



Assessing the Information Communication Technology Skills of Teachers for Post Covid-19 Teaching and Learning at Colleges of Education in Northwest, Nigeria

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ABSTRACT

Assessing the Information Communication Technology Skills of Teachers for Post Covid-19 Teaching in Colleges of Education in Northwest, Nigeria was carried out. The study was guided by four objectives, four research questions and four hypotheses. Survey design was adopted for the study while 3037 teachers from five Federal Colleges of Education, North-West, Nigeria constituted the population of the study. Three Colleges randomly sampled and 341 teachers formed the sample size. A validated questionnaire, the Teacher ICT Skills Assessment Questionnaire (TICTSAQ) adapted from PISA 2021 ICT Framework with reliability value (Cronbach, 0.73) was used as the instrument for data collection. Data were analyzed using both descriptive and inferential statistic by means of the Statistical Package for Social Sciences (SPSS) version 22.0. The findings from the study show that ICT facilities are moderately available in the Colleges, teachers' possessed high ICT skills, sometimes use ICT for educational purposes and there was no statistically significant difference in the ICT skills of male and female teachers. Four recommendations were made which include intensive and specialized workshops on digital pedagogy should be organized for teachers in Colleges of Education, North-West, Nigeria so that they can progress along the progression digital literacy → digital skills → digital competency.

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INTRODUCTION

The COVID-19 crisis has had an unprecedented disruption on education in Nigeria and the world at large. The pandemic created the largest disruption of education systems in history, affecting nearly 1.6 billion learners in more than 190 countries and all continents. According to the United Nations report, closures of schools and other learning spaces have impacted 94 % of the world's student population (UN, 2020). The crisis however stimulated innovation and changes within the education sector; the changes have also highlighted the promising future and the accelerated changes in modes of delivering quality education (UN, 2020). As countries phased

school reopening based on their priority classes, governments and stakeholders in education were encouraged to pursue certain policy responses which included reimagining education and accelerate change in teaching and learning (UNESCO, 2020). This entailed among others supporting the teaching profession and determining teachers' readiness for post COVID-19 teaching. Although issues of equity, infrastructure, broadband capacity and pedagogic capacity immediately emerged as challenges in remote delivery, UNESCO-UNICEF-World Bank (2020) advised that sustainable solutions should build upon experiences with the widespread use



of ICT to ensure learning continuity during the pandemic.

Responding to the COVID-19 crisis, World bank (2020) suggested that Education stakeholders should produce evidence on teacher's capacity and readiness to embrace and use technological innovations in teaching. Such evidences will enable them to understand what works best for their countries. Even in places with adequate infrastructure and connectivity, UNESCO (2020) observed that many educators lacked the basic ICT skills to facilitate quality e-learning. Obviously, as teachers are critical to the implementation of educational programs, they need to be equipped with the necessary skills needed to face the challenges and possibilities posed by COVID-19 so as to meet the educational needs of the society. Therefore, skills and competencies in Information Communication Technologies (ICTs) will be an indispensable prerequisite for teachers in the Colleges of Education in Nigeria, a sector which trains pre-service sub-degree teachers for the lower and upper basic education levels in Nigeria.

The COVID-19 crisis underscored the need for reform in both pre-service and in-service teacher education to produce well trained teachers in new methods of education delivery (International Task Force on Teachers for Education 2020). In line with this initiative, the Federal Ministry of Education in Nigeria adapting the UNESCO, UNICEF, World Bank and World Food Programme (2020) "Framework for Reopening Schools", Reopening Schools: How to Get Education Back on Track after COVID-19", and Global Education Cluster (2020), "Safe Back to School: A Practitioner's Guide" among other documents, developed her own Guidelines for Schools and Learning Facilities reopening after COVID-19 Pandemic Closures (Federal Ministry of Education, FME, 2020). A key objective of the guidelines was strengthening and reinforcing the use of ICT to facilitate teaching and learning; an objective well captured in Nigeria's policy framework on ICT which provides a holistic and broad vision for ICT integration in education (Nigerian National Information Communication Technology Policy FRN, 2012). This policy transcending basic technology literacy, focuses on leveraging technology to transform the roles of the

teacher and the learner in the classroom. At the global level, UNESCO (2018) designed an ICT Competency Framework for Teachers (ICT-CFT version 3) to help educational policy-makers and curriculum developers identify the requisite ICT skills teachers would need to harness technology in education.

