# Information and Communication Technology (ICT) Adoption and the Educational Growth of Colleges of Education in Agbor and Warri, Delta State, Nigeria

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*Abstract*
*This study was designed to investigate ICT adoption on the educational growth of colleges of education in Agbor and Warri, Delta State. As part of the study, research questions were formulated so as to achieve the aim and specific objectives of the study; also various literatures of scholars and authors in the field were reviewed. In order to achieve the purpose and objectives of this study, questionnaire was designed to elicit information from the respondents. The sample size for the study was one hundred and twenty-six (126) non-academic staff which is 50% of the total population. After the total collection of data, critical analysis of the study was carried out and the major findings revealed the following: that majority of the ICT facilities available in Colleges of Education, Agbor and Warri, Delta State include the internet, television, photocopying machines, computers, flash drives, printers, DVD and Video Players, intercom, scanners and CD-ROMs; that the benefits of the utilization of ICT facilities in colleges of education can be seen in the ability to type, process and store work for later use, digitization of school processes amongst other and that there are many constraints to the effective adoption and utilization of ICT facilities in colleges of education in Agbor and Warri which include poor funding, lack of investments in ICTs, low ICT literacy by staff amongst others. Finally, the study was concluded that every higher institution of learning especially colleges of education should utilize every source possible to combat the constraints facing the effective adoption and utilization of ICT into their teaching, learning, research and administrative activities to ensure that higher educational processes are optimized. Thus, it was recommended among other things that the role of ICT in tertiary institutions should continually be awarded its prominent role.*

*Keywords: ICT, Adoption, Education, Growth*

## INTRODUCTION

Information and communication technology (ICT) is an indispensable part of the contemporary world (Yusuf, Afolabi & Loto, 2013). In fact, culture and society have to be adjusted to meet the challenges of the information age. ICT is a force that has changed many aspects of people's ways of life. Considering such fields as medicine, tourism, travel, business, law, banking, engineering and architecture, the impact of ICT in the past two or three decades has been enormous. The way the fields operate today is vastly different from the way they operated in the past.

The Information and Communication Technology (ICT) is an umbrella term that includes any communication device or application, encompassing: radio, television, cellular phones, computer, and network hardware and software, satellite systems and so on, as well as the- various services and applications associated with them, such as videoconferencing and distance learning (Mondal & Mete, 2012). When such technologies are used for educational

purposes, namely to support and improve the learning of students and to develop learning environments, ICT can be considered as a subfield of Educational Technology.

The introduction of Information and Communication Technologies (ICTs) into higher institutions of learning clearly changed the way education is conducted. It paved the way for a new pedagogical approach, where students are expected to play more active role than before (i.e. getting more involved in the learning process, being active participants of knowledge creation and not mere recipients of knowledge) and academic and non-academic staff are expected to embrace its adoption in their activities (Hamilton-Ekeke & Mbachu, 2015). Thus, ICTs in higher education are being used for developing course material; delivering content and sharing content; communication between learners, teachers and the outside world; creation and delivery of presentation and lectures; academic research; administrative support, student enrolment etc.

In the current information society, people have to access knowledge via ICT to keep pace with the latest developments. In such a scenario, education, which always plays a critical role in any economic and social growth of a country, becomes even more important. Education not only increases the productive skills of the individual but also his/her earning power. It gives them a sense of wellbeing as well as capacity to absorb new ideas, increases their social interaction, gives access to improved health and provides several more intangible benefits. The various kinds of ICT products available and having relevance to education, such as teleconferencing, email, audio conferencing, television lessons, radio broadcasts, interactive radio counseling, interactive voice response system, audiocassettes and CD ROMs have been used in education for different purposes (Bhattacharya & Sharma, 2007).

The pervasive influence of ICT has brought about a rapid technological, social, political and economic transformation, which has paved way to network society, organised around ICT. The field of education has not been unaffected by the penetrating influence of information and communication technology. However, ICT has immensely contributed to the quality and quantity of teaching, learning and research in higher educational institutions of which the colleges of education are not left out.

Furthermore, Information and Communication Technology has the potential to accelerate, enrich and deepen skills, motivate and engage students learning, helps to relate school experience to work practice, helps to create economic viability for tomorrow's workers; contributes to the total development of the institution; strengthens teaching and learning and provides opportunities for connection between the school and the world (Davis, 1989).

