AVAILABILITY AND UTILISATION OF INFORMATION AND TECHNOLOGY COMMUNICATION RESOURCES FOR INSTRUCTION AMONG TECHNOLOGY TEACHERS IN SECONDARY SCHOOLS IN KWARA STATE

IBIRONKE, E. S., TAIWO, S. A., & ALIMI, A. E.
Department of Educational Technology,
Faculty of Education, University of Ilorin, Ilorin, Nigeria

Abstract

This work assessed the competency of technology teachers in the use of Information and Communication Technology (ICT) resources for instructional delivery in secondary schools in Kwara State. Three research questions three null hypotheses were formulated to guide the study. Descriptive survey design was adopted for the study. A total population of 202 Technology Teachers was used for the study. The instruments used for data collection were ICT Technology Teachers Competency (ICT-TTC) Test Instrument; and ICT Observation Checklist (ICT-OC) were the instruments used for the study. Cronbach Alpha was used in determining the internal consistency of ICT-TTC, reliability coefficient of 0.78 was obtained. While Kudder Richardson 20 (K.R.20) was used to obtain the reliability of ICT-OC instrument and it yielded reliability index of 0.86. Research question one was answered using frequency and percentages while research questions two and three were answered using mean and standard deviation. Chi-square was used to test hypothesis one- and One-Way Analysis of Variance (ANOVA) was used to test the hypotheses two and three at 0.05 level of significance. The findings of the study revealed that ICT resources for instructional delivery were mostly available in federal secondary schools when compared to private and state secondary schools in Kwara State. Also, the Technology teachers in federal secondary schools use ICT resources more than Technology teachers in state and private secondary schools for instructional delivery. Also, there is no significant difference in the Technology teachers' competence in the utilization of available ICT resources in federal, state and private secondary schools in Kwara state. In line with the findings of the study, the educational implications of the findings were highlighted and recommendations were equally proffered among others that Technology teachers, students, education administrators, government, and curriculum planner should encourage effective utilization of available ICT resources for instructional delivery in both federal state and private secondary schools in Kwara State.

Key words: ICT Resources, Availability, Competency, Utilisation, Instruction

Introduction

Resources for information and communication technology (ICT) are of great relevance to effective teaching and learning at all levels of education, particular in tertiary education. ICT has the power to strengthen instruction, support school reform, and provide economic variety for tomorrow's workforce. The global integration of ICT technologies and resources into the instructional delivery process is being embraced by education systems. ICT resources make a constantly changing, responsive instructional delivery environment possible. To improve the quality of instructional delivery in this digital age, Technology teachers must thus employ ICT resources in place of more traditional approaches in their lesson plans and instructional delivery. ICT resources of today not only make teaching easier, but they also make learning easier. Computers, data storage devices, desktops, laptops, and broadcasting technologies such as radio and television utilized in classrooms are examples of ICT tools and resources, albeit not the only ones.

In today's information-driven environment, Technology teachers must be able to use technology for educational purposes. To prepare students for the workforce, for life, and for

community service, digital literacy is essential. Promoting and improving Technology teachers' ICT competency is one of the development policies. Technology teachers must become proficient in ICT in particular to use it as a tool to accelerate their instructional delivery, realize their full potential, and ultimately aid in the growth of the nation. ICT competency is defined as having the knowledge, abilities, and capacity to use ICT to gather, process, and present data in support of activities between various groups of people for working, unwinding, and communicating (UNESCO, 2008; NICS, 2010; Albirini, 2006). In the information-based culture, it also functions as a fundamental ability (Cha *et al.*, 2011). Those who are considered to be ICT competent must be able to generate the required paperwork, solve issues, and select the appropriate ICT resources for efficient work and problem-solving. Along with having a basic understanding of ICT and the ability to create and utilize innovative ICT resources efficiently, they also need to be able to gather and distribute information ethically.

