COMPUTER ACCESSIBILITY AMONG STAFF AND STUDENTS AS A FACTOR IN REALISING AN ICT-COMPLIANT FUTO

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INTRODUCTION

Background to the study

Information and the technology for collecting, processing, storing and disseminating it are as old as man. The technologies for recording information in ancient times ranged from clay tablets through papyrus and parchment to wax and paper (Ononogbo (1990). In modern times however, Information and Communication Technology (ICT), a fusion of Information Technology (IT) and Communication Technology (CT) which began in the 1950's (Ikpaahindi 2002) has reduced the world to a global village thus repositioning the social, economic, political and academic outlook of man. This change, in recent times has been experienced at a revolutionary, rather than an incremental, rate. While the Industrial revolution was measured in centuries, this technological revolution we are living in is happening in years. In as brief a space as the last five years, the Internet has caused a major paradigm shift in the way information is accessed and delivered.

The capturing, processing and dissemination of information with dispatch, therefore, informed this fusion of IT and CT. The IT, an essentially computer technology is responsible for the capturing / acquisition and processing of information while the CT is centred on telecommunication technology geared towards the dissemination of the captured information, beating space and time. Hence, information providing system depends on this fused technology for information services.

In the words of Iljon (1998) "The convergence of computing and communication technologies impacts significantly on the way in which information resources are created, managed and used, and institutions need to plan and implement systems which take advantage of these developments".

In highly industrialized world, ICT has virtually changed the way people live and work. In teaching and learning, in research, in management, in industry and information management, in libraries and information services, in business, in national economy, in international affairs, to mention a few, nothing can be done without ICT. As the industrial era was characterised by the use of machines, so is this era branded on information. Timely information therefore, is presently the determining factor towards all round success in different facets of life.

This is why Ayo (2001:21) says that information and communication technology (ICT) is one of the most potent forces which are shaping the 21st Century. Its revolutionary impact changes and improves the society tremendously. In this present information age, it is generally agreed that

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information is the communication of knowledge. There is also a common aphorism that says 'knowledge is power'. The essence of ICT is to empower individuals and societies to achieve greater access to knowledge and ideas for the benefit of humanity.

The ICT, an information providing system, is positioned to aid the University in the actualization of objectives of teaching, learning and research through the provision of information materials. Prior to the advent of ICT, information in universities and their libraries was packaged in predominantly print form. This present development in the ICT brought a new packaging format namely: Compact Disk Read Only Memory (CD-ROM), magnetic tapes, disks and other electronic forms. Universities are presently faced with many changes and challenges. Many universities, including those in Nigeria, ought to be linked up locally and internationally using ICT facilities all geared towards providing timely and cost effective information.

Efforts to computerize many universities in Nigeria in the past were frustrated by such problems as shortage of personnel, funds and necessary equipment to handle the projects. Despite all these difficulties, university libraries have taken the lead in the past Federal Government ICT initiatives. For instance, a new wave of ICT development in Nigerian Federal University Libraries was experienced in the year 1994 with the provision of The Information Navigator Library Management software (TINLIB) and computer hardware by the Government of the Federal Republic of Nigeria via the National Universities Commission (NUC). These facilities were put into use by many university libraries like Kenneth Dike Library, U.I and the Nnamdi Azikiwe Library, U.N.N; to mention but a few. In effect the TINLIB provision acted as bedrock for the Federal Universities continued use of ICT facilities and opportunities provided by the Federal Government. However discontinuity was again experienced in the use of TINILB by some libraries as a result of technical and logistic problems.

Further effort to encourage the use of ICT in the university libraries was made by the introduction of Virtual Library Project by the Federal Government. The project, which was announced in 2001, was motivated by the sorry state of libraries in the country's higher institution. The mission of the project according to Okebukola (2002:1) is "To provide, in an equitable and cost effective manner, enhanced access to national and international library and information resources and for sharing locally-available resources with libraries all over the world using digital technology".