Information Communication Technologies (ICTs) are information handling tools that are used to produce, store, process, distribute and exchange information (Organization for Economic Cooperation and Development, OECD, 2018) while ICT skills are skills needed to understand and apply a range of computer programmes, software and other applications which includes word processing, spreadsheets, databases, power points and search engines (Redecker, 2017). As posited by Tatiana, Andrea, Solanly, Adriana, Jairo & José (2016), these applications either promote communication skills (Word processing and e-mail) or organizational skills (database and spreadsheet) or the conceptual understanding of Science and Mathematics (modelling software) Umar and Jalil (2012) identified four ICT skill areas namely: Basic ICT skills, Advanced ICT skills, Internet Application for Information Access and Internet Application for Communication Purposes. Basic ICT skills refers to storage and data transfer, use of word processing and electronic spreadsheet applications. Advanced ICT skills refers to graphics, animation, video, multimedia design and development using certain software and authoring tools. Internet Application for Information Access refers to the teachers and students' skills in accessing the internet including the use of search engines, recording, downloading and uploading materials. Internet Application for Communication Purposes refers to the use of social network, chat room, and emails to communicate with others, either for learning or socializing activities.

In the recent decades, access to ICT devices such as computers and smartphones around the world had been phenomenal. Mobile phones and internet subscription had received an astronomical boost particularly in sub-saharan Africa (World Bank, 2018) In the light of the ICT revolution, governments have become increasingly concerned with providing new generations access to high-quality ICT resources



and minimizing the digital divide in the population. Education systems have thus come to play an increasingly important role in promoting universal access to and the responsible use of ICT (Organization for Economic Cooperation and Development OECD, 2018). Technologies available in classrooms today ranges from simple tool-based applications (such as word processors), to online repositories of scientific data. Others are primary historical documents, handheld computers, mobile phones, closed-circuit television channels, and two-way distance learning classrooms (World bank, 2018). They are rapidly transforming traditional ways of teaching and learning. Teachers' play a key role in this transformation process and their beliefs, pedagogical practices and teaching skills are continuously challenged (Assar, 2019). OECD (2018) further reports that teachers' inexperience and skill deficiencies are important factors inhibiting the effectiveness of ICT use in education and for the teachers that are skilled in ICT, they use it mainly for administrative tasks. In modern science and technological societies, education demands more knowledge of teacher on ICT and the necessary skills to use in teaching-learning process. Teachers must have the knowledge and skills to use new digital tools to help all students achieve high academic standard (Bhattacharjee & Deb, 2016). Teachers need to teach with ICT skills in ways that will enable the students to perceive the benefits and potential of using computers to support their work.

Researches (Castro-Sánchez & Alemán 2011; Fu, 2013; Danner & Pessu, 2013; Oyeronke & Fagbohun, 2013; Vitanova., Atanasova-Pachemska., Iliev & Pachemskad, 2015) have shown that the appropriate use of ICTs can catalyze the paradigmatic shift in both content and pedagogy which is the core reform in the 21st century. Other virtues of ICT use include catalyzing rethinking teaching and learning as well as developing the kind of graduates required in the 21st century (Yalman, Basaran & Gonen, 2016); increases the flexibility of delivery of education, influencing the way students are taught and how they learn in a learner centred context (Siddiquah & Salim, 2017), prepares the learners for quality of and lifelong learning (Tatiana *et al.*, 2016), expand access to educational resources and broad base

of experts and professionals (Vitanova *et al.*, 2015) bridged the constraints to learning caused either by time, distance and space while providing exposure to best global practices in education to foster better teaching (OECD, 2018, Assar, 2019).

