The influence of Covid-19 on the usage of Online, Blended and Physical teaching: A case of three universities in Mbarara City – Uganda

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ABSTRACT

The Covid-19 pandemic led to the global change in people's lifestyles, with many countries enforcing lockdowns. This occurrence forced learning institutions in Uganda to adopt long distance learning. The major aim of this study was to analyze the effects of Covid-19 lockdown on the utilization of different teaching modes (physical/face to face, online, and blended) during and after the lockdown as compared to the pre-pandemic period. A cross-sectional study approach was used to examine the response of different programs (three universities) with reference to adaptation of their teaching practices during the Covid era. In our approach, we used a quantitative method with a questionnaire tool, created through Google Forms. The study took place over a period of one month in 2023, with a sample of thirteen purposively selected respondents (heads of faculties from Mbarara University of Science and Technology; bishop Stuart university, and University St Joseph-Mbarara). Results indicated a drastic shift in delivery modes, the combination of blended and online with physical modes to maintain continuity in academics while ensuring student safety and flexibility. However, we also noticed that some institutions that had become physical post lockdown and could not go into e-learning completely because of some technical challenges. The study suggests that learning institutions in Uganda should prepare for the successful implementation of blended learning with reference to these results. Furthermore, it is important to investigate the obstacles for full utilization of e-learning and some institutions going back to traditional ways of teaching.

Keywords: E-learning, face to face learning, blended learning

INTRODUCTION

Covid-19 is a highly contagious virus that spread over the world causing about 6 million deaths of people around the world irrespective of age and gender` (Cascella, Rajnik, Aleem, Dulebohn, & Di Napoli, 2020). The popular air-borne virus started spreading in the year 2019 and spread to different continent in 2020 to 2021 lasting about 2years. The spread of the virus disrupted a lot of human activity that involved gathering of people like schools, religious gatherings, economic markets and many others (Di Gennaro & Petrosillo, 2022). This was due to the need to reduce the spread of the virus as different governments put up strict measures that ended in a total lockdown of various states restriction any movement of people or mass gatherings. The lockdown forced people to conduct most of their business activities online, online platforms like facebook and whatsapp became popular attracting many users and learning institution also ventured into the use of platforms like zoom and google meets (Maphosa, Dube, & Jita, 2020; OECD, 2021). The

change in the norm of operation of business did not only affect the western world but also Africa was affected even though most African countries are known to have limited technological infrastructure it didn't stop them from adjusting to the covid 19 pandemic situation (Mahaye, 2020).

Learning refers to the passing on of knowledge from one individual to another, in the education sector, learning involve both learner commonly referred to as students and tutor who are usually referred to as teachers (Munna & Kalam, 2021; Sharopova & Khalilova, 2023). There are three different modes of learning commonly used and these include physical or face to face, online or electronic and blended learning (Atwa et al., 2022). Physical learning is the most common and traditional way of passing on knowledge. In ancient Africa, elders often passed on knowledge inform of storytelling and riddles in different places like at parties or family gathering (Seroto, 2011). With the coming of European education physical learning was and is conducted in classrooms with either chalk or white boards where teachers and students interact face to face (Muttappallymyalil et al., 2016). Online teaching refers to the delivery of learning content via electronic platforms which may either be synchronous or asynchronous commonly referred to as learning management systems (LMS), the commonly used LMS's include moodle platform, Claroline, Youtube, and many others (Bradley, 2021). The most common form of Online teaching that was adopted during the covid 19 pandemic is the synchronous electronic learning that involves active participation of both learners and teachers/instructors for example with the use of platforms like google meets, zoom, etc (Ahmed & Opoku, 2022). Blended learning on the other hand refers to combination of both face to face and online learning technologies. The convergences of online and face to face learning resulted from teachers need to provide enriching content and to extend learning beyond the walls of the classroom (Lapitan Jr, Tiangco, Sumalinog, Sabarillo, & Diaz, 2021; Meng & Dan-dan, 2022).

In developing countries, learning institutions have over the years ventured into the transition from face to face learning to electronic learning however the transition was seen to be at a very low rate until the coming of the covid 19 pandemic that forced all learning institution to close as a means of curbing down the spread of the virus (Li, 2022; Matovu, Kabwama, Ssekamatte, Ssenkusu, & Wanyenze, 2021). During the pandemic era, almost all learning institutions from preprimary to university embraced online learning which took places on various learning platforms like radios, television, LMS's, zoom, among others. Some learning institution went further to conduct online examinations and assessments (Dhawan, 2020; Mudenda et al., 2020).