The use of such facilities as noted by Cochrane (1992) will make for easy integration of various activities; co-operation and formation of networks (the vision of Digital Library Project); avoidance of efforts duplication, elimination of repetitive and uninteresting work; increase in range of services; conservation of time, generation of money, provision of real time information to users, etc. To fully harness the gains of ICT in Federal University of Technology, Owerri (FUTO) therefore, the present work attempts to investigate how access to computer by Students and Staff of FUTO can help in realising an ICT-compliant FUTO.

The Federal University of Technology, Owerri (FUTO)

Pursuant to the decision of the Federal Executive Council, under the leadership of President Shehu Shagari, to establish a University of Technology in each geo-political region, in October, 1980, a new chapter was therefore opened in the history of university education in Nigeria with the establishment of the premier University of Technology at Owerri, Imo State of Nigeria.

The Federal University of Technology, Owerri (FUTO) was therefore established by Executive fiat in 1980 and later the Federal Universities of Technology Decree No 11 of 1986 as the first of the three universities set up to provide and promote sound basic scientific training as a foundation for the development of technology and applied sciences relevant for overall national development.

FUTO commenced operations on the 28th of November, 1980 (with Professor Umaru Dechi Gomwalk as the pioneer Vice-Chancellor and Mr. Kenneth Lupton who doubled as the Director of Academic Planning and Development and later as the Acting Director of Administration) in the premises of the old Government Technical College, Owerri with a compliment of administrative staff seconded from the Imo State Civil Service. The University latter relocated to a rented premises at Plot 97, Ikenegbu Layout, Owerri, after which it moved to the Lake Nwaebere Campus (intended as the permanent site of the Federal Government Girls College, Owerri) to enable the commencement of academic activities in the University.

By October, 1981, therefore 225 students were admitted into the only School, i.e. The School of Natural and Applied Sciences which was later named School of Sciences (SOSC) while in the second year of existence three other Schools i.e. School of Engineering and Engineering Technology (SEET), School of Agriculture and Agricultural Technology (SAAT) and School of Management Technology (SMAT) enrolled their first students. The School of Post Graduate Studies (SPGS) was

the next to join the academic train in 1989 with the National Universities Commission's approval. The School of Health Technology (SOHT) on the other hand started activities with the admission of its first students in the 2003 / 2004 academic session.

In the area of administration, Dr. P. O. Esiri was appointed as the first Chancellor; Mr. A. O. Nwokocha as the Acting Bursar and Mr. J. C. Anafulu as the University Librarian, all in 1981, while HRH Chukwumela Nnam Obi II Eze Ogba of Ogbaland was appointed the Pro-Chancellor and the Chairman of first Governing Council in 1982.

Not long after the resumption at the temporary site, the facilities became inadequate for the increasing number of students and staff and by January, 1982, the Imo State Government approved the permanent site for the University which was formally transferred to the Federal Government in November, 1986 and was officially opened by the then President, General Ibrahim Badamosi Babangida on December 22, 1991 after which construction work started.

Whereas the University remained undaunted and committed in its efforts to place adequate infrastructural facilities in the permanent site, an unanticipated policy thrust on the part of the Government in May, 1993 necessitated a hurried movement of the University from its temporary site to the permanent site under the leadership of Professor C. O. G. Obah. On getting to the permanent site however, it was discovered that the infrastructure on the ground was not sufficient to accommodate the teeming number of students and staff. A number of coping strategies were then adopted to accomplish the challenge posed by the hurried relocation to the permanent site. This feat was achieved without compromising the academic session and standards. Successive administrations have continued to contribute their quota in addressing the critical problem of dearth of infrastructure in the University. However, a number of facilities are now in place and the University has now settled at its permanent site.

Presently, President Umar Musa Yar'Adua is the Visitor to the University; HRM Dr. Shekarau Angyu Masa Ibi, Kuryo II, Aku Uka of Wukari, the Chancellor; Alhaji Umaru Faruk Abdullahi, the Pro-Chancellor and Chairman of the 8th Governing Council; Professor C.O.E. Onwuliri, the Vice-Chancelor; Professor E.T. Eshett, Deputy Vice-Chancellor (Academics); Professor M.I. Nwufo, Deputy Vice-Chancellor (Administration); Mr. Charles Obioma Omeire, the Registrar; Mr. R. U. Akujobi, the Bursar and Chief J. E. Nwogu, the University Librarian.

