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Original Article

Leveraging Transformative Digitalization Strategies to Enhance Learning at Mountains of the Moon University, Uganda

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ABSTRACT

Mountains of the Moon University (MMU) is transitioning from traditional to modern educational practices to better meet the demands of the digital era. This study explored the implementation of digitalization strategies at MMU, aiming to bridge gaps between conventional methods and technological innovations. A qualitative approach was employed, utilizing semi-structured interviews and focus group discussions with 37 participants, including faculty members, student leaders, and administrative staff. Thematic analysis revealed that while MMU's digitalization efforts, including Learning Management Systems (LMS), online collaboration tools, a technical support desk, and regular blended learning schedules, have facilitated course delivery and virtual discussions, significant challenges remain. Issues such as low internet connectivity, insufficient ICT skills among users, and high data costs continue to impede effective implementation. Despite these barriers, digital tools have positively impacted student engagement and performance. The study recommends enhancing internet infrastructure, boosting digital literacy through targeted training programs, fostering a culture of digital innovation, innovative pedagogical initiatives and expanding blended instruction. Addressing these challenges can help MMU evolve into a dynamic, technology-driven institution, ensuring high-quality education that meets the needs of the digital age.

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INTRODUCTION

Recent advancements in educational modernization highlight the integration of ICT technology and process-thinking principles to model and capture the interrelated activities required for digital technology adoption in teaching, learning, and organizational practices (Benavides et al., 2020). The digital transformation of university education necessitates a broader focus, including the modernization of corporate IT architecture management, to structure innovation efforts effectively (Senyo et al. 2024; Taşdan et al., 2025; Zhuang et al., 2025).

Higher Education Institutions (HEIs) are evolving into digital universities, a model that encompasses not only the adoption of new technologies but also a strategic transformation involving information, processes, human aspects, and more. As digital maturity correlates with the scope of digital transformation efforts, this study aims to identify the digital transformation initiatives (DTIs) undertaken by HEIs, defining the new processes and technologies implemented (Fernández et al., 2023b). The Fourth Industrial Revolution brings new opportunities and challenges across all sectors, including education. Digital transformation, a critical aspect of this revolution, leverages technologies such as Artificial Intelligence (AI) and the Internet of Things (IoT) to potentially revolutionize education (Fernández et al., 2023a; Van Hoang, 2024). These technologies enable smart and ubiquitous learning environments and transformative teaching and learning methods. The diverse nature of higher education, with its varied programs, durations, and subjects, presents unique challenges for digital transformation (Alenezi et al., 2023; Smith, 2024).

Contemporary HEIs are adopting new technologies to transform their practices, business models, and processes. Digital transformation in these institutions aims to develop more advanced and effective methods to fulfill higher education's mission. Studies suggest that digital transformation involves analyzing stakeholders' needs and demands and ensuring the provision of education and research services that align with students' knowledge needs. Gradually, educational institutes worldwide are incorporating digital tools to support student learning (Alenezi, 2023). Despite HEIs' familiarity with digital transformation, the journey is often challenging (Gkrimpizi, 2024). Technologies such as Enterprise Resource Planning (ERP) software, computer systems, video technologies, social media, simulations, and AI illustrate the pervasive nature of digital technologies in HEIs (Panxhi, 2024). Numerous studies explore the impact of these technologies on higher education, including their benefits for online delivery and the use of gamification to enhance teaching practices (Khaldi et al., 2023; Kanagwa et al., 2024; Nyamwamu et al., 2024; Walimbwa, 2023). However, understanding the adoption of individual technologies only partially captures the broader phenomenon of digital transformation. There is a need to comprehend the underlying mechanisms of managing widespread change in educational organizations.

Countries like the United States, South Korea, Finland, and Singapore have been at the forefront of embracing digitalization in education. In the United States, initiatives like the National Education Technology Plan emphasize the role of technology in enhancing educational outcomes and equity (Draft, 2024). South Korea's education system integrates digital learning from early education through higher education, supported by substantial government investment in digital infrastructure and resources (So et al., 2023). Finland, known for its progressive education system, has adopted digital tools to personalize learning and foster student engagement (Okonkwo, 2024). Singapore's Smart Nation initiative incorporates digital transformation across all sectors, including education, ensuring students are equipped with digital skills for the future (Foong et al., 2024).