A proficient teacher possesses an extensive understanding of the subject matter or content. A subject-matter expert in the field could provide the students in the classroom with additional knowledge (Spear-Swerling *et al.,* 2005). In computer labs or classrooms with limited technology, competent Technology teachers can locate and use tutorials, games, practice, and web content to meet their current curricular objectives. Instructors in secondary schools need to be adept in using word processors, the internet, email, and file management, creating presentations, and utilizing Excel for data analysis (Id *et al.,* 2017). These abilities were significantly impacted by age, sex, kind of school, and teaching experience (Jamil *et al.,* 2017)

The attainment of effective instructional delivery in schools has been a subject of concern for all stakeholders in education at this present time. The major source of concern is the fall in standard of education at all level and particularly at secondary school schools' level and the shortfalls of the resources needed for effective instructional delivery. Effective teaching is the backbone of societal progress. By imparting knowledge and skills, educators empower individuals to become valuable contributors to their communities, fostering a more informed, skilled, and productive society. The use of ICT in classroom situation sees the Technology teachers as facilitator rather than dispenser of knowledge. It is therefore necessary to embrace the use of ICT resources for instructional delivery so as to avoid being eliminated from the global village of internet, extranet and intranet.

In the context of this study, ICT resources can be described as tools through which people work with the information and communication processing needs of an organization. It encompasses the computer hardware, software; the network and several other devices (video, audio, photography, camera, etc) that convert information (text), images, sound, and motion and so on into common digital form (Vannili, 2015). ICT resources have a wider spectrum of application and utilization with enormous relevance to secondary school instructional activities. Utilisation of ICT resources for instructional delivery is a good development with tremendous potentials for qualitative instructional output on education in general and secondary education in particular.

Given the importance of secondary education in the national education system, it is important that secondary school teachers inculcate in the would-be future technologists the skills through proper utilization of ICT resources to enhance appropriate instructional delivery. ICT resources include such technologies as radio, television, video, telephone, satellite system, computers and hardware and software. These resources have made more impact on different areas of human life such as education, livelihood, communication, health care and social behaviour which have compelled governments to formulate policies to harness the utility of ICT for the larger benefits of mankind.

The relevance of ICT for instructional delivery probably could be the reason it was embraced at all levels of education in Nigeria, secondary schools in Kwara State not an exception. Information and Communication Technology was formally introduced in the tertiary institution in Nigeria system in 2004 (FRN, 2004). ICT is seen by Federal Ministry of Education (FME, 2003) as a necessity for improving quality of instructional delivery. The teacher's competency in utilizing ICT in a professional setting demonstrates sound pedagogical instructional judgment and an understanding of its consequences for instructional methods and the digital Bildung of students" is how Krumsvik (2008) characterized teacher digital competence. These competencies facilitate students' comprehensive understanding of fundamental concepts and practical use of intricate real-world issues.

Literature findings (Otagburuagu & Eze (2006), Ugodulum, 2006, Ugodulunwa, 2006; and Ohakwe, 2004) revealed that many teachers perhaps lack the competency to utilize ICT for instructional delivery. Despite the revolution of ICT, the classroom Technology teachers generally demonstrate little knowledge of ICT (Azubuike 2008). Majority of Technology teachers have no knowledge of most of the ICT facilities (Ezugwu, 2006). From the studies reviewed above it could be observed that studies have been carried out on Technology teachers' competency in the utilization of ICT resources for instructional delivery in other educational institutions, except secondary schools. Also, studies done on this area, have not established whether or not Technology teachers in State are more competent than the ones in the federal, or Technology teachers in the private secondary schools are more competent than those in state or federal. Hence, the need to investigate the extent of Technology teacher's competency in the utilization of ICT resources for instructions in the federal, private and state secondary schools in Kwara State.

Statement of the Problem

In this 21st Century where the World is referred to as the global village due to the interconnectivity brought about by ICT. ICT compliance knowledge, attitude and skills are necessary among teachers, technology teachers inclusive to produce World class graduates who will adapt in the world of work and anywhere in the World. This is because ICT is rapidly facilitating fundamental, qualitative and even global changes in the processes of instructional delivery. Although, studies revealed that ICT resources in schools in Nigeria are not readily available, however, none revealed whether or not, ICT resources in the private secondary schools in Kwara State are more available or not compared to the one in the state or federal secondary schools in the state. Also, studies equally revealed that some Technology teachers and students are not ICT compliant. Apart from word processing, many Technology teachers may not know how to operate computer application software, such as Microsoft word, Microsoft excel, Microsoft access, Microsoft power point, Microsoft outlook, internet explorer among others. This may suggest that there is high rate of computer illiteracy among Technology teachers and students. Although, in all the studies reviewed none investigated whether Technology teachers in the state secondary schools are more competent or not when compared to those in federal or private; and also, studies have not shown whether or not secondary school Technology teachers in the state utilize ICT resources more or not for instructional delivery compared to their counterpart in the federal and private. Therefore, there is need to investigate the extent of competence level of Technology teachers in the utilization of ICT resources for instructions in the federal, state and private secondary schools in Kwara State.