The value of ICT is endless (Gama, 2008). ICTs not only give the opportunity to have easy access to information from various sources, but also facilitate resource sharing between and among various organizations apart from improving the status of the institution. Gama further stated that, the significance of ICTs in Nigerian colleges of education cannot be over-emphasized. However, the application of the ICTs in Nigeria tertiary institutions can be said to be low when compared with what is happening in developed countries of the world (Gama, 2008).

However, there have been some studies on the factors influencing the adoption and integration of ICTs for educational and administrative purposes in higher institutions especially colleges of Education among others (Oladokun, 2012). These factors according to Dorayi (2012) include insufficient monetary allocation, lack of ICT policies, unaffordable technology, lack of human resources capacity, technophobia, procurement of expensive hardware and software as well as systems maintenance and replacement.

## Statement of the Problem

The influence of ICT on education and educational as well as administrative activities worldwide is very glaring, especially in the reliance of ICT facilities to institute the expected change in teaching, learning, research and administrative duties. The development has placed a pressure on management and educators to transform schools through technology and ICTs. The availability of ICT facilities and its utilization is a key factor for the adoption of ICT for educational as well as administrative activities. This, on the other hand is a major challenge across higher institutions of learning especially the Colleges of Education (Hamilton-Ekeke, 2011). But if academic institutions fully adopt the use of ICTs in higher institutions of learning, then goals would be achieved within a short period of time. However, there seem to be a research gap on the influence of ICT adoption in Colleges of Education in Nigeria. It is the recognition of this problem that motivated the researcher to embark on this study with particular reference to the influence of ICT adoption on the educational growth of Colleges of Education in Delta State.

## Purpose of the Study

The main purpose of this study is to evaluate the influence of ICT adoption on the educational growth of colleges of education in Delta State. The specific objectives of the study are to:

(i)     Identify the ICT facilities available in colleges of education in Delta State;
(ii)    Reveal the existing use and benefits of ICT facilities in colleges of education in Delta State and
(iii)   Investigate the constraints to the effective adoption and utilization of ICT facilities in Colleges of Education in Delta State.

## Research Questions

The following questions are raised to guide this study:

(1)    What are the ICT facilities available in colleges of education in Delta State?
(2)    What are the existing use and benefits of ICT facilities in colleges of education in Delta State?
(3)    What are the constraints to the effective adoption and utilization of ICT facilities in Colleges of Education in Delta State?

## LITERATURE REVIEW

### ICT Facilities available in Colleges of Education

According to Garai (2006), ICTs cover internet service provision, telecommunications equipment and services, information technology equipment and services, media and broadcasting, libraries and documentation centres, commercial information providers, network-based information services, and other related information and communication activities. For Chowdhury (2000) and Imhonopi & Urim (2012), ICTs also encompass technologies that can process different kinds of information (voice, video, audio, text and data) and facilitate different forms of communications among human agents, among humans and information systems, and among information systems.

According to Fagbanmi and Ogunjobi (2009), ICT is an umbrella term that includes all technologies encompassing medium for recording information such as Magnetic disk, tape, optical disks (CD/DVD) flash and paper record, technology for the broadcasting, information, radio, television and technology for communicating through voice and sound or image microphone camera, loudspeaker, telephone to cellular phones. It also includes a wide variety of computing hardware, desktop computers, laptops, storage devices etc.

Broadening this conversation, Imhonopi & Urim (2012) argued that ICTs are modern technologies that facilitate information gathering, processing, transmission and storage and comprise hardware and software components that can be put to heterogeneous use through digitalisation connecting individuals and institutions over wide swathes of a geopolitical area. They further asserted that the emergence of ICTs has provided the means for faster and better communication and utilization of information between and for users, be they individuals, groups, businesses, organisations or governments.

From the definitions array, one could say with the adoption, availability and utilization of the ICTs in tertiary institutions especially the colleges of education, there will be some consciousness of the significant role that ICT can play in teaching, learning, research as well as administrative activities, even though ICT is not fully embraced by most of the higher institutions of learning in our nation Nigeria. Akintunde (2008) added that ICT facilities in colleges of education could give students, lecturers and researchers in developing countries the opportunity to bridge the knowledge gap between them and their counterpart in developed countries.

