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Exploring the use of Information and Communication Technology in Open and Distance Learning: The Case study of Botswana Open University

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Abstract

This qualitative study investigated the utilization of Information and Communication Technology (ICT) in an Open and Distance Learning (ODL) university located in Botswana. The sampling technique employed was judgmental sampling, which involved the selection of 16 participants comprising of a lecturer, students, and officers responsible for managing the Learning Management System (LMS). The data collection process incorporated face-to-face interviews with the lecturer and officers, as well as open-ended e-questionnaires administered to the students. Narrative data analysis was conducted separately for the lecturer, officers, and students. By applying the Attrition theory, the findings disclosed that students of the Botswana Open University encounter challenges with the ODL mode due to limited resources, inadequate or non-existent internet services, and the remoteness of areas where access to BOU campuses is impracticable. According to the lecturers, they also require technical support when assessing students' work, as these students often encounter difficulties when uploading their assignments onto the university's LMS. Consequently, the study recommends that BOU should ensure the availability of ICT tools for the students, as well as address issues related to connectivity and bandwidth by providing reliable data services. Additionally, it is proposed that students undergo comprehensive training on the LMS systems, encompassing both technical and non-technical aspects, prior to the commencement of the academic year, in order to adequately prepare them for their studies.

Keywords: Information and Communication Technology; Open and Distance Learning; Resources; Internet Connection; Access; Bandwidth; Attrition

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INTRODUCTION

In the last century, there have been significant advancements in the use of Information and Communication Technology (ICT) worldwide. These advancements have had a profound impact on the field of education, resulting in a shift from traditional, teacher-centered classrooms to a more learner-centered approach that incorporates technology. Open and Distance Learning (ODL) institutions, in

particular, were expected to embrace this change as technology aligns well with their mission. As a result of this evolution in the education sector, there has been a surge in knowledge expansion and an increase in student enrollment within educational institutions.

According to Yusuf and Al-Banawi (2013), new teaching and learning methods have emerged globally, with electronic learning (e-learning) becoming an integral part of education. E-learning refers to the use of internet and other technologies to create teaching and learning materials (Arkorful & Abaidoo, 2014). It encompasses the resources used to achieve educational goals and facilitate courses using technology. Over the past decade, there has been a transformation in technology-enhanced classrooms, with personal desktop computers (PCs) being replaced by more portable laptops, tablets, and smartphones that can be easily transported. These devices rely on wireless networks, providing instant access to information through the internet. The internet also enables access to new knowledge and supports communication, which is crucial for effective learning (Szymkowiak et al., 2021). However, access to the internet is a prerequisite for e-learning, as students need to be connected to the necessary information.

This study examines the use of ICT in ODL at Botswana Open University (BOU). The aim of the study is to identify the challenges faced by BOU students enrolled in an ODL program and develop strategies to assist them. This research is motivated by the fact that many ODL students struggle to complete their programs within the designated timeframe, often requiring extensions. Consequently, only a small number of registered students successfully graduate while others remain with incomplete coursework, leading to longer graduation times. Thus, the current study has the following objectives: (1) investigate the technological knowledge and skills challenges faced by BOU students in relation to e-learning; (2) explore the operational practices of e-learning at BOU; and (3) propose strategies to enhance student motivation in the learning process at BOU.

Challenges in the Integration of Information and Communication Technology

ICT, which stands for Information and Communication Technology, encompasses a wide range of technological tools and resources used for communication, information creation, dissemination, storage, and management, as defined by Chatterjee et al. (2023). Pérez-López et al. (2019) provides a similar definition, describing ICT as tools that handle information through various goods, applications, and services, facilitating the production, storage, processing, distribution, and exchange of information. Consequently, the effective utilization of ICT requires the availability of specific tools and resources.

The integration of ICT into the teaching and learning process is a global trend that transcends sectors and segments, as noted by Baako and Abroampa (2023). ICTs have the potential to overcome traditional barriers, amplify the voices of marginalized individuals and communities, and provide valuable information that enhances economic, health, and educational activities. In the field of education, ICT plays a direct role by offering numerous benefits to schools, students, and the wider community. However, there exist various barriers and challenges that impede the successful integration of ICT into education, thus discouraging educators and learners from adopting these technologies. One of the primary challenges in Higher Education

is the tendency to prioritize technological possibilities over educational needs (Robertsone & Lapina, 2022). The educational effectiveness of ICT hinges on how they are utilized and for what purpose, as ICTs do not yield uniform results for every individual and in every context. Tülübaş et al. (2023) underline the significant challenges associated with ICT integration in education, particularly in relation to the negative impact of digital addiction (DA) on students' academic achievement (AA). DA, an encompassing term referring to addiction to various forms of digital media, can adversely affect students' academic performance. It often leads to multitasking and cognitive overload, which distract students from their educational activities and impede their academic success. Furthermore, DA can result in behavioral symptoms akin to those observed in other addictions, thus compromising students' mental, psychological, and educational well-being. Consequently, it is crucial to continuously update digital competencies in response to the rapid pace of technological advancements. Moreover, the utilization of ICTs varies across different regions of the world, influenced by factors such as affordability, availability, and access to technology. With this in mind, the study investigated the challenges faced by students, tutors, and lecturers at BOU (Bangladesh Open University) concerning the integration of ICT, focusing on issues of access, training, and affordability.