Studies (Aduwa-Ogiegbaen, 2009; Jegede, 2009; Tella, 2011; Akude & Ebeniza, 2012; Danner & Pessu, 2013; Oyeronke & Fagbohun, 2013; Gambari & Chike-Okoli, 2014; Odeh, 2014; Omosekejimi, Brume-Ezewu, Brume-Ezewu, Nwobo & Nweke 2018; Ali, 2019; Agede, 2020; Yusuf, Durosaro, Mustapha & Afolabi, 2022) dealing with technology usage in Nigerian schools showed that the majority of Nigerian teachers are yet to be well equipped for technology-supported teaching. Findings from these studies show that ICT facilities are unavailable or inadequate for teaching (Gambari & Chike-Okoli, 2014; Odeh, 2014; Agede, 2020; Yusuf, *et al.*, 2022), lack of ICT skills (Omosekejimi, *et al.*, 2018; Ali, 2019), low ICT literacy (Yusuf, *et al.*, 2022), lack of integration or low usage of ICT in teaching (Tella, 2011; Akude & Ebeniza, 2012; Ali 2019; Yarkofoji, 2021;). While Omosekejimi, *et al.*, (2018) specifically reported that Colleges of education teachers lacked application of computers to solve real life academic problems, lacked power point, excel and spread sheet and information gathering skills as well as maximizing use of multimedia facilities, Yusuf, *et al.*, (2022) however reported otherwise. They opined that the academic staff were competent in word processing, Microsoft power point, e-payment and mobile phone browsing, e-mail and social networking. Jegede (2009) concluded that the most critical factor in the successful integration of ICT into education is the extent to which teacher educators are able to prepare student teachers with the required knowledge and skills to utilize ICT effectively. Emerging situation of the state of ICT usage in education is not limited to Nigeria alone. In Ghana, Justice, Daniel, Edward, Diabor and Daniel (2018) researched on Teachers' ICT Skills and ICT Usage in the Classroom. Results revealed that teachers' ICT skills were at the moderate level (mean=2.88, SD=1.18) but teachers use of ICT in their lessons was low (M = 2.32, SD = 1.28). Vitanova *et al.*, (2015) carried out research in Macedonia. Results showed that 58% of teachers were proficient in ICT skills for computer operation (scored 71 of the



129 points), 17% have basic knowledge and skills to operate a computer (scored between 41 to 70 points), while 25% of the teachers lack ICT skills and were below basic ICT Competency level (scored less than 40 points). They concluded that most teachers have acquired basic knowledge and skills to work with computer.

With the emerging trends in post COVID-19 teaching and learning, do COE teachers have the requisite ICT skills needed for successful, effective and quality teaching? Therefore, this study intends to identify availability of ICT facilities, ICT skills of teachers and their use for teaching. It would also be interesting to determine gender influence on the ICT skills of COE teachers and.

Statement of the Problem

The disruption caused by the COVID-19 pandemic in the history of education is unprecedented, having a near universal impact on learners and teachers around the world. Ensuring learning continuity during this pandemic, countries the world over leveraged on ICT for teachers to deliver lessons online to learners. Twenty-first-century teachers are expected to develop digital educational contents and acquire digital pedagogical skills so as to maximize the use of the computer as a teaching resource. Teachers who are competent with ICT skills will be able to design ICT based learning environments and will also be able to use ICT to support the development of knowledge creation and critical thinking skills of students. Teachers who lack these skills will encounter major challenges in the integration of ICT in the classroom. Available literature shows low level ICT skills and usage among Colleges of Education Teachers in Nigeria. Most of these studies were carried out in the other Geo political zones of Nigeria excluding the North West. Most of these studies were also restricted to either subject-specific or College-specific thereby not affording data that justify wide generation of findings. In view of lack of robust study of this nature in the North West, Nigeria, this study is embarked upon to determine the availability, skills and usage of ICT amongst the teachers in Colleges of Education in North West Nigeria for effective 21st century post COVID-19 teaching.

