



Assessing the Influence of Barriers to the Use of Information and Communication Technology on Teaching and Learning in Polytechnics of North East, Nigeria

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ABSTRACT

The main purpose of this research work was to assess the influence of barriers to the use of Information Communication Technology (ICT) on Teaching and Learning in the North East Polytechnics, to realize this purpose two (2) specific objectives were drawn with two (2) research question and one (1) hypothesis. The study employs a survey method on a population of one hundred (100) respondents that comprises Lecturers, Instructors and Technologists. A structured questionnaire was administered the data collected was analyzed using a computer special package known as SPSS. Mean and Standard deviation were used to interpret the analyzed data relating to the research questions while One-way ANOVA was used in the interpretation of the hypothesis. The result indicates that lecturers' lack of skills in the use of ICT for instructional purpose influences teaching and learning at a moderate extent in North East Nigerian Polytechnics. Likewise, lectures resistance to the use of ICT for instructional purposes influences teaching and learning to a high extent in Polytechnics in North East Nigeria and there is significant difference in the mean responses of instructors, lecturers and technologists on how lecturers' skills in the use of ICT for instructional purpose influence teaching and learning in North East Nigerian Polytechnics. The study therefore recommends among others that, All Nigerian Polytechnics lecturers should be encouraged to acquire some rudiment skills for the mastery and development of confidence for the use of ICT for instructional purposes.

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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. Salem (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 workforce, 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

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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 to engage students in instructional activities to increase their learning, but also 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 instructors 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 particularly 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 to several 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 categorized 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-Ul-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.

Problem Statement

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 the

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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 factors, 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 result to a low motivation and lack of confidence in using new technologies for instruction in the Nigerian Polytechnics and therefore affect the 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 innovative approaches as a way forward for tackling the influence of barriers (Intrinsic or Extrinsic or both) that prevent lecturers from using ICT on teaching and learning for instructional purposes at North East Polytechnics in Nigeria.

Objectives of the Study

The main purpose of this study is to assess the influence of barriers to the use of ICT for teaching and learning in North-Eastern Nigerian Polytechnics. Specifically, the study seeks to;

1. Determine the extent to which lecturers' skills in the use of ICT influence teaching and learning in North-East Nigerian Polytechnics.
2. Determine the extent to which lecturers' resistance to the use of ICT influence teaching and learning in North-East Nigerian Polytechnics.

Research Questions

Based on the purpose of this study as well as meeting the objectives of the study the following research questions were drawn to guide the study;

1. To what extent do lecturers' skills in the use of ICT influence teaching and learning in North-East Nigerian Polytechnics?
2. To what extent do lecturers' Resistance to the use of ICT influence teaching and

learning in North-East Nigerian Polytechnics?

Research Hypotheses

The following null hypothesis was formulated to guide the study and tested at 0.5 level of significance:

H01 - There is no significant difference in the mean scores of lecturers, instructors and technologists on the influence of lecturers' skills in the use of ICT influence teaching and learning in North-East Nigerian Polytechnics.

Significance of the Study

The findings of this study would be of benefit to the Polytechnic 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 innovative knowledge which will keep them informed with the current trend in the world of instructional delivery in line with internationally accepted practice.

METHODOLOGY

The study uses survey design. The study area covered the Polytechnics in the North-Eastern Nigerian that comprises of six. There are twelve Polytechnics in the region with seven-unit of schools in the entire Polytechnics. There are about 40,000 students and 2800 staff both academic and non-academic in the North-Eastern Nigerian Polytechnics which sum up to about 41,800 users of ICT facilities for teaching and learning in the Polytechnic. Therefore, some innovative ways to use the limited ICT facilities need to be introduced in the Polytechnic for an effective adjustment to the world era of technological advancement.

Focus Group Interview was used for the study, as it is one of the best techniques in assessing the barriers is to collect information through focus groups on the respondents as follows: a) Lecturers Cadre; b) Technologist Cadre

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and c) Instructors of schools. One hundred (100) respondents were used in the study.

Data were collected from the respondents using a structured questionnaire titled "Polytechnics Lecturers Instructors and Technologists Opinion Questionnaire on the use of ICT for instruction (PLITIQ) and was developed through intensive literature review based on the research questions investigated by this study. The respondents were made to answer questions on a modified Five-Point Likert-type scale. 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 on the item to elicit respondent opinion were adopted.

