

Baseline Survey on ICT Infrastructure for Online and Digital Learning during and Post Covid_19 in Selected Kenyan Universities

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Abstract: The onset of COVID-19 Pandemic forced the closure of institutions of higher learning to curb the spread of the virus. This led to new scenarios that required education institutions to rapidly adopt. The Solution was mainly online/digital learning. This study sought to investigate the status of ICT infrastructure a key enabler of online/ digital learning. This was achieved through a survey of selected eleven Universities in Kenya. The findings indicated that even though the universities had adopted blended learning the ICT infrastructure was still a challenge. The Paper recommended the need for the institutions to come up with strategies to improve on the ICT infrastructure and hence enhance the quality of learning and reduce digital exclusion.

Key Terms: COVID-19, ICT infrastructure, Digital learning, Connectivity

1. Introduction

Learning in most Kenya University was mainly face to face. However in March 2020 the education system was brought to a lock down due to COVID-19 pandemic. The Universities were forced to close down (E.I. Omwenga, P.M.F. Mbithi, J.N. Muthama ,J.M.Chone 2021). This resulted in two major problems namely: disruption of education calendar, bringing into question whether students were ever to graduate. The second was that most Kenya universities rely on fees collected from students to run the affairs of the universities. With students being off campus, the Universities faced major financial challenges. To mitigate these two challenges then there was need to engage, in digital and online learning even though the Universities were unprepared. ICT Infrastructure is an enabler for this type of learning to be effective. The study then sought to carry out a survey on status of ICT infrastructure in selected 11 Universities in Kenya.

2. Related studies

Mbithi P.M.F. and Omwenga E. (2021) have written a proposal On a Pipeline Project on How Universities can be supported to cope/mitigate the Challenges of Covid-19, Especially in Areas Of Digital Learning (ICT Infrastructure Development). This proposal was written by 11 participating Universities to the African development bank. They sought funding from the African development bank to seal gaps in present education systems.

G.N. Chemining, S.M.Mbuguah, B.M Sanda, M.A.Elimi, A.H. Mohamed A.A.Hared, C. Oduor. D.N.Kamsingi (2021) this team as participants in Strategic Leadership development Program of the Kenya School of Government, were required to write a position paper in the area of education. They settled on ICT

Infrastructure development funding support as a strategy for public Universities in mitigating the challenges of Covid-19. They argued that, the Kenya Government should come up with a marshal plan to fund ICT infrastructure. They stated that, the forced closure of universities resulted in universities being pushed into online learning without well-developed ICT infrastructure. They maintained that most universities especially public universities are experiencing reduced capitation from exchequer and reduced number of students. Leading to the universities being financially constrained. They contended that since the Government of Kenya had been involved in a successful upgrade of technical institutions, then a similar approach should be adopted in Funding ICT in Universities.

Ngwacho A.G (2020) argues that globally, and Kenya in particular, economic growth has been and will be negatively impacted by COVID-19 shocks with direct consequences to the poor, vulnerable and marginalized households who rely on informal employment and businesses to fend for their children. He says that their ability to finance school related expenditure such as school kits, meals, learning materials has been severely compromised with the pandemic. He postulates that with the Government adopting remote teaching to support distance learning and online education delivered through radio and television and internet, learners from poor, vulnerable and marginalized household will have no access to these mediums of learning which will further worsen the inequality in access and quality of education

Kathula.D.N (2020) in her study found out that the effects of COVID-19 were so severe that some teachers and parents lost their jobs or source of livelihoods. That most of the students were not able to access online learning due to lack of electricity, lack of learning materials and some were even forced to relocate to the country side. Kathula in her study hence concludes that as a result of the challenges presented by the coronavirus and the likely impact of future pandemics the government's ability to ensure continuation of learning will depend on the ability to swiftly harness available technology, provide adequate infrastructure and mobilize stakeholders to prepare alternative learning programmes.

Lugonzo, H. (2020) in his paper argues that the online education and distance learning which has been implemented by the Kenyan government through the Ministry of Education do not allow learners to have a personal relationship and intimate interaction with the online teacher. Also online teaching does not favor such learners as most of them do not have access to mediums like smartphone, internet connectivity, computers, televisions, radios, among others. He says this has widened inequality in access to relevant quality education by such disadvantaged learners. He posits that there is need for a study to determine mitigation measures.

