

Information Communication Technology and Polytechnic Education in Nigeria: The Case of Federal Polytechnic Offa

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EXECUTIVE SUMMARY

The role of Information Communication Technology (ICT) in educational development is unquestioned, and very significantly, the place of energy for effective use of ICT cannot be over emphasized. The objectives of this study were to determine how many departments make use of ICT for teaching of students at the Federal Polytechnic Offa, examine the effectiveness of the Polytechnic e-library, determine whether any department in the Polytechnic uses ICT for examinations and test the effectiveness of use of ICT compared to the conventional methods of teaching. Questionnaires were administered in hardcopies physically. Descriptive statistics was used to analyze the collected data. Very few departments make use of ICT for teaching of students at the Federal Polytechnic Offa, the Polytechnic e-library is functional when there is internet and power supply, no department indicated it uses ICT for examinations and the use of ICT for teaching is not popular. As such the study could not compare the effectiveness of ICT for teaching to the conventional methods of teaching. Addressing the lack of ICT equipment in some tertiary institutions in Nigeria is critical for the advancement of education, and to ensure that students have access to the necessary skills and knowledge to succeed in a digital world. There is a need for provision of adequate ICT Equipmentsuch as computers, projectors, internet facilities, and other relevant software, to higher education institutions in Nigeria by the government, academic institutions, and private sector organizations. There is a need to provide teachers with adequate training on the use of ICT in teaching. This will help teachers to incorporate ICT tools and techniques into their teaching methods, and help students to learn better.The higher education curriculum in Nigeria needs to be revised and updated to incorporate the use of ICT in teaching and learning. This will help to ensure that students are adequately prepared for

the digital future.The government needs to encourage public-private partnerships to support the provision of ICT equipment and infrastructure in higher education institutions in Nigeria. This will help to bridge the digital divide and ensure that Nigerian students have access to the same level of education as their counterparts in developed countries.

Keywords: Education, Development, ICT

I. INTRODUCTION

The lack of adequate ICT equipment in some tertiary institutions in Nigeria has become a major challenge to education advancement in the country. The importance of ICT in education cannot be overemphasized, as it has become an essential tool for learning and teaching in the 21st century.In Nigeria, the lack of ICT equipment such as computers, projectors, and internet connectivity has made it difficult for students and teachers to access digital resources and engage in e-learning. This situation has been worsened by the COVID-19 pandemic, which has made it necessary for schools to adopt remote learning strategies to reduce the spread of the virus.

The lack of ICT equipment in tertiary institutions has also hindered research and innovation, as students and faculty members are unable to access online libraries and other resources that are crucial for academic advancement. This has resulted in a significant reduction in the quality and quantity of research output from Nigerian tertiary institutions, which has negative implications for the development of the country.Furthermore, the lack of ICT equipment has also affected the employability of graduates from Nigerian tertiary institutions. Employers in today's digital world are increasingly looking for graduates with ICT skills, and the absence of these skills among Nigerian graduates is a major barrier to their employment opportunities.

The lack of adequate ICT equipment in some tertiary institutions in Nigeria has become a major challenge to education advancement in the country. It is essential for the government and other stakeholders to invest in ICT infrastructure in tertiary institutions to enhance the quality of education and increase the employability of graduates. This project report focuses on the challenges of ICT in Nigerian higher institutions of learning where most institutions were identified as not having access to ICT. The importance of ICT in education cannot be overemphasized as it plays a critical role in enhancing teaching and learning, research, innovation, and employability of graduates. However, the lack of adequate ICT infrastructure in Nigerian higher institutions of learning has become a significant challenge, hindering the advancement of education in the country.

In recent years, there has been a growing concern over the poor state of ICT infrastructure in Nigerian higher institutions of learning. Several reports have identified that most Nigerian tertiary institutions lack adequate ICT infrastructure, including computers, projectors, and internet connectivity. This situation has made it difficult for students and faculty members to access digital resources, engage in e-learning, and participate in research and innovation.

The COVID-19 pandemic has further highlighted the need for Nigerian tertiary institutions to embrace ICT, as the adoption of remote learning strategies has become necessary to reduce the spread of the virus. Unfortunately, the lack of ICT infrastructure has made it difficult for most institutions to implement these strategies effectively.

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resulted in a significant reduction in the quality and quantity of research output from Nigerian tertiary institutions, which has negative implications for the development of the country. Furthermore, the lack of ICT equipment has also affected the employability of graduates from Nigerian tertiary institutions. Employers in today's digital world are increasingly looking for graduates with ICT skills, and the absence of these skills among Nigerian graduates is a major barrier to their employment opportunities. In addition, the lack of adequate ICT equipment in some tertiary institutions in Nigeria has become a major challenge to education advancement in the country. It is essential for the government and other stakeholders to invest in ICT infrastructure in tertiary institutions to enhance the quality of education and increase the employability of graduates. This study investigates the performance of ICT as teaching aids for educational development. The focus is to build an evidence-based framework that explains the challenge of the developing countries' students in respect of maximizing the full potentials of the computer. Specifically, the objectives are : to determine how many departments make use of ICT for teaching of students at the Federal Polytechnic Offa, examine if the Polytechnic e-library functions, investigate if any department in the Polytechnic has begun the use of ICT for examinations and examine if ICT is used for teaching and how effective is it compared to the conventional methods of teaching.

II. LITERATURE REVIEW

Numerous studies have investigated the lack of ICT equipment in tertiary institutions across the globe and how it has become a major challenge to education advancement. Al-bataineh, A. (2019) in Jordan, conducted a study on "The Role of ICT in Enhancing Teaching and Learning in Higher Education in Jordan" and found that the lack of ICT equipment and infrastructure has hindered the adoption of digital teaching and learning methods, which has negatively impacted education advancement. Mandeep, D., and Baharom, S. (2018) in Malaysia, conducted a study on "The Role of ICT in Higher Education in Malaysia" and found that the lack of ICT equipment has resulted in low ICT literacy among students and faculty members, which has negatively impacted education advancement. Kim, M., and Bonk, C. J. (2018) in the United States, conducted a study on "The Future of Online Teaching and Learning in Higher Education" and found that the lack of ICT equipment and infrastructure has hindered the adoption of online teaching and learning methods,

which has negatively impacted education advancement.