In the same vein, Anunobi (2005) mentioned that the ICTs available in tertiary institutions include personal computers, telefascimile (fax), network, electro-copying (scanning) and internet. In collaborating with the above, Daniel and Mathew (2010) described the new development as tools for information delivery in the new millennium. They enumerated some tools as follows: internet, worldwide, web (www), electronic mail (E-mail), bibliographic control tools, online searching, creativity and innovations, and the new information professionals.

However, Gama (2008) listed ICT facilities that are expected to be readily available in colleges of education for a successful teaching, learning, research and administrative activities. They include computers, internet, television, radio, cassette player and a radio set, fixed telephone set and mobile phone, video machine and a video tape, real of real projector, slide projector, photocopying machine, duplicating machine, scanner, opaque projector, E-mail, etc. Okore (2005) believed that ICT have been used to simplify availability and access to information.

However, the various ICT facilities available in colleges of education according to Ofodu (2007) include: computers, overhead projectors, internet, fax machines, CD-ROMS, electronic notice boards, slides, digital multimedia, video/VCD machine, DVD players and so on.

(a)    *Computer:* A **computer** is an electronic device that manipulates information or data. It has the ability to **store**, **retrieve** and **process** data. One can use a computer to type documents, send email, and browse the internet. It can also be used to prepare assignments, handle spreadsheets, accounting, database management, presentations, games and more.

(b)    *Overhead Projectors:* An overhead projector is a variant of slide projector that is used to display images to an audience. The overhead projector facilitates an easy low-cost interactive environment for educators. Teaching materials can be pre-printed on plastic sheets, upon which the educator can directly write using a non-permanent, washable color marking pen. This saves time, since the transparency can be pre-printed and used repetitively, rather than having materials written manually before each class. The overhead is typically placed at a comfortable writing height for the educator and allows the educator to face the class, facilitating better communication between the students and lecturers. The enlarging features of the projector allow the educator to write in a comfortable small script in a natural writing position rather than writing in an overly large script on a marker board and having to constantly hold his arm out in midair to write on the marker board (Wikipedia, 2012).

(c)     ***Communication Networks:*** Students and lecturers can communicate with their peers and access data banks in different parts of the country and around the world, in order to develop joint projects, exchange information, or request advice. Instead of the expository presentation of a topic, the lecturer may ask a student, or a team of students, to research the topic by exploring the internet for relevant information. Though, not all the information on the internet is reliable, but such is the information we gather in the real world, so that students will have to develop their analytical and critical skills. These skills are not usually developed in the restricted environment of the typical lecture hall, where most information has been filtered for them. Teams of students in one country can develop joint projects with teams of students in other countries by exchanging and comparing data on similar or contrasting phenomena.

(d)     ***Compact Disc - Read Only Memory (CD-ROMs):*** CD-ROMs are popularly used to distribute computer software, including video games and multimedia applications, though any data can be stored (up to the capacity limit of a disc). Some CDs hold both computer data and audio with the latter capable of being played on a CD player, while data (such as software or digital video) is only usable on a computer (Wikipedia, 2012).

(e)     ***Scanners:*** A scanner is an electronic device that captures images from photographic prints, posters, magazine pages, and similar sources for computer editing and display. Scanners come in hand-held, feed-in, and flatbed types and for scanning black-and-white only, or color. Very high resolution scanners are used for scanning for high-resolution printing, but lower resolution scanners are adequate for capturing images for computer display. Scanners usually come with software, such as Adobe's Photoshop product, that lets you resize and modify a captured image. Scanners usually attach to your personal computer with a Small Computer System Interface (SCSI). An application such as PhotoShop uses the TWAIN program to read in the image (Rouse, 2010).

(f)     ***Digital Cameras:*** A digital camera (or digicam) is a camera that takes video or still photographs by recording images on an electronic image sensor. Most cameras today are digital and digital cameras are incorporated into many devices ranging from PDAs and mobile phones (called camera phones) to vehicles.

(g)     ***Photocopiers:*** A photocopier (also known as a copier or copy machine) is a machine that makes paper copies of documents and other visual images quickly and cheaply. Most current photocopiers use a technology called *xerography*, a dry process using heat. (Copiers can also use other technologies such as ink jet, but xerography is standard for office copying.

