Sub-Theme 2 :
ICT Revolution in Education

Unpacking ICT Readiness and Students' Preparedness for National Examinations During the COVID-19 Pandemic in Uganda: A Case of Kamuli and Jinja Districts of Uganda

Peter Lwanga Kayizzi; Brandt Hermus Ssemwatika

National Curriculum Development Centre

Abstract

Although the advent of the novel COVID-19 pandemic led to disruptions to education in Uganda, it also widened the scope and role that information and communication technology (ICT) can play in education. There was always a negative attitude towards embracing technology in teaching and learning, for purported reasons such as financial constraints, insufficient technical skills, insufficient equipment, inadequate management support, school culture, perceived usefulness, it is time-consuming, and others. This study set out to establish the extent of readiness to use ICT in the absence of physical class interaction that was not possible owing to intermittent total lockdowns. The objectives of the study were: to examine the relationship between ICT infrastructure and student preparedness for national examinations; to investigate the relationship between technological skills and student preparedness for National examinations; and to assess the relationship between management support and student preparedness for national examinations. The study employed a cross-sectional research design, data were collected and analysed quantitatively using descriptive and inferential statistics by means of the Pearson chi square analysis of independence. The key findings revealed that the students' performance was independent of ICT infrastructure (P value=0.992>0.07), technological skills (P value=0.143>0.07) and management support (P value=0.075>0.07), which implies that the students were not prepared to use ICT as part of their preparation for national examinations. The study may be of significance to curriculum developers, the Ministry of Education and Sports (MoES) and policymakers, society and school administrators. The study thus recommends that MoES and curriculum developers should embed and embrace the uptake of ICT as part of instruction in the schools of Uganda to prepare for similar education disruptions.

Keywords: ICT infrastructure, ICT readiness, lockdown, management support, student preparedness

Introduction

Education is a continuous process that is evidenced by progression from one class to another and from one cycle/level to another. This means that the education trajectory should not be disrupted regardless of any circumstance. There should be a possible creative or innovative mechanism to ensure that education continues amidst disruptions. Jinja and Kamuli district , where this study was carried out, are among the twenty-two district found in the Eastern Region of the Republic of Uganda. They border the Buganda Region and are separated by the Nile River.

They form an urban setting but with secondary schools that possess the characteristics of both urban and rural settings. The variations in the state of secondary schools (rural-urban settings) facilitated the selection of samples from these districts without compromising the quality of the findings. The study, therefore, aimed to establish if the innovative ICT learning mode helped the students to proceed with learning during the lockdowns and to show if the students were prepared for the introduction of such a learning mode ahead of sitting for their Uganda Certificate of Education (UCE) national examinations.

Background

Globally, ICT is recognised as a tool for improving teaching and learning (Midila, 2021). ICT usage includes, but is not limited to, both new and old communication technologies such as radios, televisions, computers, fax, scanners, print media and the internet (Mukhula, Manyiraho, Atibuni & Olema, 2021). However, in the past, there has been continuous neglect and fear surrounding the use of technology-enhanced teaching and learning, especially in Uganda's education system (Kizito, 2019; Nyakito et al., 2021). Some teachers have always had insufficient ICT devices, and harboured a negative attitude towards learning and using ICT skills in teaching (Keirungi, 2021). Technology-enhanced learning was only left to the international schools and some higher education systems, but these institutions had the intention of attracting more students and ensuring convenience in learning for those who were not able to physically access the institutions.

Students' preparedness to use ICT-enhanced learning can be assessed from equipment capability, technology skills, self-directed learning skills and motivation (Widodo, Wibowo & Wagiran, 2020). The readiness of the institution and the management as a whole is also critical when introducing ICT as a learning mode. The institutional readiness must be considered before considering the adoption of e-learning and ICT usage, as this will determine its likelihood of success (Blacer-Bacolod, 2022). The lack of integration of ICT has greatly affected the elementary levels of learning as well as the secondary levels. This became glaring at the advent of the novel Covid-19 pandemic which hit the whole world and all businesses, including schools. This sent the schools and other education institutions into forced recess precipitated by unprecedented and intermittent total lockdowns, which were enforced in an effort to curb the spread of the deadly and contagious virus. It is estimated that 64.6% of the world student population was affected by the lockdowns (UNESCO, 2020) and in Uganda about 73,000 education institutions, 548,000 teachers and 15 million learners were directly affected by the school closures (MoES, 2022). There was a need to continue with learning and teaching in a remote way because it was not clear when the education institutions would re-open, given that the virus was still spreading and the education calendar would be disrupted. Some parents even feared that their children were over-growing, surpassing the age which they presumed to be appropriate for the given classes. It was evidently safer to study using ICT devices that allowed real-time interaction between the teacher and the learners.

