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Assessment on the Readiness for Virtual Learning Adoption in Education System in Tanzania: A Study of Universities in Arusha Region

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Abstract: *The study assessed the readiness for virtual learning adoption in universities in Arusha region, Tanzania. The objectives were to: assess the readiness for virtual learning and find out intervening measures to the challenges facing virtual learning adoption in universities in Arusha region. The study was guided by Technological Acceptance Model (TAM). Convergent mixed methods design was adopted. Data was collected through observation, questionnaire and interview guide. The sample size consisted of 114 respondents; 21 lecturers, 90 master students selected by simple and stratified random sampling technique. Purposive sampling technique was used to select 3 ICT technicians and lecturers from top management level. Validity was established through expert judgment, while reliability was ascertained using test-retest technique and reliability index, QL r=0.914 and QS r=0.912 was obtained using Cronbanch Alpha Method. Credibility of qualitative data was ascertained by involving multiple analysis, while dependability was established through detail reporting of the research process. Quantitative data was analyzed using descriptive statistics in the SPSS version 20 and results were presented in table of frequencies, percentages and charts. Qualitative data were analyzed thematically alongside research questions. The study findings reveal that the readiness for VL in three universities is relatively low. Also universities should train staff and student in ICT, improve VL facilities, and provide enough funds. The study recommends that TCU and universities should review and harmonize their policy programme, so as to allow other approved programme to accommodate VL as mode of delivery.*

Keywords: *Assessment, Readiness, Adoption, Virtual Learning and Education System*

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1. Introduction

Education system in Tanzania is evolving: thanks to numerous measures put in place by the government. However, it is facing a critical challenge to meet new demands for the 21st century. The challenges facing education include emerging global pandemic such as Corona Virus Disease (COVID-19), international conflicts (Russia-Ukraine strife), inadequate Information and Communication Technology (ICT) infrastructure, change in environment, insecurity and poverty (Al-Rawashdeh et al., 2021). Tanzania needs an educational environment that would make it more responsive to challenges such as COVID-19 pandemic and international conflicts confronting the country at large. The use of traditional teaching and learning methods alone particularly those that are purely residential) fails to provide sufficient solution to challenges facing society today. Therefore, alternative ways of providing access to higher education via online need to be fully explored

(Wallis, 2020). In this direction, Higher Learning Institutions in Tanzania are becoming increasingly aware of the need for education programmes that make use of the Internet and other appropriate technologies to deliver their courses (Bhalalusesa et al., 2015). This calls for adoption of Virtual Learning (VL) in education system in Tanzania to mitigate the effects of global pandemic.

VL is the learning which occurs in absence of traditional face to face classroom environment (Schlosser & Seepersaud, 2018). It is facilitated through the use of internet and electronic devices (Al-Nofaie, 2020). VL can be asynchronous, synchronous, or hybrid (Gunes & Alagozlu, 2021). Synchronous is the type of VL where by teaching and learning take place at the same time also known as real time delivery (Martin & Parker, 2014; Schlosser & Seepersaud, 2018). Synchronous VL allows real time interaction between teacher and learner, by using platforms such as audio streaming, video streaming, text, chart, interactive white board, application sharing and instant polling (Ruddy & Ruddy, 2014). Web conferencing or videoconferencing is the common platform used in Synchronous virtual learning (Martin & Parker, 2014).

Asynchronous is the type of VL where by teaching and learning take place at different time (Schlosser & Seepersaud, 2018). It is not time bound and students can study at their own time (Perveen, 2016).It involves delivering of learning materials through different forms of Learning Management System (LMS) such as MOODLE (Al-Nofaie, 2020).It does not allow real time interaction between instructor and learner and it can be facilitated through media such as discussion board, e-mails, wikis, blogs, and video or audio recording (Huang &Hsio, 2012).

Worldwide VL trend started at 1990s where development of personal computer was on the rise (Palvia et al., 2018). VL has grown worldwide due to advancement of ICT, global acquisition of internet and better affordability of computer (Habackova, 2015). For instance, the number of students taking at least one online course in Oregon public universities in America has increased from 21.3% in 2008-2009 to 48.3% in 2018-2019. Also, the number of students who are taking fully online courses had increased from 6.2 percent in 2008-2009 to 14% in 2018-2019 and the number of students taking fully face to face or traditional classroom have declining from72.5% to 37. 5% in 2018-2019 year of study (Wallis, 2020). Virtual education is believed to become leading stream by 2025 (Palvia et al., 2018).