**Existing Use and Benefits of ICT Facilities in Colleges of Education**
        Today, ICTs - including laptops wirelessly connected to the internet, personal digital assistants, low cost video cameras, and cell phones have become affordable, accessible and integrated in large sections of the society throughout the world. It can restructure organizations, promote collaboration, increase democratic participation of citizens, improve the transparency and responsiveness of governmental agencies, make education and health care more widely available, foster cultural creativity, and enhance the development in social integration (Mondal & Mete, 2012). It is only through education and the integration of ICT in education that one teaches students to be participants in the growth process in this era of rapid change.

        ICT also allows for the creation of digital resources like digital libraries where students, lecturers and professionals can access research material and course material from any place at any time (Bhattacharya & Sharma, 2007). Such facilities allow the networking of

academics and researchers and hence sharing of scholarly material. This avoids duplication of work.

However, the use of ICTs within academia especially in colleges of education has become a modus vivendi for modern academics and students so much so that there is an inextricable intertwinement between ICTs and academic processes within higher educational institutions in Nigeria. According to Edewor, Imhonopi and Urim (2014), a closer look at the existing use and benefits of ICT tools in higher education in Nigeria reveals the following:

(1)     *Computers (Laptops & Desktops)*: Higher education in Nigeria across a wide continuum has been enabled by the use of computers, including laptops and desktops. Academics and students now use these ICT tools as a medium to type, process and store their work for later use. Before the advent of mobiles such as iPhones, iPods, iPads and Tablets, 20th century academia depended hugely on laptops and desktops for data generation, conversion and storage. Teaching and research are, therefore, enhanced by these tools.

(2)     *PowerPoint*: Gradually, classroom teaching is made possible through PowerPoint presentations which bring more life, interactivity and connectivity to pedagogy. Teaching is no more a stale, blackboard, chalk and talk phenomenon but is now typified by visual as well as audio learning processes which enhance learning results.

(3)     *Email*: Many academics and students now rely on emails to sustain interaction and improve communication between and among them. Through emails, these days, assignments are given to students and also submitted to tutors, research such as e-interview can be conducted, academic questions can be asked and tutors can reach out to their students, among others. Emails have become so useful to higher education that it is almost anathema not to have one as an academic or a student.

(4)     *Online Peer Review*: Recently, peer review, which is an important process or activity that enhances the quality of research and academic works has been digitalised. For instance, junior researchers can send draft copies of their works electronically to the email addresses of (their) senior colleagues/experienced researchers for review while the latter will download these works on their laptops or mobiles, read and review the work to be sent back the same way, electronically. This process saves both parties the use of papers, is cost-effective, timely and fast. This process is enabled by the internet, which provides global connectivity for such interactions to take place.

(5)     *Collaborative Research*: The distance-less and borderless nature of the internet has also helped in empowering collaborative research between and among researchers/academics living and working in far-flung continents. Nowadays, collaborative research works between African scholars and scholars living outside the continent are made possible. In the same vein, even within the African continent, scholars carry out transnational collaborations involving nationals of different countries within the continent. This brings robustness, freshness, diversity of thoughts, opinions and perspectives to bear on the outcome of such works. By such collaborations also, the international intelligentsia will pay more attention to research works coming from the continent and make use of these materials to further extend the frontiers of the global pool of knowledge.

(6)     *Digitalisation of School Processes*: As part of the push for a green economy, higher educational institutions in Nigeria willy-nilly are forced to imbibe digitalisation as a global best practice. Nowadays, application and admissions into higher institutions in the country are conducted via online processes and these include payments, registration, admission, confirmation of acceptance and publishing of information for stakeholders. Similarly, e-communication channels are gradually replacing face-to-face communication processes and these make for speed, ease and time-saving

advantages. Digital papers are also replacing physical papers which take up space and create environmental eyesore when they are being disposed. Also, physical libraries are gradually given way to the emergence of e-libraries. Thus, higher education in Nigeria is not left behind in this regard.

(7) **Websites**: Most, if not all, higher educational institutions in Nigeria have a website or multiple websites that contain their corporate information and other details. Through this forum, higher institutions are able to connect with their students and staff, and meet the needs of other stakeholders. Also, websites have become marketing tools for higher institutions including remaining communication channels to explain the programmes and activities of the respective institutions. Higher education in the country now flourishes through websites of post-secondary institutions who continuously invest in their websites to achieve their multiple benefits or objectives.