Challenges in the Technological Knowledge of E-Learning

E-learning presents various challenges for students, particularly those with limited technological knowledge. This can result in a sense of isolation within the e-learning environment. For instance, students in remote areas, such as Botswana, may lack the motivation to engage with others. According to Yusuf and Al-Banawi (2013), the absence of traditional classroom structures can confuse students regarding course activities and make it difficult for them to meet course requirements. Consequently, they may feel disconnected from instructors and fellow students. Moreover, Balaji et al. (2016) highlight the constant and rapid changes in technology, which can impede internet usage and access. Despite being a country with a developing economy in the Southern African Development Communities (SADC), Botswana still faces challenges related to connectivity, electricity, and social issues, which further hinder technological knowledge. E-learning is often viewed as a contemporary form of Open and Distance Learning (ODL), offering flexible learning opportunities that transcend time and place, as long as an internet connection is available (Balaji et al., 2016). However, successful implementation of e-learning requires adequate resources, training, and accessibility.

Open and Distance Learning

The concept of Open and Distance Learning (ODL) was developed to advance UNESCO's objective of Education for All (EFA). According to Fraser and Deane (2020), ODL is defined as both a process that emphasizes access to educational opportunities and a philosophy that prioritizes learner-centered education. ODL allows learners to have autonomy in their learning, allowing them to choose how, when, where, and what to learn within the limitations of available resources.

This definition demonstrates that ODL aims to provide flexible and convenient learning for students. The Botswana Open University, where this study was conducted, offers students the opportunity to study using the ODL mode, which provides flexibility in terms of time and location. However, despite this flexibility,

students still face challenges that prolong their completion time, as explored in this study. In the case of ODL, accessibility is provided to all students, regardless of their geographic location. This mode of learning is characterized by extensive support for enrolled students. In Australia, ODL gained recognition in the 1950s when it broke down the barriers of the existing education system, providing access to education for those in need (Mitchell, 2009). Although the success of ODL is not clearly established, Australia's well-developed infrastructure has led many countries, including South Africa, to adopt their education system. In the United States, the University of Chicago was the first to introduce a correspondence program using the ODL mode. The Association for Educational Communication and Technology (AECT, 2001) states that this mode of teaching and learning was designed to offer educational opportunities to those who were not part of the elite and could not afford full-time education. AECT is an international organization that values diverse thoughts, cultures, and people, and its activities aim to enhance learning. This indicates that, unlike Botswana, the implementation of ODL in the United States took into consideration the background of the students. In Africa specifically Southern Africa, Open and Distance Learning (ODL) was introduced in countries such as Zimbabwe, South Africa, and Botswana. According to Njaya (2015), in the 1980s, the Zimbabwean government recognized that the University of Zimbabwe could not meet the growing demand for university education. Consequently, the Zimbabwe Open University (ZOU) was established and currently offers a wide range of programs, from diplomas to postgraduate courses, through ODL.

In Botswana, the introduction of ODL can be attributed to the passing of the Botswana College of Distance and Open Learning (BOCODOL) Act of Parliament in 1998. The aim was to provide learning opportunities to out-of-school youths in the country. As noted by Chitema (2020), the Botswana Extended College (BEC) offered non-formal courses to teachers in rural areas and individuals who couldn't complete their training at the University of Botswana (UB) and other Teacher Training Colleges within the regular duration of the mainstream courses. The goal was to ensure access to education for students who couldn't attend traditional classrooms due to various commitments. However, currently, many students enrolled in ODL programs at BOU struggle to complete their courses within the expected time frame, and some even drop out.

In 2007, the Botswana government implemented the Maitlamo National ICT Policy to foster the growth of the ICT environment and provide universal service and access to ICT facilities, with the vision of establishing Botswana as an ICT Hub (Esselaar & Sebusang, 2016). According to the Statistics Botswana Report (2016), there was a decline in fixed telephone lines and cellular phone usage in 2015. Additionally, there was a significant 25% decrease in internet subscriptions, leading to a revision in data costs. However, in 2016, more individuals began installing internet connections in their homes and workplaces, particularly in urban areas with access to roads, electricity, and other infrastructure. Unfortunately, ODL still remains a challenge for many students in Botswana, as this study examines. Remote areas of the country continue to face difficulties due to the absence of road access, electricity, internet connectivity, and adequate ICT infrastructure for online learning. Kabir and Kadage (2017) asserted that distance education is synonymous with technology. They explained that the evolution of distance education has encompassed various forms of

technology, including print media, educational radio and television, multimedia systems, and internet-based platforms. Al-Fahad (2009) further argued that distance education relies heavily on technology and is inherently intertwined with it. The advancements in multimedia technologies have shown great potential in facilitating personalized and collaborative teaching and learning experiences (Zhang et al., 2020). Al Saiyd and Al Sayed (2011) acknowledged that these technologies have significantly enhanced the quality, diversity, and accessibility of information, thereby transforming the dynamics of teacher-student relationships. This challenges the notion that studying through an Open and Distance Learning (ODL) mode, such as that offered by BOU, should be devoid of difficulties.

