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CURRICULUM & TEACHING STUDIES | RESEARCH ARTICLE

Exploring the impact of covid-19 lockdown on learning among higher education students on the copperbelt province, Zambia

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Abstract: Many educational institutions were closed following COVID-19 lockdown. The closure disrupted the smooth running of teaching in educational institutions. Although the impact was felt across the world, it impacted more in low- and middle-income countries due to poor resources for virtual learning. This study explored the barriers to Learning among Higher Education Students during COVID-19 pandemic. The research study utilized an explorative qualitative study approach. Twenty semi-structured interviews were carried out with higher education students. Data were thematically analyzed using the four phases of data analysis in The Silences Framework (TSF) which included researcher review, Silence dialogue, Collective voices, and Researcher reflection. The study found that poor digital

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Mathew Nyashanu is a senior lecturer based at Nottingham Trent University in the United Kingdom. As a senior lecturer Mathew contributes on a number of modules for postgraduate. Some of the modules that he contributes to include Global Health and Development, Health Promotion, Research Methods and Professional Practice among others
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PUBLIC INTEREST STATEMENT

This piece of work looked at barriers to Learning among Higher Education Students during COVID-19 pandemic. The research interviewed 20 students in higher education using semi-structured interviews. The interviews were thematically analysed using the four stages. The study found that poor digital literacy, lack of digital learning resources, poor internet connectivity, lack of opportunities for practical lessons and burden of domestic chores were barriers to learning among higher education students during COVID-19 pandemic lockdown. There is need for higher education institutions to invest in ICT to enhance online lesson delivery in challenging pandemic times like COVID-19.

literacy, lack of digital learning resources, poor internet connectivity, lack of opportunities for practical lessons and burden of domestic chores were barriers to learning among higher education students during COVID-19 pandemic lockdown. There is need for higher education institutions to invest in ICT to enhance online lesson delivery in challenging pandemic times like COVID-19.

Subjects: Information & Communication Technology (ICT); Educational Research; Education Studies; Open & Distance Education and eLearning

Keywords: COVID-19; students; higher education; pandemic

1. Introduction

COVID-19 emerged in Wuhan, Hubei province of China in 2019 and spread to other parts of the world, including Zambia. The disease, which is caused by SARS-CoV-2, was declared a global pandemic by the World Health Organization (WHO) on 11th March 2020 (Ministry of Health [MOH], 2020; International Association of Universities [IAU, 2020]). To prevent the spread of the virus, several nations turned to social distancing and lockdown measures, leading to 43% of the world population being in lockdown by the beginning of April 2020 (IAU, 2020). Many nations closed schools and borders (OECD, 2020). In some countries, normal classes were disrupted for at least ten weeks (C. Brown, 2020; IAU, 2020; UNESCO, 2020; OECD, 2020). In Zambia, all schools, colleges, and universities were closed on 20th March 2020 (Hapompwe et al., 2020).

Education plays a significant role in human and community development. Besides enabling development, it promotes health, economic growth, and peace (Global Partnership Education GPE, 2020). In particular, Higher Education (HE) is a key ingredient in growth and development; it brings about innovation, increases employability, promotes health, and contributes to poverty alleviation (World Bank, 2017). Additionally, HE serves as an instrument for competence and capacity building, knowledge generation and dissemination, and skills transfer (MOE, 1996). Its purpose includes the enhancement of the labor market and public service intellectual, cultural, and community development as well as research and scholarship (Badat, 2009). Effectively, HE is a key contributor to national development, innovativeness, and economic stability (World Bank, 2017). However, HE is marred with several challenges.

2. Literature review

Firstly, changing environmental factors lead to changes in learning objectives and aspirations. The eminent shift towards ingenuity, continuous learning, sustainable development, social influence, and empowerment for decision-making calls for a re-focus of HE, to meet the needs of the dynamic world (Girona, 2011). This introduces new challenges for higher education institutions (HEIs) (World Economic Forum [WEF, 2020]). With the advent of COVID-19 pandemic there was need to change the learning delivery mode to circumvent the impact of the pandemic on the learning of students. Considering this it was important that teachers and learners were well versed with the available technology for remote learning. However, Zambia being a developing country there was an immediate challenge to the use and availability of the remote learning technology (De, 2020).

