ISSN 2473-4780

EPIDEMIOLOGY
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Original Research

Factors Affecting Access to E-Learning during the Coronavirus Disease 2019 Pandemic Among Rural-Based Pharmacy Students in Zambia: A Qualitative Study

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Article information
Received: August 18th, 2021; **Revised:** August 30th, 2021; **Accepted:** September 6th, 2021; **Published:** September 9th, 2021

Cite this article
Mwila K, Mudenda S, Kampamba M, et al. Factors affecting access to e-learning during the coronavirus disease 2019 pandemic among rural-based pharmacy students in Zambia: A qualitative study. *Epidemiol Open J*. 2021; 6(1): 20-29. doi: 10.17140/EPOJ-6-124

ABSTRACT

Background
The coronavirus disease 2019 (COVID-19) pandemic has negatively affected the education sector globally. This has resulted in learning institutions adopting e-learning techniques. E-learning implementation in higher education continues to gain prominence in both developed and developing countries. Most universities are exploring different ways of using information and communications technology (ICT). However, ICT remains a challenge more especially for students who come from rural areas.

Aim
This study was aimed at exploring the factors that affect access to e-learning among rural-based pharmacy students in Zambia.

Methods
A qualitative case study was conducted among ten (10) purposively sampled pharmacy students at the University of Zambia. The study participants were from the Manying, a district of North-Western Province, the Sinda district of Eastern Province, the Nalolo district of Western Province, the Chipili district of Luapula Province and the Mbala district of Northern Province. Semi-structured interviews were used to collect data from the respondents. Data were analyzed using the framework analysis. The sociodemographic characteristics indicate that ten (10) respondents were drawn from Zambia's five (5) provinces. Six qualitative themes were generated these included devices used for e-learning; the effectiveness of the devices; student performance; internet connectivity; and electrification of the houses. Key findings suggest that the most commonly used device was a smartphone, which posed challenges to effective learner participation in e-learning. Poor internet connectivity, non-electrification of students' houses, electricity outages, and costs-associated with internet use negatively affected students in accessing online learning and could adversely affect their academic activities and performance.

Conclusion
The COVID-19 pandemic has negatively affected access to e-learning among rural pharmacy students in Zambia. The implications of the challenges faced by the rural pharmacy students are that their academic activities and performance were negatively affected. Therefore, this posed a threat to the rights to universal access to education of the rural students who were mostly venerable.

Keywords
Academic performance; COVID-19; Coronavirus disease; E-Learning; Online learning; Pandemic; Pharmacy students.

Epidemiol Open J. 2021; 6(1): 20-29. doi: 10.17140/EPOJ-6-124

INTRODUCTION

The origin of coronavirus disease 2019 (COVID-19) from China is marked as one of the greatest challenges to public health in human history.[1,2] COVID-19 emerged from Wuhan City of China in 2019 and spread rapidly to other countries in 2020 causing the World Health Organization (WHO) to declare it a pandemic.[3,4] COVID-19 posed many negative impacts to many sectors across many nations including their educational systems.[5]

The COVID-19 pandemic has negatively affected educational systems worldwide, leading to the total physical closure of schools, universities, and colleges in many countries.[6] By mid-April 2020, approximately 1.7 billion learners were affected worldwide due to school closures in response to the pandemic. According to UNESCO monitoring, 191 countries implemented nationwide closures as well as local closures, impacting about 98.4% of the world's student population.[7]

In the wake of continuity education for universities and colleges, there was an implementation of e-learning.[8-10] E-learning implementation in higher education continues to gain prominence in both developed and developing countries, and while most universities in Information and Communication Technology (ICT)-rich environments are exploring different ways of using ICT and multimedia resources to enhance teaching and learning, the same cannot be said about ICT-challenged environments. The disparity in terms of access to e-learning in different geographical locations of the country and rural areas may be termed challenging in this context.[11-13] Nevertheless, the question of successful and sustainable e-learning implementation remains a challenge, particularly in ICT-challenged environments.[14,15]