Countries like South Africa, Kenya, Nigeria, and Rwanda are making significant strides in digitalizing education. South Africa's e-Education policy aims to integrate ICT into teaching and learning across all

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educational levels (Mkhonto & Mubangizi, 2024). Kenya's Digital Literacy Program has introduced tablets and digital content in primary schools, aiming to enhance digital skills from a young age (Manyasa, 2022). Nigeria has various initiatives to incorporate digital learning in higher education, supported by collaborations with international organizations and tech companies (Adeniyi et al., 2024). Rwanda's Vision 2020 includes an emphasis on ICT in education to transform the country into a knowledge-based economy. Indeed, Rwanda has focused on ICT infrastructure development and digital literacy programs in schools and universities (Tikoudi, 2023). Tanzania's National ICT Policy for Basic Education aims to improve educational quality and accessibility through digital tools and resources (Kassim, 2024). The rapid advancement of technology presents both opportunities and challenges for HEIs (Abo-Khalil, 2024; Quy et al., 2023). Universities in Uganda are increasingly embracing digitalization to enhance teaching and learning quality. Makerere University, for example, launched the Digitalization of Academic Records and Processes (DARP) project to ease the storage, retrieval and acquisition of academic documents by its stakeholders (Kasozi, 2024).

Universities in Uganda are embracing digitalization (Bisaso & Achanga, 2023). Mountains of the Moon University (MMU) is no exception in the higher education landscape. This research aims to explore and propose effective digitalization strategies tailored to MMU's context for a comprehensive transformation of teaching and learning. Mountains of the Moon University, established by Instrument Number 2 of 2022 to provide education to rural areas of mid-western Uganda, faces space challenges (GOU, 2022). Digitalizing teaching and learning can address these challenges while providing transformative quality education that meets 21st-century technological standards. Adapting to the digital era is essential for MMU to remain competitive and deliver quality education. Exploring digitalization strategies will benefit MMU and provide valuable insights for higher education in Uganda. Uganda's government has recognized the importance of ICT in education, with initiatives such as the National ICT Policy and the Digital Uganda Vision aiming to integrate technology into all sectors, including education, to foster socio-economic development.

Statement of the Problem

In pursuit of Uganda's Vision 2040, which emphasized the need for universities to actively engage in the generation, application, and exploitation of knowledge beyond traditional academic boundaries, Mountains of the Moon University (MMU) endeavored to enhance its educational landscape through the establishment of virtual replicas of foreign universities and the promotion of high technology innovations. Despite institutional efforts, the state of digitalization at MMU remained suboptimal, with limited access to resources, traditional teaching methods, and minimal utilization of online learning platforms.

To address this gap, MMU established an Open, Distance, and e-Learning (ODeL) department, conducted staff training, and invested in technological infrastructure. However, reports by the ODeL department (Babirye et al., 2024) indicate that the adoption of digital teaching and learning methods was still low, with a preference for traditional instructional approaches among both lecturers and learners. The extent and impact of digital transformation strategies on the teaching and learning processes at MMU remained unexplored. This study, therefore, investigated the digital transformation strategies implemented at MMU and their influence on the transformation of teaching and learning, with the aim of understanding the factors hindering the adoption of digital practices and assessing the outcomes of current interventions to inform future strategies for fostering a more digitally integrated and effective educational environment at MMU.

Objectives of the Study

The study set out to achieve the following specific objectives

- To assess the current state of digitalization in teaching and learning at Mountains of the Moon University.

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- To identify challenges and opportunities associated with digitalization in the context of the MMU.
- To propose/explore/identify effective digitalization strategies for the transformation of teaching and learning at MMU.

Research questions

- What is the current level of digitalization in teaching and learning at Mountains of the Moon University?
- What are the challenges and opportunities associated with digitalization in the context of MMU?
- Which strategies can be advanced for the effective digitalization of teaching and learning at MMU?

LITERATURE REVIEW

Leveraging Transformative Digitalization Strategies to Enhance Learning

Since the advent of the Internet nearly four decades ago, digital connectedness has transformed how individuals, businesses, and societies operate (Carroll, 2023). Digital transformation extends beyond digitizing processes, encompassing a shift in practices, procedures, culture, and perspectives to provide innovative benefits to customers, employees, and the larger community. Quy et al. (2023) conducted a study on AI and digital transformation in higher education in Vietnam, highlighting AI and IoT's potential to create intelligent learning environments and revolutionize teaching. Digital transformation in higher education aims to develop learners' capacity, increase self-study, and promote lifelong learning, resulting in intelligent educational models that support personalized learning (Nakaziba & Ngulube, 2024a).

