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Student Perceptions of Covid-19 Induced E-Learning in State Universities In Zimbabwe

Ashton Mudzingiri 

University of the Free State, Phuthaditjhaba, South Africa

Sanderson Abel 

University of the Free State, Phuthaditjhaba, South Africa

Tafirenyika Mafugu* 

University of the Free State, Phuthaditjhaba, South Africa

Abstract. During the height of the Covid-19 pandemic, the prohibition of gatherings threatened the education process. Learning institutions had to close. Instead, institutions had to opt for virtual teaching methods. This study investigates the implications of coronavirus-induced e-Learning on university education. As such, the main objective of the study was to determine the perceptions of the students about Covid-19-induced e-Learning. A survey design with 357 university students underpins the study. The students felt that the e-Learning platforms had interaction limitations and required more resources, making it more expensive. They also perceived face-to-face classes to be better than online classes, negatively affecting their performance. Students experienced challenges with e-Learning platforms, such as lack of electricity, lack of resources and information technology skills, and an uncondusive home environment. The study recommends that universities adopt a blended approach, provide students with relevant devices and data, and provide prerecorded lecture audio. The study also recommends that the e-Learning platforms be made more user-friendly. Institutions should also provide adequate technical support to lecturers and students to improve the effectiveness of online teaching and learning effectiveness.

Keywords: online learning; COVID-19; lockdown; undergraduates; developing countries; challenges

1. Introduction

University education in Zimbabwe had previously been mainly via face-to-face learning. Since Covid-19 was declared a global pandemic, it brought with it changes in the mode of operation in terms of learning and teaching in

* Corresponding author: Tafirenyika Mafugu, mafugut@ufs.ac.za

Zimbabwean universities. E-Learning is increasingly becoming critical in course delivery and instruction, and modifying traditional methods of instruction throughout the world (Lee, 2017). When gatherings were then prohibited, the education process was threatened. With the government closing all learning institutions in March 2020 in response to the Covid-19 outbreak, Zimbabwean institutions had to find ways to adopt e-Learning. The sudden change was accompanied by the challenges of digital technology resources and the lack of training and preparation for digital platforms. Molise and Dube (2020) reported that lecturers had to adjust their pedagogical methods and assessment plans to adopt new approaches to interact with learners online to mitigate the spread of coronavirus.

Kotler & Armstrong (2009) define e-Learning as a broad range of information and communication technologies (ICTs) that support teaching, learning, and assessment. It relies on the use of technologies such as computers and mobile communications. Virtual classrooms can also be used to expand educational provision.

Information Communication Technology (ICT) is widely used throughout university education. Higher education institutions were urged to take advantage of the advancement of communication technology to improve the quality of education under the UNESCO policy document for Higher Education (UNESCO, 1995). Many universities around the globe turned to using Information Communication Technology, referred to as e-Learning.

Generally, online teaching and learning changes roles, skills, competencies – traditionally critical abilities – and brings new ways of teaching and learning. Zimbabwe's higher education sector is undergoing significant changes affecting educators and learners, due to Covid-19. Online learning is relatively new in tertiary institutions in Zimbabwe, but it soon became the only viable option to facilitate teaching and learning (Zimbabwe Council for Higher Education, 2020). The pandemic provided an opportunity to accelerate the introduction of digital technology for teaching and learning in tertiary institutions (Dhawan, 2020).

2. Review of the literature

The current study is underpinned by the innovation diffusion theory (Roger, 1995) and the unified theory of acceptance and use of technology (UTAUT) models. The section will first focus on the innovation diffusion theory and later, the UTAUT model. Innovation is an act, idea, or instrument that is new to a group of people or an individual (Roger, 1995). Diffusion is when a new technology is transferred from various communication channels to individuals aiming to use the latest system. The theory has five innovative components: relative advantage, complexity, compatibility, trialability, and observability. Ching and Ellis (2004) and Rogers (2003) argue that the relative advantage refers to the extent to which an innovation is better than other innovations it supersedes. The relative advantage is equivalent to the perceived usefulness of the Technology Acceptance Model (Davis, 1986). Rogers (2003) defines complexity as the degree to which an innovation is professed as easy to use with little effort, and explains that the

adoption of innovation is jeopardised if the innovation is complex to use. Compatibility is the extent to which a given service matches with the current habits, beliefs, and needs of users. Trialability focuses on experimenting with the new technology. Observability refers to the visibility of the new technology's results (Jebeile & Reeve, 2003). The innovation diffusion model shares two components with the Technology Acceptance Model (TAM), namely perceived usefulness, and ease of use.