The data were collected by the researcher and an assistant form each school visited. Finally, the

obtained data were analyzed using SPSS. Mean and Standard deviation were used to analyzed the collected data relating to the research questions. The mean of the five point's modified Likert's scales with a lower and upper limit. Therefore, the cut-off points 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. The hypotheses were tested at 0.05 level of significance using Analysis of variance (ANOVA).

RESULTS

Research Question 1: To what extent do lecturers' skills to the use of ICT for instructional purposes influence teaching and learning in Polytechnics in North- East, Nigeria?

Table 1: Mean and Standard Deviation of Responses of Lecturers, Instructors and Technologist on the extent to which lecturers' skills in the use of ICT for instructional purposes influence teaching and learning in Polytechnics in North-East, Nigeria

S/No.	Items on skills effect	\bar{X}_L	SD _L	\bar{X}_I	SD _I	\bar{X}_T	SD _T	\bar{X}_A	SD _A	REMARKS
1	Inability to use spreadsheet programs to compile chart data for instructional purpose.	3.25	0.80	4.00	0.00	4.20	0.45	3.49	0.79	Moderate Extent
2	Inability of lecturers to use word processing programs to complete written tasks in a timely manner.	3.14	0.71	2.83	0.41	4.00	0.71	3.21	0.73	Moderate Extent
3	Inability to use database programs to create tables, store and retrieve data, and query data.	3.25	0.84	3.00	0.63	3.00	1.22	3.18	0.85	Moderate Extent
4	Inability to use electronic presentation software to create and give electronic presentations by lecturers.	3.18	0.82	3.17	0.98	4.00	0.71	3.28	0.86	Moderate Extent
5	Inability to design, create, and maintain a rightful instructional procedure.	3.50	0.96	3.33	0.52	4.00	0.71	3.54	0.88	High Extent

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S/No.	Items on skills effect	\bar{X}_L	SD_L	\bar{X}_I	SD_I	\bar{X}_T	SD_T	\bar{X}_A	SD_A	REMARKS
6	Inability to operate a digital camera and understand how digital imagery can be used for instruction.	3.43	0.84	4.00	1.09	4.00	0.71	3.58	0.88	High Extent
7	Lack of Network knowledge applicable to the use of ICT	3.61	1.07	3.83	1.17	4.00	1.00	3.69	1.06	High Extent
8	Inability to use a video conferencing classroom for teaching	3.71	0.90	3.17	0.98	4.20	0.44	3.69	0.89	High Extent
9	Inability to communicate and participate in collaborative networks via the internet.	3.04	0.92	3.67	1.03	3.60	1.14	3.21	0.98	Moderate Extent
GRAND MEAN/STANDARD DEVIATION								3.49	0.90	Moderate Extent

Note: \bar{X}_L = Lecturers' Mean Score, SD_L = Lecturers' Standard deviation, \bar{X}_I = Instructors' Mean Score SD_I = Instructors Standard deviation \bar{X}_T = Technologist' Mean Score, SD_T = Technologist Standard deviation, \bar{X}_A = Average Mean per Item and SD_A = Average Standard Deviation per Item

Table 1. shows that the respondents have a common view with a mean response of 3.54 – to – 3.77 that, skills at high extent influence lecturers' use of ICT for instructional purposes on teaching and learning. The standard deviation of 0.73 – to – 0.98 of the respondents indicates that their mean did not vary on the extent to which lecturer's skills influence the use of ICT for instructional purposes on teaching and learning. However, an average standard deviation of 1.02 and 1.06 indicate the variation of the respondents from the mean responses to the use of ICT. With

a cutoff point of 2.5 a grand mean of 3.49 and grand standard deviation of 0.90, shows that all the respondents believed that, lecturers' level of skills at a Moderate Extent influence the use of ICT for instructional purposes on teaching and learning in the North East Nigerian Polytechnics.

Research Question 2: To what extent do lecturers' Resistance to the use of ICT for instructional purposes influence teaching and learning in Polytechnics in North East, Nigeria?