In this study, the researchers adopted attrition theory as a conceptual framework to understand the challenges faced by students of BOU in the ODL mode. Attrition theory refers to the process whereby various factors influence an individual's decision to discontinue their enrollment in a university or college program (Colferai & Gregory, 2015). Examining attrition in online courses is particularly important for two reasons. Firstly, it enables an evaluation of the cost-effectiveness of online learning compared to traditional classroom-based instruction. The cost implications play a crucial role in educational planning and determining the value of investing in distance online learning for both learners and their sponsors (Gilead, 2014). Secondly, attrition provides universities with insights into students' retention and progression, enabling them to develop strategies that foster students' motivation and ensure their successful completion of programs.

Hence, the researchers utilized the attrition theory framework to address overarching issues confronted by BOU students, including program costs, accessibility to university portals, and interaction with facilitators. According to Moore et al. (2021), there is a significant correlation between attrition and a student's financial situation. Students invest their resources and time into their education, highlighting the importance of supporting them through to program completion. Consequently, universities strive to allocate funds to students who demonstrate the commitment to finishing their courses. Similarly, addressing attrition involves identifying approaches that promote learner interaction and engagement in the online distance learning process, thereby enhancing its effectiveness.

METHOD

A qualitative research methodology was employed in this study. Qualitative research refers to an investigative approach that is particularly valuable for uncovering and comprehending a central phenomenon (Creswell, 2014b). Researchers employing this method are primarily interested in exploring individuals' beliefs, experiences, perceptions, and meaning systems from their own perspectives (Flick, 2018; Mohajan, 2018). Additionally, Ritzer and Stepnisky (2022) assert that qualitative research draws its roots from social and cultural anthropology, philosophy, psychology, history, and sociology. Accordingly, this study aimed to uncover the natural context of various phenomena and seek to interpret their meaning for individuals.

Within the qualitative research framework, the researcher posed open-ended, broad questions to participants to elicit their perspectives, which were then captured in the form of verbal statements or visual representations. Prior to data collection,

ethical clearance was obtained, and participants were provided with a detailed briefing. Measures were taken to ensure anonymity, confidentiality, and to address potential biases. To enhance the confirmability of the data presented in the study, the collected data was shared with willing participants for validation before analysis.

Research Design

The concept of research design refers to the conceptual framework within which research is conducted (Yin, 2013). Furthermore, Yin argues that research design allows researchers to draw conclusions about the inherent relationships between the variables under investigation by providing a coherent model of evidence. Similarly, research design encompasses attitude perception (acting as a bridge), skill perception (the arrangements and plans for generating data), and knowledge perception (forming a research framework). Moreover, Creswell and Poth (2016) posit that a qualitative research design can be employed to identify and appreciate the meaning that individuals or groups attribute to a social or community issue. Case studies are utilized to elucidate the "why" and "how" behind phenomena and are not employed to control behavioral events (Creswell & Poth, 2016). Consequently, this research entailed a single case study involving an online learning institution, BOU, to explore the use of ICT in ODL.

Research Paradigm

Paradigm defined as a set of assumptions or beliefs regarding fundamental aspects of reality that give rise to a particular worldview (Avenier & Thomas, 2015; Mwita, 2022). This definition aligns with the definition provided by Parker-Jenkins (2018) which stipulates that a paradigm is a way of perceiving or investigating phenomena, a worldview, a perspective on what constitutes accepted or valid scientific knowledge, or a modus operandi; an established model or pattern. Social constructivism proved to be the most suitable research paradigm for this study. It is founded on specific assumptions about knowledge, reality, and learning. Social constructivists contend that reality is constructed through human actions. The paradigm was essential for this study as it facilitated meaningful conversations with participants and technical staff in order to comprehend the challenges associated with ODL, technical issues, and the characteristics of students who typically enroll at BOU.

Population and Sampling

Population

Population refers to the total number of subjects that meet specific criteria and fall within the scope of a research study (Majid, 2018). As of 2019, the population of BOU consisted of 12,058 secondary students and 2,640 tertiary students. The staff included 176 non-academic staff, 49 academic staff, and over 60 part-time tutors.

Sampling

Sampling involves determining the appropriate population, setting, and events for a study (Bertram & Christiansen, 2019). It is the process of selecting a representative portion of the population. For this study, the sample consisted of students from a specific department, categorized as either active or non-active, as well as custodians of the Learning Management System (LMS) and a lecturer. Existing literature indicates that sampling helps researchers draw conclusions about participants from a sample, leading to desired results (Bertram & Christiansen, 2019).

