

Exploring Educational Technologies Used by Mthwakazi University Rural Satellite Campuses to Implement Distance Teacher Education Programmes

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Abstract: *The 21st century has seen a massive advent of technologies, arguably more than any other time in the history of humankind. Education systems worldwide have embraced emerging technologies to expedite their teaching and learning systems to stay abreast and relevant to the time. The study explored the types of educational technologies used by Mthwakazi University (MU) rural satellite campuses to implement distance teacher education programmes. An interpretive research paradigm was employed using a qualitative research approach and a case study design. Interviews were used to gather data from six purposively selected lecturers at MU rural satellite campuses. Data was analysed narratively under emerging themes. Findings concluded that lecturers at MU rural satellite campuses used limited educational technologies,*

mostly traditional paper and text, due to electricity and internet challenges and lecturers' lack of ICT skills and knowledge. The study recommended that MU rural satellite campuses should use flash drives, Compact Disks (CDs) and Digital Versatile/Video Disks (DVDs) to download Encarta, encyclopedia and updated information and upload it into computers for access by students, invest in alternative internet sources like dongles and wireless mobile networks like ECONET and MTN.

Keywords: Educational technology, Mthwakazi university, rurality, satellite campuses, teacher education.

1. Introduction

The study is embedded on a constructivist teaching and learning approach, which allows students to construct knowledge with the help of peers, teachers, new experiences and interaction with their environment (Smirnova, 2008). Construction of knowledge is possible if students are involved in their own learning in a stimulating learning environment. Grinager (2006) argues that students can become more involved in their learning if proper educational technology is used in class. Shelly, Gunter and Gunter (2010) assert that research has proved that using technology in teaching and learning encourages students to become problem solvers and creative thinkers. In constructivism, experiences that foster creative thinking enables students to construct and reconstruct knowledge for themselves.

Students enrolled in Mthwakazi University (MU) distance teacher education programmes came from Mthwakazi's four provinces, Bulawayo, Matabeleland North, Nkabazwe and Matabeleland South. Out of these provinces, only Bulawayo is a Metropolitan province with modern technological infrastructure. Other provinces comprise small towns and growth points, while vast territories are rural areas with electricity and internet problems. Burns (2011) reveals that though distance learning is print and audio based, in the 21st century it is dominated by mobile technologies and web-based models driven by the internet. This is informed by the argument of Sadeghi (2020), who noted that students enrolled in distance learning programmes need to invest in computers and stable internet connections. Dependence on the internet is a huge drawback to distance learning because its unavailability or malfunctioning hinders learning. Clarin and Baluyos' (2022) study revealed that poor internet connection is the main challenge in conducting online classes. In addition, lack of or poor internet connectivity results in poor student attendance and delays in submitting students' assignments (Clarin & Baluyos, 2022). This study explored the

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technologies MU rural satellite campuses use in the absence of electricity or/and internet that drive distance learning in the 21st century. This is tailored towards context-based strategies that MU campuses could employ to effectively and broadly use educational technologies to implement distance teacher education programmes.

1.2 Research questions

Based on the above objective, the study answered the following research questions:

- How do MU lecturers understand educational technology?
- What types of educational technologies are used by MU rural campuses to implement distance teacher education programmes?
- What are the challenges and benefits associated with using educational technologies at MU rural campuses?
- What are the possible strategies that can be used to alleviate the challenges?

2. Conceptualisation and review of related literature

Concepts and literature were reviewed to gain a wider understanding of educational technologies used in educational programmes. This covers themes such as teacher education and distance learning, educational technology, education technology tools and packages, benefits and challenges of using educational technology.

2.1 Teacher education and distance learning

Samsujjaman (2017) posits that teacher education refers to the policies and procedures designed to equip prospective teachers with the knowledge, attitudes, behaviours and skills required to effectively perform their tasks in the classroom, school and community. Teacher education is usually divided into pre-service programmes for the initial training of prospective teachers and continuous professional development for in-servicing practising teachers. Sadeghi (2019) argues that distance education originated in the mid-18th century to compensate for the insufficiency of traditional education. It developed rapidly from correspondence courses and tapes to the present-day application of computer-based multimedia. Buselic (2012) views distance learning as focusing on teaching methods, modern technologies, and tools that deliver teaching to students who are not physically present in a traditional educational setting such as a classroom.