The COVID-19 pandemic has drastically disrupted traditional educational models worldwide, necessitating sudden adaptations in teaching and learning practices. Due to the phenomenon of going online and blended learning, universities in Uganda experienced some difficulties adjusting from traditional face-to-face teaching as they try to adopt various strategies to ensure educational continuity. Despite its benefits of flexibility and accessibility, the online learning has a number of drawbacks, including low student engagement, lack of interaction during lectures (Dhawan 2020). One way out of this complexity is blended learning which is defined as a combination of online and face-to-face instruction that presents the best balance between flexibility with access (Nortvig et al., 2018).

The Covid-19 pandemic necessitated an unprecedented global transition in the modality of education delivery, prompting many institutions to adopt online and blended learning modalities as a response to ensure academic continuity. Nevertheless, as many educational institutions revert to their original classes again; there are questions regarding the permanent place of e-learning and

blended learning solutions outside the scope of "Emergency Remote Teaching" (ERT). Therefore, this study seeks to address this gap and explore how the strategies adopted for online and blended learning modes due to pandemic may lead to changes in teaching practices.

Research Problem

Existing studies have primarily tracked how institutions transitioned to online and blended modes during the pandemic, with little information regarding the sustainability of the associated teaching practices. This study analyzed the way how universities in Mbarara City adopted to online and blended learning during the pandemic where researchers aims assessment of practices of adaptation from traditional face-face teaching and assess to what extent such practice has worked post pandemic lockdown.

Theoretical Framework

Our study was grounded in the Technology Acceptance Model (TAM) and Transformative Learning Theory (TLT). TAM was used to understand the acceptance and use of technology by users based on perceived ease of use and usefulness. This study uses the Technology Acceptance Model (TAM) in explaining the acceptance of e-learning technologies by Faculty and students of Ugandan universities during the pandemic. Getting a gauge on their acceptance levels gives you an understanding of the likelihood for adoption in long-term sustainment. TLT focuses on the process of transformative experience, mindsets and practices within individuals and organizations. This theory is employed in order to see if the pandemic´s forced embrace of online and blended learning is merely an adjustment or a transformational shift for higher education.

Collectively, these frameworks provide complementing perspectives for examining the incorporation of e-learning technologies in formal educational settings and their potentiality to effect lasting changes in educational practices.

LITERATURE REVIEW

The COVID-19 pandemic led to unprecedented changes to the education sector globally, this brought about the fast adoption of online and blended teaching modes to ensure educational continuity. As the pandemic hit, world over universities, including those in Mbarara City Uganda struggled with maintaining conventional education practices. The literature review presented here discusses how the COVID-19 pandemic has impacted the use of these modes in teaching, identifying studies that have been conducted in the past ten years. The review discusses current solutions, the gaps in research and ends with recommendations for questions to address if further post-pandemic education models are to be examined.

Evolution of Teaching Modalities in Higher Education

Traditional and Blended Learning Pre-COVID-19

Before the pandemic hit, most higher education institutions around the world, especially in low and middle-income countries such as Uganda, focused on classroom instruction. The online and blended learning modes of delivery were not utilized effectively owing to low levels of computer literacy, inadequacy of infrastructure and technology of the respective learning institutions. As noted by (Nthenya, Muchiri, Kagori, & Mawira, 2021), the traditional way of teaching in Sub-Sahara Africa was through face-to-face contacts which had been constrained by limited technology availability. Even if some attempts were made towards the adoption of blended

learning, which integrates online and physical aspects, in several African universities this was very limited, if not before, February 2020. (Ayere, 2022).

Blended learning gained ground in developed contexts in the early 2000s. Blended learning is the intentional integration of learning that occurs in a physical classroom with learning in the internet-supported environment of a virtual classroom with the intention of making the higher education experience more engaging and flexible (Garrison, 2008). However, these models were mainly applied in Western countries with limited studies on their applicability in poorer nations like Uganda (Kintu, Zhu, & Kagambe, 2017). These findings indicate that even though blended learning has the capacity to provide educational opportunities more so where access is limited, challenges, which were poor connectivity and unavailability of technological frameworks, obstructed its full scale adoption in African institutions.

The COVID-19 pandemic lockdown in the early 2020's forced universities to change their methods of teaching from physical to online classes. They did this so as to keep teaching amidst closure of learning institutions (Hodges, Moore, Lockee, Trust, & Bond, 2020). People often called this "emergency remote teaching." It was a quick fix to make sure students could keep learning even when they couldn't be in classrooms. Learning institutions started using online tools like Zoom, Microsoft Teams, and Moodle a lot more and thus lecturers and students had to learn fast how to use these new ways of teaching.