Convenience sampling, also known as opportunity sampling, was used in this study (Majid, 2018). This method involves selecting the nearest individuals available as participants and repeating the process until the desired sample size is achieved. Case studies often employ this type of sampling approach (Cohen et al., 2017; Stratton, 2021). Brandão et al. (2019) further emphasize that convenience sampling involves recruiting people directly from the field based on current opportunities. In this study, a convenient purposeful sampling technique was utilized to select 16 participants.

The collected data aims to contribute to a deeper understanding of the theoretical framework guiding the study (Etikan et al., 2015). Participants were identified based on their enrollment in an online distance learning program, their active or non-active status, and their willingness to participate. Table 1 presents the sample size for the study.

Table 1. Participants of the Study

Participant and *pseudonym*	**Number**	**Role**
BOU student *(AS 1 etc)*	13	Students who are currently active on the system
BOU officer *(OF 1, 2)*	2	They deal with and manage the LMS
BOU lecturer *(L1)*	1	Facilitator of online courses
Total		**16**

Table 1 presents the composition of the sample, which consisted of 13 students, 2 officers, and one (1) lecturer. The BOU officers were responsible for managing the Learning Management System (LMS) and were therefore knowledgeable about the activities accessed by students on the system. The lecturer, on the other hand, facilitated courses at BOU and possessed insight into the level of engagement or disengagement exhibited by students. It is worth mentioning that initially, two lecturers were intended to participate in the study. However, due to the impact of COVID-19 on the population, one of the lecturers was unable to join the study as he was contending with the infection.

Data Collection Instruments

Data was collected through face-to-face interviews with the lecturer, officers, and an administrator. Given that the data collection process took place during the COVID-19 outbreak, MS Teams was utilized to conduct interviews with participants. An interview involves interpersonal interaction between two or more individuals with a specific objective. Interviews serve as a method for gathering data through structured questioning and person-to-person engagement (Creswell, 2014a). The electronic questionnaire was administered to students, featuring both active and inactive open-ended items to gather data. Eckerdal and Hagstrom (2017) note that a qualitative questionnaire, similar to other qualitative methods of data collection, captures memories, opinions, and experiences. Additionally, e-questionnaires, as highlighted by Karaganis and St-Denis (2012), enable researchers to collect extensive data from participants as they cover various domains with internet connectivity.

Data Analysis

Multiple approaches to data analysis exist, including ethnographic, narrative,

phenomenological, and constant comparative methodologies (Saint Arnault & Sinko, 2021). The open-ended nature of qualitative research data poses some challenges since data is obtained from diverse sources, such as interview transcripts, document reviews, and questionnaire responses (Chauvette et al., 2019; Lamb et al., 2024). For the interview data, a narrative analysis approach was employed, incorporating verbatim quotes from the participants (i.e., one lecturer and BOU officers). As for the student questionnaires, a narrative analysis was used, focusing on extracts from the open comments students provided in the open-ended e-questionnaires.

Ethical Considerations

This study was conducted with strict adherence to ethical guidelines approved by the Botswana Open University Ethical Committee to ensure the integrity and ethical validity of the research process. Informed consent was obtained from all participants, who were comprehensively briefed about the research's purpose, methods, potential risks, and their right to withdraw at any time without consequence. All data was anonymized to maintain confidentiality and stored securely to prevent unauthorized access. The research design minimized potential harm or discomfort to participants, with a strong emphasis on psychological well-being. To mitigate potential biases and maintain objectivity, researchers adopted a neutral stance during both the data collection and analysis phases. Ethical oversight was continuous, with the research protocol subjected to regular reviews by an independent ethics committee to ensure compliance with ethical standards. Additionally, participants were invited to validate the findings, enhancing the credibility of the research and allowing them the opportunity to contest and verify the interpretations made. This participatory approach ensured that all personal and sensitive information was handled with the utmost respect and sensitivity, aligning with the ethical commitments of the study.

RESULTS AND DISCUSSION

Interview Findings with the BOU Lecturer

The purpose of the interview with the lecturer was to gather information about the challenges they face when using ICT for ODL mode. The following are the responses provided by Lecturer 1 (L1) in relation to the first objective. In response to the question about challenges in using technology for ODL, L1 highlighted infrastructure as one of the obstacles. L1 expressed that while the infrastructure for e-learning is advanced, there are still issues encountered in terms of uploading materials onto the learning portal, navigating the portal, and submitting assessments or online exams. The inability to see the students during exams raises concerns about the authenticity of their work. L1 emphasized that the COVID-19 outbreak led to a shift from traditional venue-based exams to online exams, which further raised doubts about students' performance.

L1 also mentioned internet connectivity as a major challenge. According to L1, many students enrolled in online programs lack the necessary gadgets and internet access, both at their workplaces and homes. This poses significant challenges for them when performing tasks or submitting assignments during the semester. Prior to the pandemic, the university used to provide tablets to students and staff as part of the program package, allowing them to access learning materials and the internet from

various locations such as internet cafes, public hotspots, libraries, and government facilities. Unfortunately, due to the COVID-19 outbreak, the university had to stop issuing these tablets, which were valuable for both the lecturers and the students.

