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Funding the online teaching and learning in developing countries: insights from Zimbabwe

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Abstract

While the outbreak of COVID-19 in December 2019 threatened educational activities in Higher Education globally, it renewed the interest in online learning and teaching in developing countries. To frame our understanding, we employed the Technological Readiness Index lens to investigate the institutional needs necessitated by the sudden uptake of online teaching and how these needs could be funded in one of the developing countries in Africa.15 Heads of Departments (HODs), working in different universities across Zimbabwe, participated in the in-depth interviews and WhatsApp discussions to generate data. Findings replicate that while HODs noted the indispensability of online teaching to embrace the Fourth Industrial Revolution (4IR), universities were confronted with trenchant institutional needs, for example, the absence of well-trained personnel, poor digital infrastructure and cyber security of which most of them emanated from inadequate funding. Considering this, the study proposes that rather than depending on traditional donor and stakeholder quota funding, governments of developing countries must liberalise internet trade markets through legal frameworks to de-monopolise the provision of internet services to reduce costs of erecting digital infrastructures and provision of services. This study, provides insights and extends scholarship on other funding strategies available for the digitalization of education in higher education.

Keywords Developing countries · De-monopolise internet trade · Funding · Institutional needs · Online teaching

Introduction

It is generally accepted that online teaching and learning in developing countries had gained both currency and serious attention in the education sector following the outbreak of COVID-19 in December 2019. Although embracing the benefits of the Fourth Industrial Revolution (4IR) in education was on the cards for some time in the developing countries (Kaisara & Bwalya, 2021; Mpungose, 2020; Zongozzi, 2020), little had been done by them

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to ensure total online teaching and learning. Subsequently, before the outbreak of COVID-19, very few institutions in developing countries, if there were any, had made tremendous efforts to wean themselves off from the traditional face-to- face teaching and learning mode and shift to remote teaching. Those which attempted to do so, were institutions that offered distance education and their operations were basically hybrid teaching and learning (Kaisara & Bwalya, 2021). Therefore, this study observes that until the outbreak of COVID-19, online teaching and learning have been considered more in developed than developing countries; and recent developments on how to contain COVID-19 have led to a renewed interest in using online teaching and learning. For that reason, the next decade is likely to witness a considerable rise in the use of online teaching and learning in higher education in these countries.

When online teaching and learning became mandatory and an alternative after the outbreak of COVID-19, a large volume of research explored challenges faced by lecturers and students (Chimbunde, 2021; Azman & Abdullah, 2021; Bowden, 2021; Dhawan, 2020), overlooking institutional needs. Previous work has mainly focused on prospects and related challenges encountered by key participants in education. Although this approach was plausible in discerning the trend of online teaching, it failed to take into account the funding strategies to address the new institutional needs necessitated by the sudden interest in it, triggered by COVID-19. In this study, we unpack this unchartered area using the Technological Readiness Index (TRI) lens and construe meanings from the HODs' perspective on the new institutional needs posed by virtual learning necessitated by both the Fourth Industrial Revolution (4IR) and COVID-19. The study was guided by the following questions:

1. What new institutional needs were posed by the uptake of online teaching and learning after COVID-19?
2. How can these institutional needs be funded in Higher Education?

Based on these questions, the study is significant as it x-rays institutional needs necessitated by the sudden uptake of online teaching and learning and how to fund them thereof. This study therefore, provides insights and extends scholarship on how to mitigate challenges of underfunding (the source of most generic university needs) to drive the digitalization of education in higher education necessary to adopt the 4IR amid COVID-19 and beyond.

