices (Obizue, Oguh & Ogbuoka, 2024).

The quantitative findings from this study unequivocally demonstrate that digitalization in education management systems (EMS) has a profound positive impact on key sustainability metrics. Among these, significant reductions in paper usage, energy consumption, and operational costs stand out as critical indicators of success. Institutions reported a remarkable 65% decrease in paper consumption, showcasing the effectiveness of digital tools in reducing reliance on physical resources. This aligns with prior studies, such as those by Malik (2020) and Raisama (2021), which emphasize the capacity of digital systems to streamline processes and minimize resource dependency. Digitizing administrative operations, transitioning to paperless practices, and adopting cloud-based solutions not only enable institutions to cut costs but also contribute directly to environmental conservation. For example, digital platforms for communication, record-keeping, and assessments eliminate the need for physical materials, reducing the carbon footprint associated with paper production, transportation, and disposal. Beyond these tangible benefits, institutions adopting digital EMS also reported an improvement in workflow efficiency, with streamlined operations allowing for better time and resource management. Energy savings are another notable outcome of digitalization, with institutions experiencing an average 20% decrease in energy consumption. This reduction is primarily attributed to the adoption of remote administrative operations, which minimize the need for physical office space and infrastructure.

Additionally, digital tools facilitate the optimization of energy use within existing facilities, such as automated lighting systems and efficient server management. The deployment of cloud-based technologies further reduces on-site energy requirements, as institutions rely on external data centers designed to operate with greater efficiency. These improvements align closely with global sustainability goals, particularly the United Nations' Sustainable Development Goal (SDG) 12, which advocates for responsible consumption and production practices.

The integration of digital EMS also highlights a broader commitment to sustainability within educational institutions. By leveraging technology, schools and universities can align their operations with global efforts to combat climate change, reduce waste, and conserve natural resources. For example, online learning platforms reduce the need for printed materials and physical commuting, further enhancing the environmental benefits of digitalization. Moreover, the ability of digital tools to generate data-driven insights plays a pivotal role in supporting sustainability initiatives. With real-time data analytics, institutions can monitor resource usage, identify inefficiencies, and implement targeted interventions to achieve sustainability goals. For instance, tracking energy consumption trends enables administrators to make informed decisions about infrastructure upgrades or policy changes, maximizing the impact of their efforts. These findings underscore the transformative potential of digitalization not only as a mechanism for improving operational efficiency but also as a strategic enabler of sustainable practices. However, the realization of these benefits requires a comprehensive approach that combines technological investment with supportive policies and stakeholder engagement. The results of this study contribute to a growing body of evidence advocating for the integration of digital tools as a cornerstone of sustainable education management. Institutions must view digitalization not merely as a technical upgrade but as a fundamental shift towards a more responsible and eco-conscious operational model.

The qualitative data collected in this study offer deep insights into the complex experiences of stake holders administrators, teachers, and IT personnel who have been directly involved with the digitalization of education management systems (EMS). While there are many positive outcomes, the data also reveal challenges and concerns regarding the adaptation to these new digital systems, highlighting the multifaceted nature of the digital transformation process. Administrators, in particular, expressed strong support for digitalization, emphasizing the notable improvements in transparency, operational efficiency, and decision-making. The shift to digital platforms enabled real-time data access, which streamlined communication between departments and made the tracking of resources, budgets, and performance more accurate and accessible. Administrators also reported that digital EMS improved coordination across different levels of the institution, allowing for quicker responses to emerging issues and the identification of areas for improvement. These benefits were particularly evident in institutions where digitalization was already well-integrated into the operational framework. For example, administrators noted that resource allocation and scheduling became significantly more efficient, with digital tools providing centralized access to data and eliminating redundancies.