The UTAUT model by Venkatesh et al. (2003) combines several models which were central to the use of technology in teaching and learning. The UTAUT model has been widely used in education to identify variables associated with student acceptance and use of technology. The model consists of the following variables (Khechine & Augier, 2019, p. 54; Venkatesh et al., 2003, pp. 447-453):

1. Performance Expectancy (PE) refers to “self perception or beliefs of the students about their performance in the course when using the system”.
2. Effort Expectancy (EE) refers to the degree of “ease of using the learning system”.
3. Social Influence (SI) refers to the “opinion of the other students, teachers, friends, classmates, and family members about using the learning system”.
4. Facilitating Conditions (FC) refers to “human, organizational, and technical support for using the learning system”.

E-Learning tools have played an essential role in helping universities facilitate student learning during Covid-19-induced university closure (Subedi et al., 2020). Instructors have used a variety of online platforms, including Microsoft Teams, Zoom, Skype, and Blackboard, to create educational courses (Petrie, 2020). The platforms include options for different types of assessment, sharing of content in the form of Word, PDF, or Excel documents, audio, and videos. They also allow tracking of student attendance, keeping assessments submitted, and avoiding false submissions. In flipped classrooms, learning resources such as prerecorded videos, PowerPoint presentations with recorded audio, and YouTube links can be provided before the class (Doucet et al., 2020). Online classroom time is then used to develop problem-solving and critical thinking skills through peer discussion (Doucet et al., 2020).

Although most institutions in developed countries had already invested in information and technology to promote flexibility in learning before the pandemic, developing countries were lagging behind (Harrati et al., 2016; Hrtoňova et al., 2015). Developed countries enjoy an abundance of resources that include infrastructure, electricity, and the Internet. However, in developing countries, there is a need to develop sustainable educational strategies that incorporate the use of technology. Currently, teachers in developing countries do not optimally integrate technology in teaching and learning due to the lack of infrastructure and technological knowledge (Naresh & Reddy, 2015). The large population size makes it difficult for technology to reach the entire population. Online learning is costly and requires reliable electricity and Internet access throughout the country (Cabauatan et al., 2021). Developing countries struggle to benefit from e-Learning due to inadequate budgets and the unavailability of both electricity and network in most parts of the country (Karkar et al., 2020; Folorunso

et al., 2006). According to Asoodar et al. (2016), providing technical support through institutional training to instructors and students, and funding is vital for technology to be effective. Izzeddin and Bdair (2021) observe that infrastructure, end-user training, and the establishment of teaching and assessment guidelines are critical in ensuring a superior virtual learning environment. Both students and lecturers need motivation for the e-Learning process to adopt the use of technology in learning (Hrtoňova et al., 2015).

Online learning enables students to participate in a program while living in their home area and allows students to learn from their peers and lecturers (Milheim, 2014; Mukhtar et al., 2020; Singh & Thurman, 2019). The cost of transport and accommodation is eliminated. In the study by Opeyemi et al. (2019), almost all participants indicated that online learning is user-friendly. Bączek et al. (2021), in their study of online learning among Polish students, revealed that 69% of the students had the advantage of staying home, 69% had continuous access to materials, while 64% enjoyed the advantage of learning at their own pace. Most of the respondents had problems with IT equipment (54%) as the main disadvantage. In their study, Alvarez (2009) observed the need for preservice and inservice ICT training to develop instructors' pedagogical competencies. The study also revealed the need for interaction with colleagues to share experiences in online teaching that could develop pedagogical practices. The study of South Asian countries by Mathrani et al. (2022) indicated that a significant proportion of students did not have adequate Internet access and technological devices. Most of the participants relied on their mobile phones. Previous studies reported the need to study the lived experience of students to ensure rigorous online teaching (Lovrić et al., 2020).