Zambia, a country in the Center of the Southern African Region only had its first two cases reported on the 18th of March 2020.[4] This resulted in the Zambian government declaring that all schools, colleges and universities be closed with immediate effect on Friday 20 March 2020. Because of this, most students or learners were forced to stay home and continue with their education *via* online platforms. Despite this unfortunate situation, students were expected to learn with the use of Web 2.0 tools. Unfortunately, accessible computers, phones, laptops, and tablets either at home or school were not affordable by the majority of the students.[11] However, policymakers and significant partners had anticipatory hopes to see learning go in a different direction in Zambia during the COVID-19 crisis. The opportunities after the crisis lie in the fact that lecturers and students will learn new ICT skills and blended learning will be a new culture in the Zambian educational systems.

The coming of technology has impacted almost all areas of life including the education sector that has been witnessing a paradigm shift.[16] The shift was made due to restrictions imposed by the ministry of health as a result of the COVID-19 crisis, and nearly all higher learning institutions in Zambia had shifted to digital learning with immediate effect. The University of Zambia (UNZA) Senate also resolved that in this closure, learning would proceed through e-learning platforms like Zoom, Moodle, and Astria, among others. Subsequently, academic staff was requested to expeditiously secure learning support material for them to facilitate teaching and learning using the e-learning platforms. Similarly, students were also guided to make sure that they registered and got connected to the e-learning platforms to avoid missing out on learning. This experience is adopted in the design of current study as it factors in the involvement of students as part of the study sample so that they could share their experiences on how they accessed e-learning during the COVID-19 pandemic crisis, taking into consideration the bottlenecks associated with the rural environment.

The literature plays a very important role in giving rise to the need to understand what kind of electronic devices were used by the rural students when accessing e-learning in their geographical settings and establishing the effectiveness of these devices used during the COVID-19 pandemic. It can be argued that Zambia has a massive literature gap on the impact of the COVID-19 pandemic on the education system. Therefore, this study endeavours to fill that literature gap by profiling the e-learning experiences of rural students during the closure of schools.

Theoretical Perspective

This study was underpinned by the e-learning theory. The theory comprises three elements as eluded by Dabbagh[17] defined through a theory-based framework that relates instructional strategies, learning technologies,, and pedagogical models or constructs. Dabbagh's framework (2005) includes multiple dimensions, such as the way people learn (open/flexible way), with the learning strategy (collaboration, exploration, problem-solving) and also with technology deployed in the learning process. "*Its pedagogical model and cognitive models or theoretical constructs are derived from knowledge acquisition models or views about cognition and knowledge, which form the basis for e-learning theory. In other words, they are the mechanisms by which we link theory to practice*".[18] From a pedagogical point of view, these models are mechanisms that link e-learning theory to e-learning practice (Figure 1).[17] The pedagogical models in e-learning are open learning, distributed learning, learning communities, communities of practice, and knowledge building communities.

Instructional strategies assist learning, such as collaboration, articulation, reflection, and role-playing among others. Instructional strategies operationalize the pedagogical models, since strategies consist of general approaches to a learning model, in other words; instructional strategies are enablers to learning. The instructional strategy facet of e-learning theory shapes the current study as it explores the modes of e-learning delivery to rural students in Zambia.

E-learning concept refers to learning *via* electronic sources, providing interactive distance learning. Today the e-learning concept, apart from technology, includes learning strategies, learning methods, and lately is very much directed to the vast possibilities of content diffusion and connection. The technological aspect of the theory informs the research question on the type of devices used by rural students to access e-learning. Therefore, this study was conducted to explore the factors that affect access to e-learning during the COVID-19 pandemic among pharmacy students in Zambia.