E.I. Omwenga, etal. (2021) in their paper presents a study on how University students, lecturers, administrators and managers perceive the impacts of the of COVID-19 crisis on various aspects of University teaching and learning in Africa, and particularly in Kenya. They state that Students were mainly concerned about issues to do with internet connectivity, computing devices and electrical power. While teaching staff were mainly concerned with access to the teaching resources, conducting online teaching, capacity to handle the online mode of teaching, devices and eContent development. They state that the pandemic has exposed the shortcomings of the current higher education system and the need for enhanced policy formulation and implementation on digital infrastructure to adapt to the rapidly changing education ecosystem of the world.

3. Research Methodology

In research methodology we are interested in the methods that will be used to collect Data. Though the methodology for research studies may vary, every research is based on data which should be of good quality and which is then analysed and interpreted to yield information. The commonest among several methods of primary data collection are surveys and they can be grossly categorized into two groups: manual and electronic. Three major methods of collecting survey data electronically are computer administered surveys, electronic mail surveys, and web surveys (M. S. Nayak,, K.A. Narayan, 2019).The methodology adopted was a survey, where a set of questionnaire were sent into participating Universities Electronic mail Survey was

selected because during lock down the basic COVID-19 protocol was to be adhered to. The responses are received back for analysis.

4. Finding of the survey and Discussion

In this section an analysis of feedback of each question is presented and discussed.

1. The Universities that participated in the study were:UON, Kenyatta, JKUAT, SEUKO, ZETEC, Pwani, Kabianga, DeKUT, Kibabii, Daystar,Garissa. The University showed a general spread across the country with University of Nairobi and Kenyatta University representing Nairobi Region. ZETECH. jKUAT and Dedan Kimathi Representing the Central Kenya Region. SEUKO and Daystar Universities representing the Eastern Region. Garissa University representing the Northern region. University of Kabianga being a representing region. Kibabii University did represent the Western region. The finding from these Universities can then be taken as replica of the Kenyan Case.

2. Sixteen members of staff from the 11 universities responded to the call. We had fourteen males and two females'. This how the spread is because the officer's target were in ICT related managerial position and most of the officers were male. In our case we did not think that gender was an issue.

3. Of the sampled sixteen person their highest educational level we seven Doctor of Philosophy (PhD) and nine Master's degree holder. This means that the sampled persons were competent, knowledgeable and were of comparable education level hence education level cannot not be a modifying factor in the survey.

4. The Current managerial position at the University for sampled staff were Director/manager ICT eight(8), Director/in charge ODeI seven(7) and a one (1) Director of an ICT institute. The sampled participant had the right exposure to expound on ICT infrastructure and how it could impact on digital learning

5. On Number of years the respondent had served the results are shown in figure 1.

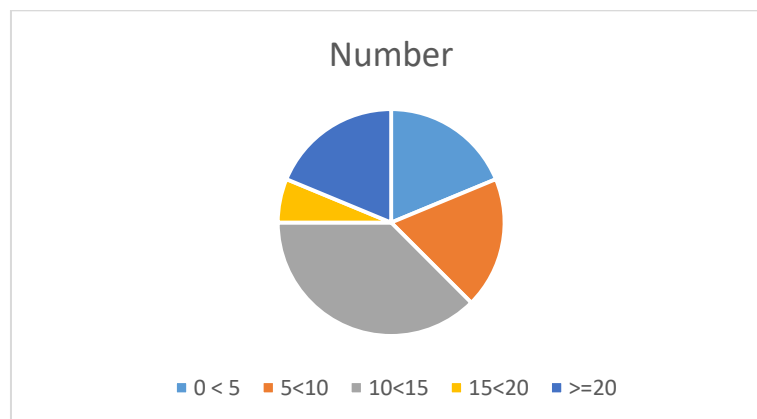


Figure 1: Pie chart indicating the years served band versus number of participants

Figure 1 shows the response and from the chart, 63% of the sampled staff had over ten experience. This implies that officers had sufficient experience to be resource persons in this area and the responses to the question are credible.

6. On the question on whether universities had internet connectivity all the respondent said yes.

That meant that all sampled the universities were in position to offer some form of digital and online learning

7. On the question of main internet service provider is Kenya Education network (KENET) was the major provider with Safaricom serving as backup provider. KENET is a National Research and Education Network that promotes the use of ICT in Teaching, Learning and Research in Higher Education Institutions in Kenya.