Digital transformation in education encompasses more than just implementing new technologies; it involves changing fundamental practices, procedures, and perspectives within educational institutions to enhance the learning experience. Quy et al. (2023) conducted a study in a Vietnamese university on AI and digital transformation in higher education, noting that the fourth industrial revolution has introduced both opportunities and challenges. Technologies like AI and IoT are seen as catalysts for significant changes in education, creating intelligent and pervasive learning environments. As such, AI can revolutionize learning and teaching processes, while IoT has the potential to create smart classrooms (Bitalo, 2024).

According to Walimbwa (2023), digitalization in education involves the comprehensive and deep use of modern digital technologies to promote knowledge development. It encompasses the widespread use of modern information technologies, development of educational resources, optimization of the educational process, improvement of digital literacy, and promotion of educational modernization. The implementation of education modernization is inseparable from digitalization, and modern digital technologies should be deeply integrated into all sectors of the education system in the context of smart values formation (Zolotarova et al., 2024).

Digital technologies facilitate the rapid dissemination, storage, and reproduction of human knowledge. The Internet has overcome time and space limitations, narrowing the education gap and promoting equality in education (Delgado Martín, 2023). It has become an essential means for knowledge sharing, creating a world without boundaries, and is crucial for achieving universal and lifelong learning. The digitalization of education encompasses vast knowledge resources and serves as an essential platform for human civilization's development. New technologies support innovative learning models, with cloud-based education platforms exemplifying the use of the Internet and telecommunications networks in education (Klopov et al., 2023).

Fernández et al. (2023b) highlight the active role Higher Education Institutions (HEIs) play in this digital transformation, emphasizing the need for strategic organizational changes alongside technological adoption. In their analysis of 39 universities, they found that 24% are involved in digital transformation initiatives, with advanced analytics, cloud computing, and AI being the most

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frequently used technologies. However, they noted that most HEIs are still in the early stages of digital maturity, with many initiatives lacking strategic integration. The study underscores the importance of developing comprehensive digital strategies to ensure significant strategic value from digital initiatives. Similarly, Quy et al. (2023) noted that the Ministry of Education and Training in Vietnam has developed a project to strengthen IT application and digital transformation in education, with specific goals set for 2025. These include making digital learning a daily activity, ensuring that a significant percentage of students and teachers effectively participate in online learning, and managing educational institutions using digital records. Their project highlights the importance of digital technology in enhancing teaching and learning experiences and promoting efficient operations within educational institutions which corroborates with the dire need of this study.

Zuraiz et al. (2024) reveal that the adoption of digital technology in HEIs is widespread, driven by the need to improve sustainability and efficiency. However, challenges such as poor leadership, underqualified staff, and techno-stress can hinder effective ICT use. Their study highlights the need for efficient organizational solutions, support services, and robust IT infrastructure to achieve seamless technology integration. The influence of digital transformation on HEIs is profound, offering opportunities to enhance the academic experience, streamline processes, and adapt to changing needs (Benavides et al., 2020).

Challenges and Sustainable Development in Digital Transformation

Despite the potential benefits of digital transformation, HEIs face several challenges. Zuraiz et al. (2024) identified issues such as poor leadership, underqualified staff, and techno-stress as barriers to effective ICT use. Heavy and demanding workloads, leadership styles, and workplace cultures can negatively impact teachers' mental health and technological adoption (Khlaif et al., 2023). Patricio & Ferreira (2023) highlighted the need for integrating digital and entrepreneurial ecosystems for long-term viability. Their study emphasized the importance of leveraging digital transformation to enhance learning and achieve economic and social objectives. They found that interactions between stakeholders and users are crucial for understanding dynamics related to digital infrastructure governance, digital user citizenship, digital entrepreneurship, and digital marketplaces.

Brunetti et al. (2020) used a multi-stakeholder approach to address digital transformation challenges, highlighting the need for strategic actions in culture and skills, infrastructures, and ecosystems. Their study proposed a macro-regional policy for digital transformation focusing on developing digital culture and skills, creating infrastructures and technologies, and investing in digital ecosystems. Effective digital transformation in HEIs requires multidimensional interventions tailored to each regional innovative system. The research by Brunetti et al. (2020) underscores the importance of developing regional innovation systems to seize opportunities offered by digital transformation. Their study emphasizes the potential contribution of each stakeholder category and the need for comprehensive strategic actions. By adopting best practices and leveraging innovative technologies, HEIs can enhance the educational experience for students, create dynamic learning environments, and achieve significant strategic value from digital initiatives.