Pradhan, S., and Sahoo, N. (2017) in India, conducted a study on "Challenges of ICT in Higher Education in India" and found that the lack of ICT equipment and infrastructure has hindered the adoption of digital teaching and learning methods, which has negatively impacted education advancement. Kizito, S. S. (2016) in Uganda, conducted a study on "ICT Challenges Facing Higher Education in Uganda" and found that the lack of ICT equipment and infrastructure has hindered the adoption of digital teaching and learning methods, which has negatively impacted education advancement.

Wang, Q., Liang, Y., and Li, Y. (2011) in China, conducted a study on "The Effects of ICT Infrastructure on E-Learning in Higher Education Institutions" and found that the lack of ICT equipment and infrastructure has hindered the adoption of e-learning methods, which has negatively impacted education advancement. UNESCO (2003) conducted a study on "ICT in Education: A Critical Literature Review and Its Implications" and found that the lack of ICT equipment and infrastructure has hindered the adoption of digital teaching and learning methods, which has negatively impacted education advancement in many countries.

Using the power of the internet, students can now learn different things wherever and whenever they want. The role of Information Communication Technology (ICT) in educational development is unquestioned, and very significantly, the place of energy for effective use of ICT cannot be over emphasized. Classroom face to face instruction, often referred to as the traditional form of educational delivery has many advantages. This provides immediate feedback mechanism for both the teacher and students and as such, misunderstanding can be clarified and arrested at an early stage. The opportunity of learning through all the senses (multimodal pedagogy) is enabled. Also, the traditional educational delivery system provides an environment for social interactions in a manner that allows students to learn from one another and by so doing enhance their social skills. Above all, classroom instruction provides a great deal of flexibility to the teacher who can arrange and rearrange the classroom environment to meet the needs of the students, the contents and the pedagogy and consequently promote learning. Despite, all the benefits of traditional classroom instruction it is highly limited in geographical coverage, access to information, access to learning

resources, interaction with a larger audience and access to many possible instructors. Therefore, the traditional classroom instruction needs to be complimented with ICT.

ICT is built on the twin foundations of information theory and physical advances in electronics, optics and other related sciences. Together, they are yielding to mankind entirely new tools, new resources and new capabilities. The technology is developing at an accelerating rate. The electronic computer was the first physical manifestation of the automation of information processing technology. The program learning activities can alter some fundamental concepts of industrial training and public education. Machine systems can pace the individual student, analyze his learning difficulties and mistakes as they occur, and can introduce remedial instructions as needed. They encourage a degree of personal participation by the student which is impossible in normal classroom work (Diebold, 1962). Technology can be used to facilitate the display of information, to increase access to external explicit information, and to increase the sharing and construction of knowledge. Technology is not suggested as a panacea for educational problems, in fact many problems in education are social rather than learning related. Yet technology can enable the effective application of constructive, cognitive, collaborative and sociocultural models of learning. In short, ICT is primarily used to automate the information delivery function in classrooms (Leidner and Jarvenpaa, 1995).

Alavi, Yoo and Vogel, 1997; Steinberg, (2003) describe how ICT can enable collaborative learning and teaching with multiple instructors, and integration of external expertise. It can be used for video conferencing system to create geographically distributed discussion panels of experts. Over the coming years, universities will face many challenges to the one-course, one-semester, one-instructor, one-site traditions of today's educational systems. This is because, no university can employ every good instructor, and no university can maintain every useful perspective on a domain and no student can attend every. ICT is highly versatile. It can be tailored to meet a variety of diverse challenges. The same network, server, and peripheral devices such as PCs or cell phones can help support distance education and remote health delivery and connect rural communities to global markets. ICT can help transcend traditional barriers of geography. It allows individuals and entities anywhere in the world access to the same information without the time and cost associated with physical transportation. This is an advantage

substantially enhanced by the advent of wireless and satellite communications and voice-over internet protocol long-distance service. It also facilitates the transfer of know-how across the full spectrum of knowledge, allowing developing countries to reap productivity gains and harness state of the art technology.

Developing countries are often characterized by poor infrastructure, unreliable energy supply, no water, bad transport or limited digital access. Poor energy supply is a fundamental constraint on the course of future development. Energy is important for education because it facilitates communication, particularly through Information Communication Technology (ICT) and also by provision of basic needs such as lighting. Access to energy facilitates economic development by providing more efficient and healthier means to undertake household tasks. It provide means to undertake productive activities more generally, often more cheaply than by using the inefficient substitutes such as candles, lanterns and batteries. Conventional thinking holds that increased energy consumption is a prerequisite for economic and social development.

The automation of information processing is part of a technology that evolved since the World War II in the scientific research associated with development of radar and the military systems for using radar data in directing combat fire control. Apparently, ICT is built on the twin foundations of information theory and physical advances in electronics, optics and other related sciences. Together, they are yielding to mankind entirely new tools, new resources and new capabilities. The technology is developing at an accelerating rate. The electronic computer was the first physical manifestation of the automation of information processing technology. The program learning activities can alter some fundamental concepts of industrial training and public education. Machine systems can pace the individual student, analyze his learning difficulties and mistakes as they occur and can introduce remedial instructions as needed. They encourage a degree of personal participation by the student which is impossible in normal classroom work (Diebold, 1962). Only ICT could make possible the provision of quality education through equal access to learning opportunities across the globe at an economical rate. Significant gains in economic productivity as a result of education may be the most promising way to stimulate general economic growth (Parker and Dunn, 1972).

Although, classroom face to face instruction, often referred to as the traditional form of educational delivery has many advantages. This

method provides immediate feedback mechanism for both the teacher and students and as such, misunderstanding can be clarified and arrested at an early stage. The opportunity of learning through all the senses (multimodal pedagogy) is enabled. Also, the traditional educational delivery system provides an environment for social interactions in a manner that allows students to learn from one another and by so doing enhance their social skills. Above all, classroom instruction provides a great deal of flexibility to the teacher who can arrange and rearrange the classroom environment to meet the needs of the students, the contents and the pedagogy and consequently promote learning.

Despite, all the benefits of traditional classroom instruction it is highly limited in geographical coverage, access to information , access to learning resources, interaction with a larger audience and access to many possible instructors. Therefore, the traditional classroom instruction needs to be complimented with ICT. Technology can be used to facilitate the display of information, to increase access to external explicit information, and to increase the sharing and construction of knowledge. Technology is not suggested as a panacea for educational problems, in fact many problems in education are social rather than learning related. Yet technology can enable the effective application of constructive, cognitive, collaborative and sociocultural models of learning. In short, ICT is primarily used to automate the information delivery function in classrooms. (Leidner andJarvenpaa, 1995) .