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The University's academic programmes are run in 6 Schools (i.e. SEET, SAAT, SMAT, SOSC, SOHT and the SPGS) with the Directorate of General Studies, Centre for Continuing Education (for part time and sandwich programmes) and the Pre-degree Programme.

The Registry, Bursary, Library and Estate & Works Units provide the necessary administrative, professional and technical Services while FUTO Consult, Department of Health Services, Centre for Industrial Studies, Centre for Agricultural Research, Centre for Energy and Power System Research, FUTO Farm Ltd, FUTO Microfinance Bank, University Staff School, among others provide supporting facilities and services.

FUTO produced its first graduates on the 13th of December, 1986 numbering 67, ever since, the annual turnout of graduates increased steadily to 1,803 by 2005. In summary, in its 26years of existence, FUTO has produced 11,830 graduates, enrolled 21,867 students as at December, 2006 and has on its payroll 2,335 staff (including 548 academic staff) as at December, 2006.

Having familiarised ourselves with the entity called FUTO, there is therefore, the need to know past efforts that had been made in ICT application in the University.

Past FUTO ICT initiatives

In the history of FUTO there have been ICT applications in form of computer stand-alones, photocopiers, printers, typewriters, projectors in the Library and Electrical / Electronic Engineering Departments, staplers, paper cutters, perforators, telephones, counting machines, etc. in some sections e.g. Registry and Bursary. In recent time however, there have been improvement or progress in this regard with the creation of the Management Information System (MIS), the ICT Directorate, the University Computer Centre (UCC), the automation & e-library in the University Library and the FUTO / SocketWorks College Portal among others. More details about these Units are therefore provided below:

- **The Management Information System (MIS) Unit of FUTO**

The Unit was established in 1994 with the objective formulated by the National Universities Commission (NUC) to handle information processing involving students' and staff records and financial processing requirements of other administrative units of the University. Software package called NUMIS deployed by NUC from the University of Nigeria, Nsukka was provided to aid the Unit

in handling its task. The software consists of a set of integrated data files designed to contain information about students, staff, finance, and research. It was developed to run on a stand-alone level (an 80/486PC) on Database IV platform. The software was not regularly updated due to low personnel capacity. To contend with the irregular update, the Unit developed an in-house system (software platform in MS Excel) to cater for the electronic processing of students registration. A System Analyst was also employed to enhance the personnel capacity of the Unit. Presently, the Unit is located in the School of Science. Prof. A.I. Onuchukwu was the pioneer Director while Prof. E.O. P. Akpan is the present Director.

The MIS Unit has an in-office local area network connectivity with four computers and peripheral sharing ability and an NYSC Communication Software Support Point which handles data capture between NYSC Unit of Student Affairs and the NYSC Office, Abuja via NYSC MASTERLIST Software V2.01.

- **The ICT Directorate of FUTO**

Prior to 1996, separate Information Technology Units worked individually to make major strides in the implementation of the cutting-edge server technologies. However, ICT activities in FUTO started officially in 1996 with the Nigerian Universities Network (NuNET) steered by NuNET Committee which was chaired by Prof. J. I. Ejimanya. NUNET provided e-mail services to the University community from an office in the Vice-Chancellor's (VC's) Lodge. The location in VC's lodge was a result of lack of telecommunication facility in the University. The e-mail service is provided by FUTO connecting to National Universities Commission's dial-up which connects to the International Centre for Theoretical Physics (ICTP) in Italy. Due to the delay in communication resulting from this type of connection, an alternative and full Internet access that does not depend on a telephone line was implemented through LinkServe Ltd. in Port Harcourt.

With such improved access the University community provided URL for search and download. Again, the LinkServe connectivity did not provide the required service for the University community. A relief was however provided with the establishment of the Electrical and Electronic Engineering (EEE) Internet Centre donated via Private / Public Partnership Initiative in 2004 which extends its networks to the NuNET office in the University permanent site.