After receiving clearance from the education ministry, it was determined that the innovative way to continue with the education processes despite the halt to education, was to use technology-enhanced learning for schools, colleges and universities because it was possible without necessarily having learners converge in schools. However, the first anticipated and relatively cheaper strategy, which was to use radios and television to deliver lessons to these affected learners, hit a dead end as some regions purportedly did not have access to a radio or television set, while others claimed that they lacked electricity and network reception for the radios and televisions in their areas, and still others feared the lack of concentration on the lessons aired on such devices. In June 2020, the Government of Uganda (GoU) through the Covid-19 Emergency Education Response Project (CERP), sought a $14.7 million grant from the Global Partnership for Education (GPE) to cushion and mitigate the impact of Covid-19 through supporting continuity of learning during lockdown in the pre-primary, primary and lower secondary levels of education (MoES, 2022).

To the National Curriculum Development Centre (NCDC), the integration of ICT in teaching and learning is one of the aspirations for the new reforms in the education curriculum, especially at the lower secondary level. This, therefore, was a blessing in disguise regarding the implementation of such reforms in view of the technophobia that has permeated in the teaching fraternity. However, in this paper we hypothesise and argue that the use of ICT to enhance teaching and learning, especially at the lower levels of learning such as secondary schools, did not favour the entire school system equally and, therefore, undermined inclusivity as a critical principle for education access across the globe. In fact, as Atwine (2021) posits, the reality was that most school children were not learning. Could this be attributed to internet accessibility and ICT issues? For example, according to the Uganda Communications Commission (UCC), Uganda has the highest priced internet in the East African region. In Uganda, for instance, buying a gigabyte of data costs approximately $2.75, as compared to Kenya ($2.48), Rwanda ($2.25) and Tanzania ($2.25). This makes the application of ICT very difficult for learning, especially in the rural schools. Some of the critical questions that one should be asking are: Were the learners ready for the uptake of ICT in learning at that time? This includes the resources, the physical ICT infrastructure, the internet connectivity and/or the general acceptance of this approach to teaching. Or was there continuity and/or sustainability of the ICT-led education drive in the schools even after the restrictions and lockdowns were lifted or eased? These questions inspired taking up such a study in the selected distrICT of Jinja and Kamuli and, alongside the research questions, informed the analysis and interpretation of the findings.

Significance of the Study

The study may be of significance to the following:

i) **Curriculum developers**

The component of ICT in teaching and learning is very critical. Therefore, the findings of this study may be of significance to the curriculum developers at NCDC in the light of the need to incorporate ICT in all the curriculum documents, especially ICT-enhanced assessments so that the learners can get to learn ICT and, therefore, be able to apply it in national examinations or even later in the world of work.

ii) **School administrations**

The findings of this study may be of significance to the various schools, especially those where the study was carried out. The findings may show how ready or unready their students were prior to sitting the national examinations. This may motivate the school administration to set up mechanisms that enhance ICT readiness on the part of students for a similar education disruption or even for the development of ICT skills among their students and teachers.

iii) **MoES and other policymakers**

Introducing ICT for learning is fundamental for quality education, especially at secondary level, but students' readiness to use the ICT is another factor. The findings of this study may inform the MoES and policymakers on the best ICT infrastructure that works for all regions and schools in Uganda, taking into consideration the power and internet accessibility requirements, as well as the skills that the teachers and students may need to implement ICT use in teaching and learning transactions.

iv) **Society**

The members of the community/society may not be aware of the role and the type of ICT that may be used for teaching and learning. For instance, society may undermine some ICT equipment such as radios, televisions and mobile phones as potential learning equipment. The findings may, therefore, educate the society on utilising the unknown ICT tools in education and training.