Changing technology is another major challenge for HE (WEF, 2020). Poor digitalization in the education system leads to gaps in teacher and learner skills, the need for digital tools, curriculum adjustment, and conversion of learning materials (Bejinaru, 2019). The adoption of new technology calls for a shift towards blended learning, innovativeness, improved digital literacy, changing role of faculty, and the promotion of digital equity, among other factors (EDUCAUSE, 2019). Additionally, the effects of climate change have added to the cost of cyberinfrastructure as universities resort to alternative sources of electricity (Arnaud et al., 2009). In light of the above assertion, it therefore meant that the quick changeover from face-to-face learning to remote

digital learning system was marred with challenges for teachers, learners and the ministry of higher education.

HE learners are also challenged in the sense that some lack cognitive abilities for knowing, learning, and understanding, while others fail to effectively engage in the learning process. In some instances, the language barrier hinders learning (Fook & Sidhu, 2015). Fook and Sidhu found that large volumes of assessments, unclarified course objectives, and lack of time management in the case of working students were additional challenges faced by learners.

Information and communications technology (ICT) is a key tool in teaching and learning. However, in Africa, the adoption and usage of ICT solutions is hampered by the high cost of bundles, low quality of telecommunications services, and missing ICT national policy, to guide ICT implementation in tertiary institutions (Murgor, 2015). In sub-Saharan Africa, HEIs are characterized by low student enrolment, insufficient qualified faculty, over-reliance on traditional face-to-face approaches to teaching and learning, inadequate public spending on education, and underdeveloped quality assurance systems (Mohamedbhai, 2011). Additional challenges for HEIs in Southern Africa include financial constraints, and brain drain have been recorded (Southern Africa Regional Universities Association [SARAU, n.d.]).

The COVID-19 lockdown led to drastic changes in teaching and learning and impacted many learners at various levels of education (OECD, 2020). The pandemic affected education systems in more than 190 nations, including Zambia (United Nations, 2020), where at least 56, 680 were HE learners were affected (UNESCO, 2020). On 13th March 2020, the government of the Republic of Zambia declared COVID-19 a notifiable infectious disease (SI 2020/21). The number of infections grew from 761 cases and seven fatalities to 11,779 cases and 283 fatalities between 18th May and 28th August 2020 (MOH, 2020).

With the use of ICT, many HEIs were able to facilitate continued teaching and learning, but this did not go without challenges. Some HEIs lacked the IT infrastructure to support online teaching and were faced with the mammoth task of harmonizing academic calendars (United Nations, 2020). Clearly, HEIs with inadequate ICT infrastructure for teaching and learning were ill prepared for the challenge. Many teachers had to adopt new pedagogy minus the assurance of sufficient training (Bao, 2020; OECD, 2020), even in Zambia where lack of ICT skills has been reported (Schurgers et al., 2009). Bao reported that some HEIs face challenges in converting materials to the online platform, and insufficient technological infrastructure support. Furthermore, HEIs suffered retardation in research and community engagement (IAU, 2020).

Boarder closures negatively affected student mobility and threatened the position of international students (OECD, 2020). Some students faced personal challenges hinging on attitude, lack of self-discipline, lack of educational materials, and unconducive learning environments off campus. The OECD reported that students had to use their own resources for learning to the detriment of the learning process, for those with no access to learning tools, while students' success required resilience and commitment. In Zambia, online learning was hampered by electricity rationing (Hapompwe et al., 2020).

Furthermore, loss of teaching hours, disruption in examinations, and insufficient technological infrastructure is expected to negatively affect student results (Sintema, 2020). The impact of COVID-19 may extend into the future as national economies dwindle and budget priorities are adjusted (OECD, 2020).

HE is critical for developing nations because of its potential to foster economic development. This is more so for Zambia, which has a population growth rate of 2.8%, one among the nations with the lowest average age with 4.5% estimated economic decline in 2020 (World Bank, 2020). Zambia recognizes education as a human right (Schurgers et al., 2009). Education is the principal

Table 1. Showing participants by gender, course, year and age range

	Male	Female
Gender	10	10
Courses	6 Engineering 2 Teaching 2 ICT	4 Nursing 3 ICT 3 Engineering
Year	Final year	Final year
Age range	21–35	21–35

driver for the realization of other rights and for sustainable development (United Nations, 2020). Hence, the need to mitigate the impact of COVID-19 on education. This study aims to explore the impact of COVOD-19 lockdown on learning among HE students. The objective of the study is to identify ways in which higher education learners were affected by the pandemic and to recommend learner support strategies for the attainment of educational goals.