Moved by the need to harmonise and coordinate the various ICT units in the University, the University Librarian, Mr. John E. Nwogu in a Memorandum dated 7th October, 2003 and addressed to the then Vice- Chancellor, Prof. Jude Ejike Njoku, proposed the establishment of FUTO ICT Directorate. In the proposal, the rationale for such a Directorate in FUTO and the organogram (i.e. what should be the composition) was suggested. Consequently, the Directorate was created in January 2005 with Prof. J. I. Ejimanya as the pioneer Director. In April, 2006, however, Prof. Chidi E. Akujor succeeded Prof. J. I. Ejimanya. The FUTO ICT Directorate however can be likened to a baby that still required much of the attention of the parents!

In this regard, recently, a memorandum of Implementation and Article of Execution was signed by FUTO, AfriHUB and Zinox Technologies precisely, on May 31, 2007, for the flag-off of the implementation of a standard ICT Resource Centre in the University as one of the 10 Federal Universities to benefit from Phase 1 of the National Standardisation, Harmonisation and Comprehensive Development of Sustainable ICT in Nigeria.

The project is expected to yield tremendous benefits including the availability of on-line access at any location on campus and the enhancement of computer literacy amongst staff and students. However, FUTO Community is still waiting for the actualisation of this dream nay promises.

- **Automation and e-Library in FUTO Library**

The ICT Unit, formerly known as the Information Technology (IT) Unit of the FUTO Library was established in 2002 in one of the office rooms in the Pilot plant library with two stand-alone computers and three staff including Mrs. C.V. Anunuobi (now Dr.) the pioneer ICT Librarian. With the assumption of Mr. John E. Nwogu as the University Librarian in April, 2003, however, several efforts were made to transform the Unit to a centre of excellence. The first of such efforts is the relocation of the Unit to a more spacious office at the Main Library, the acquisition of more computers, the networking of the Unit and the deployment of more staff to the Unit with the attendant change of name to Information Communication Technology (ICT) Unit.

Unrelenting in the "centre of excellence" vision for the University Library, a Donor Agency – The Open Society Initiative for West Africa (OSIWA) was attracted to FUTO Library as one of the ten University Libraries in Nigeria which received donation of a full complementary Internet facility. The Internet facility has been fully installed with twenty Internet-ready desktop computers. The Internet

services though commenced, latter suffered some technical setbacks. However, efforts are being made to remedy the fault and restore the Internet services.

Furthermore, after the attempts with the TINLIB Software given by NUC failed, the Library commenced the automation of its operations and services on ten desktop computers connected in a local area network with the Alice for Window Library Automation Software supplied by SoftLink Ltd., a USA based Company with a branch office in Victoria Island, Lagos. The Software was commissioned by the then Acting Vice-Chancellor, Prof. B.A. Nwachukwu in April, 2006. Presently, the retrospective conversion of the Library's manual catalogue cards to machine-readable form is almost completed and the Online Public Access Catalogue (OPAC) is now being used (with the assistance of Librarians and Data Entry Clerks) on two dedicated desktop computers by FUTO staff and students for fast / speedy bibliographic or literature search in the Library.

In addition, the Virtual or e-Library in form of e-journals and resources, stored in internal and external hard disks, CD-ROMs, Zip, Flash disks and diskettes (e.g. e-Granary, EBSCO Host, DATAD, InfoUSA, Encyclopaedia Britannica, etc.) are increasingly being consulted by FUTO staff and students for research purposes via personal and Library computers while passwords and usernames are given to students and Staff who wishes to access some online journals, portals and databases (e.g. AGORA, HINARI, AJOL, OARE, etc.) subscribed to by FUTO on the Internet.

- **The University Computer Centre (UCC)**

The Centre started in 1982 as a computer laboratory attached to the then School of Natural and Applied Science. The operations of the laboratory were under the control and supervision of the Director of Physical Science Programmes in the School. Following the progressive growth of the University, the laboratory was transformed to a central unit called Computer Centre in 1989 with Prof E. Umez-Eronini as its first Director. The Centre then becomes a central unit providing computing facility to support teaching, research and consultancy / commercial services to the University community and its environs. Engr. Dr. S. O. E. Ogbogu is the present Director of the Centre.