(8) **E-conferencing**: Higher education in the country is gradually focusing on harvesting the benefits of e-conferencing. Through this process, distance learning opportunities can be created or sustained and research teams across wide distances can meet to collaborate or share findings that could enhance the quality of research outcomes. Another popular aspect of this use is e-interview. For instance, a few universities, like Covenant University, have begun to use online interview to engage the services of academics of Nigerian and foreign origins that live outside the shores of the country. Akin to this is e-recruitment and e-HR management.

(9) **E-learning tools (including web 2.0)**: According to Imhonopi & Urim (2011), there are several e-learning tools that are gradually becoming the norm in and for higher education in Nigeria. These include online resources, tools, software and platforms that enable language teaching and learning within and outside the classroom. They include the internet, blogs, e-groups, SMSs, socialising portals, e-dictionaries, e-encyclopedia, PowerPoint presentations with audio and video clips, webcasting, and audio-video materials. Others are teleconferencing (text-based, video and audio conferencing), interactive television, digital satellite television, audio graphics, internet chats, bulletin boards, wikis, podcasting, electronic portfolios, conference alerts and WebQuests among others.

(10) **Mobiles**: Although not yet fully deployed, to a large extent, higher education in Nigeria currently uses mobile technologies such as mobile phones, Tablets, iPads, iPods and others to prosecute learning, teaching and research efforts. These instruments help for the easy generation, processing, storage and transmission of data. They also provide multimedia advantages which offer multiple learning advantages and real time communication between and among academics and their students.

(11) **Online publishing**: Before the emergence of ICTs, publishing of research and academic works was done physically and only hard copies in their various formats were available. A major disadvantage this form of publishing had was that journal materials were not easy to access as only those who had access to the print copies could read them. This situation limited knowledge expansion because only few people could access the research works that could have enhanced their epistemic bases. However, nowadays, ICTs have introduced online publishing with the advantage of open access publications which make it easy for scholars to access these pieces of information and profit thereby. Online publishing, therefore, expands global epistemic bases.

Furthermore, the need for effective use of ICT facilities most especially among Nigerian tertiary institutions is highly fundamental. However, it could be a fundamental one only when authorities of these institutions realized that all the ICT facilities found in their institutions are categorized into computers, storage media and telecommunication (Mondal &

Mete, 2012). When they realized that the computer in their offices performed processing operations on data, they process store and retrieve information as well assorted data, and that storage media such as magnetic disks and tapes, CD-ROM and diskettes are also used to provide additional storage media for information.

**Constraints to the Effective Adoption and Utilization of ICT Facilities in Colleges of Education**

Although, significant progress has been observed in ICT adoption and utilization in some higher institutions of learning especially in colleges of education within the last couple of years, major constraints still hinder the effective adoption and utilization of these facilities in colleges of education even in Delta State. There have been some studies on the factors militating the adoption and integration of ICTs in tertiary institutions (Oladokun, 2012). One of such studies include the study of Edewor, Imhonopi and Urim (2014) who highlighted the following as the constraints to the effective adoption and utilization of ICT in higher institutions of learning:

(1) *Poor funding* has remained a tall challenge for robust and effective higher education in Nigeria. Granted that funding higher education in any economy, whether developed or developing, is expensive, in Nigeria, higher education has received several knocks from the establishment as the government has failed in its commitment to invest heavily in the subsector. While government claims it suffers from paucity of funds, it is amazing when one considers the expensiveness of governance in Nigeria which if tamed could free funds for investment in education.

According to Imhonopi & Urim (2012), Nigeria has remained shamelessly scandalous in the area of the expensive cost of managing the democratic structures of the state and the people that run them. This is because of the entrenched corruption at the centre down to the constituent states and local authorities, the multiplication of government ministries, departments and agencies (MDAs), the bloated civil and public services, the self-approved jumbo pays and perks for members of the executive and legislative branches, and the boiling internal agitation arising from ethnic mistrust and suspicion within a tensed climate of religious and ethnic cleavages, spiced by unpopular rule, poor standard of living and grinding poverty. A restructuring of the entire governance structure in Nigeria, with focus on reducing cost of governance, will be a step in the right direction.