Objectives of the Study

The objectives of this research are to:

1. ascertain the extent to which ICT facilities are available to teachers at Colleges of Education in the North West, Nigeria;
2. Determine the level of ICT skills among teachers Colleges of Education in the North West, Nigeria;
3. Determine the ICT usage by teachers at Colleges of Education in the North West, Nigeria for academic purpose;
4. Determine gender disparity among teachers in terms of their level of ICT skills at Colleges of Education in the North West, Nigeria.

Research Questions

The following questions were raised to guide the conduct of this research:

1. To what extent are ICT facilities available to the teachers at Colleges of Education in the North West, Nigeria?
2. What are the levels of ICT skills of teachers at Colleges of Education in the North West, Nigeria?
3. What is the level of ICT usage for academic purpose by teachers of Colleges of Education in the North West, Nigeria?
4. Is there any difference between male and female teachers in terms of their ICT skills at Colleges of Education in the North West, Nigeria?

Research Hypotheses

The null hypotheses postulated for this study are:

HO₁: There is no statistically significant difference in the availability of ICT facilities at Colleges of Education in the North West, Nigeria.

HO₂: There is no statistically significant difference in the level of ICT skills among teachers of Colleges of Education in the North West, Nigeria.

HO₃: There is no statistically significant difference in the level of ICT usage by teachers of Colleges of Education in the North West, Nigeria for academic purposes



HO₄: There is no statistically significant difference between male and female teachers in terms of their level of ICT skills at Colleges of Education in the North West, Nigeria

METHODOLOGY

The descriptive survey design was adopted to investigate the Information Communication Technology Skills of Teachers for Post Covid-19 Teaching and Learning at Colleges of Education in Northwest, Nigeria.

The target population for this study was 3037 the total number of teachers in the Federal Colleges of Education in North-West, Nigeria. There are a total five Federal Colleges of Education in the North West, Nigeria (National Commission for Colleges of Education, 2021). They are: Federal College of Education (T), Bichi, Federal College of Education (T), Gusau, Federal College of Education, Kano, Federal College of Education Katsina and Federal College of Education, Zaria. The Colleges were purposively used for the study because they have same source of funding and extant administrative documents. Three of the five Colleges (Federal College of Education, Kano, Katsina and Zaria) were randomly sampled for the study. A total 341 teachers constitute the sample size (Krejcie & Morgan, 1970).

A researcher adapted questionnaire "Teacher ICT Skills Assessment Questionnaire (TICTSAQ)" for the study. The instruments were adapted from PISA 2021 ICT Framework (OECD, 2018). The questionnaire has four sections (A, B, C and D). Section A deals with the bio data of the respondents. Section B, containing 10 items deals with the extent of availability of ICT facilities. The items were five Likert scale ranging from 1 to 5, very available (5), moderately available (4), neutral (3), fairly available (2), not available (1). For section C containing 20 items deals with the

level of ICT skills of the teachers with responses ranging from Highly skilled (5), moderately skilled (4), undecided (3), fairly skilled (2), not skilled (1). Section D containing 12 items deals with usage of ICT in teaching and the responses ranged from always (5), often (4), sometimes (3), rarely (2), never (1).

The decision rule was 1-1.49 Not available or not skilled or not used, 1.50 -2.49 fairly available or fairly skilled or rarely used, 2.50 -3.49 moderately available or moderately skilled or sometimes used, 3.50 – 5.00 very available or highly skilled or always used respectively.

Two Science Education and one Computer Education experts from Ahmadu Bello University, Zaria validated the instrument for the study. All validators' suggestions were effected to further improve the instruments. Based on their suggestions items in section B were increased from 8 to 10 and on section D they were increased from 10 to 12.

Fifty teachers from the population but not the selected sample were used for pilot testing. Split-half method was used in order to determine the reliability of the instrument. Cronbach was used to determine the coefficient values of 0.73 which made the instrument adequate for the study.

A letter of introduction was obtained by the researchers from their Institution to the Provosts of the sampled Colleges to seek for permission to carry out the research using the teachers in their Colleges. The researchers with the help of research assistants drawn from each College administered the questionnaires to the respondents over a period of eight weeks.