Invariably, ICT can enable collaborative learning and teaching with multiple instructors, and integration of external expertise. It can be used for video conferencing system to create geographically distributed discussion panels of experts. Over the coming years, universities will face many challenges to the one-course, one-semester, one-instructor, one-site traditions of today's educational systems. This is because, no university can employ every good instructor and no university can maintain every useful perspective on a domain and no student can attend every university (Alavi and Vogel , 1997).

The versatility of ICT is high. It can be tailored to meet a variety of diverse challenges. The same network, server, and peripheral devices such as Personal Computers (PCs) or cell phones can help support distance education, remote health delivery and connect rural communities to global markets. Ultimately, ICT can help transcend traditional barriers of geography. It allows individuals and entities anywhere in the world access to the same information without the time

and cost associated with physical transportation. This is an advantage substantially enhanced by the advent of wireless and satellite communications and voice-over internet protocol long-distance service. It also facilitates the transfer of know-how across the full spectrum of knowledge, allowing developing countries to reap productivity gains and harness state of the art technology.

With ICT the lives of people everywhere can be enriched. It can bring ideas and experience to even the most isolated, opening to them the world outside their village, town and country. Experience can be shared with the world at large, at the tap of a keystroke or the touch of a cell phone keypad. It also, empowers individuals to participate in the social and political institutions of their community, giving voice to those who have traditionally been excluded. In the UN's Millennium Developments goals ICT based solutions have already proved their value in addressing several specific challenges identified (Steinberg, 2003).

Computers have powerful multimedia capability, storage capacity, and connections to digital cameras that make it possible to tell the story of a community, capture unforeseen images, and conduct face to face discussions from distant locations. There is no question that information technology makes the world smaller, overcoming boundaries of time and space, connecting communities around the globe. International education efforts have much to gain from these new capabilities (Roberts, 2004). When available, one major reasons for ICT's failure to deliver on some of its potentials in Nigeria is poor energy supply.

III. METHODOLOGY

The basic underlying assumption is that computers are the simplest interactive instructional devices and that energy is a fundamental requirement for its functionality. Questionnaires were administered. The target is to administer 1000 questionnaires to each of the 27 departments in the Federal Polytechnic Offa, Nigeria. Unfortunately 333 responses were receive from both lecturers and students. Descriptive statistics; the mean, median and mode was used to analyze data. Simple bar charts, pie charts with summary statistics were used to present results of the study.

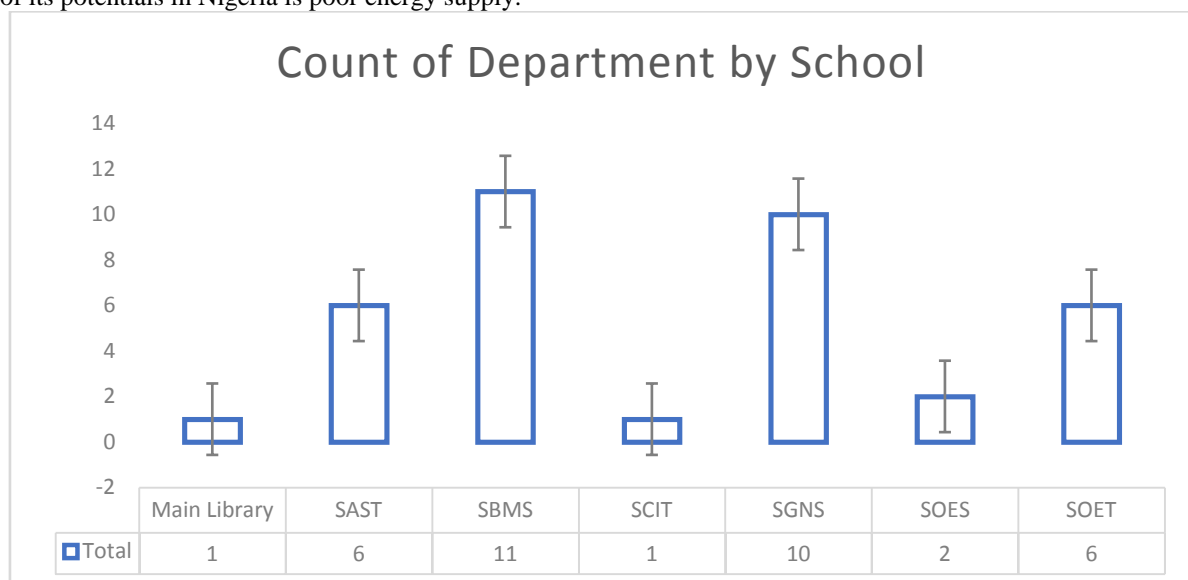
Descriptive statistics: This involves summarizing the data collected in the study using measures such as mean, median, mode, standard deviation, and frequency distribution. It will provide a clear understanding of the distribution of the data and the degree of variation within the data set.

Survey questionnaire: A survey questionnaire was used to collect data from students, faculty members, and other stakeholders in the institution on the lack of ICT equipment and its impact on education advancement. The data collected was analyzed.