8. On the question of which sections within the university have internet connection? Most participants cited Classrooms, Library, hostels, faculty rooms, laboratories, and reception and open areas. This indicate that the spread of internet is largely similar in sampled institutions.

9. All respondent responded yes to the Question “Do you have wifi/wireless internet connectivity at your campus?” This meant that situation in the sampled institutions is similar and all could offer online classes.

10. On the question of internet access options provided for off campus access. It was found out that 63% provide data bundles while 25% use EDUROAM the 13% use both. This is shown in figure 2.

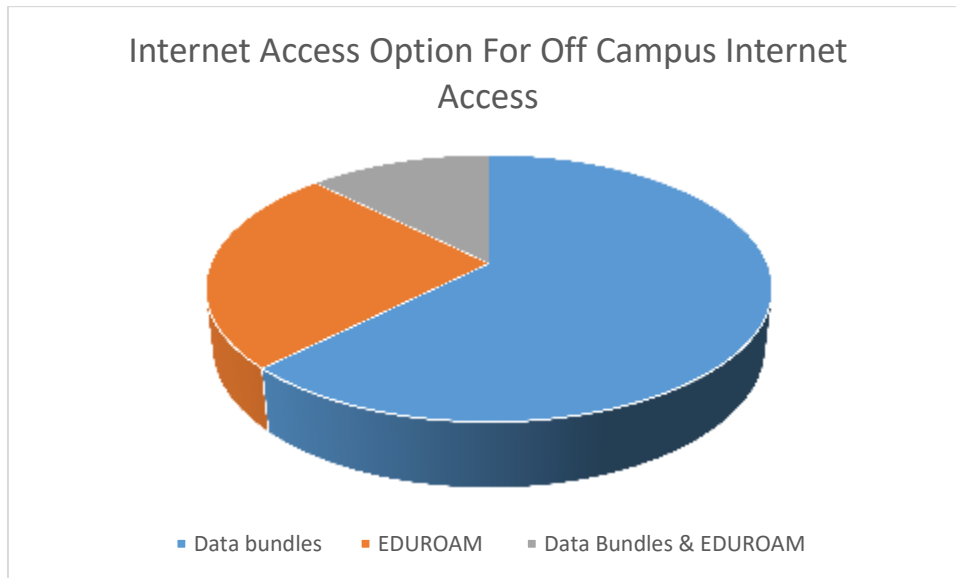


Figure 2: Internet Access Option

11. Figure three shows the response to the Question of the appropriate technology available for your University.

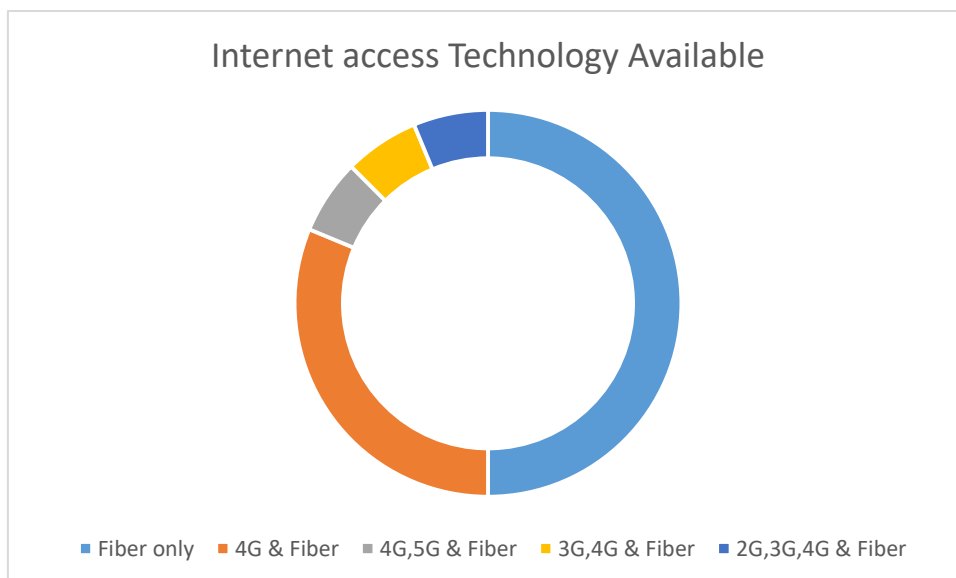


Figure 3: Technology available

12. On the Question whether all staff have dependable Computer / Laptop only answered yes the rest 14 responded No. This implies that even staff members have challenges with the ICT devices