Table 2: Mean and Standard Deviation of Responses of Lecturers, Instructors and Technologists on the extent to which lecturers' Resistance to the use of ICT for instructional purposes influence teaching and learning in Polytechnics in North East Nigeria

S/No.	Items on resistance to change	\bar{X}_L	SD_L	\bar{X}_I	SD_I	\bar{X}_T	SD_T	\bar{X}_A	SD_A	REMARKS
1	Change from traditional to innovative methods.	3.68	1.02	3.17	0.98	3.80	0.45	3.62	0.96	High Extent
2	Difficulty in managing ICT peripherals.	3.43	1.07	3.17	0.98	4.00	1.41	3.46	1.10	Moderate Extent
3	Lack of lecturers' confidence	3.86	1.11	3.67	1.03	3.80	1.10	3.82	1.10	High Extent

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S/No.	Items on resistance to change	\bar{X}_L	SD_L	\bar{X}_I	SD_I	\bar{X}_T	SD_T	\bar{X}_A	SD_A	REMARKS
4	Fear of failure	3.64	0.95	2.83	0.41	3.80	0.45	3.54	0.88	High Extent
5	Unrealistic lecturers' timelines	3.50	0.79	2.83	0.41	3.40	0.55	3.38	0.75	Moderate Extent
6	The fear of getting something wrong.	3.29	0.66	2.83	0.41	3.60	0.55	3.26	0.64	Moderate Extent
7	Negligance attitudes toward technology changes.	3.68	0.94	3.33	0.82	4.00	0.00	3.67	0.87	High Extent
8	Lecturers' image and reputation of damaging the computers.	3.39	0.83	3.33	0.82	3.80	0.45	3.44	0.79	Moderate Extent
9	Fear of failure to technology changes.	3.68	0.94	4.00	1.10	4.00	0.00	3.77	0.90	High Extent
GRAND MEAN								3.50	0.85	High Extent

Note: \bar{X}_L = Lecturers' Mean Score, SD_L = Lecturers' Standard deviation, \bar{X}_I = Instructors' Mean Score SD_I = Instructors Standard deviation \bar{X}_T = Technologist' Mean Score, SD_T = Technologist Standard deviation, \bar{X}_A = Average Mean per Item and SD_A = Average Standard Deviation per Item

The result on Table 2 indicates that, almost all the lectures are of the view that resistance to the use of ICT for instructional purpose has influence on teaching and learning in North East Nigerian Polytechnics with an average mean range from 3.26 to 3.82. However, there is a slight variation to the mean score of the respondents with an average standard deviation of 1.10 that the lack of lecturers' confidence at a high extent does influence lecturers' use of ICT on teaching and learning. A grand mean of 3.50 at a high extent influence the use of ICT and a standard deviation of 0.85 for the responses

shows that lecturers', instructors' and technologists' views do not vary with the mean on the level to which lecturers' resistance to the use of ICT for instructional purposes at high extent have an influence on teaching and learning in North East, Nigerian Polytechnics.

Hypothesis One

H_{01} - There is no significant difference in the mean scores of lecturers, instructors and technologists on the influence of lecturers' skills to the use of ICT for instructional purposes on teaching and learning in North East, Nigerian Polytechnics.

Table 3: Analysis of Variance (ANOVA) for comparing the mean scores of responses of lecturers, instructors, and technologists on the influence of lecturers' skills in the use of ICT for instructional purposes on teaching and learning in North East, Nigerian Polytechnics.

Source of Variance	SS	Df	MS	F	Sig.	Decision
BG	3.507	2	1.754	3.549	.031	Reject H_{01}
WG	7.159	36	0.494			
Total	10.667	38				

Key: BG = Between Groups, WG = Within Groups, SS = Sum of Squares, Df = Degree of Freedom. MS = Mean Square, F. = Calculated value. Sig. = statistical probability (P-value).

From table 3, it is evident that, the total responses of lecturers, instructors and

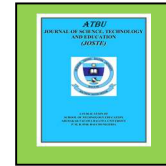
technologists' on how lecturer's skill has affected the use of ICT for instructional purposes. The calculated value (F) is 3.549 while the statistical

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probability (P-value) at 2 and 36 degrees of freedom at 0.05 level of significance is 0.031. Since the statistical probability (P-value) is less than 0.05 level of significance, therefore, the null hypothesis is rejected. This shows that, there is significant difference in the mean responses of instructors, lecturers and technologists on how lecturers' skills in the use of ICT for instructional purpose influence teaching and learning in North East, Nigerian Polytechnics.