Presently, undergraduates undertake Computer Science (CSC 201) practical course in the Centre, occasionally the Centre organises training programmes and once-in-a-while the Centre handles commercial projects. The number of computers in the Centre is far lesser than a 100, which is seen to be grossly inadequate considering FUTO Staff and Students' population.

- ## The FUTO / SocketWorks College Portal

The FUTO / SocketWorks Ltd. Collaborative ICT Project is meant to open up academic / administrative activities in FUTO to the Internet by the end of November, 2004; to provide Local and Campus Area Networks and to affect future computer-based operations of many FUTO Units.

FUTO / SocketWorks College Portal was presented to the University community on Thursday, November 18, 2004 by 1.00pm at Council / Senate Chambers. The Directors of MIS, UCC, Academic Planning and Development (AP&D), Heads of Departments of EEE and Information Management Technology (IMT) and the Coordinator of Records and Statistics are all involved in the project with the Director of ICT as the Project Coordinator.

SocketWorks operates through scratch cards which are sold by some banks. 10 years contract was signed between FUTO and SocketWorks Ltd which will be subjected to periodic review as the ICT scenario of the University improves. SocketWorks promised to continue updating their facilities within the period and also adapt to the changing needs of the University.

Area of application of this Network project includes:

1. Registration of Students online
2. Accessing of Students' result via the Internet
3. Browsing
4. Intranet

SocketWorks started its activities mainly in the area of students' online registration in the 2006 / 2007 academic session. The Company is to render services covering all students' activities except the uploading of results which will be handled by trained University staff. Publishing of Students' result however will be from the current year 1 students (2006/2007 Set). Presently, nothing much has been done in the area of 'Accessing students result via the Internet', 'Browsing' and Intranet (i.e. Campus Area Network). In other words, SocketWorks is yet to accomplish its task in these aspects.

From the foregoing, it can be said that FUTO is ICT-aware but for it to be fully ICT-compliant, the number of computers in the system, and staff and students' access to them, need to be increased, this concern then, is the main thrust of this study. In summary, the following words of the pioneer ICT and NUNET Director, Prof. J.I. Ejimanya are more relevant today than when it was first uttered in 1998:

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it is important to know that this system requires that the various units must have computers. I observed sadly that many people we expect to be using our network up till now, do not have computers....the units should strive to acquire computer systems because even if NUNET succeeds in registering so that it is able to access the rest of the world, if the units do not have computers, the whole project will not be meaningful (pg. 5).

No statement can be more appropriate!

Having taken a trip to the FUTO ICT past, we can then return home to see what we have on the ground presently.

Present Vice-Chancellor, Prof. Celestine O. E. Onwuliri's visions and goals on ICT (2006-2011)

Prof. Celestine Onyemobi Elihe Onwuliri, a Professor of Zoology (Parasitology), assumed office on the 19th of June, 2006, as the 5th Substanstive Vice – Chancellor of FUTO. Among his many visions and missions towards the earnest development of FUTO as contained in his Strategic plan is that the University should increase the provision of ICT facilities, upgrade existing ones and enhance their application in teaching, research and services. The goal popularly referred to as Goal 6, is further expatiated in the table below:

Strategy No	Strategy	Responsibility	Time
Strategy 6.1	Increase the internal telephone lines for intra-university use.	FUTO; W&M Computer Centre, University.	Years 2 – 4
Strategy 6.2	Install the necessary infrastructure to link FUTO to the internet.	FUTO; W&M Computer Centre, University.	Years 1 - 5
Strategy 6.3	Ensure that all telephone lines are functional.	W&M; University.	Years 1 - 5
Strategy 6.4	Facilitate the training and retraining of all staff in the use of computers.	University; Unit; Registry; Computer Centre; STD.	Years 1 - 5
Strategy 6.5	Foster the sharing of software and other resources through the use of the network.	FUTO; Net; Computer Centre; University.	Years 1 - 5
Strategy 6.6	Facilitate the acquisition of personal computers, peripherals and software for staff by implementing a computer loan.	Computer Centre; University.	Years 2 – 5
Strategy 6.7	Develop tailor-made software to computerize activities of the various departments and schools of the University.	MIS; Computer Centre; University	Years 1 – 5