Objectives of the study

The main objective of the study was to establish the extent of students' readiness to use ICT in the absence of physical class interaction in Kamuli and Jinja districts of Uganda.

The study was guided by the following specific objectives:

a) To examine the relationship between ICT infrastructure and student preparedness for national examinations in Kamuli and Jinja districts of Uganda.

b) To investigate the relationship between technological skills and student preparedness for national examinations in Kamuli and Jinja districts of Uganda.

c) To assess the relationship between management support and student preparedness for national examinations in Kamuli and Jinja districts of Uganda.

The study sought to test the following null hypotheses:

$H_0 1$ There is no relationship between ICT infrastructure and students' preparedness for National examinations in Kamuli and Jinja districts of Uganda.

$H_0 2$ There is no relationship between technological skills and student preparedness for national examinations in Kamuli and Jinja districts of Uganda.

$H_0 3$ There is no relationship between management support and student preparedness for national examinations in Kamuli and Jinja districts of Uganda.

Statement of the problem

In the entire world, the outbreak of the deadly Covid-19 viral disease caused disruptions to education, which was facilitated by the total lockdowns, very strict health protocols and tight restrictions (Blacer-Bacolod, 2022), all geared towards curbing the spread of the disease as a result of congregation. The government thought of ensuring continuity of learning by developing and distributing home-learning materials to the 15 million affected learners. However, only 20% of the self-study materials for learners in P1–P7 and S1–S4 were printed and distributed (Atwine, 2021). In order to promote real-time learning, virtual learning using ICT was the alternative to widen the catchment area of teaching and learning. The sudden shift from conventional classroom learning to online learning did not provide ample time for teachers and/or learners to prepare themselves for this transition to a new learning transaction. This was marked by inadequacies associated with high costs of the internet, limited bandwidth, shortage of skilled personnel, technological illiteracy among the population and inadequate infrastructure (Tumwesige, 2020), for which the learners, teachers and government were not prepared for. Although, accessibility to ICT remains a serious global concern, the problem of phobia of new technologies is another challenge (Midila, 2021). The National IT Survey of 2017/2018 found that 65.3% of the households owned a radio, 21.8% owned a television, while only 5.9 % had access to a computer at home (NITA, 2018). This brought about a digital divide between the urban and rural learners who couldn't access the internet and electricity. For instance, Uganda's internet penetration is 29.4% compared to Tanzania's 38% and Kenya's 53% (Why internet is so expensive in Uganda, 2022). This clearly demonstrates the unpreparedness for the ICT-enhanced learning as an intervention to continue with learning. The problem at stake, therefore, is to understand the ICT preparedness of students as well as the lessons learnt, from which to draw conclusions and recommendations for future preparedness, and help redirect the policy of education reforms in Uganda. Otherwise, the reforms may not be possible without a robust ICT practice and culture in the schools of Uganda.

Literature Review

COVID-19 became synonymous with technology and the gaps associated with learning during the total lockdowns, which were attributed to the digital divide between rural and urban areas (Fanelli, Cajuste, Cetta & Amanya, n.d.) as well as the size of the schools in terms of enrolment. During the Covid-19 total lockdowns in the entire world and specifically in Uganda, strategies were put in place to ensure continuity in learning, of which some turned out to be feasible while others did not bear any fruit. This was allegedly and mainly attributed to insufficient students' readiness for e-learning.

In this paper, we conceptualised ICT readiness as the perception and experiences that the learners got after exposure to this kind of learning transaction, which the majority were going through for the very first time. For instance, Bhaumik and Priyadarshini (2020) carried out a study using quantitative descriptive survey on 100 students in Delhi to establish their e-readiness for online learning during the Covid-19 lockdown. Their findings found that access to online learning was high, but the teachers' online delivery skills and the learners' digital skills were lacking.

Even before the advent of Covid-19 and the subsequent disruptions to education that led to the total lockdown and closure of education institutions, ICT was significantly associated with the students' academic performance. In a study by Osagie et al. (2019) on the role of ICT in the academic performance of postgraduate students at the university of Benin, the findings revealed that there was a significant difference between the users and non-users of ICT facilities in academic activities. The study established that there is a positive impact of ICT on students' academic performance. Whereas their study poses both a contextual and knowledge gap (having conducted their study on postgraduate students and in another country), these findings can be in concordance with the role that ICT adoption can play in the academic performance of secondary school students in Uganda.