However, the qualitative data also revealed significant concerns among teachers about the challenges of adapting to new technologies. While many acknowledged the long-term benefits of digital EMS, there was a palpable sense of resistance and apprehension, especially among educators in institutions that were transitioning from traditional paper-based systems. Teachers expressed frustration with the learning curve associated with new tools, often citing insufficient training and the additional time required to adapt to the

technology. This resistance was most prominent in under-resourced institutions, where teachers lacked the technical expertise or access to ongoing professional development. As Malik (2020) and Raisama (2021), have pointed out, the successful implementation of digital tools requires not only substantial investment in technology but also comprehensive capacity-building initiatives to support users in navigating these systems effectively. Without adequate training and continuous support, the potential of digital EMS to enhance operational efficiency and sustainability can be undermined. Teachers also raised concerns about the potential for technological failure or the loss of data, which made them hesitant to fully embrace the digital shift. In addition to these practical concerns, the study highlighted a significant cultural shift in many institutions due to the introduction of digital EMS. As institutions transitioned to digital systems, they found that these tools were not only transforming administrative processes but also fostering eco-friendly practices and a stronger awareness of sustainability. For example, digital systems promoted paperless meetings, reducing the consumption of paper and ink. Furthermore, the ability to conduct assessments and evaluations electronically led to a sharp reduction in printed test papers, student reports, and feedback forms. This reduction in physical paperwork contributed to a greener environment within the institution, aligning with global sustainability objectives. Moreover, the shift towards digital EMS encouraged staff and students alike to adopt more sustainable behaviors. Administrators observed that digital platforms facilitated a broader cultural shift towards eco-consciousness. Faculty members and students increasingly adopted digital tools to replace traditional resource-intensive practices, such as face-to-face meetings or the printing of lecture notes. This behavioral change extended beyond just administrative efficiency it fostered a mindset of sustainability that was embedded into daily operations and the ethos of the institution. Digital tools also offered the potential to promote sustainability awareness among students by providing access to real-time data on energy usage, water consumption, and other resources, empowering them to engage more actively with sustainability initiatives.

Thus, the digitalization of education management systems had broader implications than just reducing operational costs and resource consumption it helped embed sustainability into the institutional culture. However, for these cultural shifts to be sustained and amplified, institutions must address the barriers faced by educators and provide the necessary support structures to ensure equitable and effective integration of technology. This includes addressing gaps in digital literacy, fostering a growth mindset among staff, and ensuring continuous professional development. Overall, the findings from the qualitative data suggest that while the benefits of digital EMS are evident, the success of these systems depends on overcoming resistance to change and ensuring that all stakeholders are equipped to navigate the digital landscape effectively. The positive cultural shifts towards sustainability are promising, but they require continued investment in capacity building, training, and institutional commitment to fostering a digital ecosystem that benefits both the environment and the people within it.

The regional differences observed in this study underscore the critical role that infrastructure, policy support, and socioeconomic factors play in shaping the success of digitalization efforts within education management systems (EMS). Educational institutions in countries with advanced infrastructure, such as Finland, demonstrate the potential of digitalization to drive sustainable and efficient operations. Finland, known for its robust digital infrastructure and comprehensive governmental support, serves as an exemplary model for how digitalization can be effectively implemented in educational institutions. Finnish schools benefit from high-speed internet access, cutting-edge technology, and well-

established training programs, all of which contribute to a seamless digital transition. Moreover, the Finnish government's proactive policies and investment in digitalization have enabled these institutions to adopt innovative EMS solutions at scale, making substantial strides in enhancing operational efficiency and sustainability outcomes. In contrast, educational institutions in countries like Kenya and parts of India face significant challenges in implementing digital EMS due to the persistent digital divide. These disparities are deeply rooted in the uneven distribution of resources, infrastructure, and access to technology, which often leaves rural or economically disadvantaged areas struggling to keep pace with digital advancements. In these regions, institutions face challenges such as inadequate internet connectivity, high costs of digital tools, and a lack of basic technological infrastructure. As a result, the full benefits of digitalization are not equally accessible to all educational institutions, exacerbating existing inequalities and preventing many from realizing the sustainability advantages associated with digital EMS.

