



# **Overcoming Barriers To The Use Of Information And Communication Technology For Instructional Purposes In Technology Education Programmes In North East Nigerian Polytechnics**

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## **ABSTRACT**

The main purpose of this study is to determine the level to which barriers (extrinsic or intrinsic) affect the use of ICT for instructional purposes in technology education programmes in North East Nigerian Polytechnics. To realize the purpose, two (2) specific objectives were drawn with two (2) research questions for the study. A descriptive survey research design was used on a population of one hundred and eighteen (118) lecturers from nine (9) Polytechnics in North East Nigeria. A structured questionnaire was used for the collection of data. A reliability test was conducted using Cronbach Alpha and the instrument yielded an internal consistency reliability index of 0.79. A statistical mean and standard deviation were used in the interpretation of the data processed using SPSS software. The findings of the study among others, indicate that, Technology Education lecturers' possession of good knowledge on the basics of computer networks is affecting lecturers' skills. Difficulty in managing ICT peripherals and its use for instruction in Technology Education courses affect the use of ICT, lack of access to ICT facilities greatly affect its use by the Polytechnic lecturers. The study recommended among others that; The need for Technology Education lecturers' possession of good knowledge on the basic skills of computer networks should be emphasized by the managements of the Nigerian Polytechnics through collaboration with TETFund. Access to ICT facilities should greatly be made available in the Polytechnics to lessen how ICT use affect instructional purposes by the Polytechnic lecturers.

**Keywords:** Barriers, ICT use, Affecting, Instructional, Polytechnics

## **INTRODUCTION**

Information and Communications Technology (ICT) is an important part of most organizations these days. ICT being a relatively new tool in education it is not expected to be embraced with open arms. Saleem (2015) expressed that, since the beginning of human existence, mankind has sought to develop tools and improve methods that can be used to enhance his work and life. Man invented preliminary tools for hunting, growing crops, and sewing clothes. ICT in education therefore, has the potential to produce a technologically literate, critically thinking work force, which is prepared to

participate fully in the global economy of the 21st century by transforming teaching. According to Guma, Faruque, and Khushi (2018), ICT is seen as an innovative approach introduced to enhance the efficiency of teaching and learning using electronic information. ICT is therefore, an electronic means of capturing, processing, storing and communicating information in the teaching-learning process.

The use of ICT for instruction as opined by Hashim, (2015) encourages independent and active learning, and self-responsibility for learning. This view indicates that, the use of ICT in the classroom teaching-learning is very important because it provides opportunities for teachers and students to operate, store, manipulate, and retrieve information. ICT as a versatile instrument has the capability not only of engaging students in instructional activities to increase their learning, but of helping them to solve complex problems to enhance their cognitive skills (Guma, Faruque, and Khushi 2018). It is therefore based on the above view that, ICT is widely recognized as a vital resource in economic, social, political and educational development.

Ghavifekr, and Wan Athirah (2015) observed that, it is generally believed that ICT influences teaching as a profession and therefore serves as a key to the improvement of education; it brings changes in education and learning as well as the rest of society. These changes need to be seen in Nigerian Polytechnics so that lecturers and other instructor has to be familiar with the use of modern instructional settings that unite pedagogy and academic life within its entirety.

Polytechnics constitute one category of Tertiary institutions recognized by the National Policy on Education (NPE). The aim of establishing Polytechnics in Nigeria is to train technologists, technicians and management skills in courses leading to the awards of Certificates, National Diploma (ND), Higher National Diploma (HND) and Advanced Professional Diploma which are relevant to the needs, aspirations and the development of the nation's diverse economy and industries. The National Board for Technical Education (NBTE), is the main agency for Regulating Nigerian Polytechnic education. The agency makes it clear that the main objectives of polytechnic education are; the promotion of technical and vocational education and training, technology transfer and skills development to enhance the socio-economic development of the country (NBTE 2015). Aelore (2012) pointed out that, the nature of training made available in Nigerian Polytechnics is such that prepares the students to be able to apply the knowledge acquired to solve real time problems that cut across various areas of human needs.