African universities also moved to online learning during this time. A study by (Bisaso & Achanga, 2023) found that places like Makerere University in Uganda started using online platforms to teach during the lockdown. But there were still problems in areas with bad internet and where people didn't know much about using computers. Also, the gap between rich and poor students became clear. Students from families without much money had trouble getting computers and good internet to join classes(Bozkurt et al., 2020).

In Mbarara, a city in southwestern Uganda, universities like Mbarara University of Science and Technology (MUST) and Bishop Stuart University started using online learning platforms when the pandemic hit. Due to the unpreparedness of these universities, they faced challenges like not having enough money for digital software, students not having equal access to technology and teachers not knowing how to teach online (Tumwesige, 2020). Despite these hurdles, the pandemic catalyzed a shift toward online education, which could have long-term implications for the future of higher education in the region.

Blended Learning as a Post-Pandemic Solution

Blended learning has become a promising option for education after the Covid 19 pandemic, as rules relaxed and learning institutions started to open again, universities tried out a combination of online and face to face classes. The approach gave students more freedom letting them study online but also talk to lecturers face-to-face whenever needed. Research shows this mode of learning makes students more interested and helps them learn better (McCarthy & Palmer, 2023).

In the case of African universities, experts say there is need to invest into more stable and affordable internet and train staff on how to use the e-learning platforms if they want blended learning to last (Mhungu & Cele, 2022). A study by (Tsevi, 2022) about blended learning in parts of Africa showed it could help students in far-off places get an education while spending less on buildings. But this only works if schools upgrade their tech and keep helping both teachers and students use it.

Challenges and Opportunities for Physical Teaching Post-COVID-19

As universities opened back up after the pandemic, a lot of institutions found a way to go back to in-person learning, although with some changes. Physical teaching has typically been the predominate means of instruction in almost all African universities owing to the shortage of infrastructure for online learning (Karimu, 2020). On the contrary, the remote teaching experience during the pandemic has swayed both students and faculties' opinions of the need for physical classrooms in the higher education sector.

Gaps in the Literature

Apart from the studies that have been done on the transition to online and blended learning due to the COVID-19 pandemic, there are still some unresolved issues in the literature. To begin with, the majority of the studies have been done on institutions in high-income countries, where access to the technology and infrastructure is not a major issue (Connolly & Abdalla, 2022). The research on how universities in low- and middle-income countries, especially in Sub-Saharan Africa, have been able to cope with the challenges of remote and blended learning during and after the pandemic is very limited.

Additionally, while the transition to online learning during the pandemic has been well-documented, there is a need for further research on how universities can sustain these modes of learning in the long term. Most institutions reverted to physical teaching once restrictions were lifted, highlighting the potential limitations of emergency remote teaching and the lack of readiness for full e-learning adoption in many regions (Alabdulaziz, 2021).

Conclusion and Future Directions

The COVID-19 pandemic served as a triggering factor for the use of (online/blended) teaching and learning in higher education, also in low-resource areas as Mbarara City, Uganda. While institutions managed to adapt quickly to remote teaching during the pandemic, the sustainability of these learning modes remains uncertain without adequate investment in digital infrastructure, faculty training, and student access to technology. Future work should look to long-term sustainability of blended and online learning in Sub-Saharan Africa, and particularly to bridging the digital divide and creating inclusive educational policy that can be implemented to account for the varied student population.

In conclusion, there is a need for further exploration into the post-pandemic evolution of teaching practices in African universities. Researchers should explore how institutions can capitalize on the lessons of the pandemic to develop more robust, flexible, and equitable education systems. Research of this type would be informative for policymakers and educational administrators attempting to improve the quality and affordability of higher education in the region.

METHODOLOGY

A cross-sectional survey was conducted targeting faculty heads from Mbarara University of Science and Technology (MUST), Bishop Stuart University (BSU), and University of Saint Joseph Mbarara (USJM). Data was collected using structured questionnaires administered via Google Forms, focusing on the usage of physical, blended, and online teaching modes before, during, and after the COVID-19 lockdown. A quantitative approach was utilized, and faculty heads were targeted as respondents due to their insight into their universities' teaching modalities. The

sample size was relatively small, but the focus on faculty heads allowed for informed responses regarding institutional practices.