The Mean, Standard Deviation, t-test, Spearman-Brown statistics and ANOVA was employed in the analysis of data using the Statistical Package for Social Sciences (SPSS) version 22.0.

RESULTS

Table 1: Summary of Teachers Response on the Extent of Availability of ICT Facilities for Teaching

S/N	Items	N	Mean	Std. Dev.	Decision
1.	Computers (Desktop, Laptop)	341	4.02	1.18	Very available
2.	Digital Camera	341	3.03	1.56	Moderately available



3. Digital Video Camera	341	3.03	1.57	Moderately available
4. Overhead projector	341	3.71	1.39	Very Available
5. Storage Facilities (CD, DVD, Flash drive, Pen drives, SSD, HDD etc)	341	3.98	1.25	Very Available
6. Mobile Handset	341	4.28	1.02	Very Available
7. Interactive Whiteboard	341	1.69	.76	Fairly Available
8. Internet Facilities (Modem, Hubs, Routers etc)	341	3.19	1.31	Moderately Available
9. Radio	341	2.99	1.54	Moderately Available
10. Television	341	2.82	1.49	Moderately Available
Cumulative mean and std.dev.	341	3.27	1.31	moderately available

Table 2: Summary of the Levels of ICT Skills of Teachers

S/N	Items	N	Mean	Std. Dev.	Decision
1.	Turning the Computer on and off	341	4.47	.83	Highly Skilled
2.	Opening and closing application programs	341	4.40	.80	Highly Skilled
3.	Using the mouse to select and move items on a screen	41	4.33	.93	Highly Skilled
4.	Printing out documents	341	4.25	.99	Highly Skilled
5.	Saving and storing file or document	341	4.33	.88	Highly Skilled
6.	Using word processing application/packages to create new documents	341	4.18	.95	Highly Skilled
7.	Using basic MS Word functions (e.g. Spell Check)	341	4.06	.95	Highly Skilled
8.	Using the toolbar for formatting documents by selecting font size and style etc	341	4.00	1.00	Highly Skilled
9.	Creating Tables and charts to display information within a document	341	3.84	1.07	Highly Skilled
10.	Creating a spreadsheet workbook/document (e.g Microsoft Excel)	341	3.78	1.09	Highly Skilled
11.	Entering and processing data on Excel	341	3.67	1.08	Highly Skilled
12.	Creating and managing files and folders	341	3.92	.96	Highly Skilled
13.	Copying, moving and locating stored files or folders	341	3.83	1.02	Highly Skilled
14.	Creating slides for a presentation using PowerPoint	341	3.49	1.08	Moderately Skilled
15.	Connecting a mobile handset to computer/printer	341	3.74	1.07	Highly Skilled
16.	Searching for information using search engines such as Google	341	3.84	1.07	Highly Skilled
17.	Composing, attaching document, sending and receiving emails	341	3.64	1.17	Highly Skilled
18.	Data transfer from camera to computer	341	3.26	1.26	Moderately skilled
19.	Recording with a digital video camera	341	3.18	1.24	Moderately Skilled
20.	Downloading/uploading files on the Internet	341	3.60	1.29	Highly Skilled
Cumulative mean and Standard deviation		341	3.89	0.25	Highly Skilled



Table 3: Summary of Level of Teachers Usage of ICT in Teaching

S/N	Item	N	Mean	Std. Dev.	Decision
1.	Using ICT in lesson planning and preparation	341	3.07	1.13	sometimes used
2.	Using ICT in administrative tasks such as students Lecture attendance and registration	341	3.08	1.11	sometimes used
3.	Using ICT for monitoring, recording and assessing students' attainment progress and needs	341	3.20	1.12	sometimes used
4.	Sharing electronic content to students online	341	2.96	1.09	sometimes used
5.	Administer Tests/Examination online	341	2.65	1.21	sometimes used
6.	Using digital video camera to record and deliver lessons	341	2.52	1.16	sometimes used
7.	Using ICT to deliver lessons via different google Apps such as, Google Classroom, Google Meet	341	2.48	1.19	sometimes used
8.	Using ICT deliver lessons on real time basis using Apps such as Zoom, Webinar/Webcast, Skype, Microsoft Teams	341	2.55	1.22	sometimes used
9.	Using ICT to deliver online lesson via social media Apps such as WhatsApp, Telegram, Facebook, Instagram and Twitter	341	2.68	1.15	sometimes used
10.	Using online video tools such as YouTube to Teach	341	2.40	1.16	rarely used
11.	Using PowerPoint presentation for Teaching	341	2.65	1.21	sometimes used
12.	Using an interactive whiteboard to present lesson	341	2.02	1.02	Rarely used
	Cumulative mean and std.dev.	341	2.68	1.15	sometimes used