IV. STATISTICAL ANALYSIS AND RESULTS

4.1 Lecturers' Responses

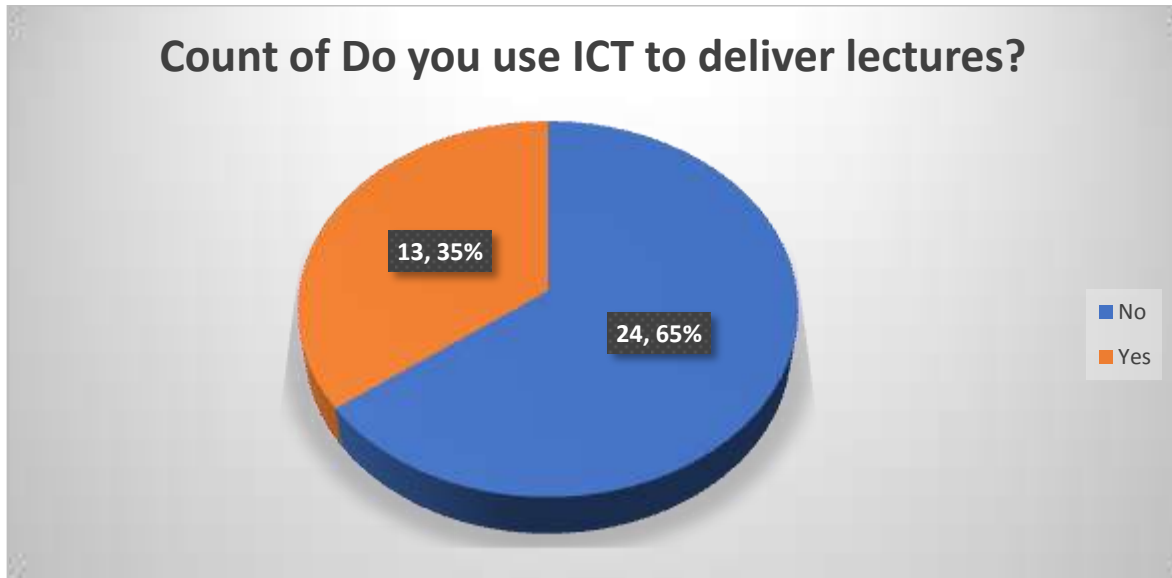
The chart below indicates a summary of responses from the Polytechnic lecturers.



The above graph summarizes the response from lecturers' population Departments in each school. There were 1, 6, 11, 1, 10, 2, and 6 response from respondent from the Main Library, School of Applied Sciences and Technology (SAST), School of Business Management Studies (SBMS), School of Communication and

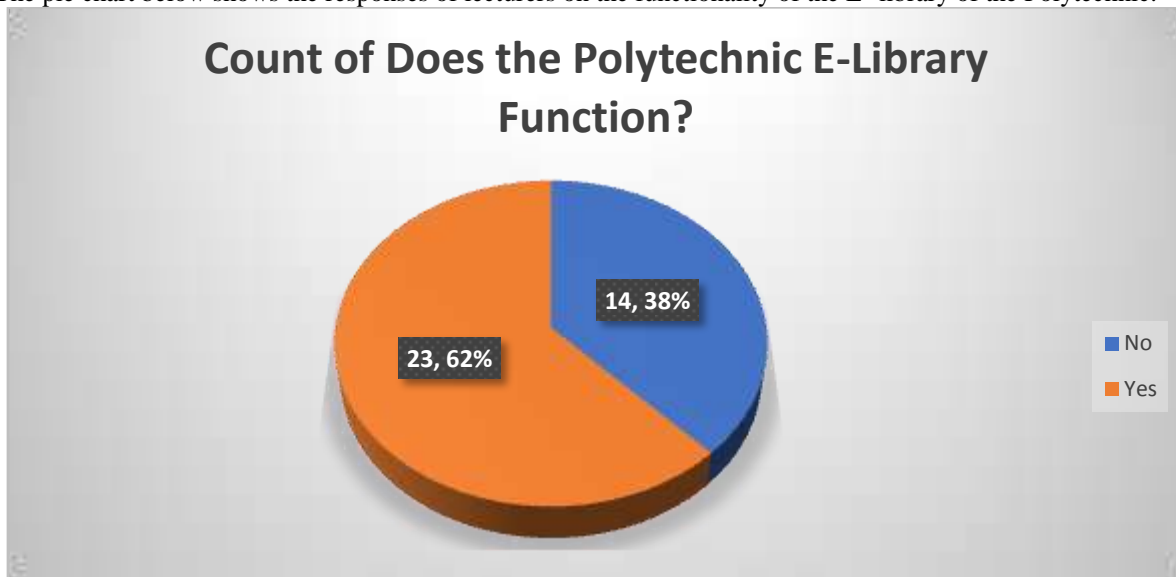
Information Technology (SCIT), School of General Studies (SGNS), School of Environmental Studies (SOES) and School of Engineering Technology (SOET) respectively.

The pie chart that follow shows count of lecturers that lectures using ICT, say projectors or online classrooms.



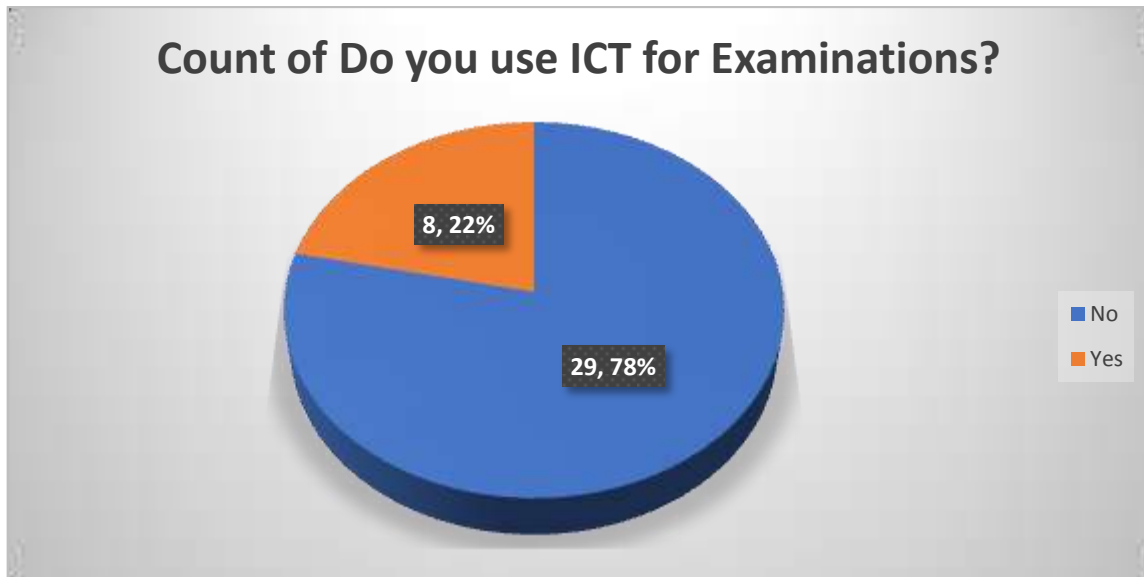
65% of the respondent (lecturers) do not use ICT to deliver lectures.

The pie chart below shows the responses of lecturers on the functionality of the E- library of the Polytechnic.