Based on the need for education particular in the Polytechnics in Nigeria, Amin (2018) was of the view that, education is a socially oriented activity and that quality education has traditionally been associated with strong teachers having high degrees of personal contact with learners. Therefore, the use of ICT in Nigerian Polytechnics for teaching and learning is a complex process and can lead one to a number of difficulties. These difficulties are known as "*barriers*". A barrier is defined as "any condition that makes it difficult to make progress or to achieve an objective" (WordNet Website). Khalid (2019) pointed out that, barriers to teacher use of ICT have been categorised into two, extrinsic and intrinsic barriers. In one study, Ertmer in (Khalid, 2019) referred to extrinsic barriers as 'first order' and cited; (*access, time, support, resources and training*) while he referred to intrinsic barriers as 'second order' and cited; (*attitudes, beliefs, practices and resistance to change*). In another research Syed Noor-UI-Amin (2013) pin pointed challenges to technology integration that are external (Extrinsic) to the teacher including; (*access to resources, training, and support*). Barriers that are internal (Intrinsic) to teachers including; (*their attitudes and beliefs, resistance toward technology in the classroom, and their knowledge and skills*). It is in line of the above opinion, this research work sees Extrinsic barriers, as the first order barriers that result from; inadequate and/or inappropriate configuration of ICT infrastructures, including access, time, support, resources and training while Intrinsic barriers, are the second order barriers that relate to teachers' personal experience and awareness, including; skills, attitudes, beliefs and practices.

### **Statement of the Problem**

In Nigerian higher institutions, the use of ICT for instruction is not being given attention as pointed out by Maila, (2020) and this hinders its use for instructional purposes and has also affected the technological development of Nigerian Polytechnics system. A common problem is that, the Nigerian Polytechnics lecturers lack attitude and skills toward effective utilization of computers in education, socio-organizational factor, school culture, administrative support, school support, they also lack pressure to use

technology changes of ICT for instruction. Limited or no access to ICT, poor quality of supporting staff. All these are barriers that result to a low motivation and lack of confidence in using new technologies for instruction in the Nigerian Polytechnics and therefore affect utilization of ICTs and need to be overcome. It is based on the said problems pointed above therefore, forms the basis of this research work by proposing the way forward for overcoming barriers (Intrinsic or Extrinsic or both) that prevent lecturers from using ICT for instructional purposes at the North Eastern Nigerian Polytechnics.

#### **Objectives and Research Questions for the Study**

The main purpose of this study is to identify and suggest the possible ways for overcoming barriers (extrinsic or intrinsic) to the use of ICT for instructional purposes in technology education programmes in Polytechnics of North East Nigeria. Specifically, the study seeks to;

1. Determine the extent to which lecturers' skills in the use of ICT for instructional purposes affect teaching and learning in Polytechnics in North East Nigeria
2. Determine extent to which access to ICT facilities affect lecturers' use for instructional purposes in Polytechnics in North East Nigeria

Based on the purpose of this study, the following research questions were drawn to guide the research;

1. To what extent do lecturers' skills in the use of ICT for instructional purposes affect teaching and learning in Polytechnics in North East Nigeria?
2. To what extent does access to ICT facilities affect their use for instructional purposes in Polytechnics in North East Nigeria?

#### **Significance and Scope of the Study**

The findings of this research will be beneficial to the following: The Polytechnic administrators, the Polytechnic Lecturers and the Federal Government of Nigeria. The findings would be of benefit to the Polytechnics administrators by identifying their strengths and weaknesses in terms of lecturers' confidence in the use of new technologies in the classroom. The Lecturers in the institutions will also find the outcome of this work as beneficial by making them to become aware of the technical competencies expected of them and the challenges ahead of them in their quest for new innovative knowledge which will keep them informed with the current trend in the world of instructional delivery in line with internationally accepted practice. Accordingly, the Federal Government of Nigeria will find the outcome of this work useful by determining the existing facilities for ICT- instructional capacity and its level in the Nigerian Polytechnics. This will help the government to determine the next step to be taken in ICT policy usage, planning and implementation, especially in the education sub-sector for a sufficient in-service training programme.