13. On the question on Number of Laptops provided by the University? The response is as shown in Figure 4

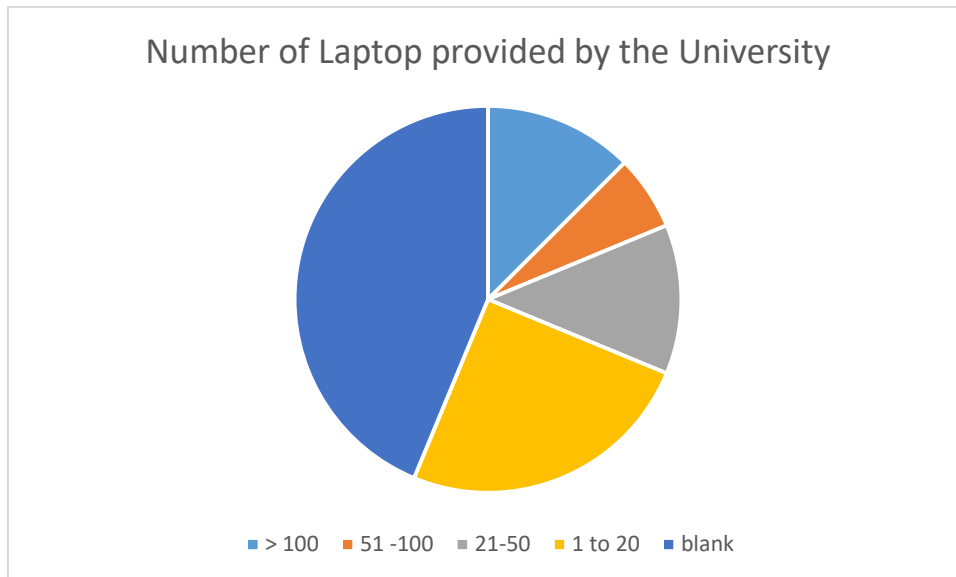


Figure 4: Number of Laptop

From the chart 69% of the respondent either had blank or had less than 20 university laptops. It is evident that most universities are not providing laptops.

14. On the Number of smartphones provided by the University 13 of the responded with NO indicating the Universities do not provide smartphone to the staff

15. On Number of tablets provided by the University 13 responded with none, while one said they had 6000 another a 100 and 1 person stated 20. But generally most of the institution do not provide smartphones.

16. On the question of Number of Desktop provided by the University From the chart 27% responded with a blank. Showing that this is still challenge in this area.

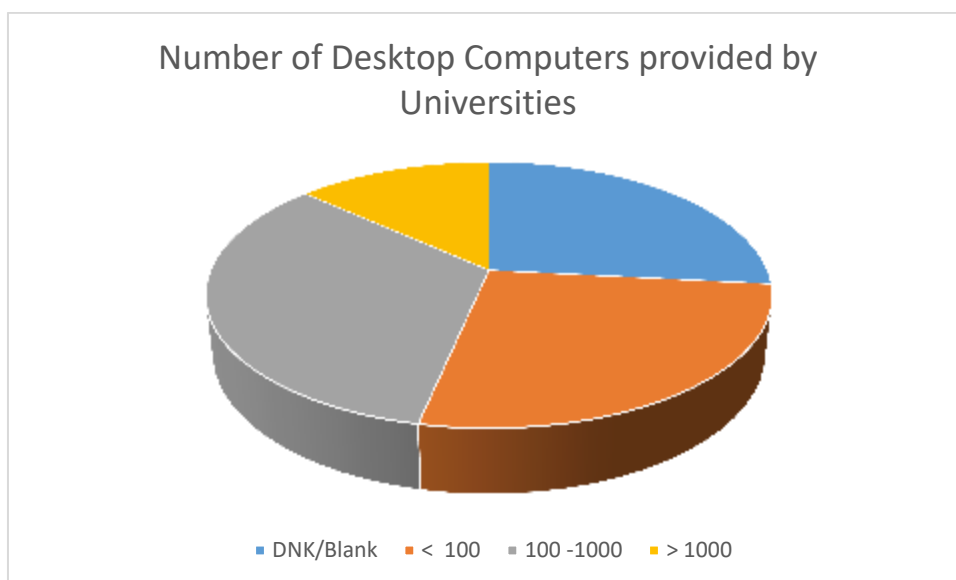


Figure 5: Number of Desktops

17. The Question of the computing device used more frequently to support e-learning by your staff? The response were: Laptop- 11; Desktop -2; Smartphone -2. Hence the most used device is the laptop yet having laptops is a challenge.