2.2 Educational technology

Research has proven that there are many definitions of educational technology. Some use educational technology synonymously with audio-visual equipment, educational media, digital technology, teaching and learning technologies (Chris, 2010). This illustrates that educational technology is broad. Bates (2014) argues that the first stage of educational technology included the use of tools such as charts, maps, symbols, models, steel and concrete. Smirnova (2008) views educational technology as the advancement in the methods and tools used to solve problems and achieve educational goals. Technology in the classroom can include all kinds of tools ranging from low-tech pencil, paper, and chalkboards, to presentation software or high-tech tablets, online collaborations and conferencing tools. New technology allows the setting of virtual classrooms. The use depends on the availability and objectives of the delivered lesson (Smirnova 2008). In brief, educational technology refers to an area of technology devoted to developing and applying hardware, software, and processes intended to promote education. It facilitates teaching and learning and improves performance by creating, using and managing appropriate technological resources and processes (Chris, 2010).

Grinager (2006) notes that educational technology includes several types of media that deliver images, text, audio, animation, and streaming video, and also includes technology applications and processes such as audio or video tape, satellite television (TV), Compact Disc Read Only Memory (CD)-ROM and computer-based learning as well as the local intranet, extranet and web-based learning. Shelly et al. (2010) view text, audio, video and animation as part of essential elements of educational technology.

Burns (2011) reveals educational technology as the application of technology to enhance teaching, learning and assessment. It includes computer-based learning and multimedia material, and networks and communication systems to support learning. In the argument of Burns (2011) and Rist and Hewer (1999), learning technology applications include computer-assisted instruction, computer-aided learning, and computer-based training. Based on the above discussions, it can be argued that educational technology is any kind of modern or traditional technology used to improve teaching and learning.

2.3 Educational technology tools and packages

Shelly et al. (2010) say that for technology to work effectively in education, proper packages and hardware should be available to expedite the implementation of education programmes in institutions. Grinager (2006) views telephones and televisions as appropriate educational technology hardware, especially in a distance learning environment. Telephones, especially cell phones, facilitate communication between students and lecturers within the student community. Grinager (2006) and Rist and Hewer (1999) identify the following educational technology packages: drill and practice, instructional software and digital/online content, tutorials, information retrieval system, and communication tools. Drill and practice offer structured reinforcement of previously learnt concepts through questions and model answers. Instructional software and digital/online content allow for anywhere anytime personalisation of learning to meet student's learning needs and pace (Grinager, 2006).

Rist & Hewer (1999) argue that tutorials are used to teach new concepts. Their software includes worked tasks and gives students a choice to assess their understanding of concepts with questions, answers and feedback. Rist and Hewer (1999) believe that an information retrieval system stores information in a way that allows students to search and browse for information as required. They include hypermedia, hypertext and reference system, online database, and other structured information systems such as encyclopaedias and dictionaries. Burns (2011) views modern communication tools and platforms as allowing students to share information with their colleagues and lecturers without any time or distance constraints. Through platforms like emails and WhatsApp, students can send their written work to their lecturers, and lecturers can give them feedback through the same platforms. Information and presentations shared through video conferencing, Zoom, or Microsoft Teams can be recorded for future reference.

2.4 Challenges of using educational technology

Shelly et al. (2010) assert that "in all areas of the curriculum, teachers must teach an information-based inquiry process to meet the demands of the information age. This is a challenge for the world's most important profession. Meeting this challenge will be impossible unless educators are willing to join the revolution and embrace the new technology tools available". Many challenges have hampered technology integration in several educational institutions. Shelly et al. argue that challenges that hamper the use of educational technologies in education institutions emanate from insufficient hardware and software and lack of educator training and experience in using instructional technology. Other challenges include a lack of high-speed school networks, budget constraints and resistance from many educators (Shelly et al., 2010). In addition, Wright (2014) says that lack of electrical power, internet connectivity, professional development, and sustainability inhibit the use of educational media.