In addition, L1 highlighted the lack of specific software that could facilitate the learning process. There is a need for software or technological tools that accommodate individuals with disabilities such as the visually impaired, hearing impaired, and others. By having inclusive technologies, teaching and learning at BOU would become more accessible. However, the absence of these technologies has resulted in the exclusion of students and staff with disabilities from participating in different programs.The other challenge that was indicated by Lecturer 1 was the lack of human resources. Lecturer 1 stated, "*I think departments like IT, in particular, need more manpower or staff members. They are overwhelmed by the amount of work and support services they have to offer, especially during examinations and assessments. It's important to remember that they service and support the whole university, and there are only two IT personnel.*"

Regarding the caliber of students, Lecturer 1 mentioned that "*it is a matter of practice and trial and error that could assist most people. You must have an interest in the use of technology. Unfortunately, most students who enter our programs have little to no skills at all, which greatly affects the progress of the program. Some students can easily navigate through with the support of their colleagues and family, while others struggle. BOU tries to help during the induction program. We also encourage them to enroll in the short ICT courses available at BOU, but at their own cost.*" The lecturer further expressed that "*if one is techno-phobic, they are likely to face difficulties in their e-teaching and e-learning.*"

The findings obtained from the interview with L1 align with numerous studies that have previously highlighted similar challenges encountered during the implementation of e-learning in higher education institutions. For example, Kibuku et al. (2020) identified obstacles such as inadequate e-learning policies, constantly evolving technologies, budget constraints, and negative perceptions towards e-learning in Kenyan universities, which mirror the issues of infrastructure and policy gaps mentioned by L1. Likewise, previous studies emphasized the high costs of equipment (Hadullo et al., 2018) and insufficient e-learning infrastructure in Nigeria (Onuoha, 2018), which parallel the connectivity and technological access issues reported by L1 at BOU.

Furthermore, the concerns expressed by L1 regarding the authenticity of online exams resonate with the findings of Han et al. (2024), who discussed the challenges associated with verifying the identity of exam takers in online settings. The transition to online exams during the COVID-19 pandemic has raised universal concerns about maintaining academic integrity, as noted by Khan et al. (2021), who emphasized the need for secure and flexible e-exam mechanisms. The implementation of continuous verification processes and context-aware continuous implicit authentication systems, as suggested by Han et al. (2024) and Ryu et al. (2023), could address some of these concerns. However, it should be noted that BOU currently lacks such sophisticated measures.

The lack of specific software to support learners with disabilities, as highlighted by L1, is validated by studies that emphasize the importance of adaptive technologies in e-learning environments. Kirongo et al. (2022) and Chorfi and Al-Hudhud (2019)discuss the significance of digital and AI-enabled assistive technologies in empowering students with disabilities, and this is a gap that BOU currently faces. The

absence of these technologies at BOU leads to the exclusion of students with disabilities, a challenge that is also noted in various other educational contexts (Ayon & Dillon, 2021; Visser et al., 2020).

Additionally, the issue of inadequate IT staffing at BOU is consistent with the findings presented by Brown-Johnson et al. (2024), who underscores the critical need for an adequate number of staff members to avoid overburdening existing personnel. In educational settings, having a sufficient number of IT staff is vital for providing support to online learning platforms and promptly addressing any technical issues that arise, as emphasized by Bashir (2021). The shortage of IT personnel at BOU, particularly during peak times such as exams, mirrors the broader challenges faced in ensuring robust support systems for e-learning.The findings from the interview with L1 have underscored significant barriers to the effective implementation of information and communication technology (ICT) for open and distance learning (ODL) at BOU. These findings have both scientific and practical implications that need to be addressed.

Interview Findings with the BOU Officers

The department responsible for the management of the learning management system (LMS) at BOU, managed by the BOU Officers, is called the Centre for Technology Enhanced Learning and Teaching (CTELT). The officers highlighted challenges faced in the implementation of e-learning in ODL. One of the challenges they face is infrastructure. Officer 1 stated, "*I'll start with the issue of infrastructure. When we started, and even up to now, we have infrastructure issues. When implementing new technologies, certain infrastructure needs to be in place, including servers and computers used by all parties involved in the learning process, from the university to the end-user, including support.*" Officer 1 further indicated that "*even network connection is an issue we are facing.*" "*Secondly, there are the issues of bandwidth, which is the rate or speed of our internet connection. This is not just a university issue but a country-wide problem. Internet connection is low or nonexistent in some areas, while in urban areas, it is better.*" Another Officer 2 from the same department raised this point again, stating, "*Sometimes the network becomes a problem, especially during exams when everyone wants to submit their work and the network gets congested. This is a recurring challenge we face every year during examination periods.*" The lack of human resources is a challenge faced by the CTELT Officer 2, both in the centre and in other sister departments that utilize their services, such as the University Assessment Office. Officer 1 also mentioned the long-standing issue of staffing problems over the past ten years. As the custodian of the Learning Management System (LMS), their responsibilities include managing students and lecturers online. Since 2014, there have only been two staff members handling these tasks, including the training of new students and staff members at BOU. Officer 1 further emphasized that due to the workload of training staff and students while maintaining the LMS, they are only able to provide basic training. As a result, the LMS features are not fully utilized, and retraining becomes necessary throughout the year.