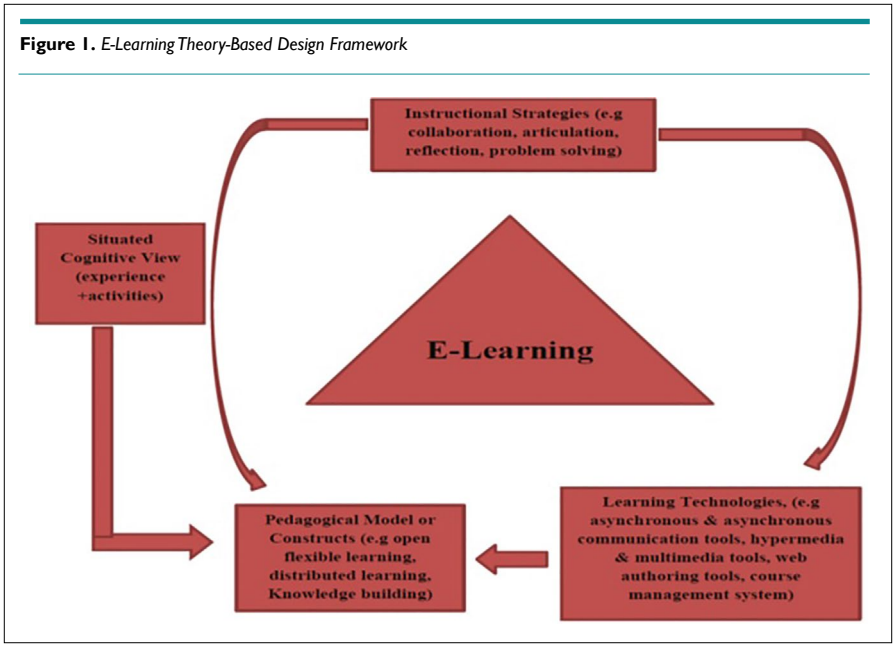


Figure 1. *E-Learning Theory-Based Design Framework*

Figure 1 indicates that the theory-based design framework for e-learning emphasizes the transformative interaction between pedagogical models, instructional strategies, and learning technologies.[17] It may be contended that situated or distributed cognition is an appropriate foundational knowledge perspective from which to develop pedagogical models and constructs for e-learning and offers a theory-into-practice framework that characterizes the instructional implications of situated cognition and guides the design of e-learning. This interaction is extensively explored in this study and how it ultimately affects academic performance for rural students.

METHODOLOGY

Study Design

This was a qualitative case study that was conducted among pharmacy students at the University of Zambia. This study was conducted amidst the COVID-19 pandemic that has disrupted physical classes in Zambia. This was a preliminary study of which a larger study will be conducted that will comprise of students from different programmes of study

Sample Size

The total sample size for the current study was ten (10) students who came from five (5) out of the ten (10) provinces of Zambia; two (2) students were picked from a rural district of the five (5) provinces. The respective rural districts were Manyinga of North-western Province, Sinda of Eastern Province, Nalolo of Western Province, Chipili of Luapula Province and Mbala of Northern Province. The districts met the researcher's desired core characteristic of being defined as rural. The students were all registered third-year Pharmacy students at the University of Zambia in 2021. The third-year pharmacy students were picked because during the physical closure of classes, they had remained to conduct their practicum. A sample size of ten (10) was arrived at because saturation was reached. Using a sample size of ten (10) in qualitative studies has been reported to be effective and enough provided the participants give more information relevant to the study.[19-21]

Sampling Technique

The respondents for the interviews were purposively sampled. Kombo and Tromp, 2006, suggest that in purposive sampling, the researcher targets a group of people believed to be reliable for the study.[22] The Snowball sampling technique was specifically used in this study. Snowball sampling is a recruitment method that employs research into participants' social networks to access specific populations. One student who comes from a rural area was identified, who then, in turn, identified other students from rural districts of different provinces of Zambia.

Data Collection

The semi-structured face to face interviews were used to collect data from the respondents. The method is advantageous because it allows direct questions to respondents about their activities. Semi-structured interviews were opted because of their flexibility in that they allow more specific issues to be addressed, elicit interpretations from the respondents, follow-up on the points that were not clear in the narrations of the respondents were made and probing where necessary. The interview guide also helped the researcher to be more systematic and to keep track of the goals of the study. The participants were chosen because they were available during school closures and the interviews were conducted strictly adhering to the COVID-19 preventive measures.