Due to the fact that negative perception about online learning is one critical factor resulting in loss of student inspiration and perseverance, it is essential to study student perceptions toward online learning (Kauffman, 2015). Previous studies (Colley et al., 1994; Gaytan, 2015; Hart, 2012; Hone & El Said, 2016; Hunter Dr. & Ross, 2019; Kauffman, 2015; Volery & Lord, 2000) have recognised several essential factors influencing online learning, including the availability of computers at home, gender, regular instructional feedback from teachers, belonging to the community of learning, support from the family, and skills in time management.

3. Purpose of the study

The study's primary objective was to explore students' perceptions about Covid-19 induced e-Learning at a university in Zimbabwe.

4. Research questions

- What experiences do university students have with e-Learning?
- What opportunities were presented to students by using e-Learning in Zimbabwe?
- What challenges faced university students when they used e-Learning during the coronavirus pandemic?

5. Methods and Materials

The study was underpinned by a cross-sectional survey research design. The study used a semistructured questionnaire to obtain both qualitative and quantitative data.

5.1. Participants

The targeted population consisted of all students studying at Midlands State University. The university has around 25000 students (Midlands State University website, 2020). Due to time constraints, the researchers focused on students from two faculties, namely Agriculture, Environment and Natural Resources Management (AENRM), and Social Sciences. The two faculties had a population of 2022 in the year 2020, with 546 from AENRM, and 1476 from Social Sciences. The Slovin formula: $n = N / (1 + Ne^2)$ was used to determine the sample size 'n' (Ryan, 2013). $n = 2022 / [1 + 2022(0.05)^2] = 333.90 \sim 334$. Where N = total number of students from the two faculties, e = desired error margin (0.05 in 95% confidence interval). The Slovin formula was used because it provides a sensible approximation of the sample size. The sample for AENRM = $(546/2022) \times 334 = 90.19 \sim 90$. The calculated sample comprised 90 students from the Faculty of AENRM and 244 from Social Science. Using random sampling, 110 students were drawn from the list of Natural Science students, while 270 students were drawn from the list of AENRM and Social Sciences students. A larger sample size allowed students to withdraw voluntarily without affecting the desired minimum sample size. A semistructured questionnaire was designed in *Google Forms* and sent to the students. A total of 102 students from the Faculty of AENRM, and 255 students from the Faculty of Social Science completed the semistructured questionnaires. These were then analysed. The final sample size was 357 students.

5.2. Data Collection and Analysis

The initial part of the survey required students to complete their biographic details (gender, age, and marital status), describe their residence, and state their enrolment mode. The second part consisted of nine items, where participants rated their agreement with the variable under consideration on a Likert scale from strongly disagree, to strongly agree (Figure 2). The closed-ended questions were as follows. *E-Learning prevented students from engaging in other activities; e-Learning requires someone who is literate in information technology (IT); lectures conducted online were better than face-to-face lectures; student interaction in online learning is limited; e-Learning is cost-effective compared to face-to-face; e-Learning does not affect student performance; e-Learning requires more resources than face-to-face; concepts are better understood when using e-Learning platforms; and e-Learning is as good as face-to-face instruction.* Questions in the last section were open-ended, where students wrote about the challenges they experienced during online learning.

To calculate the frequencies and Cronbach's Alpha, the data were then analysed using SPSS version 27. Responses to open questions were organised into themes and presented in tables. Informed consent was sought from all participants.

6. Results and Discussion

This section presents the results and a discussion of the findings.