About 70% of people in sub-Saharan Africa do not have easy access to electrical power (Wright, 2014). Technological devices need power. Until power is available and affordable in most African countries, then educational technology uptake will be slow. Wright (2014) continues to argue that most developing countries can still not connect the internet to citizens' homes at an affordable cost. In most African countries, the bandwidth is too narrow and incapable of carrying compressed videos to give citizens access to educational materials in a video format. It can be argued that increased internet bandwidth is unlikely to occur without government commitment. Wright believes that as time goes on, perhaps access to the internet will be considered a basic human right in most countries' legislations worldwide

Shelly et al. (2010) and Wright (2014) view the use of educational technologies as hindered by a lack of educator training on its appropriate use. Wright further notes that internet bandwidth, electrical power and devices may be available, but educators need to know how to use these effectively. Educators brought up in a traditional way with limited access to technology are likely to have challenges in using technology to deliver instruction. In addition, Wright (2014) views the sustainability of educational technology programmes as one of the major challenges that sub-Saharan countries face. Shelly et al. (2010) argue that to overcome huge challenges facing educational technology, institutions should have proper planning, effective leadership, and a commitment to enhancing instructional delivery using technology. They should also adequately in-service educators and encourage them to use technologies to deliver education programmes. Educators should be exposed to hands-on experiences using technology like preparing online lessons and assessments (Wright, 2014). It should be noted that pre-service training on educational technologies should be followed by continuous support from mentors when educators are deployed to the field.

2.5 Benefits of using educational technology

Education technology adds productivity to teaching and learning the same way the tractor did to farming, and it has become a necessary future productivity tool. Grinager (2006) asserts that technology in education provides students with technology literacy, information literacy, capacity for lifelong learning and other skills necessary for the 21st-century workplace. When used properly, it results in high student achievement. It also promotes proper behaviour, attendance and engagement. It further improves opportunities for education, professional development, and communication among students, lecturers, parents and administrators. Education institutions should equip themselves with adequate technological hardware, software and technical support to fully benefit from the opportunities offered by educational technologies.

Shelly et al. (2010) argue that educational technology can potentially increase students' attendance by capturing their attention and interests. Educators can integrate technologies like computers, CDs, DVDs, digital media applications and devices, e-books and electronic references, and the web into almost any classroom situation. According to Criollo-C, Guerrero-Arias, Jaramillo-Alcázar and Luján-Mora (2021), mobile devices allow students to have educational collaborations at a distance and to move and access content and information from anywhere at any time. This means that mobile technology such as laptops and cell phones offer huge benefits to teaching and learning by allowing people to stay connected while on the move. Since technology is cloud-based, mobile devices like cell phones and laptops are capable of accessing internet data anywhere in the world.

Shelly et al. (2010) view the use of e-books as beneficial in education since they are economical and easy to carry than heavy textbooks. E-books can be downloaded and stored on computers and mobile devices. Unlike hard copies, e-books can be instantly shared by many students and lecturers based in different locations. From libraries, e-books can be accessed by students in different locations using their computers and cell phones in the comfort of their residential areas without needing to travel long distances to libraries and bookshops.

Smirnova (2008) says that educational media promotes online collaborations, allowing students to work in groups through virtual platforms. This promotes a constructivist teaching and learning theory. Lev Vygotsky, a Russian social constructivist, argues that in a constructivist classroom, learners are enabled to construct knowledge with the help of their peers, teachers and interaction with their environment. Educational media allows teachers to create a stimulating learning environment that enables learners to construct knowledge independently with minimal help from teachers. Lecturers can use videos, diagrams, photographs, and audio files to support text and verbal instructional content. Rastogi (2013) argues that learners become motivated and learn better when they see images of objects they are being taught. This means that learners understand concepts better when they utilise their sense of sight.

Educational media enables lecturers to organise resources needed by learners in the digital space, for example, syllabuses, lecture notes and assignments. It also allows lecturers to directly record lectures on their computers and upload them for future reference (Smirnova, 2008). Recorded

lectures support students who did not attend the lecture due to distance, time and financial constraints, or work commitments. They can also help students during their personal study at their own pace and convenience.