Data Analysis

Framework analysis was used to analyze the data. In the analysis stage, the gathered data was sifted, charted and sorted per key issues and themes. The themes were identified and drawn from the

responses to the questions given by the respondents. The framework approach offers the researcher a systematic structure to manage, analyze and identify themes, enabling the development and maintenance of a transparent audit trail. It is particularly useful with large volumes of text and is suitable for use with different qualitative approaches. Ward et al[23] eludes that the Framework analysis is flexible during the analysis process in that it allows the user to either collect all the data and then analyze it or do data analysis during the collection process.

RESULTS

The sociodemographic characteristics (Table 1) indicate that the ten (10) respondents were selected from the five (5) out of ten (10) provinces of Zambia. The respective rural districts were Manyinga of Northwestern Province, Sinda of Eastern province, Nalolo of Western province, Chipili of Luapula province and Mbala of Northern province. The students were all third-year Pharmacy students at the University of Zambia as shown in Table 1.

Table 1. *Sociodemographic Characteristics of the Respondents*

Province	District	Program of Study	Number of Respondents
Northwestern	Manyinga	Bachelor of Pharmacy	2
Eastern	Sinda	Bachelor of Pharmacy	2
Western	Nalolo	Bachelor of pharmacy	2
Luapula	Chipili	Bachelor of Pharmacy	2
Northern	Mbala	Bachelor of Pharmacy	2

Figure 2 shows that there was a male predominance of 6 (60%) in this study.

The effects of COVID-19 on the academic performance of the respondents are given in Table 2. Assessment 1 was done before closure of the university while assessment 2 was done during closure of the university. As indicated, many about 90% of the students had their academic performance based on the assessments they wrote during the COVID-19 pandemic in 2020.

Figure 2. *Gender of Respondents*

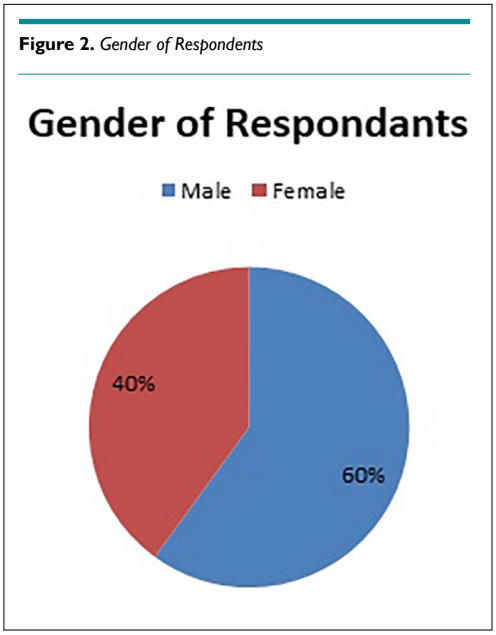
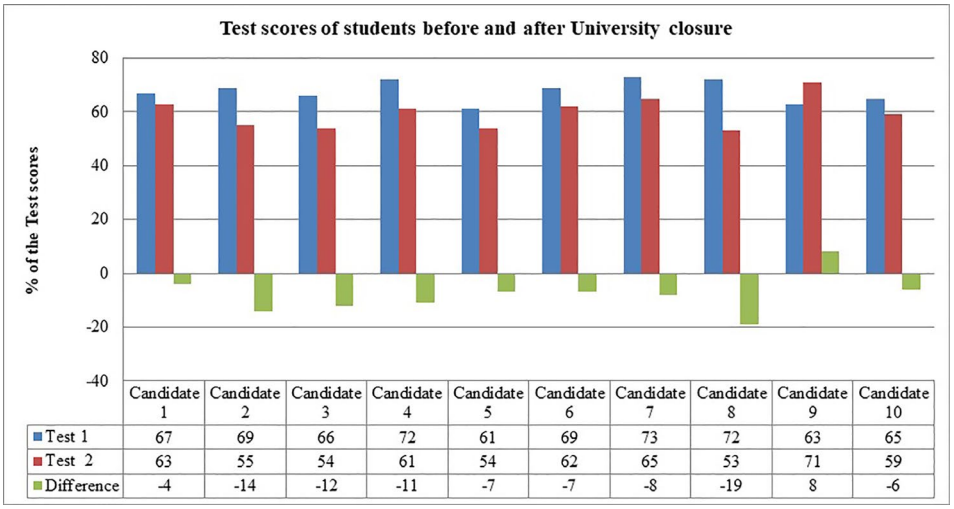


Table 2 shows responses from the participants regarding factors that affect their e-learning during the COVID-19 pandemic. The results have been presented in six (6) different themes.