Officer 1 acknowledged that the quality of students enrolled at BOU poses another challenge for the LMS custodians. When the tutors and lecturers develop online content and make it available on the LMS, the end-users often encounter difficulties. The problem, as Officer 1 observed, lies in the students' background and their lack of technological skills. Despite the induction program, many students remain unfamiliar with the LMS. This issue arises because the students are not

assessed for their basic ICT skills upon entering the program. Officer 1 mentioned that the first semester of year one is particularly problematic in this regard.

Regarding the support and strategies implemented by BOU, the officers provided the following information: Officer 1 stated that technical support and training are offered to all BOU staff (both part-time and full-time) and students. They have a helpdesk accessible through email, which operates 24 hours a day. Any officer who receives a request through email is responsible for providing the initial response. Officer 1 also highlighted the availability of instructional videos on the university website, which facilitate easy login for both staff and students. Officer 2 added that during the examination period, they are always ready to assist lecturers and tutors in uploading exams to the LMS. Additionally, they ensure that the system remains functional and does not experience any crashes or failures during the exams.In terms of strategies, Officer 1 explained that there were existing policies in place at the university. These policies encompass various aspects such as the utilization of the Learning Management System (LMS), security concerns related to the LMS, and the implementation of learning analytics. Officer 2 mentioned that they were currently developing a technology called Sharable Content Object Reference Model (SCORM). This eLearning technology aims to facilitate a more hands-off approach to teaching and learning, particularly during examination periods. The intention behind implementing such technologies is to simplify course navigation for students, enabling them to easily access and engage with their educational materials. Ultimately, these advancements are envisioned to enhance the teaching and learning experience for both students and instructors.

The challenges identified by the CTELT officers at BOU are reflective of broader issues that have been documented in the academic literature on the implementation of e-learning. In many educational contexts, inadequate infrastructure, including servers and computers, and inconsistent internet connectivity are common obstacles. For example, Hadullo et al. (2018) identified low internet bandwidth and inadequate ICT infrastructure as significant barriers to e-learning in Kenya, noting that insufficient financial support and lack of technical training exacerbate these challenges. This mirrors the situation at BOU, where similar infrastructural deficiencies hinder the effectiveness of e-learning. Walsh et al. (2018) highlighted the importance of adequate infrastructure for the successful introduction of e-learning solutions in Liberia, emphasizing the detrimental impact of limited bandwidth and a lack of skilled IT staff. Similarly, Niazi and Bakhtiarvand (2020) pointed out that barriers such as inadequate IT infrastructure and low-cost internet bandwidth hinder the effective delivery of online education in Kenyan public universities. These studies underscore the widespread nature of the infrastructural challenges faced by BOU, suggesting that similar solutions might be applicable.

The issue of bandwidth congestion during exams, as noted by the officers, is a recurrent problem that affects the reliability of online assessments. Eryılmaz and Genis-Gruber (2021) identified limited bandwidth and technological constraints as significant issues that affect online exam systems, leading to disruptions and connectivity problems during critical periods. Muzaffar et al. (2020) also emphasized the challenges posed by low bandwidth on the integrity and security of online exams, highlighting the need for robust technical solutions to ensure smooth operation.

Regarding human resources, the chronic understaffing of the CTELT department

at BOU aligns with findings from the academic literature. Shahzad and Khan (2023) emphasized the importance of continuous professional development and adequate staffing to effectively support e-learning technologies. Widiastuti et al. (2021) highlighted the need for consistent teacher training to maintain the quality and engagement of e-learning programs, noting that adequate staffing levels are crucial for sustaining effective online education.The issue of students' lack of basic ICT skills, as highlighted by Officer 1, was found to be a common challenge in e-learning environments. Steindal et al. (2021) emphasized the importance of understanding students' prior experiences with technology to enhance their engagement with LMS platforms. Assessing students' ICT skills before enrollment, as recommended by Okirigiti (2022) and Oguguo et al. (2020), could help identify areas needing additional support, thereby improving their ability to engage with e-learning effectively. The support systems in place at BOU, including the helpdesk and instructional videos, exemplify best practices identified in the literature. Sugilar (2020) stressed the importance of online tutorials as a core component of student learning support in maintaining the quality of distance education. McGuinness and Fulton (2019) identified critical success factors for online tutorial development, such as clear objectives and active learning strategies, which proved essential for effective student support. Freislich and Bowen-James (2022) also noted that online tutorials significantly supported students, especially those beginning university study, by assisting them in navigating course materials and improving their learning outcomes.