COVID-19 and online teaching in higher education

The predominant mode of instruction in many Higher and Tertiary Education Institutions before COVID-19 in developing countries in general and Africa in particular was face-to-face teaching (Aboagye, 2020; Adarkwah, 2021; Beans et al., 2020). This was because online programmes and learning had not been fully embraced and institutions of learning appeared so obsessed with the traditional on-campus programmes and face-to-face tuition. The recent COVID-19 pandemic and the global turn towards virtual learning by Higher Education in response, have rejuvenated the interest in online teaching and learning and motivated researchers to conduct studies in various fields. The education sector was not spared as evidenced by an upsurge of research in diverse context across the world. For example, Ewing and Cooper (2021) report the perspectives of Australian teachers, students and parents on technology-enabled remote learning during Covid-19. In their qualitative, interview-based study, Atiles et al. (2021) unearthed the experiences of educators of

3–6-Year-old children in public and private institutions from the United States and various Latin American countries to better understand early childhood teachers' experiences during the COVID-19 pandemic. In Singapore, Müller et al. (2021), extended our understanding on university educators' e-Learning perspectives, practices, and future adoption intentions. Almeida and Monteiro (2021) present a study from Portugal which examined the challenges of assessing and evaluating the students at a distance. A binary study by Schiff, Zasiekina, Pat-Horenczyk and Benbenishty (2021) examined university students' functional difficulties and concerns during COVID-19 pandemic in Israel and Ukraine. From these studies and others from Africa, though uncited herein for the sole reason of space, helped us to better understand how COVID-19 has helped in seeing the importance of shifting to online teaching thereby embracing the 4IR which is the way to go in the digital society.

Several studies, (for example, Chimbunde, 2021; Azman & Abdullah, 2021; Bowden, 2021; Dhawan, 2020) are in total agreement that the advent of Covid-19 with its emerging context set the pace in rethinking of pedagogical approaches to use in Higher Education and has resulted in universities shifting their programmes to teaching online. Additionally, literature further confirms that most academics share their sentiments that the Covid-19 crisis has brought forward the digitalisation of education by a full generation. Thus, resorting to online teaching and learning amid and after the Covid-19 pandemic was and is clearly a step towards embracing the 4IR. The turn to virtual learning was, however, sudden and fraught with challenges as it demanded new developments and interventions in teaching and learning not only for the developing but also for under developed countries. The studies reported challenges experienced by lecturers, students and parents.

More recent evidence suggests that lecturers lacked knowledge and skills to convert offline (hardcopy) materials into online (softcopy) materials and share them on online platforms (Chimbunde, 2021; Dhawan, 2020; Zhang, Wang, Yang & Wang, 2020). Additionally, limited internet access due to unstable internet connection, unstable internet speed, and insufficient data for those who were using mobile data were among the challenges the lecturers encountered (Reimers & Schleicher, 2020; Izhar, Na & Na, 2021). Put together, university lecturers had to meet new online education challenges which include; demonstrating pedagogical skills in an online classroom, addressing their teaching role, establishing relationships with students, and providing technical support among others.

Online teaching in Zimbabwe and Africa

Not only did lecturers in Africa, faced acerbic challenges posed by online teaching and learning, but also students. They encountered hurdles in areas of accessing the internet, purchasing the data bundles and owning user friendly tools (Izhar et al., 2021; Kaisara & Bwalya, 2021), depending on their geographical location and their socio-economic power. In several developing countries students are reported to have challenges in accessing online classes due to the high cost of data bundles. For example, this finding is evident in many studies undertaken in African countries which include Nigeria (Abdullahi, Sirajo, Saidu, & Bello, 2020); Ethiopia (Mengistie, 2020); Namibia (Kaisara & Bwalya, 2021); and Zimbabwe (Beans et al., 2020; Taru, 2020). Additionally, UNESCO (2020) reports that 82 per cent of students in Sub-Saharan Africa do not have access to the internet because of pricey data bundles, weak network signals, and poor network coverage. While literature presents various problems which confronted Higher Education during the transition to cyberspace learning, this study argues that the level of institutional needs differ by context

and country, with serious problems evident in under developed and developing countries. Literature (eLearning Africa, 2020; AU, 2020) shows that more universities in Europe than Africa were able to immediately move to online teaching. Furthermore, a survey by Africa Union (AU) (2020) reveals that by May 2020, only 29 per cent of universities in Africa had shifted teaching and learning to online platforms compared to 85 per cent in Europe. The statistics provides credible evidence that under developed and developing countries are struggling differently to adopt and use online teaching and learning. On noticing this challenge and due to the increasing spread of the Covid-19 virus, some countries like the United States, Germany, Denmark, Australia and Taiwan stepped in to support higher education in Africa, during the pandemic period (Beans et al., 2020) by providing funds that enabled the transition to online education in some education institutions. Otherwise, the funding remained in the hands of students, parents and the donor community who directly benefited from the activities of the universities (Gambo & Fasanmi, 2019).

