Assessment of Full-Scale Adoption of ICT in Post Covid-19 Era for Effective Teaching and Learning in Universities in Bayelsa State

Abulu, Paddy Bernard
Department of Educational Management, Faculty of Education, University of Port Harcourt. Email; abulu.b@yahoo.com; Phone number; 08062536157

&

Analaba, Benedict Ogadinma
Department of Educational Management, Faculty of Education, University of Port Harcourt. E-mail: analabaogadinma@yahoo.com; Phone number; 08030981097

&
Ngolube, Victoria Chinyelum-Isioma
Department of Educational Management, Faculty of Education, University of Port Harcourt. E-mail: vickingolube.ois@gmail.com; Phone number; 08033076348

Abstract

This study investigated assessment of full-scale adoption of ICT in post Covid-19 era for effective teaching and learning in universities in Bayelsa State. Two research questions and two hypotheses were used. Descriptive survey design was used. The population of this study consisted 362 teaching staff from NDU and 128 teaching staff from FUT, Otuoke, making a total of 980 academic staff of the universities in Bayelsa State. A sample size of 490 teaching staff of the Universities representing 50% of the population served as respondents. A 12 item questionnaire titled "Assessment of Full-Scale Adoption of ICT for Effective Teaching and Learning Questionnaire (AFSAICTETLQ)." was used for data collection. A test re-test was used to ascertain a reliability coefficient of 0.83. Mean and standard deviation were used to answer the research questions, while z-test statistics was employed to test the hypotheses. The result among others revealed that, the level of ICT adoption in universities in Bayelsa State has not reached the extent of competing favorably with the rest of the world in post Covid-19 era on application of ICT in communication, administrative processes and teaching-learning. It was recommended that government in collaboration with the management of tertiary institutions should introduce platforms for compulsory e-learning usage by providing necessary facilities/infrastructures and investing in the training of teaching personnel to smoothly handles the programmes.

Key Words: ICT, Teaching-Learning, Universities, Challenges, Post Covid-19 Era.

Introduction

The unprecedented outbreak of COVID-19 globally triggered large-scale institutional and behavioural shock effects in different facets of human activity, including education and health of students and families. As noted by UNESCO (2020), COVID-19 affected an estimated 1, 5 billion students globally, ranging from primary to tertiary institutions, as they failed to attend school, fearing the severity of the virus. The Covid-19 pandemic experience in the entire world brought about many major changes in different sectors of world economy. The education sector on this account has also experienced significant changes, especially the

change in school culture in the use of Information Communication Technology (ICT) for teaching and learning. Without doubt, ICT has been widely embraced in tertiary institutions during the COVID-19 pandemic lockdown. However, minority of students and lecturers at that time and even till now still are able to cope with the situation considering their background knowledge on ICT, but so many lack the technological expertise to utilize modern technologies and this has been a major issue in our educational practice till date (Shava, 2022).

Utilizing digital platforms during COVID-19 was meant to ensure continuity of teaching and learning, although recent research criticizes these quick-fix measures as unsustainable in the long term. Post COVID-19 may require tertiary institutions globally to revisit the blended learning approach in universities because online teaching in low-income countries can widen the skills and poverty gap due to lack of access to ICT gadgets (Fuchs, 2020). The adoption and usage of ICT in modern day societies is based on access, attitudes, discourses, skills, structures and availability of infrastructures that are connected to individual societal domains and life chances. Furthermore, ICT use helps in improving citizen participation in political affairs, promote entrepreneurship growth across various races and gender. The e-readiness of tertiary institutions Bayelsa can promote the ease of adoption of ICT in online teaching and learning. The lessons drawn from the current dilemma of COVID-19 challenge tertiary institutions in Bayelsa to reconfigure their institutional systems and be ready to utilize ICTs to their own advantages.

The study by Hove and Dube (2021) attests to this viewpoint by suggesting that since COVID-19 revolutionaries the future of education, institutions need to devise alternative strategies to promote online education as the most viable option to continue teaching and learning. Similarly, Kanyemba and Hofisi (2019) argue that adopting and embracing digital technologies to support teaching and learning requires tertiary institutions to be e-ready, in that their systems and infrastructure should be in place to avoid delays or derailing of students' progress. The use of ICT-related virtual platforms (computers, cell phones, projectors, etc.) requires adequate preparation of lecturers, as the post-COVID-19 era might be dictated by the recurrent virus and may take a long time to end. Drawing from these discussions, institutional preparedness remains a key imperative in promoting online teaching and learning in a post-COVID-19 era.