In a conceptual paper by Midila (2021) to establish the role of ICT-enhanced instruction during the Covid-19 lockdown in Nigeria, the findings revealed that as a result of the use of technology-enhanced accessibility and the quality of education, courses were taken online at a lower and cheaper cost than in the traditional physical learning environment. However, whereas the author states the barriers to ICT-enhanced learning, there is no finding to reflect the ICT readiness of the students as proposed by the current study.

Mukhula et al. (2021) carried out a study to determine the level of ICT readiness and ICT policy implementation in secondary schools in Mayuge district, using the cross-sectional survey design and a sample of 232 secondary school teachers. The study revealed that there was a moderate level of ICT adoption readiness and a moderate level of ICT policy implementation, and a significant moderate positive relationship. However, in the study, the sample was comprised of teachers, who are the implementers of the ICT-enhanced learning, wit the students and their experiences as recipients of the ICT services not being considered at all in the study. The current study intended to collect data on the students' readiness for ICT during the Covid-19 lockdown. This study chose students as a single unit of analysis because it is the students who may have faced difficulties with the transition to ICT technology in learning during the lockdown.

The slow rate of ICT adoption prior to the Covid-19 lockdown was facilitated by the high cost of the internet and ICT gadgets. For instance, in a study by Eton and Chance (2022) on university students to illustrate how e-learning is used in Uganda, the findings revealed that e-learning approaches at universities favourably correlated with financial implications, and some academic staff lacked e-learning training. However, the students reported that e-learning eased communication between them and their lecturers, although they reported that the internet and ICT gadgets were expensive.

A study carried out by Kagoya (2020) in Uganda and Tanzania on the use of digital transformation to address the education challenges brought by Covid-19 revealed that there was an increase in digital transformation in home and personal learning among students who had earlier on faced challenges of technophobia. It is pertinent to establish the extent to which students were ready for ICT integration during the Covid-19 lockdowns. For instance, in an effort to establish whether ICT was being integrated in the teaching and learning process in secondary schools in the Kigezi Region, Mbabazi and Nafizi (2022) carried out a study to establish the integration of ICT in teaching and learning. The study employed a quantitative approach and was guided by the MICTIVO model of ICT integration. The results revealed that ICT was not being used in the teaching and learning process and that most of the ICT infrastructure was not available in the schools and most of the respondents lacked ICT skills. On the other hand, Baluku and Kasujja (2020) carried out a mixed-methods study to establish ICT usage and its influence on students' academic performance in UCE in Kasese district. Using a sample of 291 respondents, a cross-sectional research design and a chi square test for analysis, their study established that accessibility to ICT resources in teaching influences the academic performance of students. Their study also revealed that the utilisation of ICT infrastructure influences students' academic performance in UCE secondary schools in Kasese district.

This, therefore, accounts for the perceived low readiness in some schools at the advent of the total lockdowns which were facilitated by the Covid-19 disease outbreak. The study by Mbabazi and Nafizi was in concordance with the one by Keirungi (2021) which posits that inadequate devices, fear to use ICT and lack of interest to learn ICT skills hindered the ICT integration and, therefore, uptake of ICT as a mechanism for teaching in preparation for national examinations during the Covid-19 total lockdown.

Methodology

Research Design

The study employed a cross-sectional research design to establish the associative relationships between the variables of the study, utilising the quantitative approach of inquiry. According to Creswell (2009), a research design is a plan and procedure for research that span the decisions from broader assumptions to detailed methods of data collection and analysis. Creswell stresses that the orientation, type and nature of a particular study determine the choice of a particular research design. In this case, we aimed at establishing the relationship between the different variables conceptualised in this study to come up with conclusions on future students' ICT readiness and preparedness for unprecedented situations that may lead to education disruption.

Research Approach

The study took a quantitative approach to data collection and analysis. The approach was chosen because it aided the researchers to collect plentiful data in real time, and to establish a statistical relationship between the study variables which helps in the generalisation of the research findings to the entire population under study.