Strategies for Effective Digital Transformation in Higher Education

Alenezi (2021) identified several challenges hindering digital transformation in HEIs, including lack of immediate focus, poor prioritization, decentralized decision-making, internal resistance, digital literacy gaps, and a narrow view of ROI. For HEIs to successfully implement digital technology, efficient organizational solutions, support services, and robust IT infrastructure as well as innovative pedagogical methodologies, digital literacy, and digital skills are crucial for HEIs to remain relevant in the digital era (Kiarie and Jones, 2024). Similarly, Hernández-Serrano et al. (2025) emphasized that digital teaching innovations involve academic, curricular, and organizational changes, enabling flexible and motivating learning environments. They also agree with (Kiarie and Jones, 2024) in holding that innovative pedagogical methodologies are

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essential for creating dynamic and engaging learning experiences and that digital teaching innovations go beyond technical changes and encompass academic, curricular, organizational, and structural innovations. The use of digital educational resources can create flexible and motivating learning environments, fostering autonomy and collaboration among students and teachers (Gómez-Trigueros et al.,2024). In an Indonesian study, Gayatri et al. (2022) highlighted the need for a highly professional workforce with digital skills and competence in technology and communication.

Benavides et al. (2020) conducted a systematic literature review to summarize the characteristics of digital transformation (DT) implementation in HEIs. They found that digital transformation is an emerging field, with many initiatives lacking a holistic approach. The study calls for further research on how HEIs can understand digital transformation and address the requirements of the fourth industrial revolution. They recommended technical and pedagogical guidance for university teachers to enhance digital literacy. Fernández et al. (2023b) conducting a multivocal literature review on digital transformation initiatives in HEIs emphasized the focus on providing quality and competitive education. Their study found that HEIs are in the early stages of digital maturity, with only 1 in 4 having a digital strategy. Lesinskis et al. (2023) reinforced the idea that digital transformation should prioritize student experience, with technology being a tool to achieve this goal. The greatest pressure for change in universities comes from students who demand flexible, personalized, and real-time educational experiences. The study highlights that digital transformation is a gradual process, and HEIs should continue to grow and adapt to become more digitally mature over time. As such, Namubiru et al. (2024) recommend progressive handling of instructors and students to change to a positive attitude toward students and learners if any educational reforms are to take place. In the same vein, Kabasiita et al (2024) point to the fact that there is a need for training of instructors in order to facilitate this gradual process of digital transformation.

Emerging technologies such as IoT, AI, cloud computing, and big data processing are influencing the development of digital education infrastructure (Almufarreh & Arshad 2023). IoT enables interconnected devices, creating intelligent learning environments. Big data analytics allow for data-driven decision-making and predictive analytics in education (Iyer et al., 2024). Cloud computing facilitates scalable and accessible educational resources and services, enabling remote learning initiatives. AI enhances personalized learning, automates administrative tasks, and provides customized feedback and recommendations for students (Onayinka et al., 2024; Butt et al., 2022). Robotics, AR, and 3D printing further enhance educational experiences, providing virtual laboratories and creating accurate prototypes (Boltsi et al., 2024; Munir et al., 2024). The integration of these technologies creates flexible and motivating ways of learning, fostering autonomy and collaboration among students and teachers (Aithal & Aithal, 2024). Thus, his study investigated what the state of affairs is at Mountains of the Moon University in a Ugandan setting.

Summary of Literature and Research Gaps Identified

Digital transformation in higher education necessitates a comprehensive shift in practices, culture, and perspectives to enhance the learning experience. Studies by Quy et al. (2023) and Bitalo (2024) emphasize the transformative potential of AI and IoT in creating intelligent learning environments and revolutionizing teaching methods. Nakaziba and Ngulube (2024b) highlight the importance of digital literacy, lifelong learning, and modernizing educational practices to make education more accessible and personalized. Despite these benefits, significant challenges remain, such as poor leadership, underqualified staff, and techno-stress, which hinder effective ICT integration in higher education institutions (Zuraiz et al., 2024; Alenezi, 2021). Additional issues like inconsistent internet connectivity, high data costs, and varying levels of digital literacy further complicate these efforts, highlighting the need for strategic organizational changes, robust IT infrastructure, and continuous

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training programs (Fernández et al., 2023b; Brunetti et al., 2020; Khlaif et al., 2023).