In our today world generally, the university system of education cannot thrive without the acquisition of global knowledge through application of ICT. ICT practices offers assistance to distribution of the best scientific, technological practices and help to shape the programmes of teaching and learning. Nevertheless, lack of administrative ability to rationally plan ICT programmes, insufficient facilities to enhance globalization of education, under funding of ICT programmes by government and institutions are challenges face in the adoption of ICT in the universities (Pru, 2014).

Extent of Application of ICT Adoption in Full-Scale in the Post Covid-19 Era for Effective Teaching and Learning in Universities

The use of technology to support learning has become a new habit for teachers and students. Meanwhile, previously using smartphones and laptops at school was perceived as taboo in the

eyes of some teachers and parents at several levels in Nigeria due to the belief that, it can be addictive for students who do not have good learning maturity. This significant change made the views of teachers and parents change drastically because changes in technology-based learning has come to stay due to Covid-19 pandemic. The whole system has changed from a skeptical view and fear of the bad impact of technology to a positive and mature view for students in utilizing technology which also mandates universities in Bayelsa to adopt ICT practice in full-scale and lecturers to be fully ready in handling academic activity in digital manner. The new culture created due to the Covid-19 pandemic is not fully implemented by all schools, but most schools have a new culture in the use of ICT for learning, especially the use of educational platforms that support the process of achieving competence by students (Adedoyin & Soykan, 2020).

During the Covid-19 pandemic period, among the teaching and learning ICTs adopted in some of the universities which universities in Bayelsa are inclusive are Zoom, Telegram, Microsoft Teams, Blackboard, Google Classroom and Modular Object-Oriented Dynamic Learning Environment (MOODLE) (Shava, 2022). Nonetheless, the rapid migration from contact classes to online teaching was the only viable option for many tertiary institutions in Nigeria to continue learning. Although nobody anticipated COVID-19 to transform the teaching and learning landscape.

No matter the fact ICT have come to stay in the university education, one can boldly affirm that, the level of adoption and practice of the use of ICT in our universities in Nigeria is still very poor as lecturers do not *practically utilize ICT technology in their research. Most lecturers are not firm is using ICT for* classroom instructional delivery, assessment of student's academic activities and the management of academic records. They still operate the face-to-face educational practice in full capacity as the usual practice of ICT is almost in full practice as it was before the COVID-19 outbreak (Mertala, 2020).

Challenges to Full-Scale Adoption of ICT in the Post Covid-19 Era for Effective Teaching and Learning in Universities

In the utilization of e-learning, there are technological challenges relating to insufficient bandwidth, producing delays or connection failures during lessons and video conferences. (Watson, 2020). To plan adequate pedagogical course for remote teaching, it is necessary to enhance technological skills of all the actors involved. Educators need be trained to increase their digital and other specific skills for e-learning education. Many schools are limited in their capacity to purchase the required infrastructure/facilities for remote learning and often do not have teachers with the appropriate digital skills to timely and effectively carry out teaching and learning activities credibly. Lack of IT infrastructure, computers and other resource to accomplish online teaching and learning is practically a challenge most especially in Africa. Meanwhile, Sikirit (2020) stressed that, lack of Internet access, lack of required gargets or electronic devices, unappealing environment, family issues and electricity supply affect teachers and students embracing e-learning.

According to Silyvier and Dishon (2018) some of the challenges are related to lack of university management support and commitment to run internal development training for teachers to be abreast with e- learning and other innovative practices, lack of strategic

planning to fully engage in e-learning practices, inability of teachers to follow the trend of digital changes in education and lack of ICT skills to engage in e-learning, stringent maintenance services of ICT facilities, equipment and funds to run ICT instructional programmes, inappropriate quality of hardware and software in learning institutions could also be an indication of weak or lack of IT management staff.

On this note, Lemay and Doleck (2020) have found in their different works that one of the obstacles to the use of ICT was infrastructure deficiencies; which include inadequate e-learning library domain, online seminars or discussion with lecturers, online examination, and limited bandwidth e-learning facilities; lack of enough computers, shortage of internet facilities, students' lack of access to e-learning facilities and tools, high cost of software and erratic power supply, poor network connections, materials to engage in full e-education are still in short supply or not readily made available among others. The few ICT facilities like computers available in Nigerian universities, most of them are dysfunctional as a result of deficient maintenance. Poor quality administration and planning in Nigeria higher education constitute a major challenge to educational growth across the country (Ololube, Dudafa, Uriah &Agbor, (2013). They also pointed out that, inadequate infrastructural facilities and funding increased corruption levels which are the results of the problem of brain drain, limited awareness and inadequate training standard of some universities.