This study design approach enabled the researchers to understand how universities in Mbarara city - Uganda, used the different modes of teaching. The study sought to clearly understand the commonly used mode of teaching among physical/face to face, online and blended learning. This study took up a quantitative method where a questionnaire data collection tool was used. The questionnaire tool was basically asking the respondent to select the mode of teaching used before, during and after the pandemic era.

The study target area was from universities of BSU, MUST, and USJM. These were purposively selected to represent all the universities in south western Uganda. The study participants of interest were heads of departments since their major role is to oversee the teaching administration in their respective departments, these were also purposively selected among all university population which includes students, lecturers/instructors, administrative staff and support staff. This study only included department heads from all the faculties and excluded any other members of the faculty. Data analysis was done using excel and external validity was done by relating the study findings with already existing related literature.

The participants of the study were purposively selected and these were heads of faculties in the different universities. The researchers only chose to work with heads of faculties to avoid duplication of responses since it was overseen that two members of the same faculty would definitely give the exact responses. All faculty heads in the three universities participated in the study as shown in the figures 2, 3, and 4. The data was collected using google forms, an online approach was used so as to easily access the different respondents since reaching the physically was not easy due to their nature of work. The google form data was later exported to excel for better compilation and analysis.

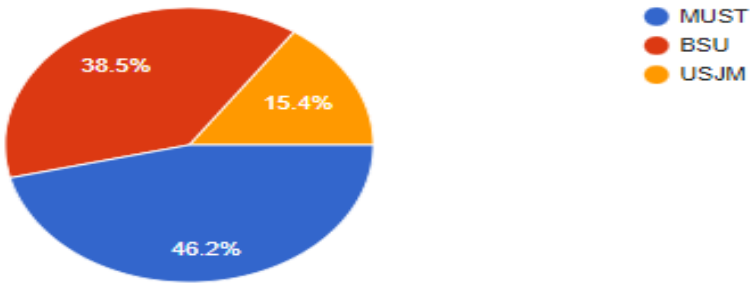

Figure 1: Percentage of faculties per University that participated in the study

Three universities participated in the study as shown in Fig 1 above; the variations in percentages are brought about by the different faculties found in each university. For every university, a faculty head/dean was purposively selected to offer information about the usage of physical, blended and e-learning before, during and after covid-19 lockdown. Below are pie charts showing the participation of each faculty in the different universities.

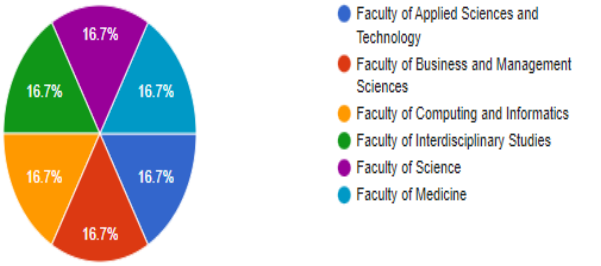

Figure 2 Faculties at MUST

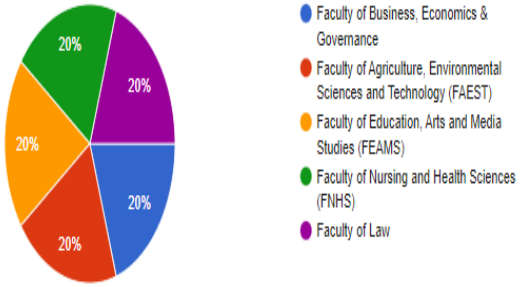

Figure 3 faculties at BSU

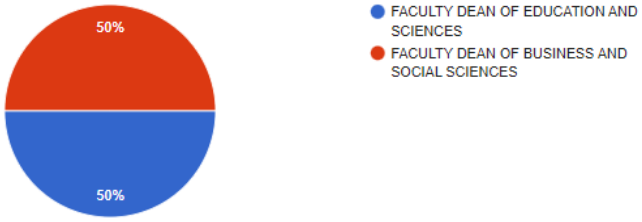

Figure 4 Faculties at USJM

PRESENTATION OF RESULTS

The study focused on understanding the usage and uptake of different modes of learning used in universities in south western Uganda considering three scenarios i.e. before Covid 19 lockdown, during the lockdown and after the Lockdown. The data presented in this section was looked at in two different points of view i.e. modes of learning used or preferred by each university and how each of the modes of learning i.e. physical learning, blended learning and online learning were being used in the selected universities. Figure 5, 6 and 7 below provide information about the usage of the three modes of learning (Physical, Blended, and Online) in three universities: Mbarara University of Science and Technology (MUST), Bishop Stuart University (BSU), and University of Saint Joseph Mbarara (USJM) before, during and after the covid pandemic.