The study is limited to the level to which barriers (Extrinsic or Intrinsic) affect the use of ICT for instruction purposes in Technology course, ICT proficiency/confidence level of the lecturers, access to facilities for ICT activities in the North Eastern Nigerian Polytechnics. Specifically, the study is limited to all the Polytechnics in the North Eastern Nigeria with more emphasis for overcoming extrinsic and intrinsic barriers that become an obstacle to the use of ICT in Technology courses at the Polytechnics level.

#### **METHODOLOGY**

A purposeful survey research design was employed. This is because according to Best and Kahn, a purposeful survey design is that which is used where a study employs questionnaire to determine opinions, preferences, attitude and perceptions of people about an issue. This entails the reason for its use so as to suggest possible ways of overcoming the barriers (extrinsic or Intrinsic) to the use of ICT for instructional purposes in Nigerian Polytechnics.

The geographical area of the study covers the Polytechnics within North Eastern part of Nigeria. There are eight (8) Polytechnics located in various cities across the six States. Therefore, the study area comprises of eight Polytechnics located in various towns and cities across the North East States. The North East (NE) Geopolitical Zone of Nigeria covers close to one third (280,419 km<sup>2</sup>) of Nigeria's land area (909,890km<sup>2</sup>). The Zone comprises of six (6) states: Adamawa, Bauchi, Borno, Gombe, Taraba and Yobe.

The population for this study consists of one hundred and eighteen (118) Technology courses lecturers of the eight Polytechnics from the six states. For a conformity and consistence, a single set of instruments was used for this study. Therefore, a structured questionnaire tagged “Polytechnics Lecturers Opinion Questionnaire on the use of ICT for instruction (PLOQ) was develop through intensive literature review based on the research questions investigated by this study. The responses were used in designing a way for overcoming these barriers. The respondents were made to answer questions on a modified five-Point Likert-type scale. The scale has five categories and each category is assigned a numerical value as follows;

<b>Scales</b>		<b>Numerical Value</b>	<b>Lower Limit</b>	<b>Upper Limit</b>
Highly Affected	(HA)	5	4.50	5.00
Affected	(A)	4	3.50	4.49
Moderately Affected	(MA)	3	2.50	3.49
Barely Affected	(BA)	2	1.50	2.49
Not Affected	(NA)	1	0.50	1.49

Three lecturers from Technology and Science Education Program at Abubakar Tafawa Balewa University (ATBU) Bauchi validate the content of the instrument (questionnaire). The expert, corrections and other guides like the length of item to elicit respondent opinion be short and snappy were adopted. After validation of the instrument, a trial test was conducted on twenty-five (25) lecturers, fourteen (14) instructors and six (6) workshop attendants from Plateau State Polytechnic Pankshin. The internal consistency was determined using ‘Cronbach Alpha’. A computer special package was used in finding out the degree of reliability of the questionnaire items and the internal consistency of the reliability was found at 0.79. And therefore, considered reliable for the study.

The data obtained were analyzed using a computer special package known as SPSS. Mean and Standard deviation were used to interpret the analyze data relating to the research questions. The mean of the five point’s modified Likert’s scales was used with a lower and upper limit. Therefore, the cut-off point of 4.50 – 5.00, 3.50 – 4.49, 2.50 – 3.49, 1.50 – 2.49 and 0.50 – 1.49 were used in the interpretation of data. Because of the consideration of the lower and upper limit. All items with a mean score of 2.5 and above were considered affected and therefore served as a way of overcoming the barrier while the mean score below 2.5 were regarded as not affected and could not serve as a way for overcoming the barriers.