Strategy 6.8	Make Internet services available to staff in their offices, laboratories, workshops etc and to the host community at affordable rate.	FUTO Net; University	Years 2 – 5
Strategy 6.9	Make Internet services available to staff quarters at affordable rates.	FUTO Net; University	Years 2 – 5
Strategy 6.10	Manage and update the content of the University Internet.	FUTO Net; University	Years 2 – 5
Strategy 6.11	Manage and update the content of the University web-site.	FUTO Net; University	Years 2 – 5
Strategy 6.12	Digitize and update staff records.	MIS; Univ.	Years 2 – 5
Strategy 6.13	Digitize all student records beginning with online registration of students.	MIS; Univ.	Years 3
Strategy 6.14	Digitize the processing of examination results.	MIS; Univ.	Years 2 – 5
Strategy 6.15	Develop an information policy to guide the acquisition, storage, dissemination and use of information for the benefit of the University community and the larger society.	Info & Pub; Univ.	Years 2
Strategy 6.16	Foster the increased use of Information Communication Technology (ICT) to deliver library services	Lib; ICT Com; Univ.	Years 2 – 5
Strategy 6.17	Foster increased use of ICT to deliver bursary services	ICT; Bursary	Years 2 – 5
Strategy 6.18	Foster increased use of ICT to provide e-learning.	University; ICT; Unit; Academic, Pl	Years 2 – 5
Strategy 6.19	Develop on bandwidth management to foster increased use of Internet facilities.	University; ICT; Unit; Academic, Pl	Years 2 – 5
Strategy 6.20	Foster the increased participation of women and very senior members of staff in ICT activities.	University; ICT; Unit; Academic, Pl.	Years 2 – 5

Source: **FUTO @ 25, Published by O'Desy Concerns, Owerri, for FUTO, 2006.**

Statement of the problem:

Access to computers within FUTO has been observed to be low; though students and staff may have personal access at home and/or commercial cybercafé. This work, in line with the present Vice-Chancellor's ICT goals (as stated above), is poised to investigate computer accessibility among staff and students as a factor in realizing an ICT-compliant FUTO, knowing fully well that without computer and access to computer, there may not be any meaningful use of ICT for teaching, learning and   research.

Research Objectives

The research main objective of the work is to investigate computer accessibility among staff and students as a factor in realising an ICT-complaint FUTO. The specific objectives are to:

1. Find out whether FUTO staff and students have access to computer.

2. Ascertain what type of access to computer FUTO staff and students have.

3. Identify various constraints to computer accessibility as perceived by FUTO staff and students.

4. Suggest how to enhance FUTO staff's and students' access to computer in order to realise an ICT-compliant FUTO.

Research Questions

The research questions are:

1. Do FUTO staff and students have access to computer?

2. What type of access to computer FUTO staff and students have?

3. What are the various constraints to computer accessibility as perceived by FUTO staff and students?

4. How can FUTO staff's and students' access to computer be enhanced in order to realise an ICT-compliant FUTO?

Scope of the study

This paper investigates the accessibility or otherwise of computer and ICT to the Staff (Academic and Non-academic) and Students (Graduate and Undergraduate) of Federal University of Technology, Owerri, Nigeria during the 2007/2008 Academic Session.

Significance of the study

This study will throw the light on the present accessibility mode of computers and ICT among staff and students of the University and hence, help the Management to make more informed decisions on the placement and installation of more computers and ICT application in the various Schools and in implementing appropriate support policy towards use.