Shelly et al. (2010) say that interactive technologies like software applications, digital media tools, reference guides, animation, simulations, and the web improve instruction by allowing students to engage and review concepts, practice skills and do in-depth research. When these are properly used, they improve the instructional delivery process. Digital media tools allow students to have learning experiences where concepts are brought to life through a variety of representations, video, pictures, simulations, audio, and animations.

Shelly et al. (2010) view educational technology as of great value in teaching and learning because it allows educators to promote participatory learning and create authentic learning experiences by enabling students to conduct web-based research and explore concepts in a digital media presentation. Educational technology also provides anchored instruction. Students can watch a web-based video of volcanic eruptions or the hydroelectricity generation process. Computers, digital media, and especially the web create numerous opportunities for discovery learning. For example, due to financial challenges, many students may be unable to visit the magnificent museum in Bulawayo, the majestic Matopos Hills for a geography expedition, the amazing Zambezi gorges, and the magnificent Victoria Falls for educational tourism. Despite financial setbacks, the web, recorded videos and downloaded YouTube videos can take students to a world beyond their own, filled with infinite amounts of information, visually, audibly and pictorially. Through the use of this kind of discovery learning, classroom walls, poverty and distance can be broken by educational technology. Educational technology bridges disparity gaps and gives equality in education to all students despite their socio-economic backgrounds, geographic locations, learning styles, and abilities. Educational technologies in class enable all students to access the same information despite their diverse backgrounds. Educational technologies in the 21st century allow students to experience educational opportunities previously unavailable. Shelly et al. (2010) assert that the internet has made it possible for students to publish their work, meet students who share similar interests with them across the world, and participate in shared learning experiences worldwide.

3. Research Methodology

This study adopted an interpretive research paradigm which allowed the researcher to understand the phenomenon from participants' perspectives and conveyed a well-rounded view from the inside (Tichapondwa, 2013). The interpretive paradigm made it possible to use a qualitative research approach. Creswell (2014) assert that a qualitative approach enables the researcher to gain a first-hand and holistic understanding of the phenomena of interest. This approach enabled the researcher to collect first-hand information directly from participants in the field. The case study design was used and made it possible to study selected campuses in detail (McMillan & Schumacher, 2014). Interviews were used to gather the study's data. Tichapondwa (2013) posits that interviews enable the researcher to obtain more data from participants with greater detail and clarity.

The population of the study comprised MU rural satellite campuses lecturers. Since it was not feasible for all lecturers to take part in the study, purposive sampling was used. Creswell (2015) posits that sampling is a way of choosing the study's participants. In qualitative studies non-probability sampling methods such as purposive sampling are used. Six Mthwakazi University lecturers in rural satellite campuses were purposively sampled to participate in the study because they had first-hand experience and information needed for the study. Data were presented and analysed verbatim and narratively. Data were grouped according to the themes that emerged during the presentation and analysis process. McMillan and Schumacher (2014) assert that in qualitative research, data analysis is inductive and establishes patterns of themes. The final report of presentations includes the voices of participants.

The study adhered to ethical guidelines. The researcher was given permission to conduct the study by MU management. McMillan and Schumacher (2014) argue that a credible research design

should adhere to research ethics. All participants signed informed consent forms containing ethical guidelines. Code names were used to protect participants' identities. The researcher told participants they were allowed to withdraw from the study whenever they want to. McMillan and Schumacher (2014) emphasise the importance of informed consent, confidentiality, anonymity and privacy. These ethical guidelines were adhered to protect participants' rights, privacy and dignity.

4. Presentation of findings

Interviews were used to gather data from six purposively sampled lecturers in four MU rural satellite campuses. During interviews, it emerged that MU satellite campuses served students who came from remote rural communities. Some satellite campuses were located in rented premises in small towns where there was electricity, while others were rented in primary and secondary schools in remote rural areas without electricity. All satellite campuses had no internet connection. Some of them had desktop computers while others did not. Participants were coded as Participant 1, Participant 2, Participant 3, Participant 4, Participant 5 and Participant 6.