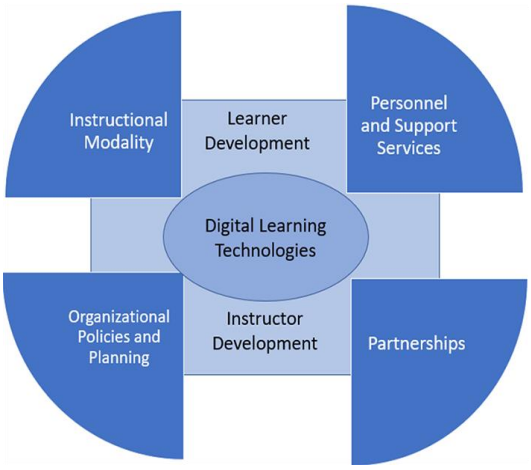
While there is extensive literature on the potential benefits and challenges of digital transformation in higher education, there is a notable gap in research focused on the context of Ugandan institutions like Mountains of the Moon University (MMU). The existing studies primarily address global regions, such as Vietnam and Indonesia, without exploring how these strategies can be effectively adapted and implemented within the Ugandan educational context. This lack of region-specific research means that the unique infrastructural and socio-economic challenges faced by HEIs in Uganda are not adequately addressed, leaving a critical gap in understanding how to navigate these issues.

Furthermore, there is limited exploration of the practical applications of the EDUCAUSE Digital Transformation (Dx) Framework within the Ugandan educational setting. This framework could provide valuable insights into systematically addressing challenges like internet connectivity, digital literacy, and technology integration. Additionally, research is needed to develop robust IT infrastructure, enhance digital literacy among staff and students, and foster a culture that supports continuous digital innovation. Addressing these gaps through targeted research can offer practical solutions and strategic interventions for effectively advancing digital transformation at MMU and similar institutions in Uganda.

Theoretical Framework

This study is guided by the EDUCAUSE Digital Transformation (Dx) Framework, which emphasizes the strategic integration of digital technologies to enhance learning, teaching, and administration in higher education. The EDUCAUSE framework stresses the importance of cultural change, leadership, and workforce development in driving digital transformation. It promotes embedding technology into institutional strategies to improve operational efficiency, student outcomes, and agility. By leveraging data analytics and fostering innovation, the framework supports continuous improvement in digital capabilities across the institution (EDUCAUSE, 2023). This comprehensive approach aligns well with the study's objectives, offering a structured method to assess digitalization at Mountains of the Moon University (MMU), identify challenges and opportunities, and propose effective strategies.

Figure 1: EDUCAUSE Digital Transformation (Dx) Framework (EDUCAUSE, 2023)



The EDUCAUSE framework is particularly relevant to this research because it addresses both strategic and operational dimensions of digital transformation. Unlike models focused solely on individual technology use, such as the Technology Acceptance Model (TAM), EDUCAUSE offers a broader perspective that includes institutional culture, leadership, and ongoing development. This holistic view is crucial for understanding the complex dynamics at MMU and for developing strategies that are technologically effective as well as culturally and operationally viable. Integrating

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technology into core practices and promoting a culture of innovation, the EDUCAUSE framework provides a solid foundation for advancing digitalization in teaching and learning at MMU.

METHODOLOGY FOR THE STUDY

This study employs a qualitative approach to gather in-depth insights on the implementation of digitalization strategies at Mountains of the Moon University (MMU). Purposeful sampling selected 37 participants across different departments and faculties, including 21 lecturers, 9 student leaders, and 7 administrative staff involved in digitalization initiatives. Semi-structured interviews served as the primary data collection method, allowing for an exploration of participants' experiences, challenges, and suggestions regarding digitalization at MMU. The interviews included open-ended questions, enabling participants to provide detailed and elaborate insights into the integration of digital technologies and their impact on teaching and learning.

In addition to interviews, one focus group discussion was conducted with 8 participants (faculty members and administrative staff) to explore collective experiences and perceptions further. Thematic analysis identified recurring patterns, themes, and insights from the interview and focus group transcripts, with NVivo software used to facilitate the organization and coding of qualitative data, enhancing the rigor and depth of the analysis. To ensure the validity and reliability of the findings, the study incorporated multiple strategies. Member checking was conducted by sharing the preliminary findings with participants to verify the accuracy and relevance of the interpretations. Triangulation of data from individual interviews and focus groups was carried out to corroborate the findings and provide a comprehensive understanding of the digitalization initiatives at MMU. Informed consent was obtained from all participants, with assurances of confidentiality and anonymity to maintain ethical standards.