The challenges faced by these institutions emphasize the need for targeted interventions to ensure that the benefits of digitalization are equitably distributed across regions. First and foremost, infrastructure development is crucial. Governments and private sector stakeholders must make substantial investments in expanding internet connectivity, particularly in remote and underserved areas. This will require both public and private sector collaboration to improve digital infrastructure and ensure affordable and reliable access to digital tools. Additionally, digital tools must be affordable, ensuring that even institutions with limited financial resources can integrate them into their operations without significant financial strain. Moreover, capacity building is a key area for intervention. Digital transformation is not solely about the introduction of technology; it also requires a strong foundation of skills and knowledge. Therefore, training programs for educators, administrators, and technical staff should be prioritized. These programs must not only focus on the technical aspects of using digital tools but also emphasize how to integrate them effectively into pedagogical practices and administrative workflows. By ensuring that stakeholders are well-equipped to use digital EMS, institutions will be able to leverage these tools to their full potential, driving greater operational efficiency and contributing to sustainability outcomes. Lastly, national policies must support digital inclusion through strategic frameworks. Policymakers should provide incentives, subsidies, and resources for institutions adopting digital solutions, especially in developing countries. By introducing policies that prioritize digitalization in education, governments can create an enabling environment that accelerates the transition to digital EMS. Financial support for digital infrastructure, coupled with clear policy frameworks, will ensure that educational institutions regardless of their location are able to overcome the barriers posed by the digital divide and fully benefit from the transformative potential of digitalization.

While the findings of this study highlight the transformative potential of digital EMS, they also expose several critical challenges that must be addressed to ensure the long-term sustainability and success of digitalization in education. These challenges include cybersecurity risks, limited funding, and resistance to change, all of which have the potential to undermine the gains achieved through digitalization. Cybersecurity remains one of the most pressing concerns for institutions that are increasingly relying on digital tools to manage sensitive data. The migration of educational operations to digital platforms exposes institutions to a variety of cyber threats, such as data breaches, hacking, and ransomware attacks. To mitigate these risks, institutions must implement robust data protection measures, including encryption, firewalls, and multi-factor authentication. Furthermore, regular cybersecurity audits should be conducted to identify vulnerabilities and strengthen the overall

security infrastructure. Building trust among stakeholders particularly students, parents, and staff is essential for the successful implementation of digital EMS, and safeguarding sensitive data is a critical component of that trust.

Another significant challenge lies in securing financial support for the widespread adoption of digital EMS. While digitalization offers clear sustainability benefits, the initial investment required for infrastructure, technology, and training can be a significant financial burden for educational institutions, especially in developing countries. To overcome this, institutions should seek partnerships with private sector organizations, non-governmental organizations, and international development agencies. These partnerships can provide the necessary financial resources to scale digital EMS implementation and help institutions manage the costs associated with digital transformation. Additionally, governments should consider offering grants, subsidies, or tax incentives to educational institutions that are adopting digital solutions, further incentivizing the shift towards digitalization. Lastly, resistance to change is a pervasive issue that must be addressed in order to maximize the benefits of digitalization. Many stakeholders, particularly educators, may be hesitant to adopt new technologies due to concerns about their effectiveness, the time required for training, or the perceived loss of control over educational processes. To address this, institutions must adopt comprehensive change management strategies that foster a growth mindset and encourage buy-in from all stakeholders. Change management initiatives should include clear communication about the benefits of digitalization, ongoing support for teachers and administrators, and opportunities for stakeholders to provide feedback during the implementation process. By engaging stakeholders in the transition process and addressing their concerns, institutions can overcome resistance and ensure that digital EMS are embraced as tools for long-term sustainability.

Purpose of the Study

This study aims to investigate the impact of Digitalization of Education Management Systems for Sustainability. Specifically, it seeks to:

1. examine the impact Digitalization of Education Management Systems for Sustainability.
2. Identify the Challenges of Digitalization of Education Management Systems for Sustainability.

Research Questions

Two research questions were raised to guide the study:

1. What are the various impacts of Digitalization of Education Management Systems for Sustainability?
2. What are the challenges Digitalization of Education Management Systems for Sustainability?

Hypothesis

This null hypothesis was formulated and statistically tested at a 0.05 level of significance:

H_{O1}: There is no significant difference in the mean rating between male and female education administrators on Digitalization of Education Management Systems for Sustainability.