In figure 5, the results indicate that MUST offers a substantial number of physical and blended programs (78 in total) along with a minimal number of online programs (1). This suggests that before the COVID-19 pandemic MUST relied heavily on traditional, in-person teaching methods (physical and blended). BSU on the other hand predominantly offered physical programs (91) and had only a small number of blended programs (6) and no exclusively online courses. This indicates that traditional, face-to-face instruction was the primary mode of learning at BSU before the pandemic. USJM mainly provided physical programs (15) and did not offer any blended or online courses. Like the other universities, traditional in-person teaching was the dominant mode of learning at USJM before the COVID-19 pandemic.

These results highlight that before the COVID-19 pandemic, all three universities had a strong emphasis on physical courses, reflecting the traditional higher education model of content delivery to learners. The limited presence of blended and online programs suggests that e-learning and hybrid learning methods were not extensively utilized.

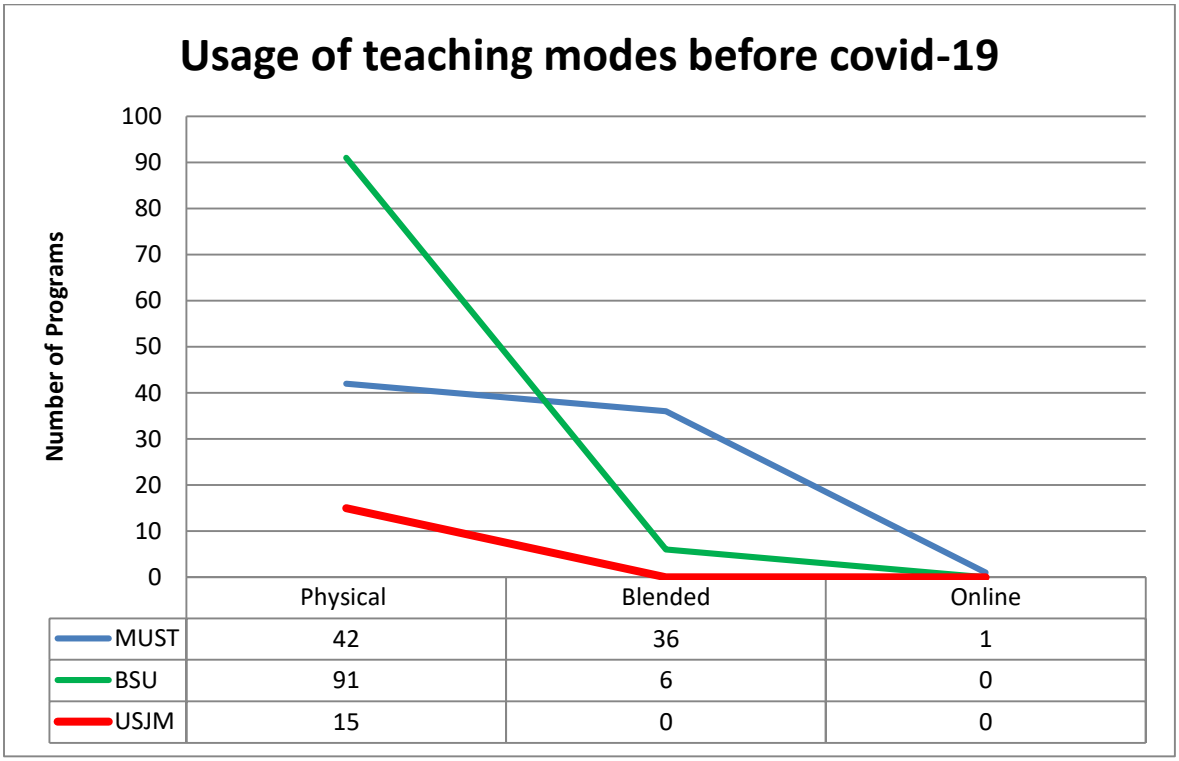

Figure 5: Before Covid-19 lockdown

Figure 6 shows that MUST offered very limited physical programs (2) during the pandemic, this suggests a significant reduction in face to face instruction, likely due to restrictions and safety concerns associated with the pandemic. The university had a substantial number of blended programs (29) during this period.