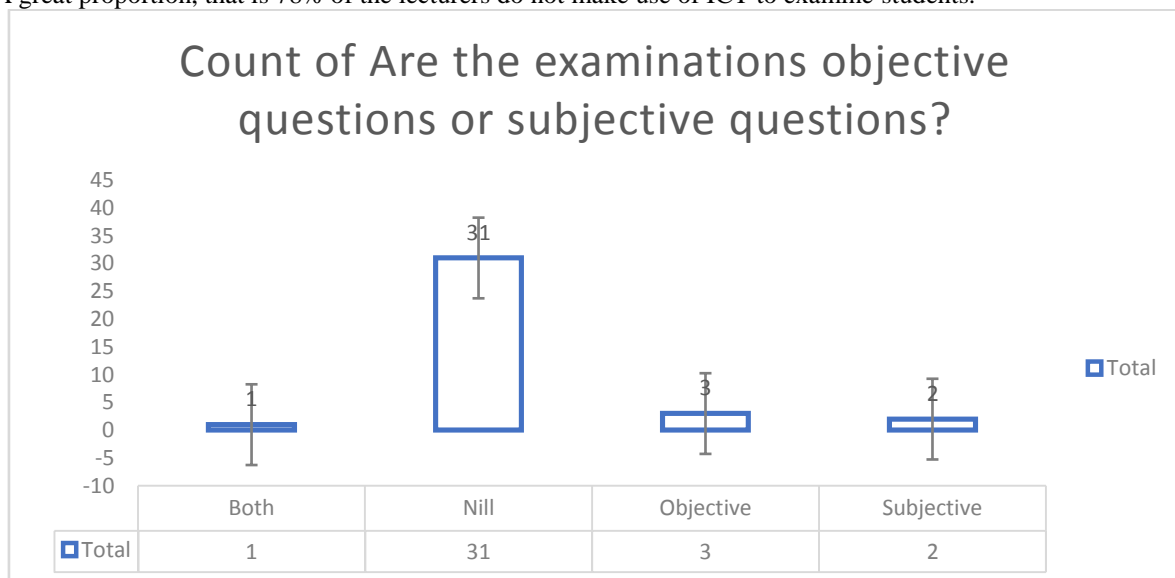


The data evidence shows a 62% that the E-Library do not functions due to internet fluctuations and sometimes power failure.

Below is the observed responses on the use of ICT to conduct examinations.

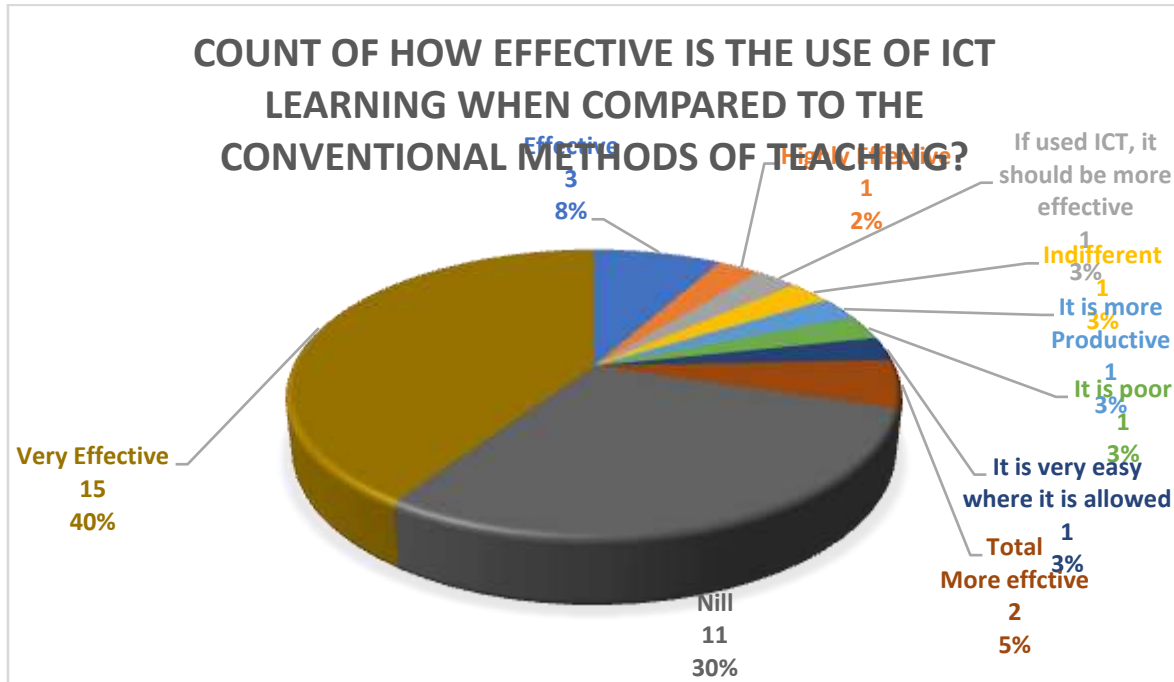


A great proportion, that is 78% of the lecturers do not make use of ICT to examine students.



The above graph summarizes the response from lecturers' population on the examination question format. There were 2, 3, 31 and 1 response from respondent for subjective questions, objective questions, nil (neither objective nor subjective questions) and both respectively.

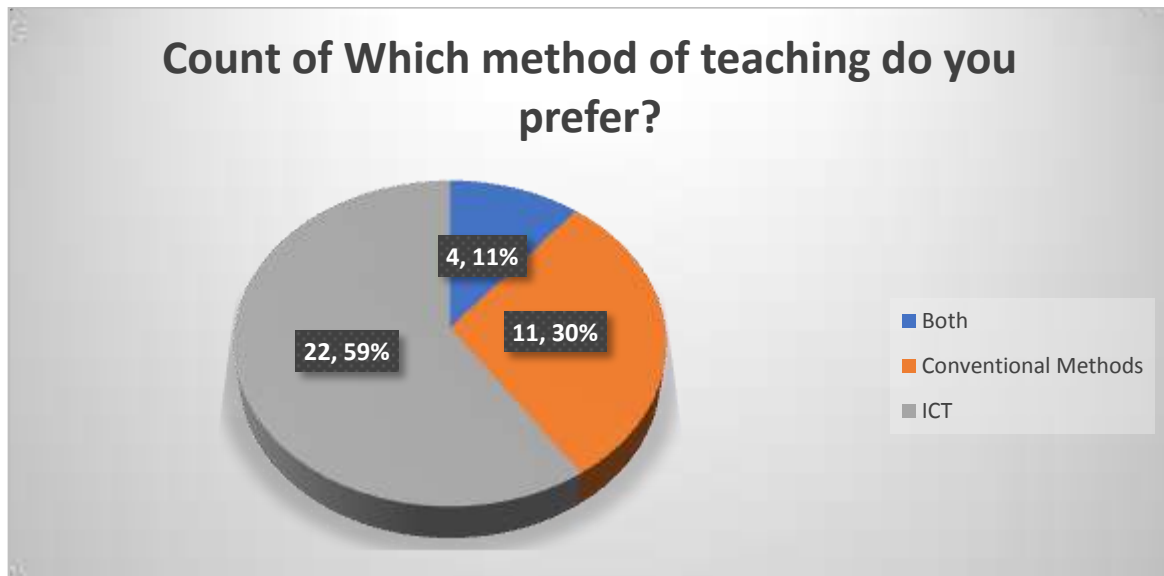
The pie chart that follow shows a good proportion of the lecturers have a perfect understanding of the importance and uses of ICT for conventional teaching.



