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Preparedness for online learning in the context of Covid-19 in selected Sub-Saharan African countries

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Abstract: This study sought to evaluate the instructor and learner preparedness for online learning in Sub-Saharan Africa. Specifically, the study explored the devices lecturers and learners use for teaching and learning, their level of digital proficiency, access to internet connection and finally, their level of satisfaction of connectivity cost, speed and stability.The study followed quantitative design and used structured questionnaire which were distinct for lecturers and students but with similar variables. It targeted three Sub-Saharan countries: Kenya, Ghana and Sought Africa. A total of 2,341 respondents participated in the research comprising of 855 lecturers and learners from Ghana, 842 from Kenya and 644 from South Africa.We found out that generally the respondents in the three countries use mostly laptops and smart phone devices compared to desktop computers except for Kenya where there was high record of desktop computers. Additionally, the use of tablet device was the least among the three countries. Lecturers and learners in these universities possessed intermediate digital proficiency which meant respondents were able to use a range of applications effectively. The study established that there was extremely low level of satisfaction with the internet connection, cost and reliability.The study recommended that institutions should maximize the use of mobile technology to teach and enhance online learning since majority of the learners possess smart phones and laptop devices. Universities should shift the focus from centralized Information Communication Technology investment in the campus to off campus empowering the learner and instructor than relying on campus Information Communication Technology hence to subsidize on internet bundles. Universities should lobby for subsidized internet bundles from internet providers and policy makers should reduce tax levies for internet service providers to offer affordable and reliable internet connection to learners and instructor off campus. In collaboration with universities, *United Nations Educational, Scientific and Cultural Organization* should prioritize capacity building for lecturers and other users to enhance skills and knowledge of online education.

Keywords: Information Communication Technology, e-learning, universities, online learning, Covid-19

Introduction

African countries have initiated Information Communication Technology projects to address lack of connectivity to the Internet and other global communication networks (Holmner & Britz, 2011). Inspite of this, they still have very low Information Communication Technology Development Index (IDI) scores (Ponelis & Holmner, 2015). Consequently, most of the universities in Sub-Saharan Africa mostly use face-to-face teaching and learning mode. Kotouaa, Ilkana, and Kilicb (2015) argues that the rate of online education in Sub-Saharan Africa universities is still very low inspite of the general worldwide trend of the growth of student enrollment in online courses over the past 15 years (Watson, Pape, Murin, Gemin & Vashaw, 2014).

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Touré, (2013) strongly argues that with the power of technology, every African citizen can be educated right across the continent. With the emergence of Covid-19, many countries have advised working from home (Bates, 2020) and similarly universities and other learning institutions have suddenly been suspended to prevent the Covid-19 transmission and have switched to online learning (Monash University, 2020). This was to ensure the continuity of education, and is broadly refered to as "emergency remote education", which was seen as an obligation put in practice in varying delivery modes (Bozkurt et al, 2020). Hodges et al. (2020) defines it as a temporary shift of instructional delivery to an alternate delivery mode due to crisis circumstances. One clear observation is that this was done hurriedly, without preparations (Bates, 2020). With the backdrop that quite a number of universities rely on face-to-face, this research responds to the question: how prepared are universities for fully-fledged online learning, which a bandwagon of universities are shifting to, brought about by the Covid-19? Generally, are the instructors and learners ready for this kind of online learning? Do they have sufficient devices for learning? Do learners and instructors have skills to embrace online learning? Where do instructors and learners access internet connection? Is the internet connectivity adequate to support online learning? The present study seeks to evaluate the instructor and learner preparedness for online learning. While several studies have been done of online learning much of the focus have not focused on abrupt change brought about by Covid-19.

Literature Review

Concept of online learning

Online learning is defined by Khan (1997) as the delivery of instruction to a remote audience using the web as an intermediary. Most authors such Benson (2002) defines online learning in terms of access to learning experiences but also on the potential for flexibility and participant interaction. This definition brings out two connotations; first learners access to online learning platforms and second learner and instructor interaction including learner to learner discussions. Thus, making learning the same as it would be during face to face. The importance of online learning is that it enables learners and researchers to have greater control over what they learn, where and even when they do so (Pete, 2019). Open learning has been broken down into three dimensions: Open courses, open education resources and open pedagogy. These dimensions have been proven to enable learners and researchers to tap into and explore a field of study, areas of operation in terms of community engagements in a more approachable and cost-effective way.