Limitations (and Delimitations) of the Study

The findings are specific to Mountains of the Moon University (MMU) and may not be directly generalizable to institutions with advanced digital infrastructures or differing levels of technological maturity. However, as Sodikov (2024) emphasizes, case studies provide deep, context-specific insights that can inform similar institutions operating under comparable conditions, particularly in resource-constrained settings. Additionally, the reliance on qualitative feedback from a relatively small sample limits statistical inferences, but this approach was deliberate, aiming to capture rich, subjective experiences aligned with qualitative research methodologies (Lim, 2024; Pregoner, 2024). Finally, while the study primarily focused on institutional digitalization strategies, broader systemic factors such as national ICT policies and socioeconomic conditions were not deeply explored. These were intentionally delimited to allow for a more focused investigation of MMU’s context. Future studies can adopt mixed-methods approaches to address this limitation, enhancing both depth and generalizability.

FINDINGS AND DISCUSSION

Digitalization Strategies for Teaching and Learning

Mountains of the Moon University (MMU) is currently embracing digitalization at an approximate rate of 40-45%. The university's digitalization initiatives encompass various aspects of its educational ecosystem. The incorporation of Learning Management Systems (LMS) aims to streamline course delivery, enabling instructors to organize content, assignments, and assessments in a centralized online platform. This not only facilitates seamless communication but also empowers students with easy access to learning resources, fostering a more independent and flexible learning environment (Delgado Martín, 2023).

Furthermore, MMU is exploring the potential of online collaboration tools to facilitate virtual group discussions, projects, and research initiatives. By embracing synchronous and asynchronous communication channels, students can engage in collaborative learning experiences that transcend physical boundaries, cultivating teamwork skills and preparing students for the collaborative nature of today's global workforce (Carroll, 2023; Fernández et al., 2023b).

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> *The LMS has made accessing lecture notes and assignments much easier. However, the internet connection often disrupts our studies* (R7, 2024).

To ensure inclusivity, the digitalization strategies at MMU also prioritize accessibility. This involves providing resources in multiple formats, incorporating assistive technologies, and ensuring that the digital divide does not hinder any student's access to educational materials (Nakaziba & Ngulube, 2024b).

> *I appreciate the digital tools, but sometimes it's overwhelming, especially when connectivity is unstable* (R2, 2024).

Analysis of successful case studies, such as those implemented at other universities, can provide insights into best practices and potential pitfalls, offering a roadmap for MMU's ongoing digital transformation efforts (Delgado Martín, 2023).

> *The inclusion of assistive technologies has been a game changer for some of us, making learning more inclusive* (R11, 2024).

> *Accessing resources in different formats has really helped, especially when I'm on the go* (R22, 2024).

The findings reveal that Mountains of the Moon University (MMU) is steadily embracing digitalization, with a focus on transforming teaching and learning processes through Learning Management Systems (LMS) and online collaboration tools. These initiatives have enhanced course delivery and accessibility, empowering students with flexible learning opportunities and fostering collaboration. As noted by Delgado Martín (2023), LMS platforms streamline content organization, assignment submissions, and assessments, providing a centralized hub for learning. Moreover, the adoption of synchronous and asynchronous tools has fostered dynamic virtual collaboration, equipping students with critical teamwork skills aligned with global workforce demands (Carroll, 2023; Fernández et al., 2023b). However, connectivity challenges persist, disrupting the effectiveness of these tools and creating frustration among students, as highlighted by participant feedback (R7, 2024; R2, 2024).

MMU's strategies also emphasize inclusivity, leveraging assistive technologies and diverse resource formats to ensure equitable access for all students (Nakaziba & Ngulube, 2024b). Students have acknowledged the transformative impact of these measures, particularly in addressing accessibility barriers and fostering independence (R11, 2024). Despite these advancements, the feedback underscores the importance of addressing the digital divide and enhancing infrastructure to optimize digital learning experiences. By analyzing successful case studies from other institutions, MMU can refine its digital transformation strategies, mitigating challenges such as overwhelming workloads and connectivity issues while maximizing the benefits of its digital tools (Delgado Martín, 2023). This balanced approach will be key to sustaining progress and achieving broader institutional goals.

Challenges and Opportunities

The findings regarding digitalization strategies at MMU reveal both progress and challenges in advancing digital transformation. According to Walimbwa (2023), low connectivity can hinder digitalization efforts, and MMU's experience with internet connectivity issues aligns with broader research in this area. The university faces infrastructural limitations like internet congestion and low speeds, impeding optimal progress.

> *We have intermittent internet connectivity, which makes online learning challenging (R3, 2024).*

Nakaziba and Ngulube (2024b) highlight additional barriers to digitalization, such as a lack of awareness about digital technologies, insufficient ICT skills among stakeholders, and inadequate ICT infrastructure. These factors compound the challenges faced by MMU and indicate a larger systemic issue hindering digital transformation initiatives across various sectors.