Purpose of the Study

The purpose of the study is to ascertain the extent of utilization of ICT for instructional delivery in secondary schools in Kwara State. Specifically, the study is sought to determine:

i. the available ICT resources for instructional delivery in secondary schools in Kwara State.

ii. the extent of the Technology teacher's utilisation of the available ICT, resources for instructional delivery in secondary schools in Kwara State.
iii. the Technology teachers' competency in utilizing the available ICT resources for instructional delivery in secondary schools in Kwara State.

Research Questions

The following research questions guided the study;

1. What are the available ICT resources for instructional delivery in Secondary schools in Kwara State?
2. To what extent do Technology teachers utilize available ICT resources for instructions in Secondary schools in Kwara State?
3. What is the competency level of Technology teachers for the utilization of ICT resources
   for instructional delivery in Secondary schools in Kwara State?

Hypotheses

The following null hypotheses guided the study at 0.05 level of significance:

1. There is no significant difference between the Technology teachers' mean responses on the availability of ICT resources for instructional delivery in Federal, State and Private Secondary schools in Kwara State.
2. There is no significant difference between the Technology teachers' mean responses on the extent of utilization of ICT resources for instructional delivery in Federal, State and Private Secondary schools in Kwara State.
3. There is no significant difference between the competency mean scores of Technology teachers in Federal, State and private Secondary schools in Kwara State.

Methodology

The design of the study is descriptive survey design. The study was carried out in all the secondary schools in Kwara State. The population for the study consists of all the Technology teachers that teach in the secondary schools in Kwara State both government and private secondary schools. The sample size for the study is 171 Technology teachers selected through purposive and proportionate sampling techniques from 30 secondary schools across the state. The research instruments used for the study are ICT- Technology teachers Competency (ICT-HETC) test was adapted from UNESCO ICT Competency Test (2008), ICT Observation Checklist (ICTC) and ICT utilization Questionnaire (EICTUQ). The questionnaire (EICTUQ) is made up of two sections. Section A is on bio data of the respondents. Section B involves information on was on availability of ICT Resources, Extent of Utilization and Technology teacher's competency. Finally, ICT Observation Checklist (ICTC) was used to gather information on the availability of ICT in the schools under study. ICTC was made up of 17 items covering most ICT resources that are needed in teaching.

The instruments were validated by three experts, two experts from Educational Foundations and one from measurement and evaluation. Twenty copies of the two instruments were trial tested on a sample that was not part of the main sample for the study area (secondary schools in Kwara State. After the trial testing, the trial tested instruments were then subjected to different reliability estimate as follows to obtain the reliability of the instruments. Cronbach Alpha was used in determining the internal consistency of EICTUQ while Kuder Richardson used to determine the ICTC reliability coefficient. The reliability indices gotten are 0.86 and 0.78 for competency instrument and Checklist instrument respectively. Kuder Richardson was chosen because the two instruments are dichotomously scored. The researcher employed direct delivery and retrieval method in the administration of the instrument to the respondents. A total of 151 copies of the questionnaire (EICTUQ) and Competency Test (ICT-HETC) were

distributed to the respondents by hand with the help of two trained research assistants. The researcher employed the services of the research assistants to collect the completed questionnaire from the respondents on the spot to ensure a high return rate.

The research question 1 was answered using frequency and percentage while mean was used to answer Research Question 2 and 3. Mean bench mark of 2.5 and above was agreed as high extent, while below was agreed as low extent. Chi-square was used to test hypothesis one while One way Analysis of Variance (ANOVA) was used to test the hypotheses 2 and 3 at 0.05 level of significance.

Results

Research Question 1: What are the available ICT resources for instruction in Secondary schools in Kwara State?