Figure 3 Effect of COVID-19 on academic performance of rural pharmacy students.

The Figure 3 indicates the document analysis of the test results of the 10 students, test one was conducted before the closure of the university while test 2 was conducted online during the closure of the university due the COVID-19 pandemic. The test

Figure 3. *Effect of COVID-19 on Academic Performance of Rural Pharmacy Students*



	Candidate 1	Candidate 2	Candidate 3	Candidate 4	Candidate 5	Candidate 6	Candidate 7	Candidate 8	Candidate 9	Candidate 10
Test 1	67	69	66	72	61	69	73	72	63	65
Test 2	63	55	54	61	54	62	65	53	71	59
Difference	-4	-14	-12	-11	-7	-7	-8	-19	8	-6

Table 2. *Framework Analysis Table*

Theme	North-Western Province	Eastern Province	Western Province	Luapula Province	Northern -Province
	Manyinga District	**Sinda District**	**Nalolo District**	**Chipili District**	**Mbala District**
Electronic device used for e-learning	• Both respondents indicated that he relied on the phone to attend online lessons.	• One student depended on a mobile phone and a laptop to access e-learning. • The other student entirely relied on the phone as he had no laptop.	• One of the students used the phone and laptop to access e-learning, while the other one relied on the mobile phone only. • "*I was using a mobile phone, and sometimes the laptop but I mostly had challenges with the laptop*".	• The students used mobile phones to access learning. • "*I was using an android phone that I bought in 2017 when I was in Secondary School, it is an old phone that sometimes switches off on its own, and right now as I am speaking I have left it charging*". • The students did not have laptops because they were unaffordable.	• Both students depended on mobile phone to access e-learning. • One of the students stated that he could not use his laptop because he lived in a non-electrified house and his laptop could only sustain power for two hours.
Effectiveness of the device	• The respondents described the phone as not being effective in attending an online lesson. • "*my phone had issues with the battery, I needed to charge it every after an hour*".	• The students linked the effectiveness of the phone and laptop to the applications that were used to access e-learning. • Some applications were not user friendly to the students. They highlighted some of the applications used as Zoom, Moodle and Google meet.	• One of the students rated the effectiveness of the phone as 5 out of 10. • "*In terms of displaying the information the screen of the mobile phone is not large enough. And when holding the phone you would find that your neck would pain after holding for a long*".	• The phone was not effective as it was old and could not support some applications.	• The students described the tools as not very effective due to poor connectivity.
Internet connectivity	• The respondents indicated that internet connectivity was a challenge. • "*The network was sometimes unstable during class; hence I would be cut off.*"	• One student cited internet connectivity as a challenge in e-learning. • "*Yes I remember at some point there was a time when we had difficulties with the three internet service network providers, and this was national wide*". • The students missed some online lectures due to poor internet connectivity. "*This usually happened where I could be cut off because of poor internet connectivity*".	• She described internet connectivity as a big challenge as it was most unstable. • When asked how she felt when she was cut off due to connectivity. • I used to feel bad was just praying that we open schools soon because my performance went down. It made me disturbed because you would find that you don't know what the lecturer talk about when you were cut off.	• Both students described internet connectivity as unstable. • Asked to recall any day when there was poor connectivity. One of the students stated; • "*yes my very bad experience was when I was writing pharmaceutical chemistry test and just after answering 20 questions out of 33 my internet was disrupted, meaning that I had left 13 questions unanswered*".	• Internet connectivity was very unstable. • Asked to recall any bad experiences they had with internet connectivity one student said; • "*You would find that you are writing a test and the page is reloading and before you even finish it has submitted for you. Sometimes the page is not moving to the next page. Sometimes the page would not change but time is moving, and the system would submit when the time has elapsed*".
Cost of e-learning	• One of the students described the cost of e-learning as fair. • This suggests that the student did not face many adverse financial challenges to access the e-learning.	• Both students indicated that the cost of buying internet bundles was high. • One of the students indicated that the cost of the laptop and the phone was not a big problem. • "*I think with the devices it was not so much of an issue because I already had these devices before the pandemic*".	• The respondents indicated that e-learning was expensive as they were expected to always have money to buy bundles for the internet.	• Subject lamented about the cost of internet data bundles.	• The students indicated that e-learning needed high-quality electronic devices that could connect to a 4G network which the subject could not afford.
Student performance	• The performance of both students during online learning went down compared to the performance during on-site learning. • "*My performance on campus was much better than when I was home, for example at home there are no facilities such as the library*". • This indicates that the students were not able to have access to a conducive environment for studying.	• Both students from Sinda district indicated that their performance was much better with the physical learning on campus than with e-learning. • Suggest minimal student lecture interaction during e-learning as a factor that contributed to poor performance by the students. • The other factor highlighted by one of the students was house chores, as a hindrance to smooth learning.	• The students lamented that their performance was drastically affected by e-learning, "*my performance went down because when we just opened we were expected to have physical tests and my performance was really bad*".	• Both students described their academic performance as bad during the period of e-learning. • "*I felt frustrated; this was because my performance had drastically gone down. I was not performing as well as I was doing during the time as was in school. What was hurting more was that I am in my third year and I am expected to make points for my graduation grade*".	• The students reported that that they performed better with physical onsite learning than the e-learning. • Asked if they were exempted from house chores? one of the students replied that responded that "*It was difficult for parents to understand how e-learning works because it was quite new, sometime they would think you would not just want to help but probably you would just want to play with the laptop*".