Since the null hypothesis is rejected, Tukey Post hoc test was used to determine the specific area of difference among the three groups. The result is presented as follows;

Pairing of L and I = $0.026 < 0.026$

Pairing of L and T = $0.722 > 0.026$

Pairing of T and I = $0.465 > 0.026$

Where; L= Lecturers

I= Instructors

T= Technologists

Thus, from the results above, pairing L and I gives an F value of 0.026, pairing L and T gives an F value of 0.722, and finally pairing T and I yielded an F value of 0.465. This indicates that the statistically significant difference lies with the instructors' group.

FINDINGS OF THE STUDY

Based on the analysis of data, the following findings emerged:

1. On the extent of lecturers' skills, it was found out that; lecturers' lack of skills in the use of ICT for instructional purposes influence teaching and learning at a moderate extent in North East, Nigerian Polytechnics.
2. On the extent of lecturers' Resistance, it is found that; lectures resistance to the use of ICT for instructional purposes influence teaching and learning at a high extent in Polytechnics in North East, Nigeria
3. The tested hypothesis shows that, there is significant difference in the mean responses of instructors, lecturers and technologists on how lecturers' skills in the use of ICT for instructional purpose influence teaching and learning in North East, Nigerian Polytechnics.

DISCUSSION OF THE FINDINGS

The result of data analysis for research question one, on the extent of lecturers' skills in the use of ICT for instructional purposes, shows that lecturers lack of skills in the use of ICT for instructional purposes influence teaching and learning to a high extent in North East, Nigerian Polytechnics. This result supports the claim made by Kaarakainen, Kivinen, and Vainio (2018) regarding ICT skills in Finnish schools that having a solid understanding of the fundamentals of computer networks is one of the ICT skills and a crucial component of integrating it into teaching and learning. Similarly, one of the important concerns to solve is the accuracy of the assessment of ICT abilities. ICT skill assessment, however, was prioritized by Kaarakainen, Kivinen, and Vainio and focused mostly on self-reports and subjective assessments. This claim solidifies the reality that formal education is urgently required for the possession of adequate knowledge of the fundamentals of computer networks to reduce the ICT skill gap initiatives. Therefore, it is hoped that this will act as a means of overcoming the influence of lecturers' skills to the use of ICT on teaching and learning in the North East, and Nigerian Polytechnics.

The results of data analysis for research question two on the degree of lecturers' resistance to the use of ICT reveal that, lectures resistance to the use of ICT for instructional purposes influences teaching and learning at a high extent in Polytechnics in North East, Nigeria. The result is consistent with Grishchenko's (2020) observation that the majority of ICT use resistance comes from those who downplay the digital age. As a result, the gap is not only closing as a result of resistance and changes in the digital age, but it also helps to understand the dynamics and social effects of the digital divide so that social policy and measures to address teachers' resistance to technological change can consider these. The causes for user resistance to technological changes in the classroom, according to Mahmud, Ramayah, and Kurnia (2017), are based on lecturers' understanding of how they evaluate a new technology system before adoption. Similar to this, in modelling, pre-implementation customer

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resistance results in end-user complaints. Complaining before finishing the session is often what motivates a teacher to reject ICT. User opposition is thus complaining from a predisposition toward the status quo.

CONCLUSION

It is important to remember that formal education should attempt to give students practical skills to enhance their knowledge and competence in their chosen disciplines. Therefore, lowering the obstacles to ICT use for educational purposes in Nigerian Polytechnics depends on technology education lecturers having solid knowledge of the fundamentals of computer networks. That implied removing obstacles to ensure successful and long-lasting ICT utilization in Nigerian Polytechnics. As a result, it will be feasible to prioritize planned professional development that focuses on technology and ICT support for educational objectives.

RECOMMENDATIONS

Based on the findings of this study the following recommendations were drawn;

1. The need for a Technology Education lecturers' possession of good knowledge of the basics skills of computer networks should be emphasized by the management of the Nigerian Polytechnics through collaboration with the Tertiary Education Trust Fund (TET Fund).
2. All Nigerian Polytechnics lecturers should be encouraged to acquire some rudiment skills for the mastery and development of confidence for the use of ICT for instructional purposes

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