Table 1: **Available ICT Resources for instructions in Secondary schools in Kwara State**

S/N	Availability of ICT Resources for instructional delivery	Federal Second Sch.	State Second Sch .	Private Second Sch .
1	Word Processing Software	A	A	A
2	Data base Management	A	NA	NA
3	Functional Educational CD-ROMs	A	A	A
4	School website	A	A	A
5	Spreadsheet software (eg. Microsoft Excel)	A	A	A
6	Web cam (web camera)	A	A	A
7	Presentation software (e.g. Microsoft Powerpoint)	A	NA	NA
8	Video Conferencing Applications	NA	NA	NA
9	E-mail for sharing resources	A	NA	NA
10	Digital cameras	A	NA	NA
11	Internet facilities	A	NA	NA
12	Digital scanners	A	NA	NA
13	Top cell phone	NA	NA	NA
14	Computers	A	NA	NA
15	Radio	A	A	A
16	Television	A	A	A
17	Video	NA	NA	NA
18	Computer room	A	NA	NA

NB: A= available; NA= Not Available

Table 1 above shows that ICT resources available in the federal secondary schools are: Word processing software, data base Management, functional educational CD-ROMs, school website, spreadsheet software (eg. Microsoft Excel), web cam (web camera), presentation software (e.g. Microsoft Powerpoint), E-mail for sharing resources, digital cameras, internet facilities, digital scanners, computers, radio, television, and computer room. Whereas the ICT resources not available in the federal secondary schools include data base management, video conferencing applications, top cell phone and video.

Also, in the state and private secondary schools, the available ICT resources are: Word processing software, functional educational CD-ROMs, school website, spreadsheet software (eg. Microsoft Excel), web cam (web camera), radio, and television, while the ICT resources that are not available in the state and private secondary schools include: presentation software (e.g. Microsoft Powerpoint), E-mail for sharing resources, digital cameras, internet facilities, digital scanners, computers, video and computer room. It could be deduced that ICT resources are mostly available in federal secondary schools when compared to private and state secondary schools.

Research Question 2: To what extent does Technology teachers utilize available ICT resources for instructional delivery in Federal, State and Private Secondary schools in Kwara State?

Table 2: **Mean and Standard Deviation on extent of Technology teachers' utilization of available ICT resources for instructions in Secondary schools in Kwara State**

	EXTENT OF TECHNOLOGY TEACHERS' UTILIZATION OF AVAILABLE ICT RESOURCES FOR INSTRUCTION	Federal Second Sch. Tech Teacher(N=3)			State Second Sch. Tech Teach(N=1)			Private Second Sch. Tech Teacher (N=4)		
		Mean	SD	Re	Mean	SD	Re	mean	SD	Re
1	Utilization of word processing to: create documents such as letters, lesson plans, examination question, etc.	3.22	0.76	HE	3.90	0.67	HE	3.05	0.90	HE
2	Utilization of spreadsheet for computation of examination scores	2.62	0.73	HE	3.01	0.71	HE	1.55	0.62	LE
3	Utilization of database management system to create and maintain data records	3.01	0.55	HE	2.12	0.55	LE	2.13	0.97	LE
4	Utilization of PowerPoint for instructional presentations	2.55	0.67	HE	2.06	0.45	LE	1.66	0.97	LE
5	Utilization of internet for electronic instructional delivery	2.56	0.69	HE	2.03	0.48	LE	2.66	0.55	LE
6	Utilization of instructional CD-ROMs for instructional delivery	3.56	0.72	HE	2.11	0.70	LE	2.66	0.90	LE
7	Utilization of school websites to share information such as academic and non academic information and resources	3.56	0.71	HE	2.10	0.59	LE	1.52	0.61	LE
8	Utilization of web cameras to capture life images.	2.01	0.76	LE	1.05	0.60	LE	2.02	0.79	LE
9	Utilization of video conferencing to host staff meetings and post announcements	2.27	1.12	LE	1.02	0.73	LE	2.02	1.45	LE
10	Utilization of e-mail to send and receive electronic messages and file attachments	3.58	0.62	HE	3.03	0.68	HE	3.03	1.45	HE
11	Utilization of digital camera to capture digital audio-visual instructional resources.	3.29	1.07	HE	1.13	0.65	LE	2.01	0.93	LE
12	Utilization of top cell phone to make conference calling for group study for test or snap pictures of important things and make important academic calls.	1.26	0.71	LE	1.11	0.46	LE	1.66	0.52	LE

NB: HE= High Extent; LE = Low Extent; Re= Remark; SD= Standard Deviation

Table 2 reveals that Technology teachers in the federal secondary schools utilize word processing to create documents such as letters, lesson plans, examination question; spreadsheet for computation of examination scores; database management system to create and maintain data records; PowerPoint for instructional presentations; internet for electronic instructional delivery; instructional CD-ROMs for instructional delivery; school websites to share information such as academic and non academic information and resources; video conferencing to host staff meetings and post announcements; e-mail to send and receive electronic messages and file attachments; and digital camera to capture digital audio-visual instructional resources. However, Technology teachers in the federal secondary schools do not utilize top cell phone to make conference calling for group study for test or snap pictures of important things and make important academic calls; web cameras to capture life images and video conferencing to host staff meetings and post announcements.