> *Digital literacy among staff and students needs improvement. More training sessions would help (R18, 2024).*

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> *The cost of data bundles is high, and when free Wi-Fi is down, it becomes difficult to stay connected (R5, 2024).*

The presence of interventions aimed at advancing digital transformation signifies a proactive approach by the university management. However, addressing the identified setbacks is crucial for ensuring the effectiveness and sustainability of these strategies.

> *The digitalization of resources has been beneficial, but consistent access remains a problem (R9, 2024).*

Improving internet connectivity, raising awareness about digital tools, enhancing ICT skills through training programs, and investing in robust ICT infrastructure are potential solutions that can mitigate the barriers outlined in the research (Zuraiz et al., 2024).

> *Our performance has improved where digital tools are used effectively (R10, 2024).*

MMU's pursuit of digitalization strategies highlights both the opportunities and challenges inherent in advancing digital transformation within the educational sector. While the integration of digital tools has led to improved performance in certain areas (R10, 2024), significant barriers such as intermittent internet connectivity, high data costs (R5, 2024), low digital literacy, and inadequate ICT infrastructure persist (Nakaziba & Ngulube, 2024b). These challenges emphasize the complex nature of digital transformation, underscoring the need for strategic interventions. This study sought to address these gaps by examining current practices and proposing solutions, such as enhanced training programs to improve ICT skills, investments in robust infrastructure, and raising awareness about digital technologies (Zuraiz et al., 2024). Overcoming these barriers is essential for ensuring sustainable progress in MMU's digitalization journey, which mirrors broader trends in global educational digitalization (Walimbwa, 2023).

Incorporating the EDUCAUSE Digital Transformation (Dx) Framework into MMU's approach can help address these challenges and leverage opportunities for improvement. The Dx Framework emphasizes leadership and governance, student-centered learning, and effective use of data to drive decisions. By aligning with this framework, MMU can systematically; address connectivity issues through strategic investments in robust infrastructure, promote digital literacy and awareness through comprehensive training programs, and foster an institutional culture that supports and sustains digital innovation. This holistic approach ensures that MMU not only adapts to the digital age but also thrives in it, equipping students with the skills and knowledge required for a rapidly evolving digital landscape.

Impact on Teaching and Learning

The impact of digitalization strategies on the teaching and learning process at MMU is multifaceted. Analysis indicates mixed feelings among students about the effect on academic performance, primarily due to inconsistent internet connectivity and the high cost of data bundles when free Wi-Fi is unavailable. Some lecturers have a negative attitude towards embracing digital change, which poses an additional challenge. Despite these obstacles, there have been positive developments. Training of staff and students, although only fairly implemented, has begun to yield improvements in digital competency (Namubiru et al., 2024; Kabasiita et al., 2024).

> *Some lecturers are resistant to using new technologies, which affects our learning experience* (R14, 2024).

> *Training sessions have helped me to catch up with computer things, but there's still a lot to learn (R8, 2024).*

> *Digital tools have made learning more flexible, but technical issues sometimes hinder progress (R6, 2024).*

Evaluation of student outcomes and engagement reveals that digital tools have the potential to enhance the learning experience by providing flexible access to educational resources and facilitating interactive learning environments. Student engagement, performance, and overall satisfaction are showing signs of improvement where digital tools are effectively integrated and supported (Carroll, 2023; Fernández et al., 2023b).

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By addressing the challenges and leveraging the opportunities identified, MMU can enhance its digitalization efforts, ultimately improving educational outcomes and preparing students for a digitally-driven world (Rukajat et al., 2024).

> *"Our digital skills have improved, but there's still a lot to be done." (R21, 2024)*
>
> *"Lecturers need more encouragement and training to integrate digital tools effectively." (R35, 2024)*

The impact of digitalization strategies on teaching and learning at MMU reveals both progress and persistent challenges. While digital tools have introduced flexibility and improved access to educational resources, inconsistent internet connectivity, high data costs, and technical issues hinder their full potential (R6, 2024). Additionally, resistance from some lecturers towards adopting new technologies negatively affects the learning experience (R14, 2024). However, training initiatives for staff and students, though still in the early stages, have begun to enhance digital competency (Namubiru et al., 2024; Kabasiita et al., 2024). Positive outcomes, such as improved student engagement and satisfaction where digital tools are effectively integrated, demonstrate the potential of digitalization to transform education (Carroll, 2023; Fernández et al., 2023b). By addressing these barriers and fostering a supportive environment for digital adoption, MMU can further enhance its educational outcomes and prepare students for a technology-driven future (Rukajat et al., 2024).