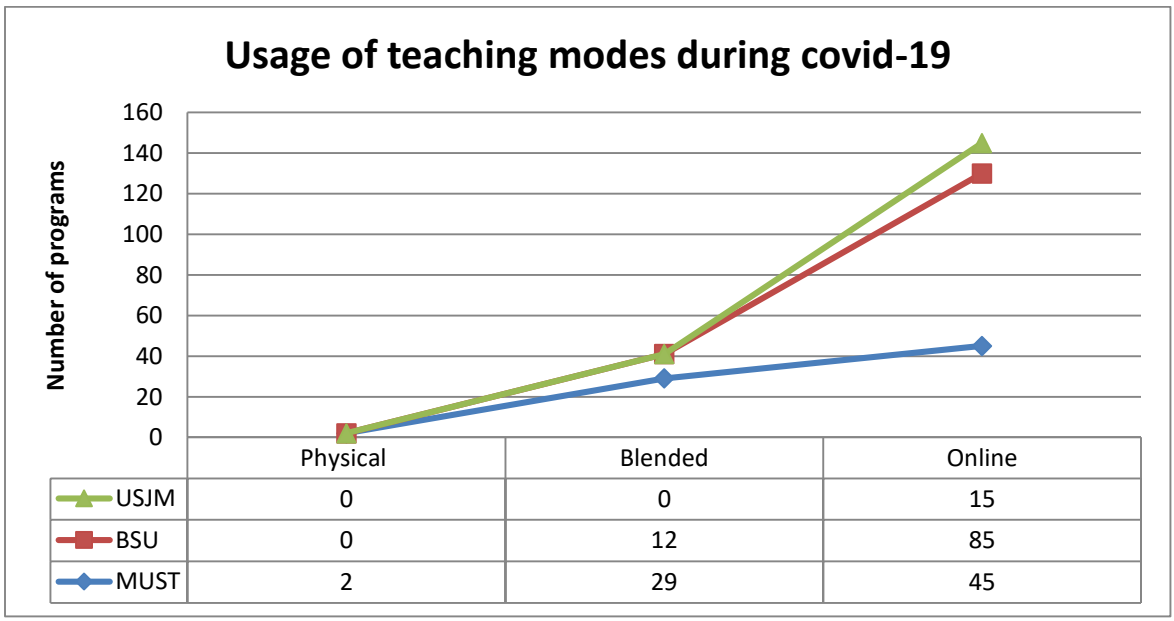

Figure 6: During Covid-19 lockdown

The increase in blended programs may indicate an effort to maintain some level of in-person engagement while incorporating online elements. The majority of programs at MUST (45) were delivered online. This underscores a significant shift towards e-learning, reflecting the adaptation to the pandemic's challenges. BSU did not offer any physical program during the pandemic. This indicates a complete transition away from in-person instruction, likely in response to COVID-19 restrictions and safety measures. The university provided a considerable number of blended programs (12). While fewer than during the pre-pandemic period; these programs indicate a partial blend of in-person and online instruction. The majority of BSU's programs (85) were delivered online during the pandemic. This data shows a strong emphasis on remote learning, reflecting the shift towards online education. USJM did not offer any physical or blended program during the pandemic. This implies a complete transition to online learning during this challenging period. The university provided a limited number of online programs (15), which were the exclusive mode of study content delivery during the pandemic. This shift reflects USJM's adaptation to the necessity of remote learning due to COVID-19.

In figure 7, results show that after the COVID-19 pandemic, the number of programs in which teaching was entirely face to face mode increased to 16, compared to the previous period. This suggests a partial return to face to face teaching, possibly in response to improved pandemic conditions but also due to pressure by learners who cannot comprehend practical programs whose programmed physical presence. The number of blended programs remained relatively high at 56. MUST continues to use this mode of learning, combining face to face and online modes. This approach indicates a commitment to maintaining a flexible approach to education. While the number of programs in which teaching is purely online decreased to just 6, MUST still offered a limited number of programs in this mode. This indicates that online learning remained a component of their educational strategy though a big reduction was noticed.