Summarily, literature on COVID-19 induced online teaching and learning in Higher Education is centred on prospects and the challenges that the lecturers, students and parents faced. Studies in the first stream report the lack of pedagogical skills by lecturers to navigate the online platforms as a major concern while the second category presented challenges of internet access and connectivity which students in developing and under developed countries experienced. The third stream is fairly scant in comparison to the latter. However, put together, these studies are insightful and remarkably in that they help us to comprehend how COVID-19 has challenged the traditional practices and situations in education and in the process accelerated the uptake of the online teaching and learning. We are now certain, from the studies, of the pedagogical needs imposed by COVID-19 induced online teaching and learning from the perspectives of students and lecturers. Nevertheless, scholarship on the institutional needs of Higher Education posed by the sudden uptake of online teaching and learning amid covid-19 remains scanty. Furthermore, an understanding of how to fund the new institutional demands in the context of virtual teaching and 4IR is absent. The voices of the Heads of Departments (HODs) in these issues is inaudible. Against this backdrop, this study is a departure from what has been researched and reported in developing and under developed countries. The study presents the perspectives of HODs of universities on the funding of institutional needs which are necessary for the uptake of the 4IR in the new normal of living with COVID-19.

Theoretical framework

The study, guided by the Technology Readiness Index (TRI) investigates the institutional needs triggered by the sudden transition to online teaching and learning amid COVID-19 and future emergencies, drawing insights from HODs of universities in one of the developing countries in Africa. The TRI is a framework, originally advanced by Parasuraman, to evaluate the capability of persons to adopt and use technology (Parasuraman & Colby, 2015). Although the TRI was initially developed to measure the ability of individuals to adopt to technology, this study extends that view and instead of using TRI to measure the individual ability, it assesses universities or organization's capacity to adopt and use technology. Thus, this study used TRI to check the institutional needs of universities in developing countries as they transit to cyberspace and provide online teaching and learning. In so doing, the study identifies the inhibitors and enablers to the adoption and use of online teaching and learning as evidently beamed by the TRI lens.

At the core of TRI, are four concepts which are used to comprehend an individual's state of mind, viz.: 'optimism; innovativeness; discomfort; and insecurity' (Parasuraman & Colby, 2015, p. 60). In the TRI framework, optimism is seen by the presence of a positive mindset, that is, the belief that one can accomplish the envisioned goals by using technology (Kopcha, 2012). The positive mindset of institutions are vested in the members of staff and in the context of this study are the HODs. Innovativeness, as embedded in TRI, are actions directed at becoming the first in a group to acquire technology, showing a preparedness to use technology, and being a constant information-seeker in respect of new technologies (Falloon, 2013). This tenet helped me to introspect what universities as entities needed to smoothly transit to online teaching and learning, thereby, showing their level of preparedness. Discomfort entails displaying evidence of struggling to comprehend how technology is used (Ifenthaler & Schweinbenz, 2013). Contextually, this characteristic was useful to unpack the institutional inhibitors which became the institutional needs to be satisfied for the effective adoption and implementation of the online teaching and learning. Lastly, insecurity is seen as resulting from distrust based on concerns about security and privacy (Ampofo, Biziman, Mbuthi, Ndayambaje, Ogeta & Orodho, 2014). Discomfort and insecurity can affect HODs' perceptions of technology and thus limit the potential value of technology diffusion across universities. The four concepts at the core of TRI are related as the first two are enablers while the last two serve as inhibitors. It is for this reason that the TRI was deemed the most appropriate theoretical framework for establishing a holistic picture of the new online institutional needs of universities activated by the sudden uptake of online teaching in universities. It also assisted in developing the themes for data analysis.