6.1. Demographic data

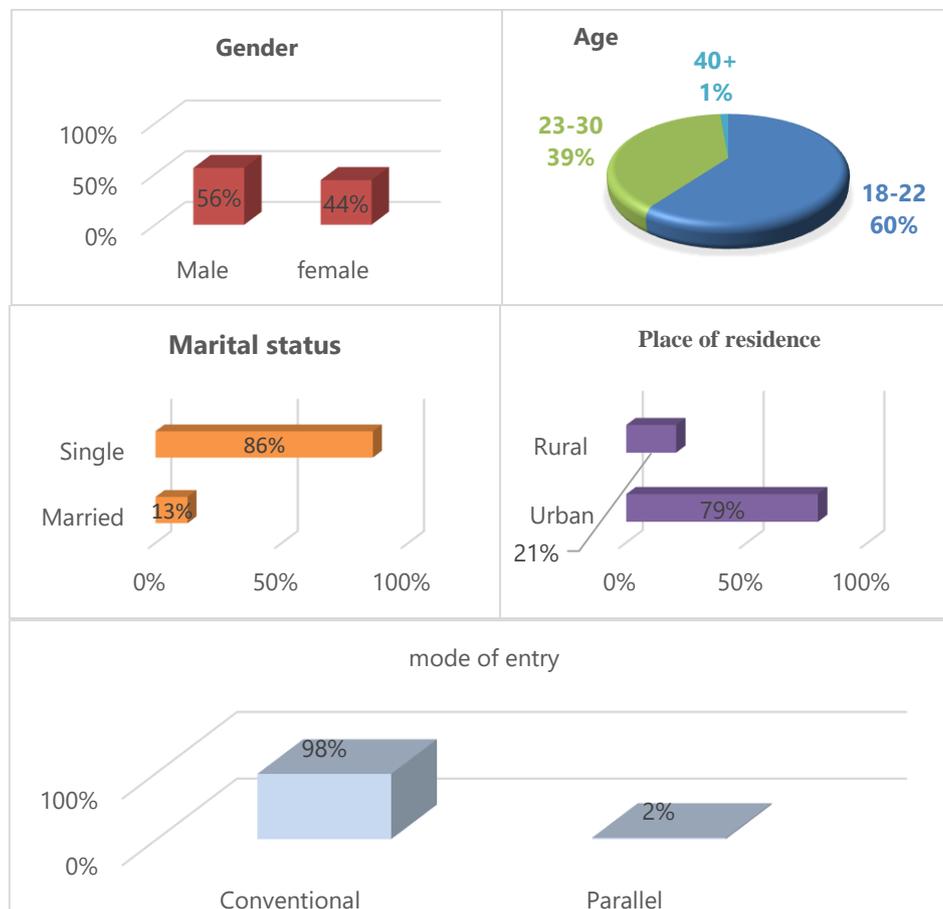


Figure 1: Demographic characteristics of the respondents (N=357)

Figure 1 shows that 56% of the respondents were male, while 44% were female. The sample is a good representation of the students at the Midlands State University, where most of the student population is male. Most (99%) of the respondents fall into the 18-39-year age category. This distribution is normal because most students enroll in the university just after completing high school. Some students (1%) above the age of 39 enrolled in the tertiary institution long after completing high school to pursue undergraduate programmes. Only 13% of the students were married, while the rest were single. Furthermore, demographics show that most of the respondents were from urban areas (79%), with a small proportion (21%) from rural communities. The mode of entry to MSU undergraduate programmes is either parallel or conventional. The parallel programme offers students who have been employed the opportunity to attend school after work later in the evening. The study shows that 98% of the respondents are conventional students.

6.2. The Scale

The reliability of the items in the questionnaire was evaluated using Cronbach's Alpha (Hair et al., 2010). A reliable scale has Cronbach's Alpha values that are at least equal to a threshold of 0.70 (Malhotra, 2007).

Table 1: Reliability Test Statistics

Cronbach's Alpha	Number of Items
.82	10

An Alpha value of 0.82 shows a high degree of reliability of the test items (Table 1). Most of the students (89%) agreed that online activities prevented them from participating in other extracurricular activities such as sporting activities like soccer, volleyball, netball, tennis, and swimming. E-Learning as such was viewed by students as academically focussed, and does not provide students an opportunity to do other extracurricular activities.