3. Methodology

3.1. Research design and sample

The research study utilized an explorative qualitative study (EQS) to explore the impact of COVID-19 lockdown on learning among students in higher education (Pohontsch et al., 2018) as this approach facilitates understanding of the issue from a new perspective. The researchers felt that semi structured interviews would be the most effective method to elicit honest feedback from participants as it allows expression of lived experiences, without the constraint of writing, and allows the research team to better capture their perspectives of the research participants (S. A. Brown et al., 2018). The interview guide was developed based on the literature on pandemic impact and higher education (Johnson et al., 2007; Prochaska & Velicer, 1997). Ethical approval for the research was obtained from Northrise University Institutional Review Board (ethics committee) following review of the research proposal.

Research participants were recruited through four higher education institutions in Zambia. Two of them were public universities while the other two were private universities. Researchers wrote to institutions of higher education inviting learners to take part in the study. Learners who had expressed an interest in participating in the study had their names forwarded to the researchers. Researchers then wrote to potential participants to provide and information sheet regarding the study and arrange a date which was convenient for the participant for interview. Prior to the semi-structured interviews, all participants were asked to read and sign an informed consent form which gave them the right to withdraw from the study at any time without giving any reason. A total of 20 students in higher education were recruited to take part in the study. Table 1 shows participants by gender, course and age range

4. Data collection

The 20 semi-structured interviews were carried out with the learners to explore their experiences of learning during COVID-19 lockdown. Interviews were held through Microsoft Zoom and WhatsApp online platforms in accordance with COVID-19 social distancing requirements to mitigate the risk of possible infection between researchers and research participants. Microsoft Zoom and WhatsApp platforms were preferred as they were cheaper than using a direct telephone call. The interviews were conducted in English by two bilingual interviewers using the approved interview schedule. Prompts were used to expand the exploration and allow new issues to be identified. The interviewers were trained in qualitative research methods and were familiar with all participants. Each interview lasted between 30 and 45 minutes. Interviews were digitally recorded, and contemporaneous notes were made by the researcher to facilitate data transcription and analysis. Interviews were transcribed verbatim by interviewers immediately after the recordings were obtained. Debriefing sessions were held, and field notes recorded. Confidentiality was protected by neither identifying interviewees nor third parties mentioned in the interviews and by

anonymizing the transcripts. Anonymized transcripts and notes were stored securely in accordance with data management procedures.

5. Data analysis

The interviews were recorded and transcribed verbatim. Each transcript was approximately 10 pages long and it contained some rich informative data. The study was guided by the four phases of the silences framework for data analysis (Serrant-Green, 2011). The initial data analysis involved repeated reading of transcripts and extraction of significant statements to form the bases of themes. The identified significant statements were coded, and the initial codes were then regrouped into more abstract themes. The analysis was conducted manually. The codes were regularly reviewed to enhance accuracy and consistency. In line with the four phases of the Silences Framework when analyzing data in the first phase, the researchers analyzed data using captions from the research participants to consolidate the data. In the second phase, the research participants were invited to confirm the data analyzed in the first phase as a true record of what they had told the researchers to ensure credibility of the data collected. In the third phase, the output from the second phase was subjected to the collective user voice group; this was a group of students who were in higher education but had not taken part in the research study. The idea was to subject the findings to a critical associative eye (Serrant-Green, 2011). In the fourth phase, the researchers analyzed the draft from phase 3 to form the final output of the research study which was presented as the main finding of this study. Figure 1 shows the four phases of data analysis

The silences framework analysis phases

6. Results

Thematic analysis identified five key challenges faced by learners in higher education. These were poor digital literacy, lack of digital learning resources, poor internet connectivity, lack of opportunities for practical lessons and burden of domestic chores. Table 2 shows themes generated by frequency and gender.

6.1. Poor digital literacy

The research participants reported a shortfall in digital literacy skills that created challenges in accessing learning materials and preparing assignments. Challenges extended beyond the use of basic computer skills to using digital technologies such as Google Docs and the Zoom platform. Pseudonyms were used to contextualize the captions.