Current Demand for Emergency Remote Education

During Covid-19 pandemic, emergency remote education a branch of online learning which is viewed as an obligation according to (Bozkurt et al, 2020) and or an alternative temporary shift mode of delivery due to crisis (Hodges et al,2020), was broadly applied. To this effect, we have witnessed an increased demand for online learning (Watson, Pape, Murin, Gemin & Vashaw, 2014). However, a number of online learning have been mostly based on instructor sending reading material to learners through email, posting material on Google classroom or Moodle or any other learning platform (Selvam, 2020). Such kind of limited online have not taken into consideration the participant interaction and instructor feedback (Selvam et al, 2020). It is important to note that basically such learning at most have summative assessment ignoring formative assessment which helps learners to get continuous feedback hence improve their learning. Feedback and frequent interaction with learners are considered to be important success factors in online courses (Baran, Correia, & Thompson 2013). However, this statement does not discredit all online courses, there are quite some well-developed courses too such as Authoraid INASP research courses with quite some good features such as online videos links, participant discussions, formative assessments and summative assessments. While as the platforms have a number of functionalities that can enhance learning, only a minimum functionality have been taken advantage of by lecturers and learners.

With the situation of Covid-19, where campuses are closed, online learning if well-developed would ideally support learning, converting the home to an e-campus, however, are the learners and instructors prepared for it? This study assesses instructor and learner preparedness for online learning after a number of countries suspended learning due to covid-19. Specifically, the study seeks to find out devices used by instructors and learners, digital proficiency, and access to internet connection. The focus of this study is to explore on online learning preparedness in Sub-Saharan educational institutions. This study, therefore, adds new insights on what needs to be considered and addressed to facilitate the adoption of online learning in institutions of higher education in Sub-Saharan Africa amidst Covid-19. Suspension of class and immediately switching to online learning can be disruptive especially if learners and instructors are not well prepared for it.

Methodology

Research Model/Design

This present study was a quantitative study. A ccording to Cresswell (2012) a quantitative research method enables a strategy of inquiry to uncover new knowledge in a field where very little is known. The study, sought to discover experiences regarding online learning, was was carried out in Kenya, Ghana and South Africa through email in coordination with university ICT departments. Survey responses were gathered in different universities in the three countries. The study had four research questions: First, what devices do lecturers and learners use for teaching and learning in Kenya, Ghana and South Africa? Second what is the level of digital proficiency of the learners and lecturers in Kenya, Ghana and South Africa? Third, where do the learners and lecturers access internet connection and finally, what was their level of satisfaction with connectivity cost, speed & stability?

Data Collecting Tools

For research question one, usage of four devices was assessed namely Laptop computer, desktop computer, tablet and mobile phone. For research question two, respondents' literacy levels were assessed especially whether they had Basic digital literacy levels such as using some common applications effectively, intermediate digital competence such as using a range of applications effectively, and advanced digital expertise that is the ability to use specific applications and tools, over and above levels commonly required. From research question three, where they were accessing internet connection was evaluated namely family members or friend's home, home, internet café cyber café. Land house/internet shop, public library, and school/university/workplace, and Wi-Fi hotspot café, restaurant, shopping mall. Finally, the fourth question was a likert scale that sought to evaluate the level of satisfaction which had five options namely very satisfied, satisfied, unsure, dissatisfied, strongly dissatisfied and not applicable.