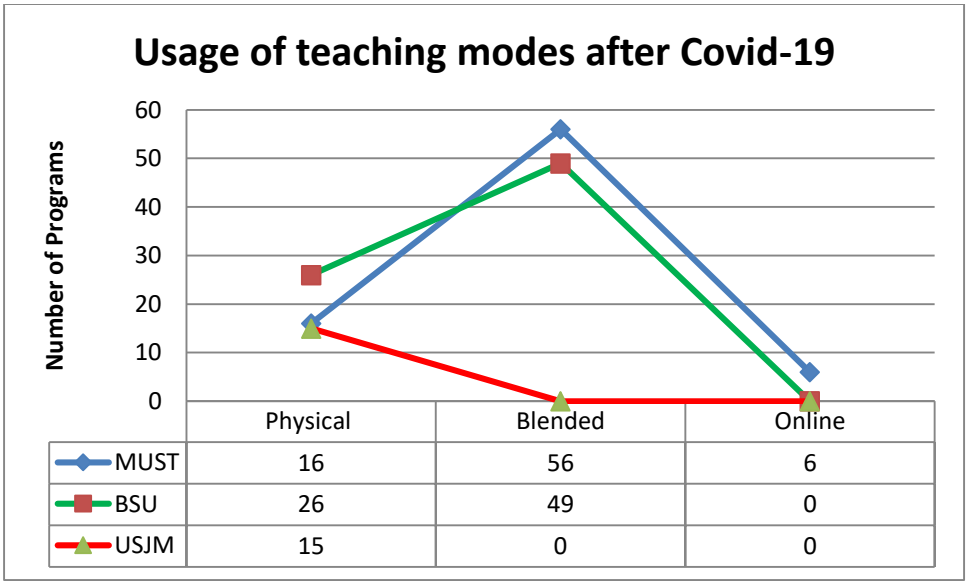

Figure 7: After Covid-19 lockdown

BSU significantly increased the number of physical programs to 26 after the pandemic, suggesting a partial return to physical teaching compared to the previous period. The number of programs offering blended learning remained substantial (49), reflecting a continued emphasis on

combining both physical and online modes of learning. Notably, BSU did not offer exclusively online programs after the pandemic lockdown, indicating a focus on blended and physical learning.

USJM primarily continued with physical programs (15) after the pandemic, emphasizing in-person instruction. The university did not offer blended or online programs during this period, indicating a continued reliance on traditional classroom-based teaching.

Statistical Analysis and Hypothesis Testing

For understanding the effects of COVID-19 on variation of teaching models (physical, blended, and online) in Ugandan universities, a statistical analysis has been performed. Two key tests were used to draw insights.

Chi-Square Test of Association:

This test examined whether the changes in teaching modes were linked to the different pandemic phases: before lockdown, during lockdown, and after lockdown. Data revealed a robust association (p 0.05) which means change in teaching paradigm was significantly affected by the pandemic. For example, the sudden move away from physical classes to online and blended learning during the lockdown wasn't just coincidental; it was a direct response to the crisis.

Paired-Samples T-Test

This test compared how the number of programs in each teaching mode changed between phases. It showed significant differences, confirming that the universities' teaching methods evolved substantially during the pandemic. For instance, the sharp drop in physical classes during the lockdown, the rise in online programs, and the post-lockdown return to more blended and physical classes were all statistically significant.

Before the pandemic, almost all programs relied on physical learning. During the lockdown, online and blended learning became the dominant methods as institutions adapted to restrictions. After the lockdown, while some online learning continued, there was a notable return to physical and blended formats. This suggests that while online learning was essential during the crisis, universities and students preferred to balance it with in-person learning once conditions improved.

Figure 8 illustrates this transition vividly. It shows how physical programs almost disappeared during the lockdown, blended learning surged, and online learning became the dominant mode. Post-lockdown, physical classes made a comeback, but blended learning remained strong, reflecting its newfound role in providing flexibility and resilience in education. In summary, the pandemic not only forced changes in teaching methods but also left lasting lessons on the value of blended learning as a sustainable approach for the future.