Methodology

Drawing from the HODs' perspectives and guided by Technology Readiness Index, the case study set out to investigate new institutional needs triggered by the transition to online teaching and learning which was accelerated by the outbreak of COVID-19. The study used the qualitative research approach which is informed by the interpretive research paradigm to address the research problem because we were interested in obtaining first-hand information of what HODs of universities believed to be the new needs unfiltered through operational definitions (Taylor et al., 2016). As such, we suspended our own assumptions, predictions, hypothesis and views about the new demands posed by the transition to online teaching and then interpreted the perspectives of the HODs. The qualitative approach was appropriate because my focus was on learning the meanings that the HODs hold about the new institutional needs (Creswell & Creswell, 2018). The study adopted a multiple case study design to generate data in order to get a holistic picture of the institutional needs by the various universities in diverse context. From the 25 universities in Zimbabwe, it picked three public universities and two private universities to make a total five universities as these made a true representations of the kind of the universities in Zimbabwe. Each university provided three HODs and represented a case. The choice complies with Stake (2010) who submits that when one picks at least two relatively similar settings of data in a single study, it becomes a multiple case study. The multiple case study design is a variant of the case study design which involves studying two or more cases on the same phenomenon (Stake, 2010). Employment of the multiple case study design was helpful as it enabled me to generate insights that expanded my understanding of the institutional needs by various universities as they manifested across the cases. The HODs were selected from public and

church run universities which served as true representation of universities in developing countries.

After being granted permission by the university administrators, we used purposive sampling technique to elect HODs in the five universities. The study made a deliberate choice of them due to the qualities which they possessed. Simply put, we decided from the research problem what was needed to be known and then we set out to find HODs who could and were willing to provide the information by virtue of the knowledge of institutional needs they possessed (Yin, 2018). We selected them on the basis that they were information-rich because they were individuals who were proficient and well informed with a phenomenon under study. Besides, their availability and willingness to participate, and the ability to communicate experiences and opinions in an articulate, expressive, and reflective manner made them the best participants. A total of 15 HODs took part in the telephonic in-depth interviews and WhatsApp discussion to generate data on the new institutional needs posed by virtual learning amid COVID-19. The in-depth interviews lasted approximately 30 min. We employed open-ended questions which enabled the HOD to express in detail and in their own words how they conceived of their university needs and made sense of it (Patton, 2015). The in-depth interviews helped us to understand the experiences of the HOD from their perspectives and in their own words (McMillan & Schumacher, 2010). To triangulate the data, we backed up the one on one in-depth interviews with the WhatsApp discussions after creating a WhatsApp group. The WhatsApp discussion generated a wider range of responses than individual in-depth interviews, resulting in richer and holistic data on the research problem (Taylor et al., 2016). The richness and depth of the data was increased as discussants elaborated on each other's views. Other than data triangulation, the trustworthiness of the study was further enhanced by member checks. We telephonically took data and interpretations continuously to the HODs for verification, corrections, and additional information. To organise the data, we applied thematic analysis (Braun & Clarke, 2006). First, the data were repeatedly read carefully, and notes were made to identify the basic units for analysis. Next, was coding the expressions of institutional needs as identified in each HOD's interviews and the WhatsApp discussions. We then collected the citations and codes into a comparative table. Thereafter, we reviewed the codes between the HOD's interviews and generated themes characterising institutional needs which was, 'identifying the "essence" of what each theme is about' (Braun & Clarke, 2006 p. 92). We then reported the findings thematically.

Findings and discussions

This study investigated the institutional needs posed by the sudden uptake of online teaching and learning and explored how these needs could be addressed. Using the tenets of the TRI framework, we picked the essence of each theme which was developed using the model by Braun and Clarke (2006). The findings were synthesized, analysed and discussed using extant literature and the guidance from the theoretical framework.