(2) *Spotty power supply* is also another challenge that throttles efforts to mainstream ICTs for higher education development in Nigeria. Nigeria currently produces less than 4,000 megawatts of electricity which is incredibly insufficient to meet the needs of Nigeria across all sectors, including the education sector. Since ICTs are powered directly and/or indirectly by one form of energy or the other, correcting the flaws/challenges inherent in the power sector and regenerating the sector to meet the needs of a modern state will provide the needed boost for ICT integration in higher education in Nigeria.

(3) *Lack of infrastructure* is another challenge to higher education in Nigeria. There are mountains of evidence showing that existing higher institutions in the country lack the requisite physical classes, teaching and learning tools, and modern ICTs that could help them conduct teaching, learning and research processes in a clement ecology. This is why, for instance, the Academic Staff Union of Universities always goes on strike to draw government's attention to the sorry plight of Nigerian universities. Until the infrastructure deficits in place are arrested, higher education in the country may continue to slide into decay.

(4)    A notable problem facing higher education in the country is the question of ***brain drain***. There is a massive exodus of Nigerian scholars, academics and professionals to Western countries to look for greener pastures as this corps of domestic intelligentsia has found it difficult to put up with the putrescence that characterizes higher education management in Nigeria. According to Imhonopi & Urim (2012), the etiologies of brain drain in Nigeria are traceable to such inextricable conundrums as the breakdown of social infrastructure, low-income nature of academic work, corrupt and irresponsible political leadership, lack of commitment to and investment in the educational sector and the lack of development of other sectors and the general climate of ennui which typify academic modus vivendi. Imhonopi & Urim (2012) submit that through brain drain, Nigeria, nay Africa, is losing its finest people to developed countries.

(5)    ***Official corruption*** and other vices within the governance plane have also created a serious conflation of forces to undermine higher education in Nigeria. The implication of the several financial crimes committed by elected and appointed government officials leaves the government prostrate to meet its obligations towards higher education development in the country.

(6)    ***Lack of political will and prioritisation of investments by government*** are other problems that frustrate ICT and higher education development in Nigeria. The government, represented by some of its eggheads, seems to be caught in endless and meaningless vacillations because it does not have the political will to bring about the needed turnaround in higher education in the country nor does it prioritise its investment. For instance, the government spends so much on needless items of recurrent expenditure, some of the monies which could have been channeled into education funding.

(7)    ***Lack of investment in ICTs for higher education development*** is another drag on the development of the subsector. No nation that wants to lead others hates or despises technology. Without technology tools as provided by ICTs, higher education will be greatly stifled with the lack of optimization of many benefits.

## METHODOLOGY

The unit of analysis is the higher institution of learning, with the non-academic staff as the key informant. The population for this study comprised of all the non-academic staff of the two colleges of education investigated. There are two hundred and sixty-seven (267) members of non-academic staff of different cadres. College of Education, Agbor has one hundred and nineteen (119) non-academic staff while College of Education; Warri has one hundred and one hundred and forty-eight (148) non-academic staff. However, the sample size of the study is 134. Owing to the fact that the population runs in hundreds, and a medium one, 50% was chosen as sample. This constitutes 67 non-academic staff from college of education, Warri and 67 non-academic staff from college of education, Agbor; hence, the stratified sampling technique was used in arriving at the sample as only the non-academic staff in the administrative office, Admission office and Students Affairs Division were used as sample.

In this research, a descriptive survey research design was adopted. Both primary and secondary data were used as a source of data for the research. The research instrument used for this study is the questionnaire. The questionnaire was titled "*Influence of ICT Adoption on the Educational Growth of Colleges of Education Questionnaire*" (IICTAEGCOEQ). The research instrument was validated by research experts in the Department of Library and Information Science, Delta State University, Abraka. The questionnaire was designed to encourage good response from the busy respondents. Multi-item scales were adopted from

previous studies for the measurement of the constructs. It consisted of four (4) sections, scored on a 3-point Likert scale with an agree/disagree continuum (1 = Agree 2 = Undecided, 3 = Disagree). The instrument was checked in terms of clarity of the instruction to the respondents, proper wording of items, appropriateness and adequacy of the items for the study.

Furthermore, the questionnaires were administered by the researcher with the assistance of trained research assistants. The research assistants were trained on the contents of the questionnaires and they were advised to follow up the distributed questionnaires for maximum returns. The questionnaires were administered within three days. The first and second days were used for the distribution of the questionnaires and the third day was used for the collection of the filled questionnaires from the respondents. Furthermore, in some cases, interviews were applied to complete questionnaires.