Despite the advantage of VL in education, the applicability of virtual learning in Tanzania is still low as the study conducted by Innocent & Masue (2020), reveal that there is limited applicability of e-learning in Tanzania universities. The current condition of corona virus pandemic has forced many universities in the world to close physical classes. This creates the need for universities to find alternative way to provide their education without physical meetings. From the foregoing, it is important to conduct a study to interrogate the readiness for adoption of VL in education system in Tanzania. In this regard, the current study sought to assess the readiness for VL in Universities in Arusha region.

1.1 Research Questions

The research questions were;

i. Are universities in Arusha region ready to adopt VL?
ii. What are the intervening measures to the challenges facing VL adoption in universities in Arusha region.

2. Literature Review

The theoretical and empirical literature was reviewed with reference to research objectives. The study was anchored on Technological Acceptance Model.

2.1 Technological Acceptance Model

Technology acceptance model (TAM) was proposed by Fred Davis in 1989, the model was formulated based on the theory of reasoned action; the model explains how individuals accept and use technology. The theory suggests that the intention of people to accept and use technology is determined by two factors namely; perceived ease to use and perceived usefulness (Lai, 2017). Perceived ease to use "is a degree to which an individual believes that using a certain technology will be effortless and easy to use" and perceived usefulness "is the degree to which an individual believes that using a certain technology would increase his or her job performance" (Alshammari & Rosil, 2020).

The model suggests that the use of information technology depend on behavior intention, and behavior intention depend on personal attitude towards the use of the system and also his or her perception of its usefulness or utility (Kalayou, 2020). User's attitude and belief are important features which influence the use of new technology.

2.1.1Application of the Theory to the Current Study

The theory was relevant to the current study because it was used to assess students and lecturers behavioral intention to adopt VL. Technology acceptance model postulates that when users are subjected with new technology, different factors influence their decision on how and when to use it (Lai, 2017). People with positive perception on the use of technology have higher acceptance for VL than those with negative attitude. The attitude of a person is not the only factor that influences his or her use of a system but is also

based on the effect of its performance (Alshammari & Rosil, 2020).

2.2 Readiness for Virtual Learning in Universities

The study conducted by Adams, Sumintono and Mohamed (2018), found that students were ready for blended learning, also there were different levels of readiness based on gender, age, ethnicity, field of study, and level of education. A study by Sharadgah and Sa'di (2020), found that higher learning institutions were not well prepared to provide online assessment, nor vivid mechanism for online assessment. Academic staff do not believe that online assessment could assess all intended learning outcome, also they believe that there is high risk of cheating due to lack of quality system to prevent it (Sharadgah & Sa'di, 2020).

Majority of lecturers were not prepared enough in terms of having the basic skills and fundamentals for implementing electronic learning programs (Farazkish &Montazer, 2019). Students do not have appropriate gadgets and internet connectivity(Vitals et al., 2021).Lecturers show high readiness in the area of having technological tools such as Smartphone, computer and ability to use internet for academic purposes (Farazkish & Montazer, 2019).Virtual education in higher learning institution was conducted through mobile messenger systems and learning management systems such as VESTA (Visualization for Electronic Structural Analysis), MOODLE(Ahmady, Shahbazi, &Heidari, 2020).

Akudolu et al., (2017) found that students have skills for posting comments, questions and answers on online discussion boards. Similarly, they are capable of using online readings and links to the text-based materials, open and reading materials in HTML of PDF formats; logging in to learning platforms, blogs and using internet charts. A study by Elfirdoussi et al.,(2020),found that students and professor view online learning as not interested as ordinary learning, and professor need to provide at least 50% of their teaching in face-to-face mode. In addition, technical support and training in the use of tools used for VL were provided to enhance and promote distance education.

Gyampoh et al., (2020), found that colleges lack polices on online teaching. Tutors have not acquired any formal training on how to do the blended learning and using virtual learning platforms in their lesson deliveries (Aheto-Domi et al., 2020).