The following themes emerged from data analysis and interpretation: educational technology, types of educational technologies used at Mthwakazi University satellite campuses, benefits of using educational technology, challenges of using educational technology, and solutions to the challenges encountered in using educational technology.

4.1 Educational technology

Participants managed to explain the term educational technology. Participant 1 said:

Educational technology is the use of information and communication technology (ICT) in teaching and learning. It involves the use of any electronic gadgets like cell phones, television, radios, and connected computers to get information that can enhance teaching and learning.

Participant 2 asserted that:

Educational technology is the use of appropriate gadgets to facilitate teaching and learning. These technologies are basically audio and visual aids that are utilised in the teaching and learning process.

Participant 3 argued that educational technology entails a wider array of technologies like ICTs and print technologies that are used for learning purposes.

Participant 4 said:

Educational technologies are any technical, technological devices, resources or delivery tools used by education institutions to train teachers, for example, computers, Powerpoint presentations and overhead projectors to make teaching and learning easier to present, understand and manage.

Participants noted that educational technology comprises print and digital media and gadgets used to facilitate teaching and learning. Smirnova (2008) views educational technology as ranging from low-tech devices such as paper and chalkboards to high-tech computers and presentation software used to facilitate teaching and learning.

4.2 Types of educational technologies used at Mthwakazi University satellite campuses

Mthwakazi University satellite campuses served students who resided in rural communities of Mthwakazi. Participants said that they used educational technologies that were available and suitable for their environments. Participant 3 said:

Lecturers rely mostly on print technology because the campus has no resources to support the use of digital technology. Some lecturers use mobile technology like cell phones to send students files, solutions and clarifications. Cell phones do not rely much on electricity; they can be charged using mobile chargers.

The same notion was held by Participant 1, who said that cell phones could compensate for the non-availability of the internet since the internet could be accessed from ECONET and MTN wireless mobile network providers through ordinary cell phones and smartphones.

Participant 4 and participant 6 noted that on their campuses, they used photocopiers to produce print material to increase learning material sources for students. The use of photocopied material is supported by Grinager (2006), who encourages educators to use text, among other forms of educational media.

Participant 2 said:

I try by all means to be resourceful and utilise any form of educational technology at my disposal that can motivate students. At times, I use a board covered with a special type of cloth where any educational objects in the form of shapes, musical notes, templates, or puppets depending on the lesson being taught, are stuck, for example, when doing role play, drama and illustrations.

Assertions by the participant demonstrated that it is essential for educators to be resourceful and utilise any relevant type of educational media that is available in their environment. Bates (2014) encourages the use of educational technologies such as models, symbols, maps and charts. Participant 2 proceeded to assert that, though his campus did not have internet access, there was electricity which enabled him to use radio educational programmes live from the airwaves. Shelly et al. (2010) support the use of gadgets with audio in class during lesson delivery.

4.3 Challenges of using educational technology

Participants said that in their satellite campuses, they faced challenges when it came to using educational technologies to deliver instruction. They faced almost similar challenges that centred around a lack of adequate ICT resources due to budget constraints and cost implications. Shelly et al. (2010) argue that education institution administrators and coordinators saw the challenges associated with the use of educational technologies as emanating from insufficient software and hardware.

In response to the question: What challenges are Mthwakazi University satellite campuses encountering in using educational technologies? Participant 2 said:

The paucity of resources on campus makes it impossible to get internet connections. This, has resulted in over-reliance on old and outdated sources of information that latest discoveries have overtaken. Lack of internet connectivity confines learning to the classroom and discourages discovery and accelerated learning.

Wright (2014) and Shelly et al. (2010) argue that lack of internet connectivity is a major challenge that limits most institutions from using technology to support teaching and learning. Participants 3, 1 and 6 argued that the lack of electricity on campuses restricted the use of digital technologies and resulted in over-reliance on print materials. Participant 3 noted that it was difficult for students to share information in hard copy formats, but students could instantly share soft copies in different locations as long as they were connected to the internet and had relevant gadgets and software to download such information. Shelly et al. (2010) and Wright (2014) note that most education institutions have no access to electricity and the internet. The lack of these strategic resources makes it impossible for institutions to use contemporary educational technologies in the digital space.