Also, Technology teachers in state and private secondary schools utilize word processing to create documents such as letters, lesson plans, examination question; utilize spreadsheet for computation of examination scores; and e-mail to send and receive electronic messages and file attachments. However, technology teachers in state and private secondary schools do not utilize database management system to create and maintain data records; PowerPoint for instructional presentations; internet for electronic instructional delivery; instructional CD-ROMs for instructional delivery; school websites to share information such as academic and non academic information and resources; video conferencing to host staff meetings and post announcements; and digital camera to capture digital audio-visual instructional resources; top cell phone to make conference calling for group study for test or snap pictures of important things and make important academic calls; web cameras to capture life images and video conferencing to host staff meetings and post announcements.

Research Question:3: What are the competency mean scores of Technology teachers for the utilisation of ICT resources in teaching in secondary schools in Kwara State?

Table 3: Mean and Standard deviation scores of Technology teachers in utilization of ICT resources for instructions Secondary schools in Kwara State

Schools	N	Mean	Std. Deviation
Federal Secondary Sch. Technology teachers	12	31.21	1.60
State Secondary Sch. Technology teachers	28	15.01	0.23
Private Secondary Sch. Technology teachers	10	22.05	4.02
Total	50		

Table 3 shows that competency mean and standard deviation scores Technology teachers in Federal secondary schools are 31.21 and 1.60. Also, competency mean and standard deviation scores Technology teachers in state secondary schools are 15.01 and 0.23; whereas competency mean and standard deviation scores Technology teachers in private secondary schools are 22.05 and 4.02.

Hypotheses

Hypothesis 1: There is no significant difference between Technology teachers ratings on the availability of ICT resources for instructions in Federal, State and Private Secondary schools in Kwara State.

Table 5: Chi-square Analysis on the availability of ICT resources for instructions in Secondary schools in Kwara State.

Chi-square test	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	6.020[a]	2	045
Likelihood Ratio	5.978	2	.049
Linear-by-Linear Association	2.705	1	.089
N of Valid Cases	55		

Table 4 reveals that sig. (2-tailed) value (0.045) is less than level of significant (0.05). This implies that the null hypothesis sets by the researcher will be rejected. This means that there is significant difference between the ratings on the availability of ICT resources for instructions in Federal, State and Private Secondary schools in Kwara State in favour of the Federal secondary schools with higher available ICT resources.

Hypothesis 2: There is no significant difference between the Technology teachers' mean responses on the extent of utilization of ICT resources for instructions in Federal, State and Private Secondary schools in Kwara State.

Table 5: ANOVA analysis on Technology teachers' responses on the extent of utilization of ICT resources for instructions in Federal, State and Private Secondary schools in Kwara State.

Group	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.950	2	.480	3.663	.001
Within Groups	.651	5	.130		
Total	1.601	7			

Table 5 reveals that sig.(2-tailed) value (0.001) is less than level of significant (0.05). This implies that the null hypothesis sets by the researcher will be rejected. This means that there is significant difference between the Technology teachers' mean responses on the extent of utilization of ICT resources for instructions in Federal, State and Private Secondary schools in Kwara State in favour federal college of education Technology teachers with extent of ICT resources utilization.

Hypothesis 3: There is no significant difference between the competency mean scores Technology teachers in Federal, State and private Secondary schools in Kwara State.

Table 6: ANOVA Results showing significant difference between the competency mean scores Technology teachers in Federal, State and private Secondary schools in Kwara State

Competency	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	264.002	2	130.976	7.987	.271
Within Groups	80.021	5	16.102		
Total	339.905	7			

Table 6 reveals that sig.(2-tailed) value (0.271) is greater than level of significant (0.05). This implies that the null hypothesis sets by the researcher is upheld. This means that there is no significant difference between the competency mean scores Technology teachers in Federal, State and private Secondary schools in Kwara State. This further shows that any difference in mean may be due to chance factor.