It is obvious that a good proportion of the lecturers' population are of the opinion that ICT is effective since 40%, 2.5%, 3.8%, 1.2%, 1.3% are of the opinion that ICT is very effective, more effective, effective, highly effective, more productive respectively while 30% of the

respondent had no response to the effectiveness of ICT.

In the chart that follows, the study examined the preferred method of teaching.



59% of the lecturers' population prefer ICT, 30% prefer conventional while 11% prefer both.

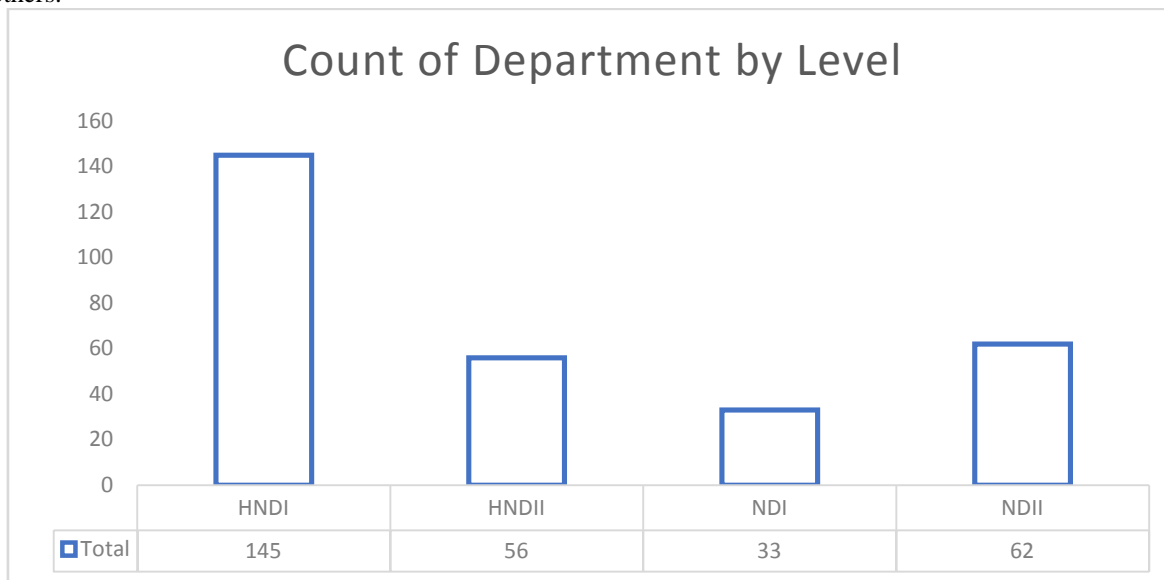
A good number of the 59% population have the following to why ICT is more preferred:

Ease of accessibility of resources; it exposes you to modern trends; it makes teaching very effective and timely; it's a better means of passing information; its fast, easy and all resources will be available to all; it saves time and promotes understanding; it is more effective, efficient and

convenient; it provides the opportunity to reach out to a large audience; it comprises of all the technological tools we use to communicate; encourage students to learn and use ICT; and it exposes you to modern trends among several others.

4.2 Students Responses

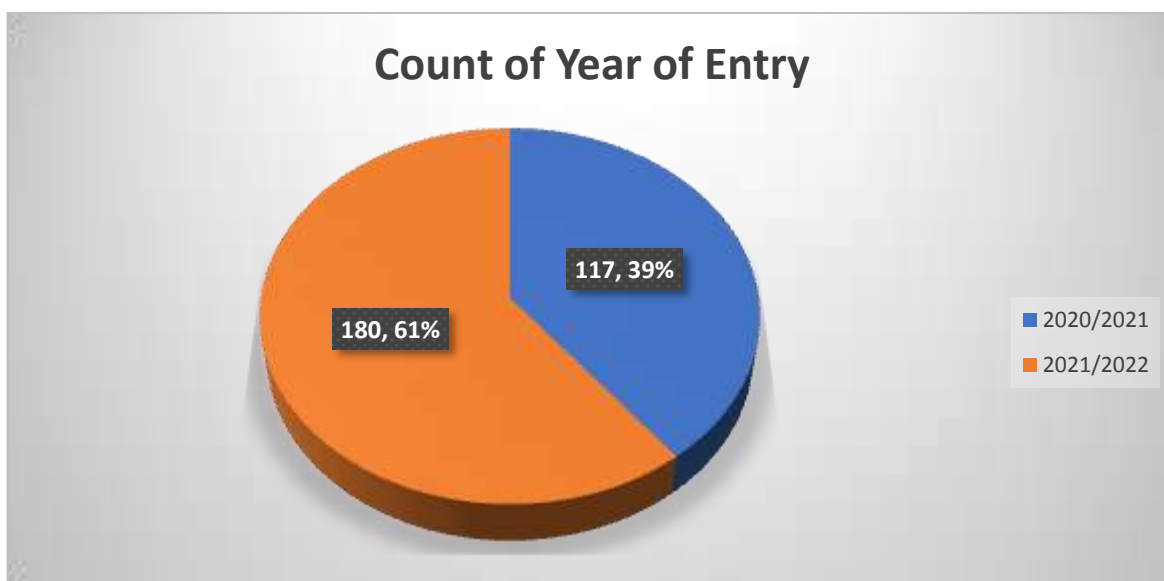
A summary of students from various departments and levels is shown below