6.3. Summary of responses to the Likert scale, questions and discussion

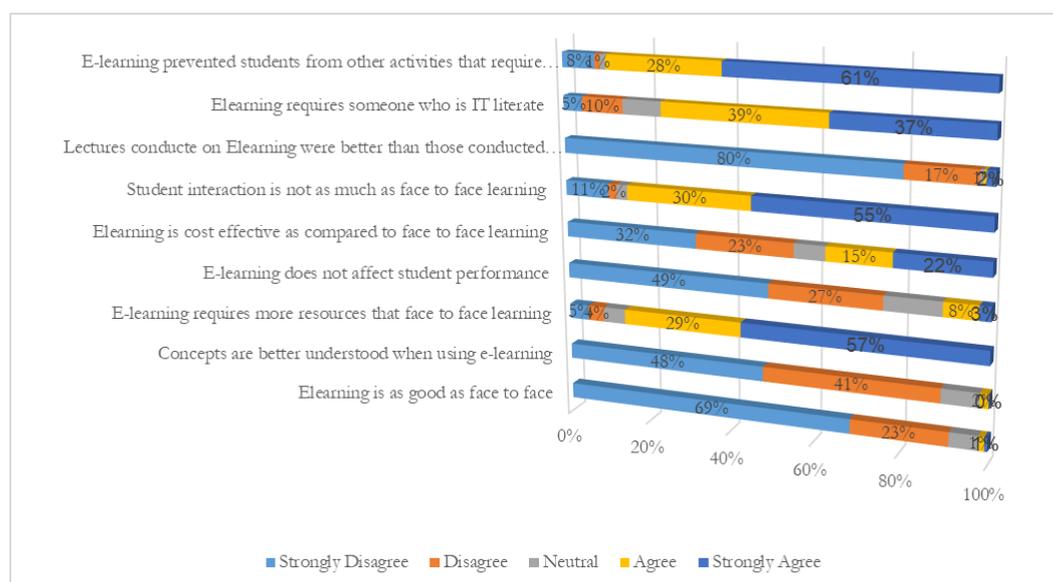


Figure 2: Responses to the Likert scale questions (N=357)

A large proportion of students (76%) indicated that e-Learning requires someone who is IT literate. 39% of the respondents agreed with this notion, while 37% strongly agreed (Figure 2). For a 21st century student to succeed in educational endeavours, information technology skills among students and lecturers are mandatory (El-Seoud. et al., 2014). The Technological Pedagogical Content Knowledge Framework identified technological knowledge, pedagogical knowledge, and content knowledge as essential elements for effective online learning (Mishra & Koehler, 2006). Technical competency for both students and lecturers is the most important factor affecting the success of e-Learning (Kim & Bonk, 2006). Both students and lecturers need sufficient training to enhance effective e-Learning. Gounder and Xing (2012) argue that it is necessary to provide institutional e-Learning support for developing countries, since lecturers and students should learn skills concerning modern technology and develop online

learning efficiency to build human capital. Additionally, students in primary and secondary education should have information technology skills to prepare for tertiary education. According to the TAM model, as the ease of use increases, both students and lecturers are likely to see the benefits of online learning, making it easier for them to accept the use of technology.

A relatively large number of students (85% male and 86% female, respectively) agreed that e-Learning provided limited peer-to-peer interaction and required more resources than face-to-face classes. Some research studies reported positive student perceptions of the impact of blended learning on student engagement (Moussa-Inaty, 2017), while the study by Rahman (2021) revealed a mixed picture in this regard. In the study by Sreehari (2020), students preferred a blended learning mode of instruction that involves online and face-to-face teaching and learning. Due to the need for more resources for e-Learning, developing countries hardly benefit from e-Learning due to the high cost of computers, Internet, and electricity (Karkar et al., 2020). Most students do not have relevant gadgets and struggle to purchase data (Dhanarajan, 2001; Heeks, 2002; Rajesh, 2003). All of these factors negatively affect student performance.

On the contrary, most of the participants in this study (97%) disagreed that online lectures were better than traditional presentations. This concurs with the study of Gherheş et al. (2021) in which it was highlighted that in some cases, face-to-face lectures can be better than online. Despite the preference for online lectures, Gherheş et al. (2021) view the blended approach as a better approach than online- or face-to-face only. Of the students who responded to the questionnaire, 86% believed that e-Learning actually negatively affected their performance. Figure 2 shows that most of the students (89%) feel that the concepts taught by e-Learning are not well understood during the e-Learning process. Regarding cost-effectiveness, a large proportion of students (55%) disagreed that e-Learning is cost-effective, while a smaller percentage (37%) of the respondents argued that e-Learning is indeed cost-effective.