> ..... *"I faced challenges during the first 2 months, didn't know how to open the videos and audios sent on google classroom. Now able to access everything. Got help from my friends."*
> **Joseph** ..... *"My computer skills are above average. Zoom is not a problem but I'm not*

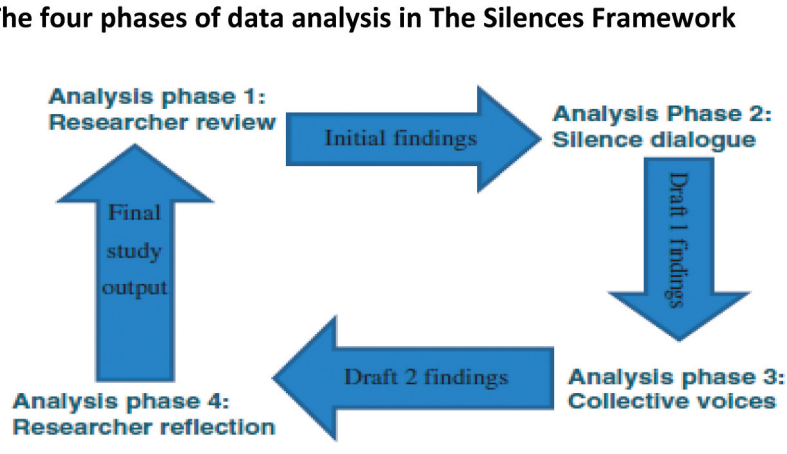

Figure 1. TSF Phases of analysis (Serrant-Green, 2011).

Table 2. Showing theme by frequency and gender

Theme	Frequency	Males	Females
Poor digital literacy	18	10	8
Lack of digital learning resources	19	10	9
Poor internet connectivity	20	10	10
Lack of opportunities for practical lessons	16	8	8
Burden of Domestic chores	20	6	14

familiar with google Docs especially during the last semester I struggled. Further training can help me especially on Calculations on balance sheet." **Monica**

6.2. Lack of digital learning resources

Students reported inadequate access to learning material due to not being able to access the intuitions online library. The overarching theme was that students did not have necessary technology or resources to enable access to online learning resources which were available.

. . . . . ."Learning resources available to us are google Zoom, Google classroom, and YouTube and J-STOR Online library as well as audio and video recordings. It is good because it enabled us to continue. With our studies, I use my laptop and phone to access information. I don't have MIFI nor any other Internet devices which makes it difficult for me to access these materials. We were given online. Books but I can't download them because they consume a lot of bundles, I reserve the bundles for Classes." **Juliet**

. . . . . "I don't have adequate digital devices, we have one laptop which we are sharing with my 2 siblings who are also learning at this institution just have a phone and it doesn't have Zoom application. It's not easy for me." **Peter**

6.3. Poor internet connectivity

All the research participants reported failure to cope with high cost of data bundles. Participants also reported issues of unstable and slow internet connectivity which was worsened by intermittent supply of electricity.

. . . . . "It hasn't been easy, have been finding challenges with bundles. Zoom needs more bundles and they're expensive, google classroom is much better, it's easy to use and to access. At times networks are bad and this is worsened by electricity black outs, at times go to the internet café where they use a generator for power and it's expensive." **Kudzi**

. . . . . "The situation was really bad during the first 2 months. We had to find ways to cope up with the new normal. We are six girls at our boarding house so we contributed money to buy a modem. We use one personal computer (PC) and one phone. We engage parents early enough to provide data bundles so that we don't run out." **Achimwene**

6.4. Lack of opportunities for practical lessons

Participants reported challenges in accessing labs and not being able to complete practical lessons in Engineering, ICT, Chemistry and Biology. Nursing students similarly reported being unable to participate in simulation training since they were learning from home online, outside the university. Nursing students who were on clinical attachment had to stop their internship in the hospitals, which further impacted on opportunity to learn or practice practical skills.

. . . . . ."Practical sessions are challenging, time is limited for practical courses on google Zoom, and we just have explanations, at the beginning instructors were also not ready for

online teaching though effort was made in trying to understand it, have seen one lecturer making practical demonstrations. If practical videos are sent, this will help us to revise them on and on." **Mawa**

. . . . . "My courses do not require practical sessions, my program (BBA) is favorable for online courses. However, those who do programs that require practical skills are only told how to do them, so better for the university to train them to perform practical skills using the laptop. Some teachers are well equipped in use of computers." **Mavuto**

6.5. Burden of domestic chores

Additional burdens were reported by students that impacted on their capacity to engage with learning. Many female participants reported that they were overburdened by household chores whereas male participants reported the need to take up part-time employment to raise money for school fees, since most of their sponsors were affected by COVID-19 lockdown. These additional demands on their time negatively impacted on their capacity to learn.