Discussion of Findings

Findings of this study show that ICT resources are mostly available in federal secondary schools when compared to private and state secondary schools. Findings also show that there is significant difference between the ratings on the availability of ICT resources for instructions in Secondary schools in Kwara State in favour of the Federal Secondary schools with higher available ICT facilities. Etebu (2010) supported the finding of this study. Etebu found that the state of ICT availability for library services in the Niger Delta University libraries is not totally encouraging; almost half the number of available computers in the libraries does not function. This finding is in line with Mandefro (2013) finding that found that storage of computers and absence of training offered to Technology teachers, lack of computer laboratory rooms, absence of school based ICT policy, absence of qualified IT Technology teachers and technical assistant storage of computers were some of the challenges confronting effective use of ICT in teaching in the schools in the zone.

Findings showed that there is significant difference between the Technology teachers' mean responses on the extent of utilization of ICT resources for instructional delivery in Federal, State and Private Secondary schools in Kwara State in favour Federal Unity Colleges Technology teachers with high extent of ICT resources utilization. This finding is in agreement with the finding of Ugwoke (2011) who found that problem of effective utilization of ICT as inadequate ICT facilities and infrastructures, high cost of the acquisition and maintenance of the ICT facilities. Also the study by Adebiyi, K. (2013) titled Availability and utilization of ICT-Based facilities in the instructional delivery of Biology concepts in Ekiti State. The result of the study shows that non-availability of ICT facilities is responsible for its low level of utilization. This finding is in consonance with the present study.

Findings revealed that there is no significant difference between the competencies means scores of Technology teachers in Federal, State and Private Secondary schools in Kwara State. Awoleye, Siyanbola and Adewoyin (2008) study supported the finding of this study; the study found a good number of the Technology teachers were found to be proficient with varied computer applications and several internet services. Azubike (2008) agreed with Awoleye, Siyanbola and Adewoyin's. Azubike, found that the availability of ICT equipments and functional ICT laboratories as factors that promote ICT competencies. However, Nkoku and Ogunkule (2001) finding contradicts with this study in relation to Technology teachers' competency shows that there is significant relationship between social studies Technology teachers' competency and application of ICT skills. Olayiwola (2006) agreed with Njoku and Ogunkule's. Olayiwola found that majority of mathematics Technology teachers were not computer skilled, and may not be ready to use computers in implementation of mathematics curriculum.

Conclusion

The study revealed the extent of available and non-available ICT resources for instructions in Secondary schools in Kwara State. Also, one of the findings of the study revealed that ICT resources use in instructions mostly available in federal secondary schools when compared to state and private secondary schools in Kwara state. Also the study found that Technology teachers in federal secondary schools use available ICT resources more for instructions in Kwara state when compared to state and private secondary schools in Kwara State. This means that there is more availability of ICT resources in federal secondary schools in Kwara State that made the Technology teachers to use it more than their counterparts. Also the study found no significant difference in student utilization of ICT resources in federal state and private secondary schools in Kwara state. Finally, the study found no significant difference in Technology teachers' utilization and competence in federal, state and private secondary schools in Kwara state.

Recommendations

In line with the findings of this study, the researcher made the following recommendations:

1. The government should maintain the policy of utilization of ICT resources for instructions in secondary schools in Kwara state by the Technology teachers during teaching.
2. Possession of essential personal or private ICT resources for instruction should also be encouraged by the Technology teachers in secondary schools by subsidizing the price of ICT resources for the Technology teachers.
3. The secondary schools' administrators in Kwara state should also improve the level of ICT training to the Technology teachers and students by mounting training and retraining programmes in the schools.

References

Adebiyitoyosi, (2013). Availability and utilization of ICT-Based facilities in teaching and learning of Biology concepts. Study mode-premium and free essay, *Term papers & Booknotes*. www.studymode.com>home>biology

Albirini, A. (2006). Teachers' attitudes toward information and communication technologies: The case of Syrian EFL teachers. *Computers & Education*, 47, 373-398.

Awoleye, M., Siyanbola, W., & Adewoyin, J. (2008). Pattern of computer and internet use among teachers in higher institutions in Nigeria. *International Journal of Learning, 15* (5), 245 – 254.