2.3 Intervening Measures to the Challenges Facing Virtual Learning Adoption in Universities

O' Doherty et al. (2018), found that provision of incentives and rewards for the time involved in development of online content will solve the problem of time constrain on lecturers. Involving instructors in the decision-making process when adopting new technology and offer training on technological knowledge, pedagogical knowledge and content knowledge will solve the problem of skill deficit among the instructors (Jonson et al., 2016).

Jabreen (2017), found that the main problem facing electronic learning was lack of awareness and not accepting the transition from tradition learning to e-learning. The solution is to conduct seminars and conferences to talk about the importance of e-learning and its benefits, and hold meetings between old and new students of different majors and exchange of knowledge amongst them (Lashayo & Johar, 2018). Agbenyagah (2019) suggest that increasing investment in both internet connectivity and ICT infrastructure is needed to solve the problem of poor internet connectivity and poor infrastructure.

Muchemwa (2021), reveal that to solve the problem of local browsers that are available within the campus only, universities should create universal portal that can be assessed anywhere. Kisanga and Ireson (2015), found that usage of renewable energy will solve the problem of electric power supply; partnership with private sector and organization which provide financial aid and increasing of financial support from government will solve the problem of financial constrain. Lecturers should use online platform that allow live interaction with students rather than platform which only allow provision of notes (Muchemwa 2021). Managers and authorities to design courses which will allow fully online delivery, this will solve the problem of university's lack course program which allows fully online delivery (Ahmady et al., 2020).

3. Methodology

The study used convergent mixed methods design, suitable design to collect both qualitative and quantitative data (Creswell & Creswell 2018). Questionnaire, interview guide and observation were used for data collection. The sample size consisted of 114 respondents; 21 lecturers, 90 master students selected by simple and stratified random sampling technique. Purposive sampling technique was used to select 3 ICT technicians and lecturers from top management level. Validity was established through research expert judgment, while reliability was ascertained using test-retest technique and reliability index, QL r=0.914 and QS r=0.912 was obtained using Cronbanch Alpha Method. Credibility of qualitative data was ascertained by involving multiple

analysis, while dependability was established through detail reporting of the research process. Quantitative data was analyzed using descriptive statistics in the SPSS version 20 and results were presented in table of frequencies, percentages and charts. Qualitative data were analyzed thematically alongside research questions.

4. Results and Discussions

The findings were discussed with regard to research objectives. Table 1 shows the results of the first objective from master students.

Table 1: The Findings from Master Students on the Readiness for Virtual Learning

Aspect of Virtual Learning in Universities	Students(n=90) f(%)
Availability personal computer	70(78)
University has reliable electric power supply	86(96)
University has computer laboratory	85(95)
Preference for online classroom than face-to-face classroom	25(28)
Technical support from university technicianto Student	61(68)
University has reliable internet connectivity	82(91)
University has accessible online library	63(70)
Student get computer and information technology training	59(65)
University offers online assessment and examination	19(21)
University provides free wireless internet services	83(92)
University offers virtual learning courses and program	30(33)
University has online system for provision of student result	84(93)
University has enough technology experts	46(51)
University has online admission system	83(92)

n= number of respondents, f= frequency, %=percentage, values presented are the number and percentage of students who agree with statement. Hence, those with contrary opinion to the statement are implied. **Source: Field Data (2022)**

On the sub item, availability of personal computer, which sought to know if student had personal computer, 70(78%) of the students agreed that they have personal computer, 20(22%) of the students opposed the statement. This means that 20(22%) of students don't own computer. The results above show that most of the master students owned computer. This indicates that master students were prepared for VL because they possess personal electronic device to facilitate VL. The finding is in agreement with that of Reisdorf et al., (2020) on how lack of technology affects students' achievement, the study found that most of the university students from different background and ethnicity owned computer.

On sub-item, university has reliable electric power supply, 86(96%) of the students agreed that universities have reliable electric power supply. The finding shows that majority of respondents were in agreement with the statement that means, universities had reliable electric power supply. The findings are in contrary with that of Muchemwa (2021), in Zimbabwe who reported that universities had unreliable electric power supply. The availability of reliable electricity in universities is important because VL is facilitated by electronic devices which are operated using electricity.