Sampling

The sampled lecturers and learners were invited to fill in the questionnaires available on Survey Monkey. Some used the online Survey Monkey, while others used the printed version of the questionnaires, which were later keyed into the Survey Monkey by the local coordinators at the participating universities in each of the three countries. A total of 2,341 respondents participated in the research comprising of 855 lecturers and learners from Ghana, 842 from Kenya and 644 from South Africa. The sample contained lecturers (66% male, 34% female) and students (72% male and 28% female). According to Wainaina, (2011), the female/male distribution is representative both for lecturers and students in Africa. Majority of the lecturers are between the age bracket of 30-49 (61%). Those within 50-59 are (20%) and those at 60 and above constitute 19%. For the students, majority (81%) are within 17-30 years bracket. Clearly most of the lecturers about (60%) have a moderate teaching experience, ranging from 4 to 10

years. Only a small fraction (5%) is very experienced (with more than 20 years). This represents the regular picture of teaching in higher learning institutions.

Data Analysis

With regards to lecturers' highest educational qualifications, we count the quality you would like to see in a questionnaire like this: 42 Doctorates, 53 Masters, and 11 Bachelors. With respect to their current positions we observe an anticipated variety in the following frequency order: lecturer (80), researcher (22), senior lecturer (17), junior lecturer (11), associate professor (15), administrator (10), director (14), and manager (13). We can also report a broad spectrum in the areas of teaching among the lecturers. This is the ranking order, ignoring scores lower than 5: Religious Studies (35), Social Science (62), Applied Science, Technology, and Engineering (22), Science (15), Education Studies (26), Arts (11), Economics, Business & Management, and Accounting (14), Health & Social Care (8), and Psychology and Philosophy (6). This spectrum naturally is also reflected in the students' areas of study as well.

Findings and Discussions

Regarding devices the present study revealed that generally the respondents in the three countries use mostly laptops and smart phone devices compared to desktop computers except for Kenya where there was high record of desktop computers. The use of tablet device was the least among the three countries. Lecturers and learners in these universities possessed intermediate digital proficiency which meant respondents were able to use a range of applications effectively. The study established that there was extremely low level of satisfaction with the internet connection, cost and reliability. The following section presents the results in detail.

Devices used by lecturers and learners

We surveyed the devices that learners and instructors use to access internet. The results in Figure 1, show that in Ghana 38% used laptop, in Kenya 29% and in South Africa 33%. Again regarding use of desktop in Ghana 21%, in Kenya 37%, and in South Africa 17%. As for use of tablets in Ghana 7%, in Kenya 11%, and in South Africa 18%. Finally, regarding those that use mobile phone devices in Ghana 34% used mobile phones for learning in Kenya 23%, and in South Africa 32%. This connotes that if online learning method is to be embraced fully.

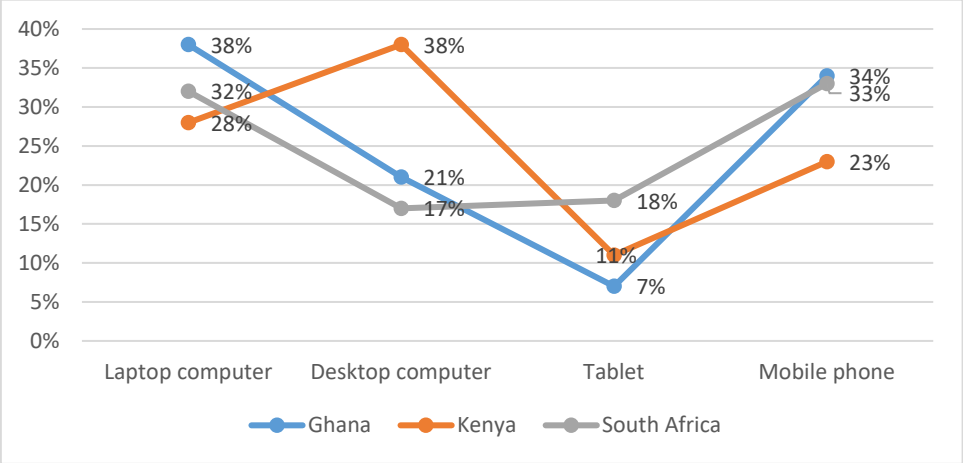

Figure 1: Devices used for internet.