Optimism and digital infrastructures

Data generated from in-depth interviews and WhatsApp discussion with HODs indicate that universities as represented by them were optimistic that online teaching and learning was the only way to go in the context of pandemics and disasters that outstrip the traditional face-to-face teaching. HOD1 remarked that, "*we find online teaching*

and learning very useful in our department. Students rely on it for continuity of education." The HODs further explained that the adoption of online teaching changed the way lecturers interacted with the students and their pedagogical approaches. HOD3 says, "*The use of technology help our staff to teach in more effective ways because they can refer the learners to the internet to back up their lectures.*" All students received the same content regardless of where they lived. HOD4 commented that, "*students from diverse geographical areas are able to learn during these times of social distancing to contain COVID-19.*" The sentiments expressed by the HODs reflect their degree of optimism. Intrinsically, the finding lends support to the TRI tenet of optimism and shows that HODs and their colleagues used technology to enhance classroom interactions and were thus optimistic that technology increased levels of learner engagement, together with improved learner results and improved digital skills (Partin & Lauderdale, 2013). The finding seems to suggest that some HODs in Higher Education have a sense of control over the online teaching, which led them to believe that they could assist students. Moreover, some HODs had the perception that online teaching offered a solution to teaching and learning during pandemics like COVID and can effectively replace the face-to-face learning. However, this finding is inconsistent to other studies which report that rather than being a labelled as a panacea to ensure continuity of education during the pandemic period, students, in some countries, claimed that the provision of online teaching and learning could not replace the face-to-face classroom environments (Adnan & Anwar, 2020). However, we argue that online learning is also developed through interaction and that it is also a collaborative process where learners actively participate in writing and reading messages with each other and with the instructor.

In response to what could be needed by institutions to make the online education closer to the traditional face to face education, HOD5 suggested that, "*this is only possible if universities build state of the art information and communication technology infrastructures and the internet service providers reduce the costs of data.*" In view of the above. The study argues that while online teaching and learning in Higher Education is a key undertaking of the 4IR, digital infrastructure and resources present in developing countries are prohibitive to reach the same level of teaching experienced when the face-to-face mode is employed. Classroom interactions is fraught with both strengths and limitations regardless of whether it is online or otherwise. For example, the work of Ebner and Holzinger's (2005) reports that not all users are equally active in an online community, and that there are indeed individuals who never actively participate—the so-called lurkers. However, the goal is to try to make online education much closer to face-to-face teaching and learning. Currently, universities in developing countries are trying to make it closer using the little resources that they have, but it will never be the same unless they partner and share the challenges with internet service providers to reduce bills related to setting up digital infrastructures and data costs. A cursory look at the sentiments of the HODs in this study, seem to suggest that one critical prerequisite needed for the proper implementation of online teaching in universities is the availability of technological savvy personnel. This indicates that the issue of resources is not confined to digital infrastructure and funds for data bundles alone but rather extends to human resources. This is because resources do not necessarily exist in physical material form, they also reside in the human mind. In most cases, resource outlay or initial investment can often be used to predict implementation of any new programme and online teaching and learning is no exception.

Innovativeness, digital skills and online assessment software

Based on the WhatsApp discussion and in depth interviews, it emerged that HODs in universities were not able to easily learn new technologies and keep up with new technologies despite that online teaching had been on the cards for some time. As said by HOD2 that: "*not all of us are conversant with new technologies currently in use. During our training at universities, online teaching and learning was unheard of. We are not ready …*" It also emerged that some HODs had no positive mindset to the sudden introduction of online teaching and learning. Some of them were not technological savvy hence the coming in of online teaching threatened their teaching autonomy. As argued by HOD3 that:

> *My digital skills are poor. I cannot navigate some of the online platforms and success of online teaching relies on my ability to use them. These hurdles make me a learner in a field I had worked for over twenty years. Thus, I prefer face to face teaching to online. Online teaching is testing my relevance in university.*

It also emerged that HODS could not easily accept the shift to online teaching and learning. HOD10 remarked that, "*though technological change is omniscient present in the education sector, acceptance of it by lecturers is quite a barrier.*" HOD9 added that: "*some of us were born before computers and thus we lack digital skills which threatens our autonomy.*"