In addition, 85(95%) of the students agreed with the statement that university has computer laboratory while 5(5%) were in disagreement with the statement. This result shows that universities were having computer laboratories. The presence of computer laboratory is one of the indicators that universities are in preparation to adopt VL. The findings coincided with that of Innocent and Masue (2020) which found that all studied universities were having computer laboratory. Computer laboratory helps those students who do not own their own computers to access it at universities. Further, computer laboratory is used to provide ICT training to students.

Moreover, 25(28%) of the students agreed with the statement that they prefer online classroom to face-to face classroom. In this regard, 65(72%) of the students

disagreed. The results show that majority of the students opposed the statement, this means that majority of students do not prefer online learning, most of the student prefer face-to-face classroom. The findings are in agreement with Al-Nofaie (2020), the study argue that VL is not always attractive for students, and students prefer face- to- face classroom than online classroom.

On the item, student get technical support from university ICT technician. The results were 61(68%) of the students agreed with the statement, and 29(32%) opposed the statement. This means that majority of the students were given technical support from university technician and few of them did not get technical support from university technician. The findings tell us that many students are facing technical problems which need assistance from ICT technicians to be solved, but not all students are successful in getting the assistance they need. Therefore, there is a need for universities to come up with the strategies that will enable all students who need technical assistance to get it on time.

Also, 82(91%) of the students agreed with the statement, university has reliable internet connectivity, and only 8(9%) of the students held contrary opinion. The result show that most of the students were in agreement with the statement. This indicates that universities have reliable internet connectivity. It is imperative to note that VL is facilitated by the use of internet. This means that the availability of reliable internet connectivity will enable universities to adopt VL and improve the quality of VL programmes.

Concerning university has accessible online library, 63(70%) agreed with the statement, and 27(30%) were not in agreement with the statement. The results show that majority of students agreed that universities have accessible online library. The researcher established that online library help students to access books, e-books, journal, students research and published papers without necessarily attending to physical library. Consequently, online library is one of the requirements for virtual learning.

On whether student get computer and information technology training, 59(65%) of students agreed that students in their university were given computer and information technology training. while 31(35%) were not in agreement with the statement. This result shows that majority of students were getting information and computer training. The presence of 31(35%) students who disagreed with the statement, tell us that the training was not provided to every student, instead the training was provided depending on the type of program students were taking. The finding is in agreement with the finding by Elfirdoussi et al., (2020) who found that technical support and training in the use of virtual learning tools was provided to students.

In addition, 19(21%) of the students agreed that university offers online assessment and examination, 71(79%) of the students were not in agreement with the statement. The result shows that most of the students were not in agreement with the statement provided; this means that, universities do not offer online assessment and examination. The result concurs with the study done by Sharadgah and Sad`i (2020) titled; preparedness of higher learning institutions for assessment in VL environment during COVID-19. The study reveals that higher learning institutions were not well prepared to provide online assessment, and there was no vivid mechanism for online assessment.

Moreover, 83(92%) agreed that university provide free wireless internet services, while 7(8%) disagreed. The findings show that majority of the students agreed that, their universities provide free wireless internet service. This means that universities do provide free wireless internet services. The findings are in agreement with that of Pete and Soko (2020) which pointed out that most of the universities provide free internet services to both lecturers and students. The provision of free internet service to students, enables students to navigate freely online; students learn, download notes and other materials, and communicates freely.

Furthermore, 30(33%) of the students agreed that university offers VL courses and programs, while 60(67%) of the students were not in agreement with the statement. The result reveals that many students were not in agreement with the statement. This implies that, universities assessed in this study do not offer online courses. A report by TCU (2022) supported the study findings by pointing out that virtual or blended mode are the new mode of delivery for most of universitiesin Tanzania.

On the other hand, 46(51%) of the students agreed that universities have enough technology experts, while 44(49%) of the students were not in agreement with the statement. The results show that the number of students who agreed and those who opposed the statement were almost equal. This means that universities were not in good supply of technology experts that is why there is no clear distinction between the views from the respondents. Correspondingly, Anatory (2015), suggested that there is a need for universities to employ staff with appropriate skills in virtual education field, like e-pedagogy experts, content developer and learning management system experts. Table2 shows the results of readiness from lecturers.