Data Collection Instruments

A five-point Likert scale self-administered questionnaire was administered to the students in the selected schools and the respondents filled them in and they were collected immediately.

Sampling and Sampling Procedure

The study utilised the simple random sampling technique of schools and respondents in order to minimise the possibility of bias during data collection.

Target Population

The study targeted 'A' level students in Senior Six from schools that were randomly selected in Kamuli and Jinja districts of Eastern Uganda. These were targeted because they were the ones affected directly by the lockdown and subjected to the virtual technology mode of learning prior to sitting their UCE examinations. This is justified by a study by Mukhula et al. (2021), which concluded that secondary schools in Mayuge (one of the Eastern Region districts) were in the early stages of domestication of ICT and ICT policy implementation.

Sample Size

The size of the population of the students was unknown at the time of carrying out the study. Therefore, the study utilised the Cochran formula (1977) for determining the sample size of an unknown population. If the population size is unknown, the population proportion is also unknown (Uakarn, Chaokromthong, & Sintao (2021).

Where: n = sample size

z = 1.81 (z score at 93% confidence level)

e = 0.07 (desired level of precision)

= **167 students**

Data Processing

The data collected was cleaned for inconsistencies, coded and entered into the computer for analysis.

Data Analysis

Descriptive statistics were used to analyse the demographic data, while inferential statistics of a chi-square test of dependence and multiple regression analysis were used to analyse and establish the associative relationships with the aid of STATA version 15.0 statistical computer software. Because the data was categorical in nature, this justified a chi-square test of independence and later multiple regression analysis to establish the level of dependence between the variables in the study.

Response Rate

Out of the sample of 167 students supplied with questionnaires, 153 returned the questionnaires, representing a response rate of 92%. The high response rate was attributed to guided supervision when filling in the questionnaires. According to Nulty (2008), a response rate of 60% or higher is appropriate. Creswell (2012) also concurs that survey researchers seek high response rates from participants so that they can have confidence in generalising the results to the population they are studying.

Descriptive Analysis

The respondents were asked the grade that they scored at their UCE level to establish if the lockdown and the subsequent introduction of ICT as a teaching and learning strategy had affected their performance. The following were the findings based on the items measured during the study:

Performance at UCE Level Examinations

The respondents were asked to respond to the grade that they scored during their UCE examinations. The purpose of this was to establish if the lockdown had affected their performance in the examinations. This was also intended to establish if the innovation of ICT as a mode of learning in preparation for their examinations had any influence on how they performed.

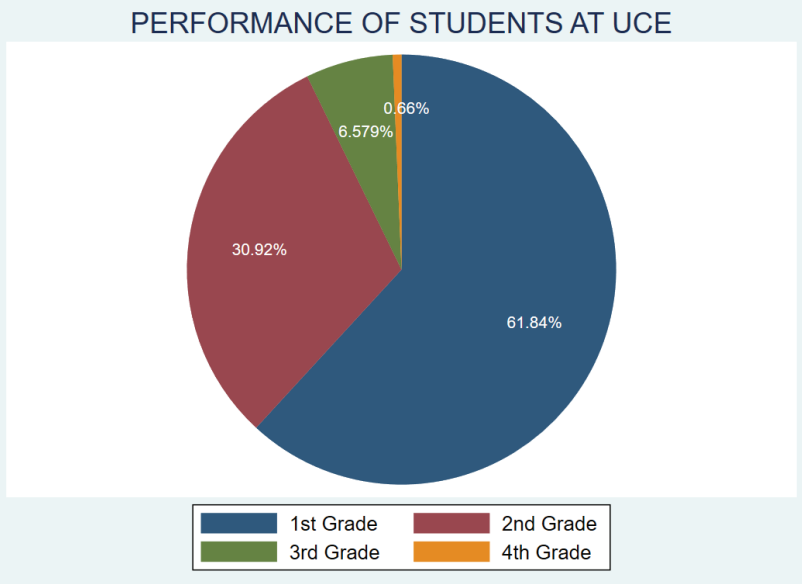

Figure 1: Pie chart showing the performance of the students at UCE level

From a total of 153 respondents, the results reveal that 61.84% reported to have attained a 1st grade at their UCE examinations sat in 2021. This was followed by 30.92% of the students who reported to have scored a 2nd grade, 6.579% scored a 3rd grade, while only 0.66% of the students reported to have scored a 4th grade in the examinations.