Results from Students' Questionnaires

The impact of students' location on their online learning was a prominent issue highlighted in the questionnaires. A significant number of students reported that their geographical location had a negative effect on their studies. For example, Student 1 mentioned that the unreliable internet connectivity in their area required them to rely on data bundles, which quickly ran out, disrupting their studies. Student 2, who resided and worked in a semi-remote area, had no internet access at all, forcing them to travel up to 200 km to access the internet. Similarly, Students 3 and 4 also faced challenges with poor network connectivity in their respective locations. Student 3 indicated that poor network connectivity hindered their online learning experience, while Student 4 had to travel to the BOU center in their village to access reliable internet.

In terms of ICT skills prior to enrollment at BOU, the surveyed students had varying levels of basic computer skills. Student 1 had skills in Microsoft Word and Excel, while Student 2 had limited knowledge, primarily in Word and creating graphs. Student 4 was familiar with word processing and PowerPoint, although they expressed uncertainty about where to find information online. None of the students had previous experience with online training programs, highlighting a gap in their familiarity with digital learning environments.

The experiences of students in the BOU online program varied. Student 1 found the program beneficial for enhancing their IT skills through activities such as online chatting and using Google for research. Student 3 appreciated the program's efficiency and flexibility, which allowed them to study at their preferred times. Student 4 echoed this sentiment, valuing the flexibility offered by online learning. However, Student 2 had a contrasting experience, citing technical knowledge as a challenge and describing

the BOU online service as not always user-friendly. They often required assistance from colleagues or people they lived with during virtual meetings.

Students' interactions with BOU's online platforms revealed diverse experiences. Student 1 found it difficult to navigate online activities due to fear of making mistakes, frequently relying on assistance from more tech-savvy colleagues and family members. In contrast, Student 2 found the process straightforward due to high-quality network connectivity and reliable services provided by BOU, and they also sought help from the helpdesk when needed. Student 3 faced challenges with poor network connectivity, which affected their ability to submit assignments, but they found the BOU website helpful for providing information and instructions, and appreciated the ability to contact administrators for guidance. Student 4 reported no difficulties with the online platforms, especially when accessing them on campus.

These results underscore the significant impact of location, prior ICT skills, and the quality of online support services on students' online learning experiences at BOU. Addressing these issues could enhance the overall effectiveness and accessibility of BOU's e-learning programs. The challenges encountered by BOU students due to their geographical locations are aligned with the findings of numerous studies conducted on internet connectivity in e-learning environments. Syarifudin (2023) highlighted the significant challenges faced by students in terms of internet connectivity, particularly during synchronous learning sessions on platforms like Zoom. These findings resonate with the experiences of BOU students who grappled with unstable and unreliable internet connections, consequently impacting their ability to engage effectively in online classes. Similarly, Mgongo (2022) indicated that reliable internet connectivity is imperative for the accessibility of online learning systems, thereby presenting significant challenges in areas with limited or nonexistent internet access. This is consistent with the issues raised by BOU students, such as Student 2, who had to travel 200 km to gain access to the internet. Yuwono et al. (2022) also observed that students residing in remote areas with poor signal coverage experienced substantial disruptions in their online learning experiences, mirroring the connectivity problems faced by BOU students in rural locales.

The scarcity of internet access as a primary barrier to effective online learning has been extensively documented. Mavhandu-Mudzusi et al. (2021) discovered that transgender students encountered obstacles in accessing online education due to limited interaction opportunities and an unsupportive home environment, compounded by the absence of internet access. This aligns with the experiences reported by BOU students, who identified unreliable or nonexistent internet connectivity as a significant impediment. Ab Hamid et al. (2022) and Tarigan et al. (2022) similarly emphasized the substantial challenges posed by inadequate internet connectivity and limited broadband data, thereby highlighting the indispensability of robust and reliable internet connections for successful online education.

Another critical issue that needs to be addressed is the disparity in students' prior online training experience. Avgerinou (2023) underscored that faculty members lacking online training may encounter difficulties in designing effective online courses, consequently leading to decreased student engagement. This finding is reflected in the experiences of BOU students, as none of them had received any prior online training, thereby impacting their capacity to adapt to the digital learning environment. Palomino et al. (2023) and Yu et al. (2021) also highlighted the adverse

effects of inadequate online training on student preparedness and motivation, thereby resembling the challenges faced by BOU students in navigating online learning platforms.

The variability in student experiences with online learning at BOU, ranging from positive to challenging, was found to be consistent with findings from other studies. Kaspar et al. (2024) discovered that personal characteristics play a significant role in university students' perceptions, engagement, and performance in online learning, which is evident in the diverse experiences reported by BOU students. Similarly, Krishnan and Joseph (2024) and Li et al. (2021) observed that students' initial perspectives on online learning and their ability to focus and engage with course content varied widely, mirroring the mixed experiences of BOU students.

Flexibility, a major advantage of online learning, was particularly appreciated by some BOU students. Huang and Yu (2019) emphasized that perceived flexibility in online learning positively influences learning outcomes. This sentiment was echoed by Student 3 and Student 4 at BOU, who valued the flexibility and efficiency of the online program. Additionally, Ciptayani et al. (2020) and Majadly et al. (2024) emphasized the benefits of flexibility, convenience, and self-paced learning in enhancing the online learning experience.