Table 2: Findings from Lecturers on the Readiness for Virtual Learning

Aspects for Virtual Learning in Universities	Lecturers (n=21),f (%)
Availability of personal computer	20(95)
Preference for online teaching than face-to-face teaching	7(33)
Pedagogicalskills for online teaching	8(38)
University has virtual learning policy	7(33)
Lecturers have technical skills for online teaching	10(48)
University has e-learning management system	11(52)
Lecturers get technological support from university	16(76)

n= number of respondents, f=Frequency, %=Percentage, values presented are number and percentage of students who agree with statement. Hence, those with contrary opinion to the statement are implied. **Source: Field Data (2022)**

The findings shows that 20(95%) of lecturers agreed that they had personal computers while only 1(5%) of the lecturers had reservations. The findings show that majority of the lecturers agreed with the statement. This indicate that majority of lecturers were having personal computers. On the item, preference for online teaching than face to face teaching 7(33%) of the lecturers agreed with the statement, while 14(67%) of the lecturers were not in agreement with the statement. This mean that majority of lecturers in the study area (universities) do not prefer online teaching. The findings of the study are in agreement with the findings in the study conducted by Elfirdoussi et al. (2020), which found that the respondents' (professor) view online learning as not interesting as face-to-face learning.

In addition, 8(38%) of lecturers agreed with the statement, pedagogical skills for online learning, and 13(62%) disagreed. The results show that most of lecturers opposed the statement, this indicate that most of the lecturers do not have pedagogical skills for online teaching. This finding is in agreement with the findings in the study conducted by Aheto- Domi et al. (2020). The study found that most lecturers have not acquired any formal training on how to do the blended learning and using VL platforms in their lesson delivery.

On the statement university has VL policy, 7(33%) of the lecturers agreed with the statement, while 14(67%) disagreed. The results show that majority of the lecturers opposed the statement, this indicate that the studied universities do not have VLpolicy. The study conducted by Mwakyusa and Ng'webeya (2022), suggested that government should put more emphasis on development of VL policies, which will increase accountability, participation and commitment in higher learning institutions. Furthermore, 10(48%) of lecturers agreed that they have technical skills for online teaching, while 11(52.9%) of lecturers disagreed. The results show that the number of lecturers who agreed is close to the number of lecturers who disagreed. This indicates that almost half of the lecturers have technical skills for online teaching. The findings are in agreement with the findings by Bariham et al., (2021), which pointed out that instructors had content knowledge but they lack technical skills to conduct online course.

Likewise, 11(52%) of the lecturers agreed with the statement that, university has e-learning management system, while 10(48%) of the lecturers were not in agreement with the statement. The results show that slightly more than half of the respondents, agreed with the statement. These imply that some universities in studied area do have e-learning management system, and others do not have e-learning management system. According to TCU (2022), a university should have e-learning management system and also should have mechanism to evaluate content in learning management system, so as to be able to deliver online and blended courses.

Lastly, on whether lecturers get technological support from university ICT technician, 16(76%) of lecturers agreed with the statement. While 5(24%) of the lecturers opposed the statement. These results show that majority of the lecturers agreed with the statement. These imply that lecturers were getting technological support from university ICT technician.

During the interviews, while responding to the theme reliable internet connectivity, the respondents indicated that all universities where the study was conducted were connected to internet service. One of the respondents reported that:

> University is connected to internet service, and it provides free wireless internet services to students and

lecturers (Personal interview, 29th April, 2022).

The qualitative findings during the interviews are in agreement with the quantitative findings in this study. The quantitative findings show that the universities have been connected to internet services. Also, students and lecturers were given free internet services. The respondents further explained that they normally provided with the password for WIFI particularly once the ICT technician has opened your account in the system.

Moreover, a response on the theme, online services available in the university, a respondent who is ICT technician reported that:
Online services available are; admission system, online library, online system for provision of students' results and all these are found on our web site (Personal interview, 25th April, 2022).

The findings show that universities provide different online services such as admission services, online library, students' examination results, and all these services are found in universities web site. The findings are also in agreement with the quantitative findings in this study. Similarly, the results are in agreement with the findings in the studies done by Innocent and Masue (2020); Mwakyusa and Ng'webeya (2022).

4.2 The Findings on the Intervening Measures to the Challenges Facing Virtual Learning Adoption

Table 3 summarizes the findings on the Intervening Measures to the Challenges Facing Virtual Learning Adoption in universities in Arusha region.