Electrification of the house	• Both students lived in electrified houses but faced challenges of power cuts because the electricity power supply company undertook load shedding. • This suggests that the devices that the students depended on for e-learning were sometimes off due to loadshedding (electricity outages).	• Both students were living in electrified houses but also complained about the issue of power outages.	• The students were living in houses that were not electrified "*My house was not electrified so I used to go to my friend's house that was electrified, however, I could not go there anytime I had to make sure she was home it was her parent's home*".	• Their houses were not electrified and this adversely affected their studies.	• Both students lived in non-electrified houses. • This negatively affected the students as they needed to take their mobile phones for charging at the neighbourhood at a fee.

Figure 4. *Mapping of e-learning Experiences*

scores for 9 out of 10 students show a reduction at varying degrees this suggest that students performed better during physical learning than online learning.

The Figure 4 summarizes the e-learning experiences of the students sampled for the five (5) provinces, it is noted that the students faced similar challenges at varying degrees. Difficulties faced by the students ultimately negatively affected their academic performance.

DISCUSSION

E-learning has been embraced by nearly all teaching institutions globally, including Zambia during the COVID-19 pandemic.[24] The process of e-learning rests on several factors including the quality of the internet and speed, ease accessibility to online resources, the availability of suitable learning infrastructures along the readiness of both lecturers and students to adjust to this technology.[25,26] In the current study, we explored the factors that affect access to e-learning during the COVID-19 pandemic among pharmacy students in Zambia.

Devices Used for e-Learning

The findings from the generated themes suggest that students coming from different rural provincial areas faced very similar difficulties in accessing e-learning. It was established that all the students depended on their mobile phones as the main device for their e-learning. This finding is also highlighted by a study that was conducted in Ghana, which reported that distance learning students find it easier to use a smartphone in their learning activities.[27] Six of the students did not have laptops except for the students coming from western and eastern provinces, what that meant was that the students without laptops could not adequately do some assignments on their own, but had to take them for typing which affected the quality of their work. This concern raised by the participants in this study was also cited by educators in the United States of America (USA) after the lockdown due to COVID-19. Educa-

tors were worried that not all children have laptops or the Internet in their homes.[28] The lack of computers/laptops and computer labs was reported in another study as one of the factors causing challenges in students accessing online learning.[9] Additionally, in a descriptive cross-sectional study conducted at Liaquat College of Medicine and Dentistry. The students preferred using mobile phones to laptops during e-learning.[29] This could be because of increased teacher-student interactions and the improvement of communication in the classroom when using mobile phones than other devices.[30] Roberts et al[31] also established in their study that students preferred using mobile phones during e-learning.