**RESULTS**

The results of data analysis for this study are presented as follows;

**Research Question 1:** *To what extent do lecturers’ skills in the use of ICT for instructional purposes affect teaching and learning in Polytechnics in North East Nigeria?*

**Table1: Mean and Standard Deviation of Responses of Lecturers on the extent to which lecturers’ skills in the use of ICT for instructional purposes affect teaching and learning in Polytechnics in North East Nigeria**

S/No.	Items on skills effect	$\bar{X}_L$	$SD_L$	$\bar{X}_{GI}$	REMARKS
1	Inability to use spreadsheet programs to compile chart data for instructional purpose.	3.97	0.68	3.98	Affected
2	Inability of lecturers to use word processing programs to complete written tasks in a timely manner.	3.82	0.67	3.78	Affected
3	Inability to use database programs to create tables, store and retrieve data, and query data.	3.62	0.70	3.57	Affected
4	Inability to use electronic presentation software to create and give electronic presentations by lecturers.	3.86	0.67	3.80	Affected
5	Inability to navigate the World Wide Web and search effectively for data on the Internet and use it for instruction.	3.89	0.66	3.84	Affected
6	Inability to design, create, and maintain a rightful instructional procedure.	3.88	0.67	3.81	Affected
7	Inability to operate a digital camera and understand how digital imagery can be used for instruction.	3.91	0.67	3.84	Affected
8	Technology Education lecturer’s possession of good knowledge on the basics of computer networks and understanding how their school network works.	4.02	0.64	4.03	Affected
9	Lack of Network knowledge applicable to the use of ICT	2.79	0.92	2.77	Moderately Affected
10	Inability to download software from the web and major sites that can be used for their instruction purpose.	3.81	0.68	3.73	Affected
11	Inability to use WebCT or electronic board teaching skills to teach their students.	3.81	0.67	3.73	Affected
12	Inability to use a video conferencing classroom for teaching	3.81	0.67	3.74	Affected
13	Inability to communicate and participate in collaborative networks via the internet.	2.99	0.97	2.96	Moderately Affected
14	Inability of Lecturers in Technology Education to handle the computers and their peripheral devices for their instruction	3.79	0.72	3.69	Affected
15	Inability of a lecturer to provide feedback on a document through a web-based document application.	3.85	0.67	3.80	Affected
<b>GRAND MEAN</b>			<b>3.67</b>		<b>Affected</b>

**Note:**  $\bar{X}_L$  = Lecturers’ Mean Score,  $SD_L$  = Lecturers’ Standard deviation and  $\bar{X}_{GI}$  = Grand Mean per Item

It is clear that table 1 above shows that the respondents have a common view with a mean response of 3.60 – to – 3.98 that skills have moderate effect on lecturers’ use of ICT for instructional purposes. However, Technology Education lecturer’s possession of good knowledge on the basics of computer

networks with a grand mean per item 4.03 is affecting lecturer's skills in the use of ICT. The responses indicate that, lecturer's inability to communicate and participate in collaborative networks via the internet and Lack of Network knowledge applicable to the use of ICT with a grand mean per item response of 2.96 and 2.77 were moderately affecting the lecturer's use of ICT for their instructional purposes. The standard deviation of 0.52 – to – 0.99 of the respondents did not vary on the extent to which lecturer's skills affect the use of ICT for instructional purposes. With a grand mean of 3.67, all the respondents were of the opinion that, lecturer's level of skills affects the use of ICT for instructional purposes in the North East Nigerian Polytechnics.

**Research Question 2:** *To what extent does access to ICT facilities affect their use for instructional purposes in Polytechnics in North Eastern Nigeria?*

**Table 2: Mean and Standard Deviation of Responses of Lecturers on the extent to which access to ICT facilities affect their use for instructional purposes in Polytechnics in North Eastern Nigeria**