Table 3: Findings on Intervening Measures to the Challenges Facing Virtual Learning Adoption

Intervening measures to the challenges facing virtual learning adoption	Students (n=90) f (%)	Lecturer(n =21) f (%)	Total (n=111) f(%)
Training staff & students in ICT	84(93)	21 (100)	105(95)
Provision of adequate computer in computer laboratory	77(86)	20 (95)	97(87)
Improvement of VL facilities	77(86)	19 (91)	96(86)
Update VL policies	78(87)	19 (91)	97(87)
Provision of adequate funds to institutions	77(86)	17 (81)	94(85)
Creating VL awareness to students and lecturers	77(86)	20 (95)	97(87)
Reliable and sufficient internet connectivity	80(89)	17 (81)	97(87)
High internet speed	80(89)	18(86)	98(88)
Provision of technological support to students and lecturers	79(88)	18(86)	97(87)
Alternative electric power supply	80(89)	21(100)	101(91)
Affordable internet cost	77(86)	17 (81)	94(85)
Affordable price of electronic devices	73(81)	17 (81)	90(81)

n=number of respondents, f=Frequency, %=Percentage, values presented are number and percentage of students and lecturers who agree with statement. Hence, those with contrary opinion to the statement are implied. **Source: Field Data (2022)**

On the item, training staff and students in ICT, 84(93%) of the students agreed with the statement, while only 6(7%) disagreed. On the other hand, all 21(100%) lecturers agreed with the statement. The results show that majority of respondents agreed with the statement. This means that in order to overcome the challenge of limited knowledge in ICT students and staff should get ICT training. The findings are in agreement with the finding by Jabreen (2017) which suggested that institution should provide ICT training to both students and lecturers.

On provision of adequate computer in computer laboratory, 77(86%) of students agreed with the statement. Additionally, 20(95%) of the lecturers supported the statement. The results show that most of the respondents agreed with the statement. This implies that, in order to solve the problem of limited number of computers in computer laboratory, university should provide adequate computers in computer laboratory. The finding is in agreement with the study by Mutsya and Makokha (2016), which suggested that universities should increase the number of computers in computer laboratory.
The findings on improvement of VL facilities were 77(86%) of the students agreed with the statement. In addition, 19(91%) of the lecturers were in agreement with the statement. The results showed that majority of the respondents agreed with the statement. This means that the university should improve and adequately supply VL facilities as an intervening measure to be taken in order to solve the challenge of inadequate and poor VL facilities.

The findings on updating VL policy, were 78(87%) of the students supported the statement, while 12(13%) opposed the statement. Similarly, 19(91%) of the lecturers agreed with the statement, while only 2(9%) disagreed with the statement. The findings show that majority of the

respondents agreed that, there is a need to update VL policies both at TCU, and in Education system so, as to accommodate VL. Mponela and Mkulu (2021) recommended that government should prepare VL policy that will facilitate the adoption of VL in higher learning institutions.

On provision of adequate funds to institutions, the findings were, 77(86%) of the students agreed with the statement, while 13(14%) disagreed. Moreover, 17(81%) of the students agreed with the statement, while 4(19%) of the students disagreed. The findings show that majority of respondents agreed with the statement, this means that majority of students agreed that university should be given enough funds by government and other stakeholder in order to solve the problem of inadequate funds.

Findings on the item, creating VL awareness to students and lecturers where 77(86%) of the students agreed with the statement, while 13(14%) disagreed. Also, 20(95%) of the lecturers agreed with the statement, while 1(5%) disagreed. The results show that majority of the respondents agreed that there is a need to create VL awareness to students and lecturers. The findings are in agreement with Jabreen (2017), who suggested that universities should conduct seminars and conferences on the importance and benefits of VL, and allow new students to get VL experience from the former one.

On reliable internet connectivity, the findings were, 80(89%) of the students agreed with the statement, while 10(19%) disagreed. In addition, 17(81%) of the lecturers agreed with the statement while 4(19%) disagreed. The results show that most of the respondents agreed with the statement. That means university need sufficient and reliable internet connectivity. This will even enhance online research and meetings. The finding is in agreement with Agenyegah (2019), who suggested that universities should increase investment in internet connectivity. Pete and Soko (2020), recommended that learners and lecturers should be given internet bundles, so that they can have access to internet everywhere and not limited to campus Wi-Fi.