. . . . . ." It needs a lot of concentration to work on your own. Helped to dress chickens since it's where my fees come from. At times would attend Zoom class dressing chickens with my earphones on. It's really hectic apart from that I'm expected to assist with other household duties." **John**

. . . . . "My guardian was affected by COVID-19 lockdown, his working time was reduced meaning decrease in his monthly income have to go for part-time employment to compliment my fees, joined my brother who lay bricks though it's not an easy task. By the end of the day, it leaves me tired so much so that I can't even concentrate." **Gloria**

7. Discussion

Within this study research participants reported a lack of digital literacy skills, thereby facing challenges in accessing learning materials and preparing assignments, using Google Docs and using the Zoom platform where most of the lectures were being launched from. These findings concurred with De (2020) who asserted that there was an immediate challenge for both learners and teachers' capabilities to use the available remote learning resources. The use of digital technology is becoming increasingly central to the achievement of learning outcomes in higher education, and education in general (Knox 2019). However, this relies on the ability of both teachers and learners to have the underpinning digital literacy skills necessary to engage with available technology. During the lockdown period, these digital literacy skills were critical in allowing effective delivery of distance education.

Considering the above, there is need for the central government, through the ministry of higher education, to invest in digital literacy training to prepare learners for eventualities that may affect delivery of face-to-face lectures, such as with the COVID-19 pandemic. As a long team strategy to circumvent the problem, digital literacy should be incorporated in the curriculum from primary education up to higher education. Institutions of higher education like universities also need to invest in digital literacy training for both staff and students to enable delivery of virtual learning.

The availability of digital learning resources is an integral part of online learning and critical to achieving learning objectives, especially when virtual learning methods are being utilised. The availability of such resources in low- and middle-income countries is very limited owing to poor funding of the higher education sector (Frehywot et al., 2013). This research identified that participants had inadequate learning resources for effective study during the pandemic period. This ranged from limited access to online learning resources to being unable to access the appropriate hardware needed to enable learning, such as computers, I-pads and Kindles. These findings were corroborated by Murgor (2015) who reported that education in developing countries was marred with poor and unavailability of equipment for remote learning. This lack of resources

drastically affected learners' ability to fully engage with the learning processes during COVID-19 pandemic thereby impacting on the achievement of learning outcomes.

In order to prevent a recurrence of this situation, there is need to invest in digital resources that can be borrowed and used by students, particularly in pandemic periods such as COVID-19. Alternatively, access to resources may be improved by establishing community-based learning cafes with digital equipment and resources that can be used by learners at a nominal charge to undertake virtual lessons during periods when they are unable to attend class-based activities. The nominal charge can be invested back into the community initiative to enhance sustainability of the cafes project (Kumar, 2004). Such strategies have been found to be effective at community level in some community-based projects elsewhere around the world. These practical solutions, however, would require significant investment and would require support from central organisations, such as the government.

One of the themes identified by the participants was the problems encountered with unstable and slow Internet connectivity, which was worsened by intermittent supply of electricity. These findings concurred with Mohamedbhai (2011) whose findings asserted that remote learning in many developing countries is affected by poor internet connectivity and poor constant power supply to drive remote learning gadgets. The internet is a key educational resource (UNESCO, 2003). Good internet connectivity enables learners to access course materials and other scholarly information when undertaking distance learning (Bon, 2007). It also enables one-to-one teaching and learning as well as group learning. Participants also reported difficulties in coping with high cost of internet bundles at a time of economic downturn.

To alleviate these problems, a stakeholder approach to problem solving must be adopted to invest in high speed Internet connections and form consortia for the purpose of negotiating the cost of bundles and possibly enhance open access of internet for students to use (Bon, 2007). The ministry of higher education needs to engage and facilitate collaboration with the private sector to provide affordable Internet access to universities (Gunga & Ricketts, 2007). The government must also prioritize the development of technology infrastructure and provide tax incentives to key players in the technology industry, such as reduction of import duty on the important internet equipment. Additionally, the government must develop a strategy for a sustainable power supply to avoid widespread interruption of virtual learning.

Participants in this research study reported hardships in acquiring hands-on experience and challenges in accessing laboratories to perform practical lessons in Engineering, ICT, Chemistry and Biology. Nursing students similarly reported being unable to participate in clinical simulations since they were learning from home and those on clinical attachment had to discontinue their internship in the hospitals they were attached to. These findings were not peculiar to Zambia alone but were also echoed by Sintema (2020) who propounded that in many developing countries there was lack of effective infrastructure to support practical learning. As higher education continues to adapt to new expectations from students, experiential learning in business, accounting programs, health and engineering has become more important. Practical work promotes experiential learning and enables confirmation of the theoretical understanding of concepts (Wrenn & Wrenn, 2009). Not being able to complete this experimental learning deprives the learner of valuable opportunities to practice and refine their skills.