This led to further investigation of what ICT resources they had used during the lockdown for purposes of learning ahead of their preparations for the UCE examinations.

Usage of ICT resources

Table 1: The responses on the ICT resources that the students used during the lockdown

ICT Resources	Frequency	Percentage
Radio	54	16.36
Television	86	26.06
Phone	89	26.97
PC / Laptop	28	8.48
Internet	57	17.27
None	16	4.85
TOTAL	**330**	**100.00**

Source: Field data, 2023

The respondents were asked about the ICT resources they used during the lockdown for purposes of learning in preparation for the national examinations. The responses were based on a multiple-response question. The findings revealed that television and the phone were the most widely used

ICT resources by the students, at 26.06% and 26.97%, respectively. There was also a negligible difference between access to the internet and access to radio as ICT resources, which were reported at 17.27% and 16.36%, respectively. A few of the respondents had used personal computers or laptops for learning purposes, at 8.48%, while 4.85% of the respondents reported not having had access to any ICT resources during the lockdown for learning purposes.

Chi square test of independence

A chi square test of independence was run between the two categorical variables performance of students at UCE and access to ICT – resources to test for the presence of a relationship between the two. The results are presented in Table 2.

Table 2: The chi square test of independence between access to ICT resources and students' performance at UCE

Performance of Students At UCE	Access to ICT Resources for Learning Purposes During the Lockdown		
	NO	YES	Total
1st Grade	6	88	94
2nd Grade	7	40	47
3rd Grade	2	8	10
4th Grade	1	0	1
Total	**16**	**136**	**152**

Source: Field data, 2023

Pearson chi2(3) = 12.1181 Pr = 0.007

According to Table 2 above, the results of the test revealed a P value of 0.007, which is less than 0.07 (P value =0.007<0.07) at 93% level of significance. This indicates that there is a statistically significant relationship between performance and access to ICT resources. This was in line with the study by Osagie et al. (2019) that there is a positive impact of ICT on student performance. This calls for MoES and the school administrations to endeavour to integrate ICT in all learning activities if the students are to be ready for its use and preparation for national examinations. This was also similar to the findings by Baluku and Kasujja (2020) that accessibility to ICT resources in teaching influences the academic performance of students.

Binary logistic regression

Binary logistic regression was run at the multivariable level. It is a model that shows whether performance of the students in UCE national examinations was dependent on all or any of the three variables in the study, that is ICT infrastructure, technological skills and management support. However, the findings after further analysis revealed that performance of the students was independent of ICT infrastructure, technological skills and management support.

Table 3: Logistic regression between student preparation and ICT readiness for national examinations

Logistic regression	Number of obs	=	153
	LR chi2(3)	=	5.35
	Prob > chi2	=	0.148
Log likelihood = -48.584433	Pseudo R2	=	0.052

Access to ICT resources for purposes of learning in preparation for UCE examinations	Coef.	Std. Err.	Z	P>z	[93% Conf. Interval]	
ICT INFRASTRUCTURE						
Yes	0.0077	0.8129	0.01	0.992	-1.5856	1.6010
TECHOLOGY SKILLS						
Yes	1.5815	1.0810	1.46	0.143	-0.5371	3.7002
MANAGEMENT SUPPORT						
Yes	-2.1408	1.2005	-1.78	0.075	-4.4937	0.2121
_cons	2.6706	1.0464	2.55	0.011	0.6198	4.7215

The model revealed that ICT readiness explains only 5% of the variations in the performance of the learners during the UCE examinations of 2021. This implies that ICT had a very minimal impact on the students' performance at UCE examinations. However, the study by Mukhula et al. (2021) to determine the level of ICT readiness and ICT policy implementation in secondary schools in Mayuge District revealed that there was a moderate level of ICT adoption readiness and a moderate level of ICT policy implementation. Therefore, the hypothesis was tested as follows:

$H_0$1 There is no relationship between ICT infrastructure and students' preparedness for national examinations in Kamuli and Jinja districts of Uganda.