The above graph summarizes the response from students' population by level in each Department. There were 145, 56, 33 and 62 responses from respondent from the Higher National Diploma I (HNDI), Higher National

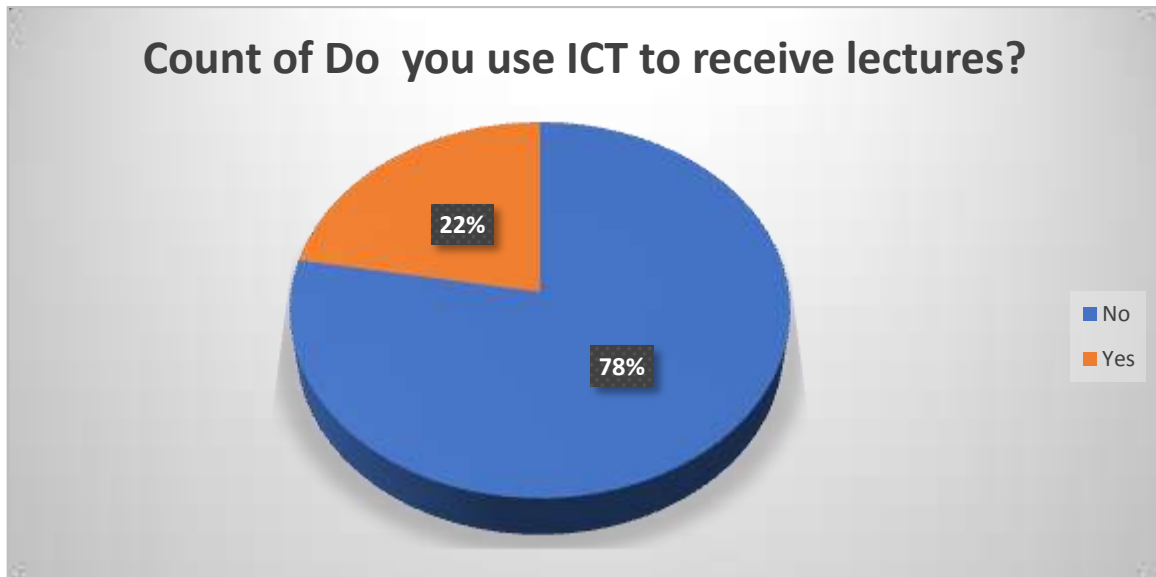
Diploma II (HNDII), National Diploma I (NDI) and National Diploma II NDII) respectively.

Evidence of the year of entry of examined students is reflected in the table that figure that follow



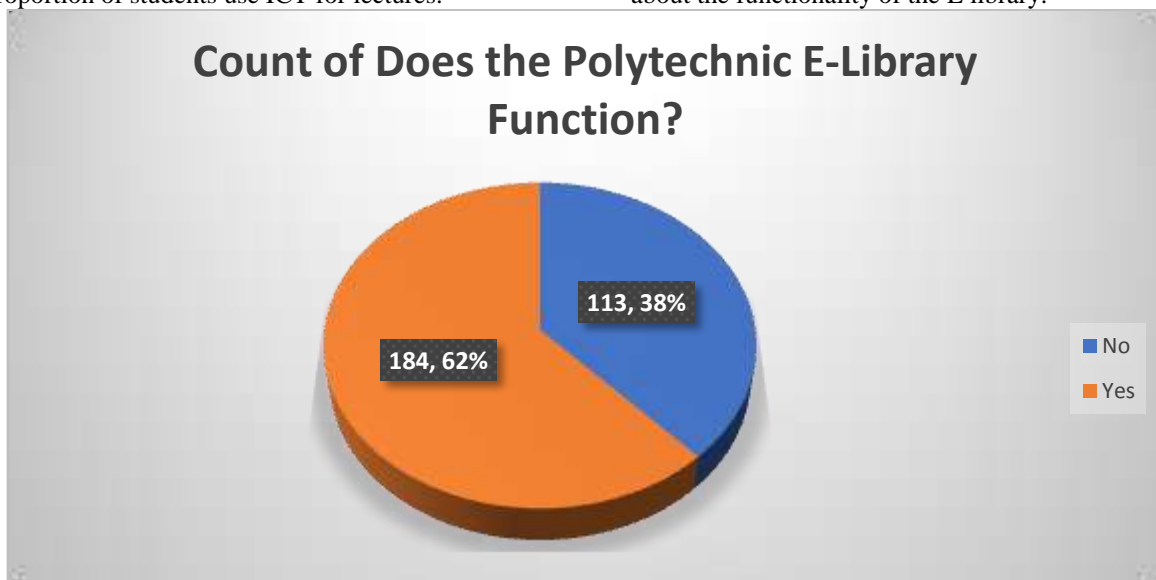
The population engaged in this research got admitted into the Polytechnic in 2020/2021 and 2021/2022 academic session with 39% and 61% respectively.

The pie chart that follow shows the count of students that use ICT to receive lectures



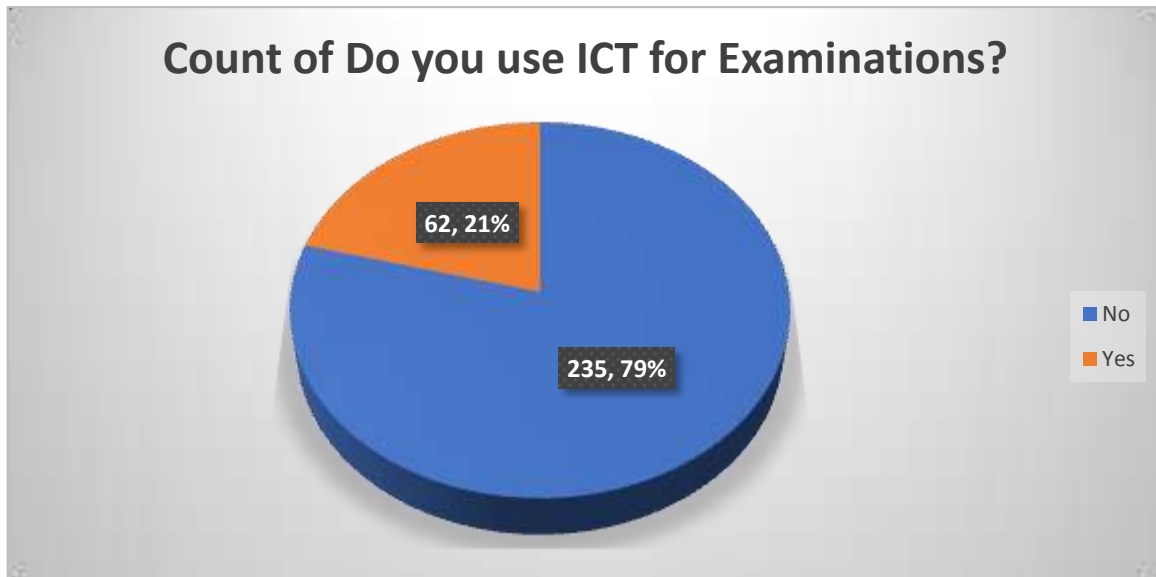
It is 78% data evident that students' population do not use ICT to receive lectures. Only a small proportion of students use ICT for lectures.