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LITERATURE REVIEW

Introduction

Many studies and initiatives are concerned with ensuring that African countries are prepared to meet the challenges of the information age, and their main thrust seems to revolve around access to information and communication technologies (ICTs) and ICT policy development in general. ICT is said to provide an array of tools for acquiring and using information and for thinking, learning, decision-making, teaching, expressions and leisure. These same experiences provide the skills that will enable students, staff and faculty to perform effectively in the global, digital, information -based future we all face.

Relevant literature will be reviewed under the following sub-heading:

- The concept of ICT
- The components of ICT
- Evolution of ICT in Nigerian University education
- ICT as a facilitator of teaching, learning, and research
- The place of computer in ICT
- Access and types of access to computer
- Computer and ICT accessibility and legal implications
- Constraints to computer and ICT accessibility
- Promoting computer and ICT accessibility in higher education
- Summary

The Concept of ICT

Information and Communication Technology has been defined by Qiang and Ayers (2003:1) as consisting of hardware, software, networks and media for collection, storage, processing, transmission and presentation of information (voice, data, text, images). Blurton (1999:46) described it as "a diverse set of technological tools and resources used to communicate and to create, disseminate, store and manage information". The ICT is defined according to the American Library Association (1993) as "the application of computers and other technology to the acquisition, organization, storage, retrieval and dissemination of information. Ifidon (1985) enumerated the functions available for ICT use to include: ordering, receiving, settlement of invoice and

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administration of records and expenditure. Further to that Oketunji (2001) and Chesenga (2004) listed among other functions acquisition, cataloguing, and circulation, and serials control, selective dissemination of information services and preparation of management information. Other activities which ICT can be used for include procurement process, fund analysis and accounting, bibliographic file control, cataloguing, preparation of record /entries and transaction control. Effecting additions, changes and deletions or correction control can be performed with ICT facilities. Agbaje (2002) also informed that ICT facilities can be applied in browsing, publishing, money transfer and electronic commerce, electronic copying, consortia and database management. Chesenga (2004) also mentioned that the application of ICT facilities could be in the stand- alone or integrated form.

Thioune (2003) grouped ICTs into two categories namely traditional and new ICTs. Traditional ICTs are radio, television, fixed line telephones and facsimile machines which have been ingrained in the daily habits and lives of people and communities. The new ICTs consist of computers and specific data processing applications accessible through computers (e – mail, Internet, among others), cellular phones and wireless technologies.

According to the United Nations Economic Commission for Africa (1999), ICTs cover Internet service provision, telecommunications equipment and services, information technology equipment and services, media and broadcasting, libraries and documentation centers, information providers, network-based information services, and other related information and communication activities. It is not uncommon to find definitions of ICT that are synonymous with those of information technology (IT). For example, Foster (2001:3) defines ICT as "the group of technologies that is revolutionizing the handling of information and embodies a convergence of interest between electronics, computing and communication. Duncombe and Heeks (1999) simplified the definition by describing ICT as an 'electronic means of capturing, processing, storing and disseminating information'. Hence in this review, the term ICT will designate the mechanized information processing interaction between providers and users of information and also the development and application of information processing systems. It is therefore, important to emphasize that these technologies only provide new mechanisms for handling an already existing resource: information.

The Components of ICT

The most common or popular ICT facilities are photocopiers, personal computers, CD-ROM, printers, scanners , fax machine, telephone, Online Public Access Catalogue, Global System of Mobile Communications (GSM), Local Area Network, Wide Area Network, LCD Multimedia projectors and Internet. According to Oketunji, Daniel & Okojie (2002), the highest ICT facility in use was the photocopier while the lowest was the scanner. Aina (2003) noted that ICT facilities include microfiche, microfilm readers, the computer and its peripherals like keyboard, monitor, modems, printers, networked electronic journals, CD-ROM and CD-ROM drives. He recommended the Internet for effective access to other collections.