18. On the question whether all students have dependable computer / Laptop. All respondents 16 replied no.

19. On the question of which computing device is used more frequently for e-learning by your students? The 13 respondent said smartphone while 2 stated the laptop and one said the tablet 1.
20. On the having wifi/wireless internet connectivity at your campus?. All the respondent said yes,
21. On the question which mode is used to offer your courses? All the respondent said Blended =16. This means that all institution some form online learning.

5. Discussion

From the responses given it is evident that ICT devices are a challenge to both students and staff and hence Online/Digital learning may greatly be affected by lack of the ICT devices especially the lack of laptops and smartphones. Although most have WiFi within the institution while off campus data bundles were provided or used for communication. Data bundles were by the service providers. From observation it was found out this was a challenge especially to members of staff and students who were not used to having on line classes for about 3hours. From observation it was also realized that some areas were not well covered by the service providers and hence student and staff had issues participating on online learning while off campus. This may lead to question of quality of online teaching and the issue of digital exclusion.

6. Conclusion and Recommendations

From the finding it's evident that the basic ICT infrastructure is available in most of this institutions. However, with effective online/digital learning the infrastructure is basically not adequate and there is need to address this quality and sustainable education for all. It's the recommendation of the researchers that the Universities upgrade their ICT infrastructure. Where the Universities are facing economic challenges the Government should develop strategies to overcome these challenges. These strategies may include zero rating or reduced taxation ICT devices so that they could become affordable. Also the Government could give incentives to service provides to extend coverage of their network. Finally the government could come up with a Marshall plan to improve the ICT infrastructure.

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8. Reference

1. E.I. Omwenga, P.M.F. Mbithi, J.N. Muthama, J.M.Chone 2021. .A Study on the Impact of COVID-19 Pandemic in African Universities International Journal of Computer Applications Technology and Research Volume 10–Issue 08, 208-212, 2021, ISSN:-2319–8656.

2. Mbithi P.M.F. and Omwenga E. 2021 A Proposal On A Pipeline Project On How Universities Can Be Supported To Cope/Mitigate The Challenges Of Covid-19, Especially In Areas Of Digital Learning (ICT Infrastructure Development).
3. Ngwacho A.G: (2020 COVID-19 Pandemic Impact on Kenyan Education Sector: Learner Challenges and Mitigations Journal for Research innovation and Implication in Education ISSN 2520-7504 (Online) Vol.4, Iss.2, 2020 (pp. 128-139).
4. G.N. Chemining, S.M.Mbuguah, B.M Sanda, M.A.Elimi , A.H. Mohamed A.A.Hared, C. Oduor. D.N.Kamsingi (2021) A Position Paper On ICT Infrastructure Development Funding Support As A Strategy For Public Universities In Mitigating The Challenges Of Covid-19 . Kenya School of Government.
5. Kathula.D.N.2020.Effect of Covid-19 Pandemic on the Education System in Kenya Journal of Education, 3(6) Page 31-52.
6. Lugonzo, H. (2020). A Theoretical Study of the Impact of Corona Virus Crisis on Learners' Social Interaction in Kenyan Learning Institutions. *IJER-International Journal of Educational Research*, 3(04), 09-19.
7. M. S. Nayak,, K.A. Narayan(2019) Strengths and weaknesses of online surveys IOSR Journal of Humanities and Social Sciences (IOSR-JHSS) Volume 24, Issue 5, Ser.5 (May-2019), PP 31-38 e-ISSN: 2279-0837, p-ISSN:2279-0845.www.iosrjournals.org (17) (PDF) *Strengths and Weakness of Online Surveys*. Available from:
<https://www.researchgate.net/publication/333207786> *Strengths and Weakness of Online Surveys* [accessed Jan 08 2022].

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