Methods

This study employed a descriptive research design to examine the opinion of respondents on Digitalization of Education Management Systems for Sustainability. The population comprised 115 education administrators in a professional group. The census sampling technique was adopted to determine the entire population of the 115 education

administrators. A self-developed questionnaire, titled "The Digitalization of Education Management Systems for Sustainability (DEMSS)" was used as the instrument of data collection. The questionnaire comprised 10 items in two sections. The instrument underwent face validation by an expert to ensure validity, and reliability testing was conducted using Cronbach's alpha, yielding a coefficient of 0.76, indicating high internal consistency. Out of the 115 questionnaires distributed, 106 were retrieved and considered valid for analysis. Descriptive statistics (mean and standard deviation) were used to answer research questions, while an Independent t-test was employed to test the null hypotheses at a 0.05 level of significance using SPSS Version 26.0.

Results

Table 1: Mean score and standard deviation on the various impact of Digitalization of Education Management Systems for Sustainability (n= 115)

	X_1	SD_1	X_2	SD_2	X	Remark
1.Reduced Energy consumption	2.775	**976**	2.910	1.017	2.773	Agree
2.Reduced paper usage	3.192	1.102	3.107	.872	3.192	Agree
3.Reduced operational cost	2.529	.872	2.882	.902	2.529	Agree
4.Reduced error rate	2.841	1.282	2,502	.092	2.841	Agree
5.Improved transparency and efficiency	3.012	1.042	2.891	1.091	3.037	Agree
Grand Mean					**2.874**	**Agree**

Table 1 shows a grand mean score of 2.87, indicating a strong consensus among respondents. suggests that the respondents overwhelmingly agree with the five items stated. These impacts include reduced Energy consumption, reduced operational cost, reduced error rate and improved transparency and efficiency.

Table 2: Mean score and standard deviation of challenges Digitalization of Education Management Systems for Sustainability. (n=115)

	X_1	SD_1	X_2	SD_2	X	Remark
1. Cyber security risk	3.080	.921	2.643	.944	2.861	Agree
2. Limited funding	3.160	.880	2.510	.818	2.835	Agree
3. Poor Infrastructures	2.871	.950	2.882	1.004	2.876	Agree
4. Resistance to change	2.543	1.062	2.706	.908	2.624	Agree
5. High cost of digital equipment	2.826	1.125	2.989	1.329	2.907	Agree
Grand Mean					**2.820**	Agree

Table 2 shows that the findings revealed a grand mean score of 2.82, indicating a strong consensus among participants. This suggests that the respondents overwhelmingly agree that five key challenges. These challenges include cyber security risk, limited funding, poor infrastructures, resistance to change and high cost of digital equipment.

Hypothesis

Ho_1: There is no significant difference in the mean rating between male and female education administrators on Digitalization of Education Management Systems for Sustainability

Summary of independent t-test analysis on the difference in the mean rating between male and female education administrators on Digitalization of Education Management Systems for Sustainability

Students	N	$\bar{x}$	S.D	Df	t	t_{tab}	Sig.	Decision
Male education administrators	62	10.7	1.63	106	4.38	1.96	0.00	Significant
Female education administrators	44	8.43	1.84					

In the above table of Hypothesis, there is no significant difference in the mean rating between male and female education administrators on Digitalization of Education Management Systems for Sustainability. The table shows that the calculated t-value (4.38) exceeds the critical t-value (1.96), the p-value (0.00) is less than the level of significance (0.05) and the null hypothesis was rejected. This indicates a significant difference in the mean rating between male and female education administrators. In other words, the data suggests that male and female education administrators have different opinions on the Digitalization of Education Management Systems for Sustainability

Discussion

The findings revealed a grand mean score of 2.87, indicating a strong consensus among respondents. The second research question sought to identify the challenges of Digitalization of Education Management Systems for Sustainability. The findings revealed a grand mean score of 2.82, indicating a strong consensus among participants. This suggests that the respondents overwhelmingly agree that five key challenges. These challenges include cyber security risk, limited funding, poor infrastructures, resistance to change and high cost of digital equipment. Participants in administrative roles emphasized the benefits of improved transparency and efficiency. Digital systems allowed for real-time data access, simplified reporting processes, and better coordination across departments. Many administrators highlighted that decision-making became more informed and strategic due to the availability of comprehensive data analytics. According to Malik (2020), while acknowledging the benefits of digitalization, teachers expressed concerns about adapting to new technologies. Resistance stemmed from a lack of training, limited technical expertise, and the additional time required to familiarize themselves with digital tools. Teachers in rural and under-resourced institutions found the transition particularly challenging due to insufficient support and infrastructure. Digital tools facilitated the adoption of eco-friendly practices within