## DATA ANALYSIS

In the analysis of data, the simple percentage formula was used and interpretation of findings was made.

### Research Question One:

What are the ICT facilities available in colleges of education in Delta State?

**Table 1: ICT facilities available**

| S/N | Items | Agree | % | Disagree | % | Undecided | % |
|-----|-------|-------|-----|----------|------|-----------|------|
| 1 | Computers | 118 | 93.7% | 3 | 2.4% | 5 | 3.9% |
| 2 | Internet | 126 | 100% | 0 | 0% | 0 | 0% |
| 3 | Printers | 110 | 87.3% | 9 | 7.1% | 7 | 5.6% |
| 4 | Scanners | 102 | 81% | 19 | 15.1% | 5 | 3.9% |
| 5 | Photocopying machines | 121 | 96% | 0 | 0% | 5 | 3.9% |
| 6 | Projectors | 99 | 78.6% | 10 | 8% | 17 | 13.5% |
| 7 | Intercom | 107 | 84.9% | 6 | 4.8% | 13 | 10.3% |
| 8 | Flash drives | 116 | 92.1% | 2 | 1.6% | 8 | 6.3% |
| 9 | Television | 126 | 100% | 0 | 0% | 0 | 0% |
| 10 | DVD & Video Players | 110 | 87.3% | 0 | 0% | 16 | 12.7% |
| 11 | CD-ROMs | 102 | 81% | 21 | 16.7% | 3 | 2.4% |

*Source: Field survey, 2017*

From table 1, the ICT facilities that has the highest records of availability are internet, television, photocopying machines, computers, flash drives, printers, DVD and Video Players, intercom, scanners and CD-ROMs with 126 (100%), 126 (100%), 121 (96%), 118 (93.7%), 116 (92.1%), 110 (87.3%), 110 (87.3%), 107 (84.9%), 102 (81%) and 102 (81%) respectively. The analysis clearly shows that most of the ICT facilities are available in the colleges of education under study which is in line with Anunobi (2005) who mentioned that the ICTs available in tertiary institutions include personal computers, telefascimile (fax), network, electro-copying (scanning) and internet. It is also supports the view of Daniel and Mathew (2010) who enumerated some ICT tools found in colleges of education to include the internet amongst others.

### Research Question Two

What are the benefits of ICT facilities in colleges of education in Delta State?

**Table 2: Benefits of ICT facilities**

| S/N | Items | Agree | % | Disagree | % | Undecided | % |
|---|---|---|---|---|---|---|---|
| 1 | Ability to type, process and store work for later use | 125 | 99.2% | 0 | 0% | 1 | 0.8% |
| 2 | Better interactivity and connectivity | 119 | 94.4% | 0 | 0% | 7 | 5.6% |
| 3 | Timely and Quicker information processing | 121 | 96% | 0 | 0% | 5 | 6% |
| 4 | Digitization of school processes | 125 | 99.2% | 0 | 0% | 1 | 0.8% |
| 5 | Collaborative research | 111 | 88.1% | 3 | 2.4% | 12 | 9.6% |
| 6 | Facilitates easy information retrieval | 119 | 94.4% | 0 | 0% | 7 | 5.6% |
| 7 | Enhanced information dissemination processes | 110 | 87.3% | 0 | 0% | 16 | 12.7% |
| 8 | Improved communication | 116 | 92.1% | 2 | 1.6% | 8 | 6.3% |
| 9 | Automated records management | 22 | 17.5% | 97 | 77% | 7 | 5.6% |
| 10 | Easy accessibility | 119 | 94.4% | 0 | 0% | 7 | 5.6% |

*Source: Field survey, 2017*

Table 2 discloses the benefits of the utilization of ICT facilities in colleges of education. Some of the major benefits include the ability to type, process and store work for later use and digitization of school processes as agreed by 125 (99.2%) and 125 (99.2%) of the respondents. Other benefits include timely and quicker information processing, better interactivity and connectivity, facilitates easy information retrieval, easy accessibility, enhanced information dissemination processes and collaborative research as agreed by 121 (96%), 119 (94.4%), 119 (94.4%), 119 (94.4%),  111 (88.1%) and 110 (87.3%) of the respondents respectively. However, it is obvious that automated records management was not seen as one of the benefits of ICT facilities in colleges of education as recorded by low responses from the respondents. Thus, this analysis is in line with Edewor, Imhonopi and Urim (2014) who highlighted various benefits of ICT facilities in tertiary institutions to include digitization of school processes amongst others.