The fact that a significant percentage of respondents in the three countries uses a laptop computer is encouraging as it implies that when universities are suspended, learning can still go on since lecturers and learners have mobile device to use at home. On the other hand, the high percent of respondents

using desktop is worrisome to embrace e-learning especially for Kenya as it suggest that when schools are suspended quite a significant percentage of respondents would not move with a desktop computers. Perhaps these desktops are assets of the university hence not movable as Twinomugisha (2019) supports that that devises are a big challenge for most of the learners.

This is supported by Aseey and Andollo (2019) who argue that in general, most countries in Africa have tried to invest on Information Communication Technology Infrastructure. However, amidst Covid-19, where learners and instructors are to work off campuses, the infrastructure location disadvantages these kinds of investments. This view however, contradicts that of Soko (2018) who argue that for universities to have a sustainable competitive advantage they need to invest in intangible assets. In a similar study carried out in Kenya, it was concluded that universities should enhance quality through research, staff focus, student focus and governance and planning not nessesarily tangible assets (Soko, 2015). As noted in the development of Information Communication Technology infrastructure, during the Covid-19 it does not give cutting edge to universities as such. This view is also supported by the opinion of Selvam (2020), who states that Covid-19 has disrupted across industries and the winners amidst the global disruptions have been the Information Communication Technology and internet. However, such investment should be decentralized.

The use of mobile phones is quite high across the three countries especially South Africa and Kenya while the use of tablet is quite low across the three countries. Another difference observed among the learners is that majority of learners in South African universities do not use desktops. Mobile phones and laptops are the most used devices among them. The finding echoes with Chigona, Kankwenda and Manjoo (2008) who point out the amazing 58% annual growth rate of mobile phone users among learners in South Africa compared to Asia. This is interesting as it implies that perhaps South Africa would be more prepared for online learning as the devices are movable not centrally located at the campus. The growth of internet subscription in Sub-Saharan Africa is supported by (GSMA, 2020) who projects that is fastest growing region, with a Compound Annual Growth Rate of 4.6% and an additional 167 million subscribers over the period to 2025. This would mean that there will be a subscriber base of over 600 million, representing around half the population.

Shava, Chinyamurindi and Somdyala (2016) stresses the perceived usefulness and ease of use of smart phones as motivator to access internet everywhere. Most mobile phones owned by *Technical and Vocational Education and Training*students were in the category of smartphones, bearing modern features that facilitate instant messaging, exchange of data and information as well as speedy access to information via the Internet**.** The fact that mobile phones and laptops are the most used devices is interesting especially amidst Covid-19 because lecturers have the facilities such as the mobile devices to continue teaching and learners can use them to continue learning remotely.

Covid-19 has brought all learning campuses to standstill and the home has become the e-campus. This phenomenon poses a great challenge to both instructors and learners as they are caught up with other family responsibilities especially managing dependents homeschooling since all learning activities operate from homes. The phenomenon has also put pressure on devices as they are to be shared among many dependents. Another challenge is interruption of electricity especially for lecturers and students who retreat to work remotely from the rural areas. In most of the rural areas, while there could be electricity connection the instability is common rising from delayed replacement of faulty transformers and electricity posts.

Digital proficiency

Regarding digital proficiency, three elements were assessed among the respondents namely basic digital literacy which entail use of common applications effectively, intermediate digital competence which meant respondents could use a range of applications effectively and finally advanced digital

expertise thus use specific applications and tools, over and above levels of commonly required. Figure 2, shows the results. The study established that 31% of respondents in Ghana, 36% Kenya and 11% in South Africa had indicated that they had basic digital literacy. Again, 60% of respondents in Ghana, 55% in Kenya and 54% in South Africa indicated that they had intermediate digital competence. Finally, the study found out that 9% of the respondents in Ghana, 9% in Kenya and 34% in South Africa indicated that they had advanced digital expertise. This means that the majority had intermediate digital competence category.