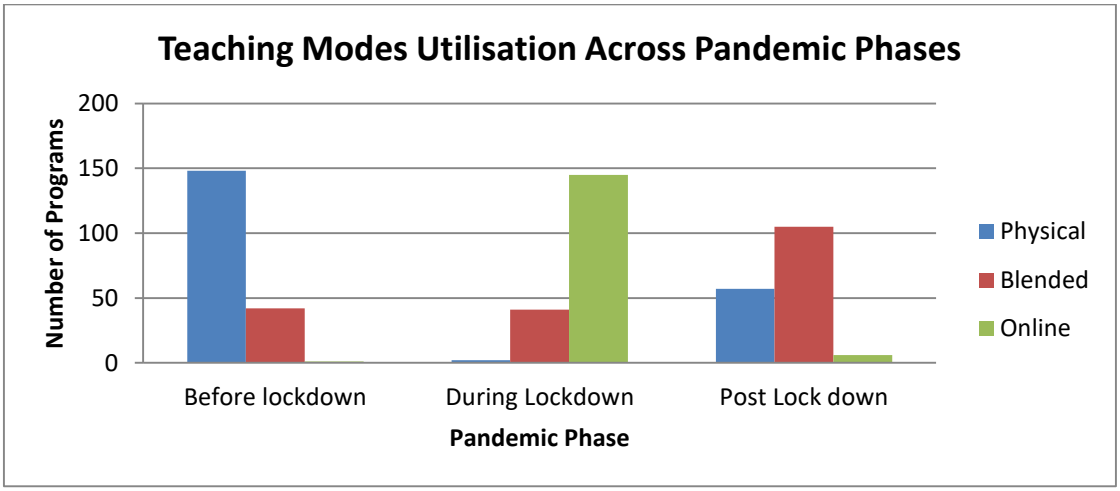

Figure 8 Teaching modes being utilized across the pandemic phases

DISCUSSION OF RESULTS

The study achieved a 100% response rate, with all faculty heads participating. Before the pandemic, all three universities predominantly employed physical teaching methods. During the lockdown, there was a marked increase in online and blended learning adoption. Notably, post-lockdown, MUST and BSU have reverted to offering a significant number of physical programs, while USJM continues to rely solely on physical teaching.

The pandemic has catalyzed a rapid shift towards online and blended learning modalities. The partial reversion to physical teaching post-lockdown suggests a preference for traditional instructional methods, possibly due to challenges encountered during online learning, such as limited technological infrastructure and reduced student engagement. These findings imply that while online learning is viable, it may not be sustainable as a sole modality in the long term.

The study's findings revealed that while all three universities primarily relied on physical learning before the pandemic, there was a significant shift toward online and blended modes during the lockdown. However, the return to physical teaching after the pandemic highlights a critical tension in how sustainable e-learning practices can be in low-resource settings like Uganda.

Implications for E-Learning beyond Emergency Remote Teaching

The study highlights several key insights for sustainable e-learning:

1. Capacity Building: While online platforms like Zoom and Moodle were rapidly adopted, most universities lacked the infrastructure for large-scale, long-term e-learning. Future efforts must focus on building digital infrastructure and skills, particularly in under-resourced contexts.
2. Blended Learning as a Long-Term Solution: Many faculty members expressed a preference for blended learning as it allows for flexibility while maintaining face-to-face interaction, especially for practical subjects. This suggests that universities might adopt a hybrid model moving forward.
3. Equity in Access: While online learning was effective during the pandemic, unequal access to technology and internet connectivity created barriers for many students. For e-learning to be a viable long-term solution, these disparities need to be addressed.

Addressing the Broader Literature

This study contributes to the growing body of literature on e-learning adoption in developing countries, with a focus on the post-pandemic transition. It adds to discussions around the sustainability of e-learning and whether the rapid shift during Covid-19 will result in lasting changes or a return to traditional face-to-face learning.

Significance of the Study

This study is significant as it provides a comprehensive analysis of how universities in a low-resource context adapted their teaching modes during a global crisis. The findings highlight critical areas for improvement, such as enhancing digital infrastructure and training faculty for sustainable e-learning adoption. Furthermore, the study contributes to the broader literature on educational resilience and provides actionable insights for policymakers and educators aiming to integrate e-learning effectively in higher education.

CONCLUSION

The findings indicate that while online and blended learning became essential during the pandemic, the shift back to physical learning post-pandemic suggests that e-learning may not be fully sustained unless critical infrastructure and support systems are put in place. This research highlights the dynamic evolution of teaching practices in response to the COVID-19 pandemic, offering insights that can assist educational institutions in developing long-term e-learning strategies. These strategies should include faculty training, digital infrastructure development, and student access to technology, enabling flexible and resilient teaching methods that incorporate both online and blended learning to ensure continuity and quality in higher education.

RECOMMENDATION

This research highlights the dynamic evolution of teaching practices in response to the COVID-19 pandemic. The insights gained can assist educational institutions in developing flexible and resilient teaching strategies that incorporate both online and blended learning, ensuring continuity and quality in higher education. More so, further research should explore why some universities reverted to physical teaching and the barriers to fully integrating e-learning into their long-term educational strategies.

Based on the study's findings, universities in Uganda should prioritize enhancing digital infrastructure and internet connectivity to support sustainable e-learning and blended learning. Blended learning, which gained prominence during and after the pandemic, should be adopted as a long-term strategy due to its flexibility and ability to maintain face-to-face interaction for practical programs. Institutions must invest in capacity building for both faculty and students to improve digital literacy and effective use of learning management systems. Additionally, addressing equity issues by providing affordable internet access and devices to underprivileged students is crucial. Developing comprehensive e-learning policies and establishing mechanisms for continuous monitoring and evaluation of teaching modes will ensure these strategies are effectively implemented and adapted to future challenges

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