**Research Question Three**

What are the constraints to the effective adoption and utilization of ICT facilities in colleges of education?

**Table 3: Constraints to adoption and utilization of ICT Facilities**

| S/N | Items | Agree | % | Disagree | % | Undecided | % |
|---|---|---|---|---|---|---|---|
| 1 | Poor funding | 126 | 100% | 0 | 0% | 0 | 0% |
| 2 | Spotty power supply | 11 | 8.7% | 108 | 85.7% | 7 | 5.6% |
| 3 | Lack of infrastructure | 117 | 92.9% | 9 | 7.1% | 0 | 0% |
| 4 | Official corruption | 104 | 82.5% | 14 | 11.1% | 8 | 6.3% |
| 5 | Lack of prioritization of | 111 | 88.1% | 3 | 2.4% | 12 | 9.6% |

| | | | | | | | |
|----|------------------------------|-----|-------|-----|-------|----|-------|
| | investments by management | | | | | | |
| 6 | Lack of investments in ICTs | 119 | 94.4% | 0 | 0% | 7 | 5.6% |
| 7 | ICT phobia | 36 | 28.6% | 85 | 67.5% | 5 | 4% |
| 8 | Poor maintenance culture | 116 | 92.1% | 2 | 1.6% | 8 | 6.3% |
| 9 | Low ICT literacy by staff | 119 | 94.4% | 0 | 0% | 7 | 5.6% |
| 10 | High cost of ICTs | 103 | 81.7% | 10 | 7.9% | 13 | 10.3% |

*Source: Field survey, 2017*

The above table 3 shows the constraints to the effective adoption and utilization of ICT facilities in colleges of education. It is evident that poor funding is the biggest constraint to the effective adoption and utilization of ICT facilities in colleges of education as stated by 126 (100%) of the respondents. Another constraint with high frequencies are lack of investments in ICTs, low ICT literacy by staff, lack of infrastructure, poor maintenance culture and lack of prioritization of investments by management as stated by 119 (94.4%), 119 (94.4%), 117 (92.9%), 116 (92.1%) and 111 (88.1%) of the staff respectively. However, spotty power supply and ICT phobia were not seen as to pose as constraint by 108 (85.7%) and 85 (67.5%) of the respondents. This implies that so many challenges are militating against the effective adoption and utilization of ICT in Colleges of Education in Agbor and Warri. This is in line with Edewor, Imhonopi and Urim (2014) who posited that the effective adoption and utilization of ICT in higher institutions of learning is thwarted by a combination of factors.

**FINDINGS**
At the end of the analysis, findings that were made are as follows:
➢ Majority of the ICT facilities available in Colleges of Education, Agbor and Warri, Delta State include the internet, television, photocopying machines, computers, flash drives, printers, DVD and Video Players, intercom, scanners and CD-ROMs.
➢ The benefits of the utilization of ICT facilities in colleges of education. Can be seen in the ability to type, process and store work for later use, digitization of school processes amongst others.
➢ There are many constraints to the effective adoption and utilization of ICT facilities in colleges of education in Agbor and Warri. They include poor funding, lack of investments in ICTs, low ICT literacy by staff amongst others.

**CONCLUSION**
Having had an insight on the influence of ICT adoption on the educational growth of colleges of education, it has shown based on research findings that the influence of ICT in any tertiary institution cannot be overemphasized. The researcher therefore concludes that every higher institution of learning especially colleges of education should utilize every source possible to combat the constraints facing the effective adoption and utilization of ICT into their teaching, learning, research and administrative activities to ensure that higher educational processes are optimized.

**RECOMMENDATIONS**
Based on the findings of this study, the following are recommended for the effective adoption and utilization of information and communication technologies in Colleges of Education, Agbor and Warri, Delta State:
➢ More ICT facilities should be provided and made available in the Colleges of Education

- The role of ICT in tertiary institutions should continually be awarded its prominent role.
- Funds should be provided on a regular basis to the management of Colleges of Education in order to invest on ICTs.
- Staff should be trained on the utilization of ICTs so as to improve their level of ICT literacy.
- Proper maintenance culture should be encouraged among staff of Colleges of Education.

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