S/No.	Items on Access to ICT	$X_L$	$SD_L$	$X_{GI}$	REMARKS
1	Lack of adequate incentives to access ICTs for instructional procedures	3.81	0.69	3.73	Affected
2	Lack of ICT infrastructure for linking formal and informal learning contexts	4.04	0.66	4.07	Affected
3	Power failure to use ICT for instruction in Nigerian Polytechnics	3.84	0.68	3.79	Affected
4	High cost of acquisition of ICT facilities	3.81	0.67	3.76	Affected
5	The limited computers available are outdated and obsolete for the use of ICT for instruction	3.81	0.68	3.76	Affected
6	Lack of internet connectivity in the computer laboratories	4.02	0.64	4.03	Affected
7	Limited or poor internet connectivity in our schools	3.82	0.67	3.77	
8	Lack of periodical maintenance as well as accessibility of the computers and their peripheral devices	3.83	0.69	3.79	Affected
9	Lack of provision for necessary infrastructural support to use ICT for instruction	3.82	0.66	3.73	Affected
10	Inability of private sector and civil society to ensure affordable and sustainable access to ICT use	3.81	0.67	3.76	Affected
11	The cost of acquiring the computers, their peripheral devices, installation and maintenance	3.81	0.67	3.78	Affected
12	Lack of development of an integrated broad-based model/strategy for accessing ICTs for e-education	3.83	0.66	3.78	Affected
13	Lack of access to the use of ICT in Polytechnics is placed on import of ICT infrastructure,	3.80	0.69	3.70	Affected
14	The cost of internet bundle and access to internet facilities	3.81	0.68	3.73	Affected
15	The high cost of hardware and software applications	3.88	0.67	3.91	Affected
	<b>GRAND MEAN</b>				<b>AFFECTED</b>
		<b>3.78</b>			

**Note:**  $X_L$  = Lecturers' Mean Score,  $SD_L$  = Lecturers' Standard deviation and  $X_{GI}$  = Grand Mean per Item

From the data analysis on table 4.5, lack of ICT infrastructure for linking formal and informal learning contexts with a grand mean per item response of 4.07 and Lack of internet connectivity in the computer laboratories with a grand mean per item response of 4.03 has affected the access for the use of ICT by the Polytechnic lecturers. The standard deviation of the responses indicates a similar view of the respondents that lack of access to ICT facilities greatly affect its use by the Polytechnic lecturers. It is agreed by the respondents that due to high cost of acquisition of ICT facilities like the computers, their peripheral devices, installation and maintenance with a grand mean per item response of 3.76 and 3.78 has affected the use of ICT by the Polytechnics lecturers. Above all the grand mean of 3.78 indicates respondents that, access to ICT facilities has affected its use by the Nigerian Polytechnics.

### **Findings of the study**

The major findings of this study are presented as follows:

On the extent of lecturers' skills in the use of ICT for instructional purposes it was find out that,

1. Technology Education lecturer's possession of good knowledge on the basics of computer networks, is highly affecting lecturer's skills
2. Lecturer's in ability to communicate and participate in collaborative networks via the internet
3. Lack of Network knowledge applicable to the use of ICT affects lecturer's skills moderately
4. lecturer's level of skills affects the use of ICT for instructional purposes in the North Eastern Nigerian Polytechnics.

On the extent does access to ICT facilities it was found that;

1. lack of ICT infrastructure for linking formal and informal learning contexts affect the use of ICT
2. Lack of internet connectivity in the computer laboratories affected the use of ICT
3. lack of access to ICT facilities greatly affect its use by the Polytechnic lecturers
4. high cost of acquisition of ICT facilities like the computers, their peripheral devices, installation and maintenance affect the use of ICT

The data analysis for research question one, on the extent of lecturers' skills in the use of ICT for instructional purposes shows that, technology Education lecturer's possession of good knowledge on the basics of computer networks, is highly affecting lecturer's skills. This finding is in support of the assertion of Kaarakainen, Kivinen, & Vainio. (2018). On the Performance-based testing for ICT skills assessing: a case study of students and teachers' ICT skills in Finnish schools. That when examining ICT skill levels, the accuracy of assessment is one of the key issues to address. They lay emphasis that to date, ICT skill assessment is based mainly on self-reports and subjective evaluations. This assertion makes it a reality that, in order to diminish the ICT skill gap interventions using formal education are urgently needed and this will overcome how skills level by the lecturers will affect the use of ICT in Nigerian Polytechnics.