Participant 4 believed that technological challenges on her campus were further aggravated by the lack of ICT skills by most lecturers. She said:

... those lecturers who do not have ICT skills resort to traditional methods of instructional delivery. Instead of trying available options of educational technologies, they go for simple methods like paper and traditional chalkboards.

Wright (2014) argues that educators who are not oriented on educational technology are the ones who resort to traditional teaching methods such as chalkboards and print material. Participant 1 expressed concern that they could not update their computers online due to the lack of internet in her campus. He said:

Computers need to be updated periodically online with antivirus and other software. When there is no internet connection, such updates are impossible, leaving computers vulnerable to viral attacks.

Computers should be protected from viral attacks to safeguard information (Shelly et al., 2010). Participant 1 also said:

Since the campus does not have internet, students and lecturers end up using their cell phones to access the internet from wireless mobile network providers. Downloading big documents like PDF files using a cell phone is expensive and difficult. Even if one downloads the document, words will be too small and strenuous to the eyes, especially for most students who do not have smartphones that can enlarge words. Smartphones are too expensive for most students who come from economically disadvantaged backgrounds.

At the time of the interview, this participant was struggling to download an examination cover page file sent to him by the main campus. He pointed out that incident as an example of challenges that students and lecturers encountered when accessing the internet through their cell phones.

He continued to say:

In most cases, the cell phone network is not reliable, and at times it is too weak for downloading information. Some students stay in remote rural areas where there is no network access at all.

Shelly et al. (2010) view the lack of internet connectivity as one of the setbacks that hinder the use of educational technologies in some institutions of learning.

4.4 Benefits of using educational technology

Rastogi (2013, p. 131) argues that popular sayings on audio-video technology are: 'I hear, I forget, I see, I remember, I do, I understand'. Participants concurred that one of the leading educational technology's advantages is that it enhances students' understanding of concepts by appealing to their multiple senses, such as the sense of touch, hearing and sight. Participant 2 argued that the use of educational media enables learners to use many senses instead of always relying on the sense of hearing. In congruency with this assertion, Participants 3 and 5 noted that educational technologies like graphics, text, electronic media, video, and audio are suitable for all unique needs of learners. For instance, some students are good *visual learners*; some are good *auditory learners*, while some are good *tactile learners*. She said that through various educational technologies, *auditory learners* who learn better through hearing would benefit most from audio and video clips. *Visual learners* would benefit from visuals and videos, while *tactile learners* who learn better through touching would benefit more from the use of desktops, laptops and smartphones that can be manipulated. She argued that educational technology accommodates learners with diverse and unique learning needs and styles.

Participants concurred that, when used properly, educational technologies motivate learners and improve their understanding of concepts because it appeals to their five senses during instructional delivery. Participant 3 said that the generation of learners in tertiary institutions was born during the era of technology; as a result, they were motivated to learn through the use of technology. This was supported by participant 5, who asserted that some learners from affluent families were already using cell phones and computers in their homes and using such gadgets was motivating them. Rastogi (2013) views technology as a motivating factor in the teaching and learning process. No learning can take place without motivation. Educators can motivate learners by using educational technologies that appeal to their multiple senses.

Participant 5 said:

Students who already have cell phones and computers can act as role models and encourage others to motivate their parents to buy them these gadgets. Using technological gadgets to learn enables learners to use their psychomotor skills through touching and manipulating hardware and software.

Participant 2 said:

Through the use of educational technology, the five senses are at play in the receipt, processing, storage and retrieval of information. Also, as learners manipulate and handle technological gadgets according to stipulated instructions and procedures, they develop the right values and attitudes in life.

He argued that learning is not only information based but it also inculcates important skills and values in learners. The South African Curriculum and Policy Statement Documents (CAPS) of 2012 emphasises that lesson outcomes should also cater to skills and values that should be inculcated into learners during instructional delivery.