Table 4: Summary of Mean score on ICT Skills of Male and Female Teachers in Colleges of Education in the Northwest, Nigeria

Gender	N	Mean	Std. Dev.	Mean difference	decision
Male	246	3.91	0.97	0.05	difference exist
Female	95	3.86	0.98		

Table 5: Summary of One-Way Analysis of Variance of Teachers response on Availability of ICT Facilities in Colleges of Education, Northwest, Nigeria

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	146.946	2	73.47	33.82	.000
Within Groups	6706.976	3087	2.17		
Total	6853.922	3089			

$F(2,3087) = 33.82; p < 0.05$

Table 6: Summary of One-Way Analysis of Variance of Teachers response on the level of ICT Skills in Colleges of Education, Northwest, Nigeria

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	159.433	2	79.72	65.70	.000
Within Groups	8580.765	7072	1.21		
Total	8740.198	7074			

$F(2,7072) = 65.70; p < 0.05$



Table 7: Summary of One-Way Analysis of Variance of Teachers response on the Usage of ICT for Academic Purpose in Colleges of Education, Northwest, Nigeria

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	885.84	2	442.92	360.04	.000
Within Groups	5679.82	4617	1.23		
Total	6565.66	4619			

F (2,4617) = 360.04; p < 0.05

Table 8: Summary of t-test score of the level of ICT skills obtained among Male and Female Teachers of Colleges of Education, Northwest, Nigeria

Gender	N	Mean	Std. Dev.	M. dif.	df	t	p	decision
Male	246	3.91	0.97			0.05	339	1.99 0.41 not significant
Female	95	3.86	0.98					

DISCUSSION

The results in Table 1 indicate that ICT facilities were moderately available in the Colleges. Subjecting the variable to further test of significant availability, hypothesis one, "ICT facilities are not significantly available for use by teachers in Colleges of Education in the North West, Nigeria", was subjected to One Way ANOVA at $\alpha = 0.05$. Based on the result, $F(2, 3087) = 33.82$; $p < 0.05$ obtained in this study (Table 5), the hypothesis is not accepted. This finding disagrees with the lack of basic ICT facilities in many organizations and Universities in countries like Nigeria asserted by Omorobi & Effa (2018). In related studies in other Colleges across North-East, North-Central, South-South, South-East and South-West geopolitical zones of Nigeria (Tella, 2011; Akude & Ebeniza, 2012; Gambari & Chike-Okoli, 2014; Odeh, 2014; Ali, 2019, & Agede, 2020), the findings showed either non-availability or inadequacy of ICT facilities. Other findings from related works in sister tertiary institutions in Nigeria showed non -availability of ICT facilities (Ali, Nwafor & Onoh, 2019; Omorobi and Effa, 2018). A case-to-case examination on the responses on specific ICT facility showed that the respondents rated mobile handsets and computers as the very available ICT facilities while iterative board was fairly available. The response on mobile handsets and computers agrees with other related work (Siddiquah and Salim, 2017) and this finding could be indicative of relative access to those facilities by the teachers.