Effectiveness of the e-Devices

The availability of appropriate and adequate technology is the mainstay of the ultimate delivery of e-learning. Technology helps in improving the quality of the e-learning experience through content integration and communication of learning material content at reliable speed and acceptable response times especially in a remote e-learning setup.[32] It was established that all the students from the five provinces described their tools as not being very effective at varying degrees, one student from the Eastern province had a better phone and laptop to access e-learning than the rest of the students whilst the student from Luapula province had the worst phone that was bought four years ago. His phone proved to be unreliable, such that it could switch off on its own during online classes. The two students from Western and Eastern provinces who had laptops both described them as not effective because they needed much stable internet connectivity and more data bundles compared to the phones. Studies have reported challenges faced during e-learning such as poor internet, unreliable phones and interruptions during teaching.[33-35] Considering the ineffectiveness of the devices used by the students in accessing e-learning, the researchers infer that the conditions in the rural districts of Zambia are not favourable to support e-learning.

Cost of e-Learning

Eight (8) out of the ten (10) students described e-learning as a financial burden. The students from Eastern Province were relatively financially stable compared to the rest of the students. The students associated the costs to mainly their inability to buy good Android operating system based smartphones and laptops. The cost was also mainly incurred on buying internet data bundles. The most affected student was a female student from the Western Province who despite having the laptop missed 75% of her classes mainly because of poor connectivity and lack of money to buy internet data bundles. The high cost of learning associated with e-learning is in concord with the report by Adeoye et al.[36] Despite this unfortunate situation of the closure of schools due to the COVID-19 pandemic, students were expected to learn with the use of web 2.0 tools. Unfortunately, accessible computers, smartphones, laptops and tablets either at home or school were not affordable by the majority of the students. Similarly, the use of online learning platforms comes with huge costs more especially to university students.[37] A study by Mahdy on the impact of COVID-19 on the academic performance of students established that availability, speed and cost of the internet were some of the common problems associated with e-learning especially for students who live in provincial and rural areas as these can hinder proper delivery of study materials by both students and lecturers.[38] Another study that was conducted in Jordan cited the poor economic conditions as challenges faced by students from the rural and remote areas during e-learning amid COVID-19.[39] Accessibility to online learning is affected by the cost attached to it.[4] Therefore, there is a need to consider the cost associated with attending online learning by University students.

Internet Connectivity

All of the ten (10) participating respondent student described the internet connectivity as unstable at varying degrees; the most affected student was from the Western province that had to ride a bicycle for 65 Km to the nearest place that had at least stable internet connectivity. The poor connectivity adversely affected students as they had to miss most of the lectures due to instability. This finding is in line with the assertion by Awidi[14] that successful and sustainable e-learning implementation remains a challenge, particularly in ICT-challenged environments. Internet challenges make it difficult to conduct and attend online learning.[9,14] It was notable that students from rural districts of Zambia were faced with the critical challenge of poor internet connectivity. Poor internet connectivity is a hindrance to quality education among students coming from rural areas.[34,40] Another study that was conducted in South Africa highlighted similar findings where students in rural areas were faced with challenges of internet connectivity during online learning amid the COVID-19 pandemic.[41] It is important to note that adequate infrastructures capable of supporting a successful deployment of e-learning based projects are needed. That is good internet connectivity and proper devices needed for sharing learning content with potential learners.[32]

Non-Electrification of Student's Houses

All the students except two from Eastern province were living in in home had no electricity it presenting difficulties in charging their laptops and mobile phones. This caused them to miss lectures because they sometimes had to take their mobile phones for charging during online classes. Further, the lack of electrification of the students' houses also affected their ability to study, especially at night. According to Awidi[14] he described e-learning is the use of ICT devices, Internet and World Wide Web resources, as instruments to construct knowledge, to support teaching and learning in synchronous and/or asynchronous modes. Non-electrification of student's houses hinders them from accessing e-learning.[4] Similarly, a lack of electrification and power outages in some areas negatively affects students' online learning and has been cited as among the inequalities affecting access to education.[42] The findings suggest that asynchronous modes of learning where online lessons can be recorded and students watch at their own convenient time should be explored to abate the challenges associated with lack of electrification and poor internet connectivity.