Statement of Problem

ICT has been widely embraced in tertiary institutions during the COVID-19 pandemic lockdown. However, minority of students and lecturers still lack the technological expertise to utilize modern technologies. In addition, limited funding in some universities hinders the purchasing of modern ICT equipment to support the adoption, and teaching and learning in tertiary institutions. Unfortunately, universities in Bayelsa State are seen as not having sufficient technological capacity needed to compete on the global educational platform. The needed hardware, software and people ware for carrying out global educational service delivery are scarcely available in the universities when compared to its tune of requirement.

The working conditions in the Nigerian universities seems to be a little below the standard provided in the light of the present-day technology due to the slow attention giving to ICT adoption in real practice. Meanwhile, there is the issue of poor file management, poor usage of the internet facilities due to interest or awareness, e- library or smart cards, inadequate facilities needed to accommodate academic staff, non-academic staff and students to source the internet and a seemingly poor implementation, poor management of facilities/equipment that are already provided to globalize the system as the case maybe.

Aim and Objectives of the Study

The study assessed full-scale adoption of ICT in the post Covid-19 era for effective teaching and learning in universities in Bayelsa State. The specific objectives of the study are to:

1 Examine the extent of full-scale ICT adoption in the Post Covid-19 Era for effective teaching and learning in universities in Bayelsa State.
2 Identify the challenges to full-scale adoption of ICT in the Post Covid-19 Era for effective teaching and learning in universities in Bayelsa State.

Research Questions

To guide the study, the following research questions were used.

1. To what extent do lecturers adopt ICT in full-scale in the Post Covid-19 Era for effective teaching and learning in universities in Bayelsa State?
2. What are the challenges to full-scale adoption of ICT in the Post Covid-19 Era for effective teaching and learning in universities in Bayelsa State?

Hypotheses

The following hypotheses were used to guide the study.

1. There is no significant difference in the extent of full-scale adoption of ICT between lecturers in NDU and FUT on the extent lecturers adopt ICT in full-scale in the Post Covid-19 Era for effective teaching and learning in universities in Bayelsa State.
2. There is no significant difference in the challenges to full-scale adoption of ICT between lecturers in NDU and FUT in the Post Covid-19 Era for effective teaching and learning in universities in Bayelsa State.

Methodology

The population of this study consisted nine hundred and eighty (980) academic staff of the two Universities in Bayelsa State. On the one hand, Niger Delta University Wilberforce Island has a total number of teaching staff numbering seven hundred and twenty-four (724) and Federal University of Technology, Utuoke, two hundred and fifty-six one thousand teaching staff (256) respectively. The sample for the study comprised of four hundred and ninety (490) teaching staff of the Universities representing 50% of the population. That is, three hundred and sixty-two (362) teaching staff from Niger Delta University Wilberforce Island and one hundred and twenty-eight (128) teaching staff from Federal University of Technology, Utuoke, Bayelsa State. The stratified random sampling technique was used to select the teaching staff in the two (2) Universities and the four hundred and ninety (490) teaching staff selected served as respondents.

A 12-item questionnaire titled "Assessment of Full-Scale Adoption of ICT for Effective Teaching and Learning Questionnaire (AFSAICTETLQ)." was used for data collection. Section A was for collection of demographic data, the section addressed issues relating to the research questions and hypotheses of the study. Section B was based on the 4-point rating scale of (Strongly Agree (SA) = 4 points; Agree (A) = 3 points; Disagree (D) = 2 points; and Strongly Disagree (SA) = 1 point) and (Very High Extent (VHE) = 4 Points; High Extent (HE) = 3 Points; Moderate Extent (ME) = 2 Points; and Low Extent (LE) = 1 Point). A test re-test was used to ascertain a reliability coefficient of 0.83. Mean and standard deviation were used to answer the research questions, while z-test statistics was employed to test the hypotheses. In the analysis, items between 3-3.9 is regarded as very high extent, from 2.5-2.9, high extent, from 2-2.49, low extent and from 1-1.19 is very low extent respectively.

Results and Discussion

Data Analysis and Empirical Results

Research Question 1: To what extent do lecturers adopt ICT in full-scale in the Post Covid-19 Era for effective teaching and learning in universities in Bayelsa State?