From the TRI lens, the HODs' voices shows that their actions were not directed at becoming the first personnel in their departments to acquire technology, thus showed little preparedness to use technology and embrace the 4IR (Falloon, 2013). HODs were also afraid of the unknown future brought by the introduction of online teaching. They feared their work could be taken by one person teaching many students at one go. This finding supports Chimbunde (2019, p. 41) who argues that many of the change agents dread the unfamiliar that the suggested shift to online teaching may make them feel "threatened about their ability to perform the assigned tasks and even about losing their jobs.'

It was also a finding of this study that institutions in developing countries were still not able to assess students online and that area has to be upgraded and put in place. HOD 5 remarked that: "*our university has no software that we use to assess students using online platforms and most lecturers are incompetent in this area.*" While this finding was evident in Zimbabwe, one of the developing countries, it rejects findings in developed countries as reported by Coghlan et al. (2021) that educational institutions can supervise remote exam-takers simply by watching live online video such as via Zoom, online proctoring (OP) software programs which can be human-led and/or automated. From the TRI lens, the failure to have and conduct online assessment of students shows lack of innovativeness. It was found that the majority of the HODs had no confidence in their ability to be innovative in their adoption of online teaching. They believed they could not assess students using software which other universities were doing (Coghlan et al., 2021). Considering this finding, it shows universities in developing countries do not possess the skill to assess students online. The study argues that these universities should confront scarcity of the software and ignorance and then borrow from the developed world how that online assessment can be done successfully though research reports that its flaws raises ethical issues (Coghlan et al., 2021).

Discomfort and staff training

From the in-depth interviews, HODs showed discomfort on the use of technology and suggested that they get trained. Moreover, they indicated that technology was overwhelming. As posed by HOD2 that, *"… with technology, we have lost control of our students. Besides, technology is too demanding for old lecturers like us."* HOD7 had this to say: *"Technology has brought more harm than good. We are overstaffed now because teaching online can allow one to teach many students effectively."* This confirms discomfort as embedded in TRI which explains that when people fail to comprehend how technology is used; express discomfort about the potential lack of control regarding the use of technology; and find technology overwhelming then that is called discomfort (Ifenthaler & Schweinbenz, 2013). In essence the HODs' narratives displayed evidence of struggling to comprehend how technology is used. Such discomfort impacts negatively on the lecturers' work and attitude. HOD5 suggested that their mindset had to be changed so that acceptance of online teaching becomes viable of which she says, *"To clear the confusion and pursue the same vision, we need to be workshopped on the prospects of the 4IR and online teaching."* In addition, some of the HODs called for training to handle online platforms. As narrated by HOD8 that, *"we are not competent enough to navigate online platforms. Only training on this aspect will salvage us from such challenges."* This resonates with Chimbunde (2021) who supports that those old lecturers who had no previous digital training, had to undergo retraining to equip and align them with the dictates of the online teaching and teaching in the area of pedagogics and didactics. Given this situation, the finding suggests that universities need personnel who are trained in digital skills if effective online teaching is to be realised. Based on this argument, it follows then that the success of online teaching in Higher Education hinges not only on the availability of both physical and human resources but also on the training of HODs. Built from this, training for HODs in digital skills is therefore considered a critical factor in the implementation of the online teaching and learning (Chimbunde, 2021). Without it, HODs may not become competent e-lecturers. As such, a comprehensive training of implementers on online teaching is so important.

However, contrary to the above argument, a unique finding of this study indicates that it was a big task for universities to ask senior lecturers and professors to undergo training on how to navigate the online platforms without increasing anxiety and concerns among them given their vast experience in education despite their limited proficiencies in this regard. As posed by HOD2 that:

> *Lecturer awareness and development of online teaching remains one of the most sensitive but urgent issues if it is to be successful. The challenge is to find a better way to teach the educators without embracing them. There is need to involve the lecturers because universities cannot compel them to train without their buy in and consent.*

The finding indicates that lecturers are critical agents in the adoption of online teaching and therefore their concerns need to be addressed with caution to avoid clashes. This observation suggests that a bottom-up approach can be relevant to introduce the online pedagogical reform and might be more effective than top-down which is more like an imposition which can strain the relations. For that reason, if lecturers can be shown to understand the benefits of discussing their own experience, they possibly will become less defensive and more open to the suggestions of any forms of staff development.