Finally, the literature underscores the importance of students' self-efficacy and comfort with technology in successful online learning experiences. Lin (2024) and Alghamdi and Ali (2021) discovered that students' belief in the effectiveness of technology and their motivation and acceptance of online learning significantly impact their engagement and success. This is reflected in the varied levels of confidence and competence among BOU students in using online platforms, with some needing considerable assistance while others navigating the systems more independently.

Challenges and Strategic Improvements in ICT Utilization for ODL at Botswana Open University

The study investigated the utilization of Information and Communication Technology (ICT) in the Open Distance Learning (ODL) mode currently offered by the Botswana Open University (BOU). The findings revealed significant challenges encountered by lecturers, students, and Learning Management System (LMS) personnel in adapting to the ODL mode. As a result, students face difficulties in their studies, leading to some dropping out due to the digital divide experienced in Botswana. Leal Filho (2022) argue that the implementation of new technologies requires the necessary infrastructure. However, the Botswana Open University shows evident gaps in this regard.

Regarding the infrastructure needs of students, Garad et al. (2021) asserts that an effective e-learning infrastructure should include internet accessibility, electronic devices, an efficient e-learning system, and communication applications. The responses from the student questionnaires indicate dissatisfaction in these areas, suggesting significant issues with the university's human resources. Ireri et al. (2019) emphasize the importance of maintaining a balance between physical and human resources.

According to Mathew and Chung (2021), the ODL mode is designed for students who do not fit into the traditional university system or who are too busy to attend

regular classes. This mode of learning offers flexibility, which is crucial for many students juggling jobs and other responsibilities within their households and communities. However, a lack of experience in ICT can hinder learning, especially for students who are new to computers and rely on these skills to achieve their academic goals. The ICT courses taken by the students do not appear to adequately prepare them for the ODL mode, suggesting a shallow understanding of the necessary ICT skills (Bećirović, 2023).

Finally, Garad et al. (2021) establishes a significant relationship between attrition rates and a student's learning approach and financial situation. Students invest their resources and time into their education, and financial constraints can have a negative impact on this investment. Overall, this study reveals the challenges faced in implementing ICT in the ODL mode at the Botswana Open University, particularly in terms of infrastructure, human resources, students' ICT skills, and financial constraints.

The challenges identified in the current study reflect broader systemic issues that need to be addressed in order to optimize the use of ICT for ODL. By implementing strategic improvements in infrastructure, internet connectivity, human resources, and ICT training, BOU could enhance the effectiveness and accessibility of its e-learning programs. These measures would not only improve the quality of education but also ensure that all students, regardless of their technological proficiency, fully benefit from the opportunities provided by digital education.

CONCLUSION

The study revealed that students enrolled at BOU encounter difficulties in adapting to the online system due to insufficient support. This challenge is exacerbated by a lack of data and poor connectivity in the students' respective regions, which are often characterized by poverty and limited bandwidth. Furthermore, lecturers expressed the need for additional support in assisting students with online training for Open and Distance learning. Tutors also noted that students do not actively seek help when needed. Regarding lecturing, the findings indicated that lecturers themselves face obstacles related to infrastructure, such as inadequate working devices. Consequently, students are unable to engage with the BOU LMS due to the absence of necessary equipment. BOU officers, who are responsible for managing the LMS, expressed frustration over the infrastructure issues that hinder both teaching and learning. They emphasized that while support is provided to BOU students, it becomes ineffective when infrastructure is lacking. In the e-questionnaires, three students reported having minimal knowledge of digital tools, with only proficiency in MS Word. This demonstrates that without proper infrastructure and connectivity, their skills cannot progress beyond their current level of proficiency.

RECOMMENDATION

The study recommended that BOU should ensure the availability of ICT tools for students and address connectivity and bandwidth issues by providing reliable data. To prepare students well in advance for their studies, it is necessary to provide comprehensive training on both the soft and hard aspects of LMS systems before the start of the academic year. In order to offer and implement an online program, it is crucial to assess the requirements, determine the number of students needed, and

design the curriculum accordingly. The establishment of online learning infrastructure, including addressing organizational issues, planning, structure, system components, and various factors such as decision-making, human resources, and training, is essential. This infrastructure should be adaptable to accommodate curriculum trends, evolving technologies, and student needs.

The study had certain limitations as it was conducted during the COVID-19 outbreak. Participants were reluctant to participate and faced challenges in providing the required data due to the same issues they encountered with devices and connectivity. Despite two lecturers initially expressing their intention to participate, one eventually withdrew. It would be beneficial to further explore the study, with increased participation from lecturers and the inclusion of focus group discussions with students to obtain substantial data for conclusive findings.

Author Contributions

In this article, it is noteworthy that Tebogo Magetse developed the theoretical framework that served as the foundation for the study and conducted further analysis of the data, which was subsequently analyzed collaboratively by Sammy Khoza and Vasidevan Naiker. The manuscript was authored by Tebogo Magetse.

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Conflict of Interests

The researchers declare no conflict of interests.

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