Table 1: Mean and Standard Deviation Analysis of Lecturers in NDU and FUT on the extent Lecturers adopt ICT In Full-Scale in The Post Covid-19 Era for Effective Teaching and Learning in Universities in Bayelsa State.

S/N	The extent of application of ICT in the teaching and learning activities	Lecturers in NDU 284 $\overline{X}$	SD	Lecturers in FUT 167 $\overline{X}$	SD	$\overline{X}$ $\overline{X}$	Remark
1	In your university it is compulsory for lecturers to use computers *for* assessment of student's academic activities to grade their performance	3.05	1.25	3	1.23	3.03	Very High Extent
2	In your university, lecturers utilize *ICT in full-scale for* classroom instructional delivery.	1.94	1.24	1.88	1.27	1.91	Very Low Extent
3	In your university, m*ost lecturers are firm in using ICT for* classroom instructional delivery	2.4	1.12	2.17	1.19	2.29	Low Extent
4	In your university, most Lecturers often operate face-to-face educational practice in full capacity.	2.87	1.15	3.19	1.32	3.03	Very High Extent
5	In your university required ICT facilities are available to encourage all lectures to adopt e-learning in full-scale	1.99	1.23	2.17	1.17	2.08	Low Extent
6.	In your university required training on ICT are organize to groom lecturers on the application of ICT in all school affairs	1.89	1.27	1.94	1.25	1.92	Very Low Extent
Grand mean		2.36	1.21	2.39	1.24		

Table 1 indicated that item number 1 and 4 had the highest mean score of 3.03, followed by item 3 with 2.29, item 5 with 2.08, item 6 with 1.92 and item 2 with 1,91 respectively. Items 1 and 4 had mean scores which are above 2.50 criterion mean, indicating that, considering the extent lecturers adopt ICT in full-scale in the Post Covid-19 Era for effective teaching and learning in universities in Bayelsa State is that, to a very high extent lecturers compulsorily use computers *for* assessment of student's academic activities to grade their performance and most Lecturers often operate face-to-face educational practice in full capacity.

Nevertheless, items 3 and 5 were below the criterion mean of 2.50 indicating that, to a low extent m*ost* university *lecturers are not firm in using ICT for* classroom instructional delivery and required ICT facilities are not available to encourage all lectures to adopt e-learning in full-scale. To a very low extent, required training on ICT in the universities are

not organize to groom lecturers on the application of ICT in all school affairs and lecturers do not utilize *ICT in full-scale for* classroom instructional delivery.

Research Question 2: What are the challenges to full-scale adoption of ICT in the Post Covid-19 Era for effective teaching and learning in universities in Bayelsa State?

Table 2: Mean Responses and Standard Deviation Analysis of Lecturers in NDU and FUT on the Challenges to Full-Scale adoption of ICT in the Post Covid-19 Era for Effective Teaching and Learning in Universities in Bayelsa State

S/N	Items	Lecturers in NDU 284		Lecturers in FUT 167			
		$\overline{X}$	SD	$\overline{X}$	SD	12	Remark
1	lack of university management support and commitment to run internal development training for teachers to be abreast with e-learning	3.06	1.25	2.68	1.14	2.87	**Agreed**
2	Maintenance services of ICT facilities	1.89	1.27	2.12	1.18	2.01	**Disagreed**
3	lack of network capacity to cope with increased data usage	3.65	1.60	3.28	1.36	3.47	**Agreed**
4	Inadequate e-learning facilities	3.00	1.23	2.60	1.22	2.8	**Agreed**
5	Inability of university institution to plan strategically to fully engage in e-learning practices	3.11	1.27	3.08	1.26	3.10	**Agreed**
6	lack of ICT skills to engage in e-learning	3.32	1.38	3.60	1.57	3.46	**Agreed**
Average mean and standard deviation		**3.01**	**1.33**	**2.89**	**1.29**		

Table 2 indicated that item number 3 had the highest mean score of 3.47, followed by item 6 with 3.46, item 5 with 3.10 and item 1 with 2.87 and item 4 with 2.8 which are above the criterion mean of 2.50. This clearly indicated that, the challenges inhibiting lecturers' utilization of e-learning technologies for instructional delivery is as a result of lack of university management support and commitment to run internal development training for teachers to be abreast with e- learning, lack of ICT skills to engage in e-learning, Inadequate e-learning facilities, Inability of university institution to plan strategically to fully engage in e-learning practices and lack of network capacity to cope with increased data usage. Meanwhile, item 2 had a mean score of 2.01, which is below the criterion mean of 2.50, meaning that maintenance services of ICT facilities is not a challenge inhibiting lecturers' utilization of e-learning technologies for instructional delivery.