Insecurity and cyber security

It emerged from the WhatsApp discussion and in-depth interviews that while some HODs were not prepared to abandon the online teaching and learning in the future, they possessed a sense of insecurity with regards to issues to do with cyber safety and plagiarism. HODs commented that:

> *The Fourth Industrial Revolution is here to stay….. Online teaching is the only sure way to go in the face of pandemics such as COVID-19. My concern is on passing students based on other people's work. In addition, cyber space is infested with hackers. We are at risk and the future is unknown.*

This kind of insecurity is better explained using the TRI lens which advance that insecurity is seen as resulting from distrust based on concerns about security and privacy. The finding confirms several studies (Ampofo et al., 2014; Kabanda, 2018; Ulven & Wangen, 2021) which acknowledge the emergence of cyber insecurity in higher education. Given this, the paper argues that insecurity can affect HODs' perceptions of technology and thus limit the potential value of technology diffusion in their universities affecting the students as well. What follows from this finding is that universities in developing countries must install software that guard against plagiarism where students' work is subjected to a plagiarism software which detect similarity of work. Furthermore, cyber safety mechanisms such as laws must be put in place to protect internet users from the rising cyber insecurity. This lends support to Ulven and Wangen (2021, p. 1)'s claim that the demands for information security in higher education will 'continue to increase because serious data breaches have occurred already and are likely to happen again without proper risk management.' In the same context, Kabanda (2018) observes that in Zimbabwe over 140 cases of cyber-crimes were reported which include phishing, credit card fraud, identity theft, unauthorized access, hacking, and telecommunications piracy. We argue therefore that the prevalence of cyber-crimes with no measures taken to demystify them affects the lecturers' support on the adoption of online teaching.

Funding the emerging institutional needs

It came out from the in-depth interviews that universities in developing countries needed funding to address their institutional needs premised on the belief that shifting to online teaching is more expensive than maintaining the traditional face to face learning. HOD9 suggested that:

> *Our greatest challenges is poor funding. With funds we can set digital infrastructures, train our personnel, set up cyber security measures and subscribe to any internet service provider. Online teaching is expensive to run unlike the face to face teaching.*

A follow up on how to close the gap on funding, HOD 7 submitted thus:

> *Shortage of resource support is a challenge. We have our own traditional means of getting funds but these are limited. I believe the government, the corporate world and the universities can team up to build the digital infrastructures and reduce the costs of internet service. Universities serve the community and the community is an agent of change within universities*

This finding suggests community engagement in social change and education. The narrative shows that the HODs in this study were aware of the institutional needs though universities from developing countries could not provide them because of financial constraints. Often, international development programs envision online education that bank on on the same kind of infrastructure that would be accessible in developed nations. However, less-developed countries do not have this same level of infrastructure. A major finding from the reflections of the HODs narratives indicates that while universities are agents of community, the community itself must be responsible for the changes within the universities. Interestingly, the suggestions made by the HODs revolve around partnership, where stakeholders are expected to shoulder the costs for the establishment of digital infrastructures as well as data costs. The study agrees with the HODs that the internet service providers as beneficiaries of online teaching and learning through selling their services, have a social responsibility to plough back their profits to their clients. Shortages of resources as narrated by HODs could only be solved if all key players develop a collective psyche characterised by the values of social responsibility which encourages stakeholders to plough back their resources to the community they serve for the sustenance of the implementation of online teaching and learning. Thus, we argue that whenever a new challenge confront the education sector, it is prudent for the education sector to seek for solutions from the community in which it is located and operates. Education is a social institution within the society and contributes a function to the survival of that society. Thus, problems in the education sector must be solved by the members of the society. As such, members of the society must team up to ensure the education system is running well for the benefit of the whole education sector and the community at large. In the context of this study, for society to survive after COVID-19 and other pandemics, its people must be educated to solve the society's problems and this education must be done online. For the online teaching and learning to take place, society has to provide resources and create an environment which allows this. Thus, we agree with Chimbunde (2021) that successful educational reforms are initiated from the community.