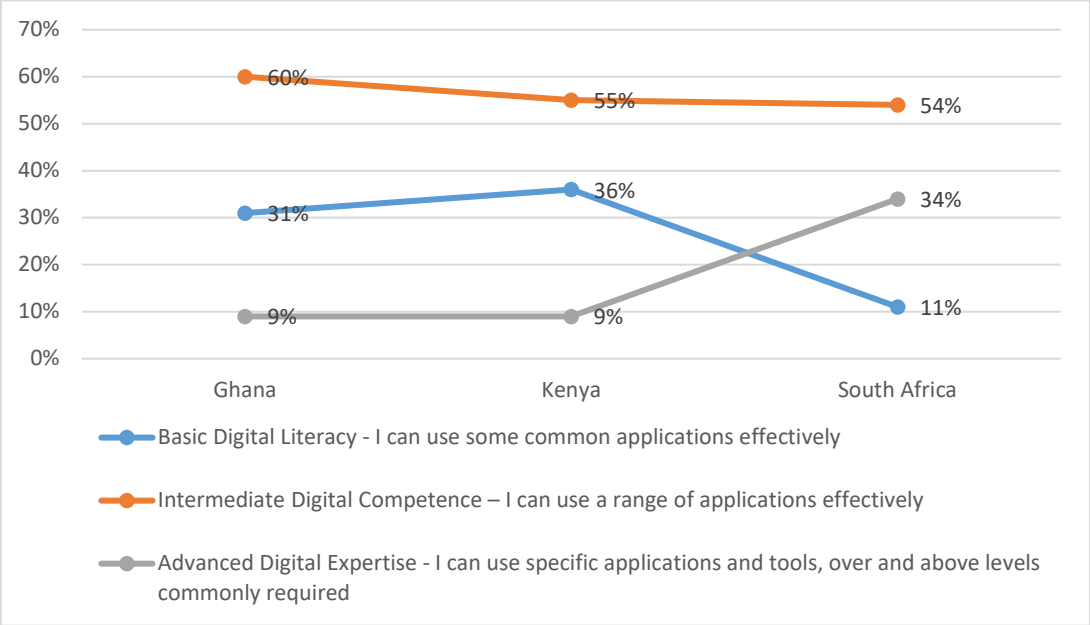

Figure 2: Digital Proficiency.

Since a significant number of the lecturers and learners in these universities do not have yet the desired Information Communication Technology competencies as foreseen in the findings, and because there is a significant digital literacy differentiation among lecturers and learners, the implementation of their National Information Communication Technology Policies is still at stake and needs a strong government boost and international support for the three countries. This finding is worrisome, especially during the Covid-19 pandemic, which manifested itself without much preparation for learners with online learning. As in Kenya, a directive was given to close the school in one week before the closure of the term which was to end in 3 weeks. This did not give enough time to prepare the learners and instructors to first complete the syllabus online learning and carry out formative and summative assessments. This means that learners and instructors needed training to improve on use of online learning platforms such as Moodle, Google classroom, zoom and so on, to effect learning. The abrupt leap into the online learning because of Covid-19 may compromise on quality of education in universities. However, the advantage is that there are quite lots of online videos on YouTube which could fill this training gap. There would perhaps be need for self-learning skills to learn how to use online learning facilities for both instructors and learners.

Tarus, Gichoya and Muumbo (2015) found out that Inadequate Information Communication Technology and e-learning infrastructure, financial constraints, lack of affordable and adequate internet bandwidth, lack of operational e-learning policies, lack of technical skills on e-learning and e-content development by the teaching staff, lack of interest and commitment among the teaching staff to use e-learning and amount of time required to develop e-learning content are the main challenges hindering the implementation of e-learning. Another profound issue is that Open Educational Resources may not be fully utilized if one is not digitally proficient.

Access to internet connection

Respondents were asked to indicate where they mostly get their internet services from. As reflected in Figure 3, 9% of the respondents from Ghana stated that they got internet from family members or friend's home, 17% from their homes, 15% used internet café internet, 14% public library, 31% used school/university or workplace and finally 15% used internet from restaurant or mall. Additionally, 14% of the respondents from Kenya stated that they got internet from family members or friend's home, 11% from their homes, 12% used internet café internet, 22% public library, 31% used school/university or workplace and finally 10% used internet from restaurant or mall. Finally, 10% of the respondents from South Africa stated that they got internet from family members or friend's home, 28% from their homes, 6% used internet café internet, 6% public library, 31% used school/university or workplace and finally 19% used internet from restaurant or mall. Generally, this means that most to the respondents accessed internet connection at campus and the place of work.