Participant 1 asserted that educational technology promotes the use of the child-centred approach to teaching and learning. As a result, it is fascinating and promotes learner motivation, as it removes the monotony of the instructor always taking centre stage during the teaching and learning process. The participant proceeded to say:

The current approach to teaching and learning calls for a shift from a teacher-centered positivist approach to a child-centred constructivist approach. In constructivism, knowledge is constructed by learners with the guidance of the teacher, and learners are also supposed to get information on their own. Educational technology enables learners to be independent researchers.

Piaget and Vygotsky view the constructivist teaching and learning theory as contributing to effective teaching and learning through its learner-centredness that enables learners to construct information on their own as long as the environment is enabling. Educational technology has made independent learning possible by removing boundaries of learning inside the rigid four-walled classrooms to learning anywhere, anytime. Even if someone is herding cattle, he can access information from the lecturer, internet sources, colleagues, or other students worldwide, as long as they are connected to the internet and have appropriate technological gadgets and applications. Chris (2010) argues that educational technology improves education delivery through its systematic and iterative instructional design process that improves performance in education.

Participant 1 went on to say:

Through educational technologies, learning is not restricted to venues and time, as students can learn anywhere at any time convenient to them. Students can also receive feedback from their lecturers anytime, anywhere through, for example, WhatsApp, SMSs and emails.

The participant's assertions are supported by Criollo-C et al. (2021), who argue that technology has promoted flexible and self-directed learning on the part of the learner. Participant 2 noted that educational technologies give students an opportunity to learn at their own pace at any time, at any place, without the need to always depend on their lecturers. He said:

Giving learners enough support and digital resources that allow them to learn on their own and become independent learners is called accelerated or discovery learning. Within an inclusive education setup, educational technologies enable lecturers to provide meaningful learning to both learners with or without special needs because educational technologies are inclusive they cater for the diverse needs of all learners.

Shelly et al. (2010) view educational technology as a vital factor that embraces all students and captures their attention and interests resulting in improved motivation and attendance.

Strategies to deal with challenges encountered in the use of educational technologies

In response to the question: How can the challenges encountered in the use of educational technology be dealt with? Participants suggested a range of mitigation strategies. Participant 1 said:

Satellite campuses that do not have electricity can use solar panels and generators to provide power for their computers, radios and televisions. Lecturers in satellite campuses that have electricity but no internet connectivity can go to where there is internet or to the main campus and download updated Encarta and current encyclopaedia and other information. Then they can upload those downloads to desktop computers on satellite campuses for access by students. The encyclopaedia contains information for all subjects, and it is like a mini internet if utilised well.

Strategies suggested by Participant 1 are supported by Criollo-C et al. (2021), who see technological devices as tools for creating and deploying content and improving communication between students and lecturers. Students and lecturers could share information by using technological gadgets like computers and cell phones. Downloading updated information, encyclopaedia and Encarta into computers and savers at Mthwakazi University satellite campuses could make valuable information available to students even if those campuses lacked internet connection.

Participant 2 said that to expand educational technologies, satellite campuses that did not have electricity supply could use cell batteries for their radios and solar panels to power their computers and televisions. He argued that doing that would help those campuses to access educational programmes on radio and TV. Even if those areas had no radio and television signals, lecturers could use pre-recorded radio and TV educational programmes such as lessons, educational dialogue and debates aired or screened by radio and TV stations such as South African Broadcasting Corporation (SABC). Grinager (2006) views televisions as appropriate educational technology, especially in a distance learning environment.

Regarding the non-availability of the television signal, participant 1 argued that:

In situations where there are challenges with radio and television signals, campuses can invest in satellite technology and decoders to access international stations on Digital Satellite Television (DStv) engrossed with rich educational programmes delivered by experts.

Participant 2 said that satellite campuses that did not have access to the internet, could invest in dongle technology. He said that dongle technology could connect them to the internet enabling them to use online educational technologies, e-libraries, and digital links that could connect and enable them to share information with other education institutions globally. Smirnova (2008) posits that educational technology promotes online collaborations and information sharing.