While practical experience cannot be easily replicated in a virtual world of education, there is need to consider how technology can be used to effectively deliver practical skills training and simulations. The use of video conferencing technology may also be considered as one way to engage learners with practical elements and should be user-friendly and easily accessible (FutureLearn, 2020). Opportunities to engage with low-risk activities should also be considered, such as attaching student nurses to units with low COVID-19 prevalence. This would allow continuity of learning and provide students valuable time to correlate theory into practice and

conceptualize the information learnt. Learning from the current pandemic situation, it is essential that central organisations such as the government and General Nursing Council develop disaster preparedness strategies and policies which would support the safe delivery of education and clinical placements in future disease outbreaks.

Carroll's model of school learning states that, "the degree of learning effectiveness is defined as a function of the time needed for learning and the time actually spent for learning (OECD, 2016; Seel, 2020). Ukpong and George (2013) found that students who spent longer hours in studying performed better than those who did not. Thus, learner time to study is a fundamental requirement in achieving the learning outcomes. The burden of work and house chores hinder learner success (Chinyoka & Naidu, 2014; Reich et al., 2013) in that it takes away learner time for study and rest. Most of the female participants reported that they were overburdened by household chores, which took away most of their learning time. Some of the male participants had to take up part-time employment to raise money for school fees and food for the family, since most of their sponsors were affected by COVID-19 lockdown.

To reduce the burden of house chores, the government should invest in community sensitization efforts, to educate parents and guardians about the importance of education and the effect of house chores on learning (Chinyoka & Naidu, 2014; Emmanuel, 2015; Reich et al., 2013). Furthermore, civil society must advocate for a cultural shift where parents and guardians take away some responsibilities from learners. There is a relationship between effective time management strategies and learner success (Adams & Blair, 2019). As such, learners must practice effective time management strategies such as establishing schedules that adequately cater for learning as well as house chores (kpong & Goerge, 2013). Additionally, learners must engage their parents and guardians to come up with effective ways of handling house chores so that their learning is not negatively affected. Furthermore, sponsors must provide adequate funding, to take away the burden of working while studying. Alternatively, learners should plan to work during study breaks rather than in term time.

8. Implication for practice

Digital inequalities may be evident in access to technology, as well as differences in digital literacy which will further impact on students' ability to engage with remote learning (Beaunoyer et al., 2020).

There is need for higher education institutions in low- and middle-income countries to develop and improve methods of online delivery in education to mitigate learning challenges during pandemic periods like COVID-19. More importantly, there is need to incorporate digital literacy in the national curriculum from primary education up to university to inculcate these critical skills for learning in the digital age. More investment is needed to train teachers in higher education who are equipped to undertake remote teaching using a wide range of technologies. There is also need for mental health support skills among higher education teachers to support the students in pandemic times like COVID-19. There is need for craft literacy and craft competence among policy makers to make policies that are cost effective and practicable.

9. Limitation of the study

This research was contacted in one province of Zambia, future researches should incorporate other provinces in Zambia to enhance comparison and possible generalization of the findings across the country. This research used a qualitative approach to explore participant experiences and the impact of COVID-19 on learning, in future a research incorporating both qualitative and quantitative methods may be needed to explore a wide range of issues from different epistemological and ontological positions.

10. Concluding comments

COVID-19 pandemic has enormously impacted on the teaching and learning of students in higher education. The challenges have limited the ability of students to achieve their learning

outcomes effectively. Considering the findings of this study, there is need for universities to invest in ICT teaching and development to enhance uptake of online lesson delivery in challenging pandemic times like COVID-19. The higher education departments need to develop a strategy to deliver education in pandemic times. More importantly, there is need for higher education teachers to be trained in delivering remote learning as part of preparing for pandemic eventualities.

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Disclosure statement
No potential conflict of interest was reported by the authors.

Research Novelty

- This research highlights the impact of COVID-19 on Learning among Higher Education Students in a low resourced country and contextual to the economic and environmental factors of the country in question.
- The research also provided possible solutions to the identified problems specific to the country where the study took place.

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