The study by Cabauatan et al. (2021) indicates that training or a background in Information Technology is critical to improving competency in the use of technology. According to Petrie (2020), online platforms allow lecturers to create educational courses. These platforms provide options for discussion forums that promote student participation. In addition, the platform can be used for video meetings and storage files that keep classes organised and user-friendly. They provide additional support by sharing diverse content, including Word, PDF, Excel, audio, and video files (Petrie, 2020), and allowing students to interact with the content before the class. According to Doucet et al. (2020), online classrooms are used to develop understanding through discussion. Discussions encourage the development of problem-solving and critical thinking skills (Pokhrel & Chhetri, 2021). These also allow for the rubric-based assessment of submitted assignments. The benefits of online platforms can only be enjoyed if both lecturers and students are well trained to use the platforms effectively and resources such as data, electricity, and laptops are available and affordable to support online learning.

Table 2: Challenges reported by students on e-Learning

- Students indicated that purchasing e-Learning data was an additional cost they incurred when moving to e-Learning. It implied that students had to incur a hidden additional cost by purchasing e-Learning data bundles over and above the full fees paid.
- The inaccessibility of electricity affects the learning of students through e-Learning.
- One of the biggest challenges of Covid-19-induced e-Learning was accessing the e-learning platforms.
- The lack of appropriate e-Learning equipment such as laptops, computers, and compatible smartphones was a major challenge for students.
- Most students lack information technology skills.
- The home learning environment was not conducive.
- The interaction between the professor and the student was minimal.
- Reduced chances of passing.

The challenges reported by the students such as high data costs, the unavailability of electricity, and the unavailability of learning devices, could be the reason for the view of the students that face-to-face classes are better than online classes (Table 2). Additionally, the lack of technological skills and non-conductive home environments created more barriers to online learning. According to the Technology Acceptance Model (TAM), such barriers make it difficult for participants to accept the use of technology. The results are consistent with the results observed by Rahman (2021) in India, where there was poor Internet connectivity, high Internet cost, lack of a proper environment at home, and irregular electricity access. The challenges including the insufficient allocation of funds for education to support the use of online learning and lack of technical knowledge make it difficult for developing countries to benefit from e-Learning (Folorunso et al., 2006; Karkar et al., 2020).

7. Conclusions

Massive technical and administrative support will help improve the incorporation of technology in developing nations. To promote effective teaching and learning, e-Learning requires training for both students and lecturers. Most of the students disagreed that online lectures were better than regular face-to-face presentations. Of the students who responded to the questionnaire, 86% were of the opinion that e-Learning actually negatively affected their performance. The challenges reported by the students like the high data costs, the inaccessibility of electricity, and the inaccessibility of the learning devices could be the reasons why students viewed face-to-face classes better than online classes. Additionally, the lack of technological skills and unconducive home environments created more barriers to online learning. Adequate support in providing skills and resources by higher education institutions is required to successfully implement e-Learning programmes in developing countries. The study adds to the limited literature on online teaching and learning in developing countries. It highlights areas that need attention to improve the effectiveness of online teaching and learning effectiveness, enabling lecturers and students to benefit from a blended learning

approach. Covid-induced e-Learning provides an opportunity for institutions to improve their infrastructure and pave the way for blended learning.

8. Conflict of Interest

The authors declare that there were no potential conflicts of interest.

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10. Authors' Contributions

'Conceptualisation, A.M. and S.A.; Methodology, A.M. and T.M.; Software, A.M.; Validation, A.M., S.A. and T.M.; Formal analysis, A.M. and T.M.; Investigation, A.M.; Resources, A.M.; Data curation, A.M.; Writing – original draft preparation, A.M.; writing – review and editing, T.M. and S.A.; Visualisation, S.A.; Supervision, S.A.; Project administration, A.M. All authors have read and agreed to the published version of the manuscript.'

11. Data availability statement

Research data are available on request.

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