Theoretical and Practical Implications

This study contributes to the theoretical understanding of digital transformation in higher education by emphasizing the relationship between institutional capacity, digital tools, and stakeholder experiences. The findings reinforce theories on digital inclusion, highlighting the critical role of access to digital infrastructure and skill-building initiatives in bridging the digital divide (Nakaziba & Ngulube, 2024a). Additionally, the research supports the application of the EDUCAUSE Digital Transformation (Dx) Framework, which underscores the importance of governance, data-driven decision-making, and student-centered learning in navigating complex digitalization processes (Zuraiz et al., 2024). By demonstrating the transformative potential of assistive technologies and inclusive practices, this study provides a valuable foundation for further theoretical inquiries into equity and inclusivity in digitally-mediated educational settings.

The insights from this study have practical implications for higher education institutions undertaking digital transformation. MMU's experience underscores the importance of strategic investments in ICT infrastructure, such as high-speed internet and campus-wide Wi-Fi, to ensure uninterrupted access to digital tools. Furthermore, the study highlights the necessity of implementing tailored digital literacy programs to enhance the competency of both staff and students, as emphasized by Koch and Fehlmann (2025). Institutions must also adopt inclusive strategies, such as providing content in various formats and incorporating assistive technologies, to accommodate diverse learner needs (Monica et al., 2025). These measures, if implemented effectively, can help MMU and similar institutions address the challenges of digital transformation while leveraging its potential to improve teaching, learning, and overall educational outcomes.

CONCLUSION

In summary, Mountains of the Moon University (MMU) has made commendable progress in embracing digitalization, with initiatives such as Learning Management Systems (LMS) and online collaboration tools enhancing the educational experience by providing a more flexible and interactive learning environment. These digital tools have empowered students with easier access to resources and facilitated collaborative learning, which is crucial in today's global workforce. However, challenges such as inconsistent internet connectivity, high data costs, and varying levels of digital literacy among students and staff remain significant obstacles. Addressing these challenges through strategic investments in infrastructure, comprehensive training programs, and increased awareness of digital tools will be crucial for the sustained success of MMU's digitalization efforts.

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The diverse responses from students and staff underscore the complexities of digital transformation in higher education. While there is an appreciation for the accessibility and flexibility provided by digital tools, the recurring issues of internet instability and the high cost of data pose substantial hurdles. Additionally, resistance to technological adoption among some lecturers highlights the need for targeted interventions to foster a culture of digital acceptance. By addressing these barriers and leveraging the opportunities identified, MMU can further enhance its digital capabilities, ultimately improving educational outcomes and preparing students for success in a digitally-driven world.

Incorporating the EDUCAUSE Digital Transformation (Dx) Framework into MMU's strategy can provide a structured approach to navigating these challenges. The Dx Framework emphasizes leadership and governance, student-centered learning, and effective use of data to drive decisions. By aligning with this framework, MMU can systematically address connectivity issues, promote digital literacy, and foster an institutional culture that supports and sustains digital innovation. This holistic approach will ensure that MMU not only adapts to the digital age but also thrives in it, equipping students with the skills and knowledge required for a rapidly evolving digital landscape.

Recommendations

To address the challenges and capitalize on the opportunities for enhancing digital learning at Mountains of the Moon University (MMU), a series of targeted recommendations have been proposed.

To students and lecturers (Users)

- Participate actively in digital literacy training programs to enhance ICT skills, ensuring effective use of digital tools for teaching and learning.
- Make full use of the available Learning Management Systems and other digital platforms provided by MMU to access, organize, and share educational content.
- Regularly provide feedback about the experiences and challenges with digital tools to help the university address issues and improve digital infrastructure and resources.

To the MMU and other universities

- Allocate funds to invest in ICT infrastructure to upgrade internet connectivity and expand Wi-Fi coverage to ensure reliable access for all students and staff.
- Develop and implement ongoing digital literacy workshops and training sessions to enhance the digital skills of both students and lecturers.
- Ensure all digital platforms and resources are accessible to students with disabilities, providing assistive technologies and multiple formats of learning materials.

To the government and other policymakers

- Implement policies and programs to subsidize internet data costs for students, making online learning more affordable and accessible.
- Develop and fund digital literacy programs at the national level to equip both students and educators with essential ICT skills, fostering a digitally competent workforce.

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