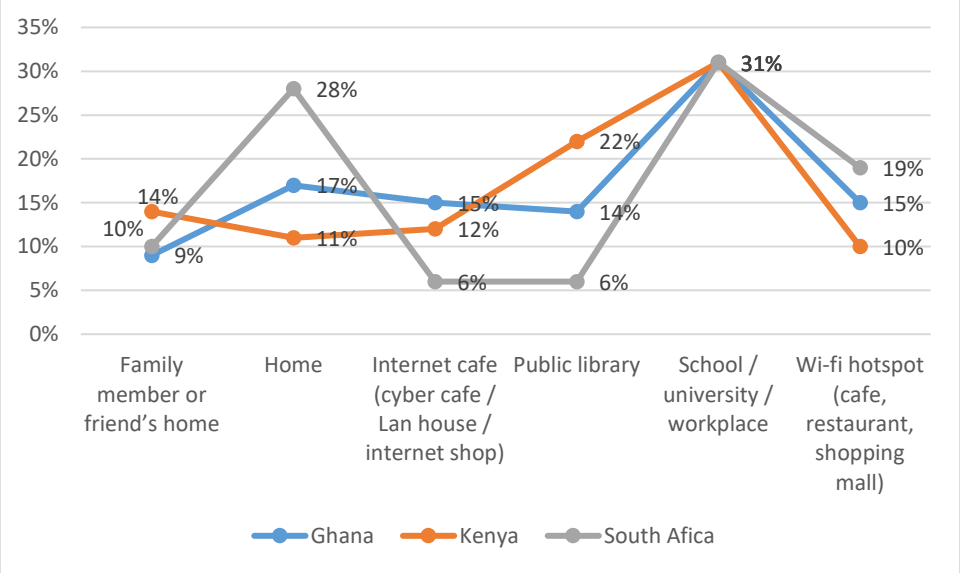

Figure 3: Access to internet.

There is an alarming substantial digital differentiation in terms of internet accessibility among university lecturers and learners. Even though, Aseey, Andollo (2019) holds the view that most countries in Africa have tried to invest on internet connectivity, the fact that campus is the most location where to access internet is worrying during the Covid-19 pandemic where instructors and learners have limited access to campus. At campus, internet is free for students and lecturers in most universities. This could mean that quite significant number of learners and instructors do not have internet at their homes. The directive from the government to work from home, would therefore mean that instructors and learners cannot fully embrace online learning hence compromising on quality of university education.

Internet connectivity cost, speed and stability

Internet connection is a key factor in the access and use of digitized educational resources. A question was posed to lecturers and learners; to what extent are you satisfied with internet connection where you most frequently access it? Relating it to cost, speed and stability, majority of respondents expressed dissatisfaction. With reference to table 1, 40% were very dissatisfied and dissatisfied with the cost, while 48% were satisfied and very satisfied with the cost. As for internet speed, 47% were very dissatisfied and dissatisfied with the speed and 43% were satisfied and very satisfied with the cost. For stability, 48% were very dissatisfied and dissatisfied with internet stability and 39% were satisfied and very satisfied. This shows higher counts in 'very *dissatisfied and dissatisfied'* in all the three countries

especially on internet speed and stability. As for the cost, however, generally almost half of the respondents were satisfied with it.

Table 1: Level of satisfaction of internet services.