The notion of partnering donors to fund digitalization of higher education sounds plausible but very limited because some developed countries like the United States, Germany, Denmark, Australia and Taiwan had already stepped in to support higher education in Africa, during the pandemic period and provided funds that enabled the transition to online education in some education institutions (Beans et al., 2020), which however is inadequate and not long lasting. We argue donor dependence is necessary but not enough because governments and institutions' individual capacities still needed to be explored, especially in poor sub-Saharan Africa. In the words of HOD 7, *'The donor syndrome must be purged off…. Institutions and their governments must think of local solutions to fund themselves rather than depending on donors.'* This suggests that developing countries must wean themselves from the donor syndrome and apply intervention strategies that are home grown to promote localisation and community driven decisions that are sensitive to the realities of that community. For that to happen, developing countries must think beyond the obvious and interrogate their potential. HOD 5 was of the view that:

> *Setting up digital structures is expensive not because of materials that are used but this is because very few companies in this country operate in this business of providing internet services. If many players are given the mandate to challenge this kind of monopoly, then a competition to provide services will see the reduction of data costs as well as the building of digital infrastructures.*

The uniqueness of this finding is that the governments of developing countries must play their part by freezing the monopoly of business and invite many business corporates to come on board and compete to provide services, thereby reducing costs of data and the provision of services. As these business entities transact their daily businesses of providing internet services, they would want to see their customers accessing the internet everywhere and will build digital infrastructures thereby servicing those who require it most—the universities. While Gambo and Fasanmi (2019) recommend that all beneficiaries of university education must contribute their quotas to the funding process, this study proposes that the key stakeholder, who is the government, has to judiciously create a legal framework to permit a well-functioning free market so that technological companies as they compete for customers provide digital structures and data at low prices. In this way, the role of policy makers in developing countries is to create an efficient and agile market that will keep prices low for university consumers. This would allow penetration of internet and its application in the universities. The study therefore, argues that governments and communities in which universities are located have responsibility of creating liberal internet markets and funding the universities respectively for the betterment of all members of the world and therefore should not wait for funding quotas from donors. Instead they must develop local solutions to fund the digital transformation of higher education in the context of 4IR amid COVID-19 and beyond.

Conclusion

In exploring the transition to online teaching and the subsequent funding of institutional needs of universities in the developing countries, this study provides an economic perspective on how universities in developing countries could improve their practice using local resources from their communities. The study argues that the sudden turn to virtual learning by higher education is a key defining undertaking of the twenty-first century. It argues that while the face to face method is known to be vibrant and lively with discussions, universities in developing countries are trying though unsuccessfully to make online teaching and learning much closer to it. Following this scenario, there is need for team work in providing human, capital and physical resources. Central to the study was that it demonstrates that critical to the success of the online teaching is the need for the availability of digital infrastructure, low cost data bundles, trained HODs, cyber security measures which hinge on adequate funding. Additionally, it affirms and concludes that the adoption of online teaching and learning in universities from developing countries remains a challenges unless these institutional needs are made available. The study shows that online teaching demands new developments and interventions where institutions are to employ innovative strategies to fund the institutional needs. In a way, the study acknowledges that it is a big task for developing and under developed countries to completely shift to online teaching and proposes that the community and the government must strategise to source resources and funding to kick start the digitalization of education in higher education, especially so, during times of global pandemics. As such, local communities and the governments are implored to reshape their thinking and complement institutions of higher education in mapping solutions to challenge the underfunding bedeviling the education sector. The governments of these developing countries must play a key role to provide cheap data and internet services and this could be made so by de-monoplolising the internet trade markets.

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