The chart that follows show what the students think about the functionality of the E library.



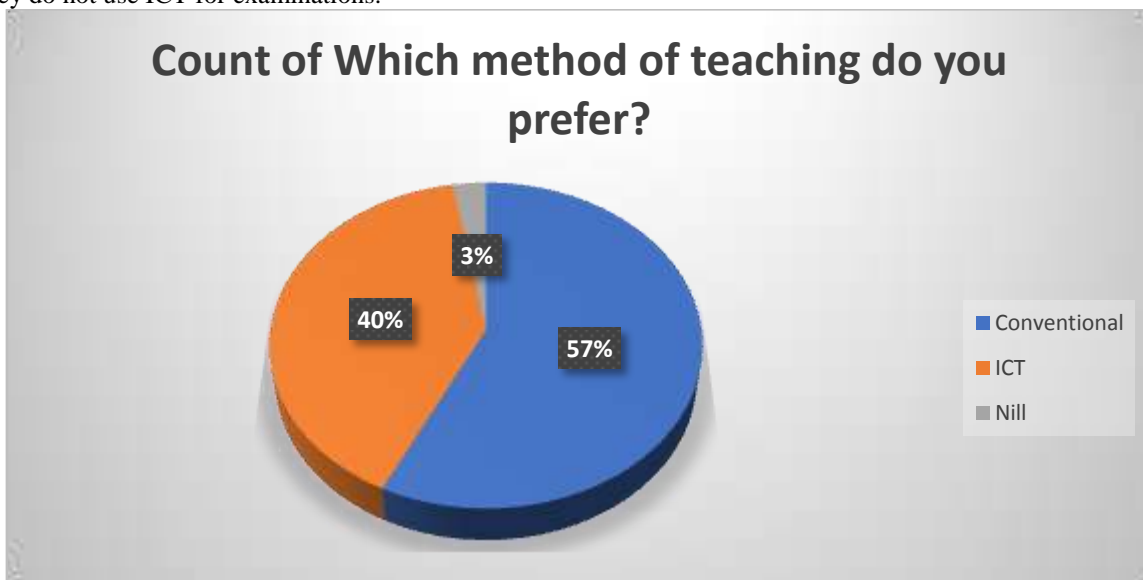
It is obvious that the E-Library functions with 62% data evidence.

The use of ICT for examinations by the students was asked and the responses are as indicated below



It is sufficient to say that students do not use ICT to write examinations with 79% of the responses from the students' population stating they do not use ICT for examinations.

The preferred method of teaching by the students was investigated and the results are as below



57% of the response from the student population prefer the conventional method of teaching, 40% prefer ICT while 3% prefer both.

The 57% student population whose preferred method of teaching is conventional method says:

They are able to answer exam questions based on class explanation; the method gives room for interaction; it gives room for practicals; better understanding and fast assimilation; It enable student to have physical interaction with lecturer; personal communication between lecturers and students; there is room to mingle with more

brilliant colleagues; feedback is more reliable; detailed explanation and opportunities to ask questions; and gain more experience than ICT among several others

V. DISCUSSION, CONCLUSION AND RECOMMENDATION

The survey results shows that the use of ICT for educational purposes needs to be improved upon in the Nigerian Polytechnics if the survey results from the Federal polytechnic Offa, Nigeria is anything to go by.

The lack of ICT equipment in some tertiary institutions in Nigeria is indeed a major challenge to education advancement. Despite the efforts made by the government and other stakeholders to provide ICT equipment in these institutions, the statistical results of our study indicate that both students and teachers do not adequately use ICT for teaching. This implies that there is a need for urgent intervention to address this issue and improve access to ICT facilities in these institutions.

It is evident from the literature review that many countries across the globe have faced similar challenges, and have taken steps to address them. For instance, Malaysia and Jordan have implemented policies and initiatives to enhance the integration of ICT in higher education. However, in Nigeria, much needs to be done to improve the situation. We recommend that the government and other stakeholders invest more resources towards ICT infrastructure in tertiary institutions, as well as training and support for teachers and students on how to effectively use these technologies.

Overall, addressing the lack of ICT equipment in some tertiary institutions in Nigeria is critical for the advancement of education, and to ensure that students have access to the necessary skills and knowledge to succeed in a digital world.

Based on the findings of this study on the lack of ICT equipment in some tertiary institutions in Nigeria and its impact on education advancement, the following recommendations are suggested:

Provision of Adequate ICT Equipment: There is a need for the government, academic institutions, and private sector organizations to provide adequate ICT equipment, such as computers, projectors, internet facilities, and other relevant software, to higher education institutions in Nigeria. This will enhance the use of ICT in teaching and learning, and improve the quality of education.

Teacher Training: There is a need to provide teachers with adequate training on the use of ICT in teaching. This will help teachers to incorporate ICT tools and techniques into their teaching methods, and help students to learn better.

Curriculum Development: The higher education curriculum in Nigeria needs to be revised and updated to incorporate the use of ICT in teaching and learning. This will help to ensure that students are adequately prepared for the digital future.

Public-Private Partnership: The government needs to encourage public-private partnerships to support the provision of ICT

equipment and infrastructure in higher education institutions in Nigeria. This will help to bridge the digital divide and ensure that Nigerian students have access to the same level of education as their counterparts in developed countries.

In conclusion, it is recommended that the above measures be taken to address the lack of ICT equipment in some tertiary institutions in Nigeria, and to ensure that ICT is used to enhance teaching and learning, and promote education advancement in the country.

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