As regards the level of ICT skills of teachers, the cumulative mean value of 3.89 and standard deviation, 1.04 (table 2) show that the teachers possess High ICT skills. This finding differs from Macqual and Ichakpa (2014) who reported that the College of Education in their study were marginally skilled in ICT. One Way ANOVA at $\alpha = 0.05$ (Table 6) gave result $F(2,7072) = 65.70$; $p = 0.00 < 0.05$). On the basis of the result the hypothesis that there is no statistically significant difference in the level of ICT skills obtained by teachers at Colleges of Education in the North West, Nigeria is not accepted. In a related study, Omosekejimi, *et al.*, Brume-Ezewu, Brume-Ezewu, Nwobu & Nweke (2018) reported that Colleges of education teachers lacked technical know-how, had low ICT confidence and showed computer phobia. Competence is known to breed confidence, that the teachers have low ICT confidence indicates low level competence in ICT skills. The authors further showed that the teachers lacked skills in the use of power-point, excel and spreadsheet, information gathering skills and ability to maximally utilize multimedia facilities in using computer to address real life academic problems. Yusuf, *et al* (2022) however reported in their study that the College of education teachers were competent in word-processing and Microsoft- power point among others. The findings from this study show that with the passage of time the teachers are improving in their ICT skills.

Table 3 presented the level of ICT usage by the teachers of Colleges of Education in



the North West, Nigeria, for academic purposes. The cumulative mean value for this cluster is 2.68 and the standard deviation is 1.15. The result showed that the teachers sometimes use ICT for educational purposes. One way ANOVA result, (Table 7) gave $F(2,4617) = 360.04$; $p = 0.00 < 0.05$ implying that the hypothesis, "teachers do not significantly use ICT for academic purpose in Colleges of Education, in Northwest, Nigeria" is not accepted. This finding disagrees with related studies of Akude & Ebeniza (2012), Chike-Okoli (2014), Gambari, Okolocha & Nwadiana (2015), Omoisekejimi, *et al.*, (2018), Ali (2019), Yarkofoji (2021) who reported that use of ICT in teaching was not popular among Colleges of Education teachers in Nigeria. The finding in this work differs from earlier submission by Garba, *et al* (2013) that Colleges of Education in Nigeria are not readily prepared for effective technology integration for educational purposes. It further underscored the need for development in the area of ICT infrastructure and Manpower.

To determine whether there was gender difference in the level of ICT skills obtained among male and female teachers in Colleges of Education in Northwest, Nigeria, the analysis of responses as presented in Table 4 gave average mean score of male to be 3.91 and that for female to be 3.86. The mean difference of 0.05 was in favour of male. Whether this difference was statistically significant was determined with t-test. Results in Table 8 showed $p = 0.41 > 0.05$. Hence the hypothesis that there is no statistically significant difference in the level of ICT skills of male and female teachers in Colleges of Education, Northwest, Nigeria is accepted. Yarkofoji (2021) and Macqual & Ichakpa (2014) also established similar finding.

CONCLUSION

The Information Communication Technology Skills of Teachers for Post Covid-19 Teaching at Colleges of Education in Northwest, Nigeria have been assessed using three Colleges of Education funded by the Federal Government of Nigeria. The Implication of the results from this study shows that though the precursor to engage in digital learning exist, the Colleges are not fully ready to support digital learning. Constraints of space and time bridged through digital platform in

Education can not readily be mitigated, so disruption in education caused by pandemics like COVID-19 where there was total lock down and closure of Schools or any event that hinder physical engagement would adversely affect academic sessions in these Institutions as was the case in 2020. With the ever-changing world and internationalization of education, teacher educators need to leverage on technology skills to harness pedagogical and content knowledge for effective teaching and learning for global relevance in the 21st century.

RECOMMENDATIONS

Based on the findings from this study the following recommendations are made:

1. The Federal Government through the National Commission for Colleges of Education and the Management of the Colleges of Education in the North-West, Nigeria should invest in more ICT facilities so that a benign environment for ICT use in teaching can be created;
2. Intensive and specialized workshops on digital pedagogy should be organized for teachers in Colleges of Education, North-West, Nigeria so that they can progress along the progression digital literacy → digital skills → digital competency.
3. Teachers in Colleges of Education in North-West, Nigeria should endeavour to integrate more ICT usage in their teaching;
4. Both male and female teachers in Colleges of Education, North-West, Nigeria, should upscale their level of ICT skills.

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