Azubike, M. (2008). Information communication technology competencies needed by secondary school Business Educators in Nwangele Local Government Area of Imo State. *Unpublished B. Sc. VOCED Project, University of Nigeria Nsukka.*

Cha, E., Jun, J., & Kwon, Y. (2011) . Measuring achievement of ICT competency for students in Korea. *Computer & Education, 56*, 990-1002.

Etebu, A. T. (2010). *Information and communication technology (ICT) availability in Niger Delta University Libraries*. Bayelsa: Library Philosophy and Practice.

Ezeani, L. U. (1998). *A handbook on principles and methods of teaching*. Onitsha; West and Solomon Publishing Coy. Ltd.

Ezugwu, G. G. (2006). Utilising information and community technology for quality instruction in college of education. In D. N, Ezeh and N, Onyegegbu (Eds), Information communication Technology in the service of education; 220-226. Enugu: Timex.

Federal Republic of Nigeria (FRN) (2001). *Nigerian national policy for information technology (IT): Use IT*. Abuja: Federal Republic of Nigeria,

Federal Republic of Nigeria (FRN) (2004). *Nigerian national policy. Lagos*: NERDC publisher

Federal Republic of Nigeria (FRN) (2008). *National commission for colleges of education minimum standard for NCE teachers*. Abuja: National commission for colleges of education.

Jamil, M., Jamil, S., & Rasheed, K. (2017). An Assessment of Secondary School Teachers' Performance and Skills in ICTs in Accordance with National Professional Standards Pakistan. *Haripur Journal of Educational Research, 1*(1), 62–75.

Kromsrik, R. (2008). Situated learning and teachers' digital competence. *Education and Information Technologies, 13*, 279-290

Mandefero, E. (2013). An assessment of the availability and utilization of ICT facilities for teaching and learning purpose in selected secondary schools of Sidama Zone. Sidama zone: *Hawassan University College of social science and Humanity school of Education and training.*

NICS (2010) .The National ICT Competency Standard (NICS) for teachers. Retrieved from http://www.ncc.gov.ph/nics/files/NICS-Teachers.pdf.

Njoku, C., & Ogunkule, A. (2001). Social studies teachers' competence in the use of ICT in secondary Schools in Rivers State. *International Journal of Technologies in Learning.* 19(2), 83 – 92.

Ohakwe, S. N. (2004). Emerging issues and concepts in the computer world: Implications for National Diploma Business Programmes in Nigeria. *Journal of Curriculum Organisation of Nigeria* 11(1) 82 – 86.

Olayiwola, U. K. (2006). Information and communication technology (ICT) competencies for the implementation of mathematics curriculum. In Ezeh D.N., & Onyegegbu, N., (Eds), *information communication technology in the service of education:* 34 – 44. Enugu: Timex.

Otagburuagu, E. J., & Eze, V. O. (2006). English Language teaching in Nigeria Universities and the ICT revolution. In D. N, Ezeh and N, Onyegegbu (Eds), *Information communication Technology in the service of education*; 87-96, Enugu: Timex

Spear-Swerling, L., Brucker, P. O., & Alfano, M. P. (2005). Teachers' literacy-related knowledge and self-perceptions in relation to preparation and experience. *Annals of Dyslexia, 55*(2), 266–296. https://doi.org/10.1007/s11881-005-0014-7

Ugodulunwa, C. A. (2006). An appraisal of University teachers' use of information and communication technology (ICT) in educational research. In D. N, Ezeh and N, Onyegegbu (Eds), *Information communication Technology in the service of education*; p50-58. Enugu: Timex.

Ugwoke, E. O. (2011). Effective utilization of ICT for repositioning Business Education programme in tertiary institutions in Nigeria for national development. *International Journal of Education Research. Official Journal of Faculty of Education, University of Nigeria Nsukka. 11* (1), 202 – 213.

UNESCO (2008). *2008 UNESCO ICT teachers competency standard modules.* Paris: UNESCO.

UNESCO. (2008). *ICT competency standards for teachers.* United Nations Educational, Scientific and Cultural Organization, 1–15. www.unesco.org/en/competency-standardsteachers

UNESCO. (2018). *UNESCO ICT competency framework for teachers version 3.* In United Nations Educational, Scientific and Cultural Organization. https://unesdoc.unesco.org/ark:/48223/pf0000265721