The study revealed that the P value was 0.992, which is greater than 0.07 (P value 0.992>0.07) at 93% confidence level. Thus, we accept the null hypothesis that there is no relationship between ICT infrastructure and students' preparedness for national examinations in Kamuli and Jinja districts of Uganda. This implies that there is no statistically significant relationship between ICT infrastructure and students' preparedness for national examinations. However, this was inconsistent with the finding by Baluku and Kasujja (2020) in a study to establish the influence of ICT infrastructure on academic performance in Kasese district that revealed that the utilisation of ICT infrastructure influences students' academic performance at UCE in secondary schools.

$H_0$2 There is no relationship between technological skills and student preparedness for national examinations in Kamuli and Jinja districts of Uganda.

The study revealed that the P value was 0.143, which is greater than 0.07 (P value 0.143>0.07) at 93% confidence level. Thus, we accept the null hypothesis that there is no relationship between technological skills and students' preparedness for national examinations in Kamuli and Jinja districts of Uganda. This, therefore, implies that there is no statistically significant relationship between technological skills and students' preparedness for National examinations in Kamuli and Jinja districts of Uganda. This implies that there is no statistically significant relationship between management support and students' preparedness for national examinations.

$H_0$3 There is no relationship between management support and student preparedness for national examinations in Kamuli and Jinja districts of Uganda.

The study revealed that the P value is 0.075, which is greater than 0.07 (P value =0.075>0.07) at 93% confidence level. Thus, we accept the null hypothesis that there is no relationship between management support and students' preparedness for national examinations in Kamuli and Jinja districts of Uganda. This implies that there is no statistically significant relationship between management support and students' preparedness for national examinations.

This is further indicated by the independence of performance on ICT infrastructure, technology skills and management support, whose P values were all greater that 0.07 at 93% confidence level i.e., P value = 0.992, P value = 0.143 and P value = 0.075 respectively. This is an indication that the students were ill prepared to use ICT for learning purposes during the lockdown in preparation for UCE examinations. The detailed analysis of the models is presented in the following tables;

Table 4: Logistic regression between ICT infrastructure and access to ICT resources for learning purposes during the lockdown

Logistic regression	Number of obs = 140
	LR chi2(4) = 11.69
	Prob > chi2 = 0.0198
Log likelihood = -39.667596	Pseudo R2 = 0.1284

Access to ICT resources for learning purposes during the lockdown	Coef.	Std. Err.	Z	P>z	[93% Conf. Interval]	
The integration of ICT in teaching and learning impacted my performance in UCE examinations.						
Yes	0.2861	0.6851	0.4200	0.6760	-0.8408	1.4129
Access to ICT resources improved my critical thinking skills and problem-solving abilities in preparation for UCE examinations						
Yes	-2.2379	0.7219	-3.1000	0.0020	-3.4253	-1.0505
Access to ICT resources positively affected my motivation to learn and preparation for UCE examinations						
Yes	0.7281	0.7037	1.0300	0.3010	-0.4294	1.8857
Students in schools with ICT infrastructure were better prepared for UCE exams than those without						
Yes	-0.1944	0.6212	-0.3100	0.7540	-1.2162	0.8274
_cons	3.0081	0.6204	4.8500	0.0000	1.9876	4.0286

Table 3 above indicates that ICT infrastructure accounts for only 12.84% of the variation in students' performance. There is a statistically significant relationship between access to ICT resources for purposes of learning and an improvement in their critical thinking skills and problem-solving abilities in preparation for UCE examinations since its P value was less than 0.07. (P value= 0.002<0.07) at 93% confidence level. An increase in access to ICT resources for purposes of learning would lead to a 2.2379 reduction in the critical thinking skills and problem-solving abilities of the learners. Owing to the presence of opportunities to access ICT resources, the students may not create room to think and enhance their problem-solving skills.