Academic Performance

All the ten students interviewed indicated that their academic per-

formance had decreased during the e-learning period and this was attributed to some factors such as divided attention between house chores and online class time, poor internet connectivity, lack of electrification of their houses, and the high cost of internet data bundles. Though the assessments used in this study indicated that nine students had their academic performance reduced during as a result of the effect of COVID-19. It was, therefore, notable that e-learning, if not cautiously implemented may widen the gap in terms of access to education between the rural and urban students. Similar findings have been reported by other scholars. In a study by Sintema, it was reported that the academic performance of students reduced as a result of COVID-19 and the introduction of e-learning.[43] Similarly, a recent study among pharmacy students indicated that the students were worried about their academic performance as online learning was the first time to them and the COVID-19 pandemic had disturbed them mentally.[44] In this regard, schools, colleges and universities must put in place measures to address the gaps that exist between rural and urban students in accessing online learning. On the other hand, one study reviewed that students thought that e-learning was better than traditional face to face learning as it provided convenience and portability as students can access it anywhere.[45] A cross-sectional study conducted by Mahdy[38] to analyze the impact of COVID-19 lockdown on the academic performance of veterinary medical students and researchers reviewed that most of the participants 96.7% believed that COVID-19 pandemic lockdown affected their academic performance with varying degrees. Despite the students' worries about academic performance, online learning must be embraced and implemented in the best way that supports continued learning.[46]

STRENGTHS AND LIMITATIONS

This study is important as it provides information on the challenges faced by rural pharmacy students at the University of Zambia and rural distance learning students engaged elsewhere. These challenges are not only limited to pharmacy students but all rural University students in Zambia. Therefore, these findings can help in developing strategies aimed at addressing the challenges faced by rural university students. The limitation to this study was that it was purely qualitative in nature; it did not use a randomized process to collect data, hence making it susceptible to biases. However, this limitation was abated somewhat in the selection of the participants.

CONCLUSION

It was established that the rural students largely depended on smartphones to access e-learning during the closure of schools as a result of the COVID-19 pandemic. Even when some students sometimes used the laptops, they described them as not being reliable because they demanded much more stable internet connectivity and constant power supply to access online lectures. Almost all the students described the smartphones and laptops as not being very effective in accessing e-learning, this was attributed to the low quality of the smartphones that they possessed such as inability to sustain power for a longer period, smaller screens to display legible PowerPoint slides and living in a non-electrified house. The respondents unanimously described e-learning as a huge cost as they were coming from vulnerable families, they all indicated that e-learning needed high-quality electronic devices and adequate data bundles which were not within their means. Key among the challenges faced by the students was poor internet connectivity in rural areas; some respondents had to walk long distances to the nearest place that had at least stable internet. The implications of the challenges faced by the rural students are that their academic performance was drastically negatively affected; therefore, this posed a threat to the rights to universal access to education of the rural students who were mostly venerable.

RECOMMENDATIONS OF THE STUDY

1. Learning institutions need to put in strategies to mitigate the challenges faced by vulnerable students during the COVID-19 pandemic that has negatively affected the education sector. Strategies may include provision of asynchronous learning so that students can be attending online classes at their own convenience.
2. Government should come up with initiatives to support vulnerable students with devices such as smartphones and laptops during the period of online learning.

ACKNOWLEDGMENTS

The authors are grateful to all the pharmacy students who took part in this study and the University of Zambia e-Library for providing access to the majority of the articles that were used in this study.

FUNDING

No external funds were received for this publication.

ETHICS STATEMENT

This study was approved by the University of Zambia Health Sciences Research Ethics Committee (UNZAHSREC). Protocol ID: 2020310174. IORG no: 0009227 IRB no: 00011000 FWA no: 00026270. After IRB ethical approval, regulatory approval was obtained from the National Health Research Authority (NHRA). Consent to participate in this study was obtained from the students.

CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest.

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