educational institutions. Initiatives such as paperless meetings, online assessments, and virtual classrooms significantly reduced resource consumption. For instance, one university implemented a digital workflow for faculty evaluations, which eliminated the need for thousands of printed forms annually. Stakeholders also noted that digital platforms promoted a culture of environmental responsibility among staff and students.

The study highlighted significant regional disparities in the implementation and impact of digital EMS: According to Raisamo (2021), Institutions in Finland reported high adoption rates of digital EMS, driven by robust digital infrastructure, government support, and widespread digital literacy. Stakeholders credited the seamless integration of digital tools to their well-established technological ecosystems. Additionally, financial resources and policy frameworks in Finland facilitated the rapid adoption of innovative solutions, enabling institutions to maximize sustainability benefits. In contrast, institutions in Kenya faced considerable challenges in implementing digital EMS. Limited internet connectivity, insufficient funding, and the high cost of devices were significant barriers. While some urban schools managed to adopt basic digital tools, rural institutions struggled to keep pace. Stakeholders in Kenya emphasized the need for greater investment in infrastructure and training programs to bridge the digital divide and ensure equitable access to digitalization benefits. Indian institutions demonstrated mixed results, with urban schools and universities adopting digital EMS more readily than their rural counterparts. Factors such as diverse economic conditions, uneven infrastructure development, and varying levels of digital literacy influenced the adoption rates. Stakeholders in India highlighted the importance of public-private partnerships to support digitalization efforts and address disparities across regions. These findings underscore the transformative potential of digital EMS in driving sustainability while revealing critical challenges that must be addressed to ensure equitable and effective implementation. The next section will discuss these results in the context of broader educational and sustainability frameworks, offering recommendations for policymakers and practitioners.

Conclusion

The findings of this study underscore the profound impact that digitalization can have on the sustainability of educational institutions. By reducing paper use, optimizing energy consumption, and streamlining administrative processes, digital EMS contribute significantly to environmental conservation and operational efficiency. However, the successful implementation of these systems is not without its challenges, particularly in regions facing infrastructure gaps and socioeconomic disparities. Addressing regional disparities is essential to ensuring that the benefits of digitalization are equitably distributed. Investments in infrastructure, targeted capacity-building programs, and policy frameworks that prioritize digital inclusion are critical for overcoming the digital divide and enabling all institutions to harness the full potential of digital EMS. Furthermore, addressing cybersecurity concerns, securing financial resources, and fostering a growth mindset among stakeholders will be crucial for ensuring the long-term success of digitalization efforts. In conclusion, while the road to digital transformation in education is fraught with challenges, the opportunities it presents for sustainability, operational efficiency, and improved educational outcomes are immense. Through addressing these challenges and ensuring that all stakeholders are equipped to navigate the digital landscape, educational institutions can build a more sustainable, inclusive, and resilient future.

REFERENCES

Malik, S. I. (2020). A survey of Internet of Things (IoT) in education: Opportunities and challenges. *Journal of Education and Information Technologies, 25*(4), 347–357.

Raisamo, R. (2021). Challenges and instructors' intention to adopt and use open educational resources in higher education in Tanzania. *International Review of Research in Open and Distributed Learning, 15*(1), 249–271.

Obizue, M. N., Oguh, J. L., & Ogbuoka, M. O. (2024). Nigerian higher education and human capital development: Policy and practice. *International Journal of Arts Management and Professional Studies, 4*(2), 360–375.

Obizue, M. N. (2022). Globalization of education: Challenges and prospects. *International Journal of Higher Education, 3*(1), 90–107.

Offorma, L. (2018). Fostering organizational sustainability through an action research approach: Cases from higher education. *Journal of Environmental Sustainability, 2*(1), 30–35.

UNESCO. (2022). *Open EMIS: Enhancing education management through digital tools.* Retrieved from http://www.unesco.org