Findings on high internet speed were, 80(89%) of students agreed with the statement, while 10(11%) disagreed. On other hand, 18(86%) of lecturers agreed with the statement, while 10(11%) disagreed. This implies that the problem of low speed of internet must be tackled by providing internet with high speed. According to Pete and Soko (2020), low internet speed strongly affect video based platforms such as Zoom which need strong internet connection, therefore it is important for internet service provider to find a way of strengthening internet signals.

Findings on the provision of technological support to students and lecturers were, 79(88%), of the students agreed with the statement, while 11(12%) were not in agreement with the statement. Also, 18(86%) of the lecturers agreed with the statement, while 3(14%) disagreed with the statement. The results show that most of the respondents agreed with the statement, this means that majority of the respondent agreed that provision of technological support to students and lectures is a panacea to the lack of technological support to students and lecturers.

Findings on sub item alternative power supply was supported by 80(89%) of the students while 10(11%) disagreed. Moreover, 21(100%) of lecturers gave their affirmative approval to the statement. The findings show that majority of the respondents agreed with the statement, this mean that respondents agreed that there is a need of alternative power supply source such as automatic electric generator in order to cope with the problem of frequent power outage. On the item affordable internet cost, the total number of respondents who agreed with the statement was 94(85%). This will help universities to run VL with minimum cost.

Lastly, on affordable price of electronic device, 73(81%) of the students agreed with the statement and 17(19%) of the students disagreed. Moreover, 17(81%) of the lecturers agreed with the statement, and 4(19%) disagreed. The results show that majority of the respondents agreed with the statement. This means that majority of the respondent agreed that there is a challenge of high price of electronic devices, and to address this challenge there should be affordable price of electronic devices. Government and stakeholder should look on the possibilities of outsourcing affordable electronic devices to students and the universities.

On interview about the intervening measures to the challenges facing VL adoption, a respondent who is ICT technician reported that:

> University should provide ICT training to lecturers and students in order to cope with new technology, increase number of ICT experts. Provide modern and compatible device for VL. Lastly, university management should be ready to embrace new technological advancement. (Personal interview, 22nd April, 2022)

The respondent observed that university should provide ICT training to both students and lecturers; this will help them to be competent and familiar with VL facilities. Also, the respondent suggested that universities should increase the number of ICT experts, this will reduce the workload ICT technician have. Similarly, by doing so, students and lecturers will get quality and sufficient support from the technician.

Moreover, universities should provide modern and compatible devices. Respondents observed that the devices used were outdated and other devices were not compatible with some modern technology. Furthermore, the respondents suggested that university management

should be ready and willing to accept changes, it seems that sometimes management are conservative, and afraid to accept changes such as new ways of delivering courses and new technology. This fear is caused by either lack of proper knowledge concerning the technology or fear of expenses needed to adopt and run that technology.

5. Conclusion and Recommendations

5.1 Conclusion

Based on the findings of the study, the following conclusion was drawn; the first objective of the study assessed the readiness for VLin universities by considering some aspect of VL, such as availability of computer laboratory, electricity, internet connectivity, accessible online library. The findings show that lecturers do not have technical and pedagogical skills for teaching online, universities have shortage of technology experts, no university offers online assessment and examination, and no university in the study area provide VL programmes and both students and lecturers do not prefer online learning. The researcher concluded that, the readiness for virtual learning adoption in the universities was at its infant stage. This implies that universities were not ready for VL.

On other objective, which was to find out intervening measures to the challenges facing VL adoption, the researcher found that the government, stakeholders and responsible bodies should provide adequate funds to institutions, and institution should allocate enough budget which will enable universities to purchase, increase and maintain VL facilities and this will address the problem of poor and inadequate VL facilities facing most universities.

5.2 Recommendation

Based on the study findings the following recommendations were made;

i. It is the right time for university management to adopt technology advancement and put higher learning institutions at an advantageous point to continue with teaching and learning despite emergence of phenomenon or pandemics such as COVID-19.

ii. Universities should come up with a plan to increase the number of ICT facilities, experts and training programmes for effective implementation of VL.

iii. TCU and universities to review and harmonize their program policy, so as to allow other approved programs to accommodate VL as mode of delivery

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