Table 5: Logistic regression between technological skills and access to ICT resources for learning purposes during the lockdown

Logistic regression	Number of obs = 136
	LR chi2(4) = 10.77
	Prob > chi2 = 0.0956
Log likelihood = -32.818017	Pseudo R2 = 0.1410

Access to ICT resources for learning purposes during the lockdown	Coef.	Std. Err.	Z	P>z	[93% Conf. Interval]	
I was confident using technology for studying and preparing for UCE exams						
Yes	1.0654	0.7811	1.3600	0.1730	-0.2195	2.3502
I used technology for educational purposes even before covid-19						
Yes	-0.5626	0.7068	-0.8000	0.4260	-1.7252	0.6001
I received formal training on the use of ICT in preparation for learning during covid-19 lockdown						
Yes	-0.1601	0.7051	-0.2300	0.8200	-1.3198	0.9996
Knowing how to use ICT helped me to study and prepare for UCE exams						
Yes	-1.1637	0.7298	-1.5900	0.1110	-2.3641	0.0366
Students who were able to use ICT had an advantage in preparation for UCE exams						
Yes	-1.4301	0.8433	-1.7000	0.0900	-2.8171	-0.0430
Technology will impact education and exam preparation in the future						
Yes	-0.4492	0.8676	-0.5200	0.6050	-1.8763	0.9779
_cons	4.4258	1.1483	3.8500	0.0000	2.5370	6.3146

Table 4 above indicates that technological skills account for only 14.10% of the variations in students' performance. It further revealed that the students' performance is independent of the presence of technological skills among the learners. This was based on the fact that there is no statistically significant relationship between technological skills and students' performance at 93% confidence level. That is, all the P values were greater than 0.07. Regardless of the students having not had technological skills, they still performed well in the UCE examinations, considering that the majority passed in 1st and 2nd grades, i.e. 61.84% and 30.92%, respectively.

Table 6: Logistic regression between Management support and access to ICT resources for purposes of learning during the lockdown

Logistic regression	Number of obs = 150
	LR chi2(4) = 7.78
	Prob > chi2 = 0.1685
Log likelihood = -47.031223	Pseudo R2 = 0.0764

Access to ICT resources for learning purposes during the lockdown	**Coef.**	**Std. Err.**	**Z**	**P>z**	**[93% Conf. Interval]**	
The school management offered ICT support towards preparation for UCE exams						
Yes	-0.1718	0.6700	-0.2600	0.7980	-1.2739	0.9302
Special assistance or ICT resources were provided by the school management to aid in learning for exam preparation						
Yes	-0.4934	0.6793	-0.73	0.468	-1.6109	0.624
The school management frequently communicated updates and information related to ICT in preparation for UCE exams						
Yes	-0.7923	0.6694	-1.1800	0.2370	-1.8934	0.3088
I noticed improvement in my learning abilities in preparation for national exams since the school management was supportive in terms of ICT						
Yes	0.2188	0.7008	0.3100	0.7550	-0.9339	1.3715
Students who received more support from their school management performed better in National exams						
Yes	-0.9771	0.7049	-1.39	0.166	-2.1366	0.1824
_cons	3.3818	0.6604	5.12	0	2.2955	4.4681

Table 5 above indicates that management support accounts for only 7.64% of the variations in students' performance. It further revealed that the students' performance is independent of the management support in ICT to the learners.

This was based on the fact that there is no statistically significant relationship between management support and students' performance at 93% confidence level. This is because all the P values were greater than 0.07. Therefore, regardless of the students having not been supported by their school management, they still performed well in the UCE examinations, considering that the majority passed in 1st and 2nd grades, i.e. 61.84% and 30.92%, respectively.

For all the three models, the R-squared was not a good fit and thus there are various factors that could have accounted for the variations in the performance of the learners other than ICT readiness. The positive impact of ICT on students' performance is something which can be realised with time through further investment in the integration of ICT in learning to better prepare learners for unprecedented disruptions to learning/education.

Conclusion

From the findings in the study, we established that the students were ill prepared for the use of ICT for learning, probably owing to the fact that they were not using ICT-based learning. The advent of the Covid-19 disease and the associated total lockdowns forced the MoES and the schools to continue with learning in a remote way. ICT-based learning was the prevailing alternative and there was a variety of ICT resources that the students had to choose from to continue with learning amidst the lockdown and tough restrictions and health protocols.

Recommendation(s)

We recommend that MoES should ensure that ICT-integrated learning is part of the pedagogies in all schools at all levels, not only to develop the learners' technological skills, but also to keep both the learners and teachers ready and prepared for any unprecedented disruptions to education which could affect the learners' performance if they were not ready for ICT use.

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