Participants 1 and 2 shared a similar notion: if satellite campuses connected themselves to the internet through dongles, their students and lecturers could enjoy using Skype, Zoom, Microsoft Teams platforms to facilitate and improve administrative and instructional communication and engagements. They could also access videos from YouTube and credible information from the Google Scholar site. Participant 1 said that through Microsoft Teams and Zoom students could discuss school matters among themselves or join formal virtual online lessons delivered by their lecturers from the main campus. Shelly et al. (2010) argue that on YouTube, students and lecturers can access audio and visual learning material delivered by experts worldwide.

Participant 3 argued that MU campuses should solve the problem of electricity and the internet through engaging relevant government departments and stakeholders, encouraging them to accelerate rural electrification programme, and equipping rural education institutions with computers and internet connections. Participant 3 went on to say that:

Before the government supplies electricity and internet, campuses can make use of resources that can be saved on desktop computers, like saving updated information on flash drives, DVDs, CDs and then uploading this information to the desktop computers for utilisation by learners.

Participant 6 said:

Even if there is no internet, the institution can buy external hard drives in bulk from countries like China, where they are affordable. Then study material can be downloaded into these external storage hard drives and given to students during orientation sessions before the beginning of semesters.

Participant 1 said:

To deal with shortages of technological resources, satellite campuses can partner with parents, donors and stakeholders to mobilise resources like computers, electricity, solar energy, dongles, internet, laptops, smartphones and iPads.

Participant 1 also suggested that campuses should subscribe to wireless network providers like MTN and ECONET and open accounts where students and lecturers could join and access education information using their cell phones.

Participant 4 argued that campuses needed to sensitise parents about the need to buy their children laptops and smartphones. She further argued that Mthwakazi University should include educational technology in the teacher training programme curriculum and in-service lecturers and capacitate them with modern educational technology knowledge and skills. Shelly et al. (2010) view the lack of educator training and experience in using technology as some of the major challenges in institutions. Participant 4, therefore, had a vital point that Mthwakazi University lecturers needed to be trained on the use of educational technologies.

The study's findings revealed that lack of internet and electricity limited MU rural campuses' use of educational technologies. Sadeghi (2020) argues that distance education programmes are driven by stable internet connectivity. After understanding encountered challenges and limitations, the study generated context-based strategies that MU campuses could utilise to effectively use educational technologies despite the non-availability of electricity and internet connectivity.

5. Conclusion and Recommendations

From existing literature and the study's findings, it was concluded that Mthwakazi University satellite campuses used a restricted range of educational technologies due to a lack of electricity on some campuses and a lack of internet connection in all the four campuses that participated in the study. The lack of these essential resources and lack of ICT skills by some lecturers made most lecturers resort to traditional print material. It was also concluded that those campuses where students and lecturers tried to use cell phone technology were restricted by costs, network problems and failure to download big files and documents. Another conclusion was that mitigation strategies suggested by participants were vital and had the potential of prospering Mthwakazi University in using diversified educational technologies once implemented properly and well supported. Some of the strategies include the use of generators and solar panels to power computers, televisions and radios, investing in dongle, satellite, and decoder technologies to access the internet and educational programmes from televisions respectively. Participants also suggested using a downloaded Encarta, encyclopaedia and making use of flash drives, DVDs and CDs to download up-to-date information from the internet and upload it to computers, radios and televisions. Based on findings, it was further concluded that MU rural satellite campuses could invest in and utilise a wide range of educational technologies regardless of challenges posed by lack of electricity and internet connectivity.

Based on the study's findings and literature, it was recommended that MU rural satellite campuses should:

- Invest in solar energy and generators to power their computers, radios and televisions.

- Embrace radio and television educational programmes in the delivery of instruction.
- Invest in alternative internet sources like dongles and wireless mobile network service providers like ECONET and MTN.
- Encourage parents to buy their children smartphones and laptops for use in their school work.
- Download the Encarta and current encyclopaedia and upload them into their campus computers for access by students.
- Train lecturers and capacitate them with ICT knowledge and skills.
- Integrate educational technology into their teacher training programmes curriculum.

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