The data analysis for research question five on the extent to which access to ICT facilities affect ICT use shows that, lack of ICT infrastructure for linking formal and informal learning contexts affect the use of ICT, lack of access to ICT facilities greatly affect its use by the Polytechnic lecturers, Lack of internet connectivity in the computer laboratories affected the use of ICT and high cost of acquisition of ICT facilities like the computers, their peripheral devices, installation and maintenance affect the use of ICT is in support of Aramide, Ladipo, & Adebayo (2015) on a demographic variables and ICT access as predictors of Information Communication Technologies' usage among science teachers in federal unity schools in Nigeria. The work agree of accessibility was found to contribute more to ICT use among the science teachers than location of ICT access.

### **CONCLUSION**

It is pertinent to note that, institutional training should aim to equip students with useful skills to improve their knowledge and capabilities in their chosen fields. Therefore, Technology Education lecturer's possession of good knowledge on the basics skills of computer networks is a key to the reductions of the barriers to the use of ICT for instructional purposes in Nigerian Polytechnics. An implication of encouraging Polytechnics lecturers to master/acquire some rudiment skills for the use of ICT for instructional purposes described previously were achieved through technology-focused training. Based on

the purpose of this study and as possible means for overcoming the barriers (extrinsic or intrinsic) the following recommendation were drawn to serve as means of overcoming the barriers affecting the use of ICT;

1. The need for Technology Education lecturer's possession of good knowledge on the basics skills of computer networks should be emphasize by the managements of the Nigerian Polytechnics through collaboration with the TET Fund.
2. The stake holders in the education sector should emphasize the need for the Nigerian Polytechnics Lecturer's ability to communicate and participate in collaborative networks via the internet for their skill improvement.
3. Access to ICT facilities should greatly be made available in the Polytechnics to Lessing how ICT use affect instructional purposes by the Polytechnic lecturers
4. A special intervention for acquisition of ICT facilities like the computers, their peripheral devices, installation and maintenance to the use of ICT for instructional purpose should be consider by the Federal Government of Nigeria

## REFERENCES

- Amin, Syed Noor (2018): An Effective use of ICT for Education and Learning by Drawing on Worldwide Knowledge, Research, and Experience: ICT as a Change Agent for Education (A LITERATURE REVIEW).
- Aramide, K. A., Ladipo, S. O., & Adebayo, I. (2015). Demographic variables and ICT access as predictors of Information Communication Technologies' usage among science teachers in federal unity schools in Nigeria. *Journal of Library Philosophy and Practice*, 1.
- Aelore, D (2012). Developing Technological Pedagogical Content Knowledge in Pre-Service Mathematics Teachers through Collaborative Design. *Australasian Journal of Educational Technology*, 28(4), 547-564.
- Ghavifekr, S. and Wan Athira Mohammed, Sani. (2015): Effectiveness of ICT Integration in Malaysian: A Quantitative Analysis. *International Research Journal for Quality in Education*, 2 (8), 1-12.
- Guma A., Faruque A.H., and Khushi M. (2018) The Role of ICT to Make Teaching-Learning Effective in Higher Institutions of Learning in Uganda. *International Journal of Innovative Research in Science, Engineering and Technology*: 7, 6 ISSN ONLINE (2319-8753) PRINT (2347-6710)
- Hashim, J. (2015). Information communication technology (ICT) adoption among SME owners in Malaysia. *International Journal of Business and information*, 2(2).
- Kaarakainen, M. T., Kivinen, O., & Vainio, T. (2018). Performance-based testing for ICT skills assessing: a case study of students and teachers' ICT skills in Finnish schools. *Universal Access in the Information Society*, 17(2), 349-360.
- Khalid, A. B. (2009): Barriers to the Successful Integration of ICT in Teaching and Learning Environment; A Review of the Literature. *Eurasia Journal of Mathematics, Science & Technology Education* 2009, 5(3), 235-245
- Maila, D. H. R. (2020): Technological Barriers and Challenges in the Use of ICT during the COVID-19 Emergency in higher institutions. *Universal Journal of Educational Research* 8(11B): 6124-6133, 2020
- Salem A. A. (2015): Intrinsic and Extrinsic Factors that Influence Instructors' Use of E-learning. A publication collected from: <https://www.researchgate.net/publication/267376211>