Test of Hypotheses

Ho_1: There is no significant difference between the mean scores of lecturers in NDU and FUT on the extent lecturers adopt ICT in full-scale in the Post Covid-19 Era for effective teaching and learning in universities in Bayelsa State.

Table 3: z-test Analysis of the Difference between the Opinions of Lecturers in NDU and FUT on the extent Lecturers adopt ICT in Full-Scale in the Post Covid-19 Era for Effective Teaching and Learning in Universities in Bayelsa State.

Subject	N		SD	Df	z-cal.	z-crit.	Level of Sig	Remark
Lecturers in NDU	284	2.36	1.21	2				
				449	-0.25	1.96	0.05	Not Rejected
Lecturers in FUT	167	2.39	1.24					

The result of table 3 showed that the z-calculated value of -0.25 is less than the z-critical value of ±1.96 at degree of freedom of 449 at 0.05 level of significance. Therefore, the null hypothesis is not rejected and upholds that, there is no significant difference between the mean scores of lecturers in NDU and FUT on the extent lecturers adopt ICT in full-scale in the Post Covid-19 Era for effective teaching and learning in universities in Bayelsa State.

Ho_2: There is no significant difference between the mean scores of lecturers in NDU and FUT on the challenges to full-scale adoption of ICT in the Post Covid-19 Era for effective teaching and learning in universities in Bayelsa State

Table 4: z-test Analysis of the Difference between the Opinions of lecturers in NDU and FUT on the Challenges to full-scale adoption of ICT in the Post Covid-19 Era for Effective Teaching and Learning in Universities in Bayelsa State.

Subject	N		SD	Df	z-cal.	z-crit.	Level of Sig	Remark
Lecturers in NDU	284	3.01	1.33	2				
				449	0.94	1.96	0.05	Not Rejected
Lecturers in FUT	167	2.89	1.29					

Table 4 shows that the z-calculated value of 0.94 is less than the z-critical value of 1.96 at degree of freedom of 449 at 0.05 level of significance. We therefore retain the null hypothesis and uphold that, there is no significant difference between the mean scores of lecturers in NDU and FUT on the challenges to full-scale adoption of ICT in the Post Covid-19 Era for effective teaching and learning in universities in Bayelsa State.

Summary of Findings

1. It was found that, to a very high extent lecturers compulsorily use computers *for* assessment of student's academic activities to grade performance and most Lecturers often operate face-to-face educational practice in full capacity. Nevertheless, to a low extent m*ost* university *lecturers are not firm in using ICT for* classroom instructional delivery and required ICT facilities are not available to encourage all lectures to adopt e-learning in full-scale. To a very low extent, required training on ICT in the universities are not organize to groom lecturers on the application of ICT in all school affairs and lecturers do not utilize *ICT in full-scale for* classroom instructional delivery.
2. It was also found that, the challenges inhibiting lecturers' utilization of e-learning technologies for instructional delivery is as a result of lack of university management support and commitment to run internal development training for teachers to be abreast with e- learning, lack of ICT skills to engage in e-learning, Inadequate e-learning facilities, Inability of university institution to plan strategically to fully engage in e-learning practices and lack of network capacity to cope with increased data usage.

Discussion of Findings

Extent Lecturers adopt ICT In Full-Scale in The Post Covid-19 Era for Effective Teaching and Learning in Universities in Bayelsa State

The result of this study as revealed in the summary of findings coincides with the findings of Mertala (2020) who found that, *most lecturers are not firm is using ICT for* classroom instructional delivery, assessment of student's academic activities and the management of academic records. They still operate the face-to-face educational practice in full capacity as the usual practice of ICT is almost in full practice as it was before the COVID-19 outbreak. This is also in line with Adedoyin and Soykan (2020) whose work revealed that, the new culture created due to the Covid-19 pandemic is not fully implemented by all schools, but most schools have a new culture in the use of ICT for learning, especially the use of educational platforms that support the process of achieving competence by students.