	Ghana		Kenya		South Africa		Response count	
Answer Options	**Frequency**	**Percentage**	**Frequency**	**Percentage**	**Frequency**	**Percentage**	**Frequency**	**Percentage**
Cost								
Very dissatisfied	145	17%	141	17%	53	8%	339	14%
Dissatisfied	270	32%	220	26%	128	20%	618	26%
Unsure	75	9%	25	3%	93	14%	193	8%
Satisfied	277	32%	278	33%	230	36%	785	33%
Very satisfied	79	9%	172	20%	106	16%	357	15%
N/A	9	1%	6	1%	37	6%	52	2%
Total	855	100%	842	100%	647	100%	2,344	100%
Speed								
Very dissatisfied	160	19%	184	22%	53	8%	397	17%
Dissatisfied	283	33%	282	33%	128	20%	693	30%
Unsure	70	8%	37	4%	93	14%	200	9%
Satisfied	272	32%	238	28%	230	36%	740	32%
Very satisfied	68	8%	93	11%	106	16%	267	11%
N/A	2	0%	8	1%	37	6%	47	2%
Total	855	100%	842	100%	647	100%	2,344	100%
Stability								
Very dissatisfied	163	19%	186	22%	43	7%	392	17%
Dissatisfied	315	37%	274	33%	141	22%	730	31%
Unsure	111	13%	78	9%	92	14%	281	12%
Satisfied	212	25%	208	25%	287	45%	707	30%
Very satisfied	48	6%	86	10%	81	13%	215	9%
N/A	6	1%	10	1%	0	0%	16	1%
Total	855	100%	842	100%	644	100%	2,341	100%

The finding that the respondents were generally satisfied with cost is surprising and contradicts a study by Tarus, Gichoya and Muumbo (2015) who observed that financial constraints, lack of affordable and adequate internet bandwidth were constraints to online learning. In the present study, this contradiction could be because internet services were mostly accessed at campus and workplace implying that respondents were accessing it free of charge. Perhaps there was only a small number using their own internet services. This is interesting especially during remote working in the context of Covid-19, as it implies that the cost burden of internet services is born by instructors and students therefore the observation of Tarus, Gichoya and Muumbo (2015) is realistic.

As for the internet speed and stability the finding shows that majority are dissatisfied with these elements perhaps not strange. Njihia, Mwaniki, Ireri and Chege (2020) also found lack of internet connectivity as a challenge to online learning. In the context of Covid-19, this implies that even if the online learning would be the best mode, it would face challenges of internet connections. This would greatly affect video based platforms such as zoom which require strong internet connection. This would call upon the need for internet service providers to find ways of strengthening signals or development of e-learning platforms that do not require very strong internet connection. Additionally, there are also issues of power black outs which poses a big challenge to online learning. This is supported by World bank research which states that for many developing countries such as those in Africa, they are faced with challenges relating to Internet connectivity, electricity and access to digital devices (Twinomugisha, 2019). A report from Zimbabwe further adds that vast majority of students have no access to reliable electricity and network connections, considering that only 41% of Zimbabwe have access to electricity and even smaller share have access to mobile networks (Mukeredzi, Kokutse, Dell, 2020). In Kenya, for example, there was countrywide blackout on 9th May 2020 and another one on 24th June 2020 and such are common occurrences (Muriuki, 2020; Musyoka, 2020).

Recommendations

The study makes the following policy recommendations to strengthen online learning and to achieve the Sustainable Development Goal on Education for All and that nobody is left out.

1. Universities should maximize the use of mobile technology to teach and enhance online learning since majority of the learners now possess smart phones. Hence, they should shift the focus from centralized Information Communication Technology investment in the campus to off campus. Thus, learners and instructors should be the focus of Information Communication Technology. This implies that internet bundles should be allocated to learners and instructors so that they can access internet everywhere not limited to campus. Additionally, universities should provide support such as devices to needy students to bridge the learning gap.
2. Universities should lobby for subsidized internet bundles for their learning activities from internet providers. Additionally, they should mobilize for increased signal strengths especially in the rural areas.
3. Governments should reduce tax levies for internet service providers so that they can put in place the infrastructure to strengthen signals. This will enhance access, use and sharing of teaching and learning materials to learners everywhere.
4. Information Communication Technology should develop software that are less straining on connectivity and internet bundles. Such software that do not take time to stream.

In collaboration with universities, *United Nations Educational, Scientific and Cultural Organization* should prioritize capacity building for lecturers and other users to enhance skills and knowledge of online education and provide subsidies for devices for learning such as laptops.

Conclusion and Further research

Several online learning programs are likely to leave out the persons living with disability. Perhaps the focus is more on the minority and leaving out the minority groups. This study recommends further research on experiences of people living with disability and online learning during the Covid-19, challenges and learnings in view of improving online learning programs for all.

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