Challenges to Full-Scale adoption of ICT in the Post Covid-19 Era for Effective Teaching and Learning in Universities in Bayelsa State

The result of this study as revealed in the summary of findings is consonance with the findings of Sikirit (2020) who found that, lack of Internet access, lack of required gargets or electronic devices, unappealing environment, family issues and electricity supply affect teachers and students embracing e-learning. This is also in line with the work of Lemay and Doleck (2020) who found in their different works that one of the obstacles to the use of ICT was infrastructure deficiencies; which include inadequate e-learning library domain, online seminars or discussion with lecturers, online examination, and limited bandwidth e-learning facilities; lack of enough computers, shortage of internet facilities, students' lack of access to e-learning facilities and tools, high cost of software and erratic power supply, poor network connections, materials to engage in full e-education are still in short supply or not readily made available among others.

Conclusion

The study rationally indicated that universities in Bayelsa State are gradually partaking in the full adoption of ICT in their operation but the level of adoption has not reached the extent of competing favorably with the rest of the world when compared to how far they have gone in terms of its application in administrative processes, teaching-learning and communicative processes. In some instance, there are issues of political instability, lack of stable policies in education, scarcity of ICT infrastructure, under funding, unsteady and inadequate electrical power supply which are factors that are limiting the infusion of ICT in universities. Therefore, if lecturers fully adopt the usage of relevant technologies in teaching and learning, it will go a long way to help both lecturers and students to acquire relevant 21st century skills to be successful in the present technology driven economy.

Recommendations

Based on the findings of the study, the authors recommended that:

3. The management of tertiary institutions should introduce platforms for compulsory e-learning usage by providing necessary facilities/infrastructures and investing in the training of teaching personnel to smoothly handles the programmes.
4. Universities in Bayelsa school design workable programmes where staff are trained periodically on computer and ICT skills with practical and functional knowledge that would make them to be *firm in using ICT for* classroom instructional delivery.

References

Adedoyin, O., & Soykan, E. (2020). *Covid19 pandemic and online learning: the challenges and opportunities.* Interactive learning environments, 1-13. DOI: 10.1080/10494820.2020.1813180.

Clarke, A. (2020). Digital government units: What are they, and what do they mean for digital era public management renewal? *International Public Management Journal, 23*(3), 358-379.

Fuchs, C. (2020). Communicative socialism/digital socialism. *TripleC, 18*(1), 1–31.

Hove, B., & Dube, B. (2021). COVID-19 and the entrenchment of a virtual elite private school: Rethinking education policies in Zimbabwe. *Journal of Culture and Values in Education, 4*(2), 84-94.

Kanyemba, D., & Hofisi, C. (2019). e-Government Innovation for Improved Service Delivery. *Journal of Public Administration, 54*(2), 207-222.

Lemay, D.J., & Doleck, T. (2020). Online learning communities in the covid-19 pandemic social learning network analysis of twitter during the shutdown. *International Journal of learning Analytics and Artificial Intelligence for Education* (IJLAI), 2(1), 85-98.

Mertala, P. (2020). Paradoxes of participation in the digitalization of education: a narrative account. *Learning, Media and Technology, 45*(2), 179-192.

Ololube, A.D., Uriah, I.N., & Agbor, M. (2013). *The corona virus effect on Pakistan's digital divide*. https:www.bbc.com/worklife/article/202000712-the-coronavirus-effect-on-pakistians-digital-divide.

Ololube, N. P., Agbor, C. N., & Uriah, O. A. (2013). Vicious hazard to peace culture in tertiary education: The activities of the secret cults. *British Journal of Education, Society &Behavioural Science*, 3(1), 65-75.

Pru, L. (2014). *Characteristics of globalization with a link to education*. http://www.ehow.com info_8468888_characteristics-globalization-education.html.

Shava, E. (2022). Reinforcing the role of ICT in enhancing teaching and learning post-COVID-19 in Tertiary Institutions in South Africa. *Journal of Culture and Values in Education, 5*(1), 78-91.

Sikirit, D. (2020). *Learning from home during the COVID-19 pandemic.* https://www.unicef.org/indonesia/coronavirus/stories/learning-home-during-covid-19-pandemic.

Silyvier T. & Dishon W.O. (2018). Teacher preparedness for implementation of e–learning programmes in public primary schools In Kenya, *International Journal of Education, Learning and Development, 6*, (2), 48-58.

UNESCO. (2020). *COVID-19 educational disruption and response. UNESCO* https://en.unesco.org/covid19 /educationresponse.

Watson, E. (2020). Education: The potential impact of social media and hashtag ideology on the classroom. *Research in Social Sciences and Technology, 5*(2), 40-56.