However, simplifying the definition of technology, Moll (1982) classified technology into two groups. These are "low and high technologies". Under the "low technology", we have equipment and machines such as typewriters, offset printing machines, micro-form readers, projectors, staplers, paper cutters, perforators, library catalog, telephone, radio, television etc. The above "low technologies" are hardware or equipment. The "high technology" on the other hand consists of the various means of obtaining or transferring information using computers, telecommunication and microelectronics. From the various definitions the main elements that appear prominent as "high technology" according to Madu and Adeniran (2005:2) include:

a. Computer

b. Telecommunication

c. Microelectronics

d. Storage facilities

The computer and storage devices media are grouped into two parts; the hardware and the software. The hardware are of general purpose for every computer user and include the input devices like keyboard, card reader, mouse etc; the Central Processing Unit (CPU) and the output devices such as printer, Visual Display Unit (VDU) while the software includes slides, filmstrips, films, paperclips, office pins, tapes, fiches and transparencies etc.

According to Oketunji (2000) the software is of two types. The operating systems type that makes the computer does everything it ought to do usually come with the computer. They include Microsoft DOS, Windows: 95, 98, 2000, XP, NT, Linux etc. The

other type is called application software which is meant for specific tasks. e.g. CorelDraw for designing, Microsoft Office for desktop publishing, Nero for burning CD, PowerDVD for video entertainment, etc.

The storage media in use includes the magnetic tape, magnetic disk and optical discs (Rowley 1988, 1993). The popular ones are the floppy disk (diskette), the hard disk and the Compact Disc Read Only Memory (CD – ROM). Comtpon (1994) provided six reasons why CD-ROM is important among which is the conservation of space, ease of access and reduced mutilation.

As revealed by Capron (2000) mail, telephone, TVs and radios, books, newspapers and periodicals are the traditional ways users send and receive information. However, data communications system…computer system that transmits data over communication lines such as telephone lines or cables…have been evolving since the mid-1960s. This telecommunications aspect of ICT provides the capabilities for the transfer and / or communication of data from one workstation to another (Oketunji, Daniel and Okojie 2002). While the computer and the storage media act to gather process and store information for use, the telecommunication facilities act to actualise the dissemination of such information.

Furthermore, Siddiqui (1997) identified ICT facilities as: telecommunication networks, electronic mail, electronic bulletin boards and electronic conferencing. Included in the list are tele-facsimile (Fax) and online searching. Daniel and Mathews (2000) mentioned the Internet, the World Wide Web (WWW) and networking / resource sharing. Others are electronic mail and online searching. In other words the telecommunication facilities are those ICT facilities that require the telephone or Very Small Aperture Terminal (VSAT) and related cable facilities to be put to use. Hence they could be grouped into the Local Area Network (LAN) facilities, the Wide Area Network facilities (WAN);World Wide Web (WWW), the Internet facilities, the Electronic mail (E- mail) and the facsimile (FAX).

Despite the enumerated ICT facilities and their uses, it was observed by Tise (2001) that the use of ICT in African and Nigerian Universities is very low and at its embryonic stage, with the exception of the University of Jos as reported by Akintunde (2004) and few other universities, ICT intervention / application in teaching, learning and research is a late-comer to Nigeria Universities. How then do we get there?

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Evolution of ICT in Nigerian University Education

The Development of ICT in the Nigerian university system has occurred in basically four directions. (Liverpool, 2001) First it has evolved via individual university initiatives through the establishment of academic computer science departments and computer centers, the latter as academic support units. Second, it has evolved through the introduction of administrative computing through a computerized Management Information System (MIS). Thirdly, this development has taken place via the NuNet, a project for the networking of the Nigerian university system and its connection to the Internet. Both of these were spearheaded by the National Universities Commission (NUC), a national body, set up by government to co-ordinate and monitor Nigerian universities. Fourthly, ICT in Nigerian educational institutions has evolved through the Library & Information Services (LIS) set up by individual university library initiatives. In the majority, these four directions have not been convergent and that has resulted in unnecessary competition for limited resources as well as duplication of efforts and facilities (Liverpool, 2001).

However, ICT facilities have impacted every stage of information resources management from the production through the packaging to access. Woodward (1994) informed that the rapid growth of computer networks and the proliferation of electronic information sources have resulted in information explosion. ICT has also evolved in the Nigerian Universities through cheap and easy access provided to Students and Faculty through networks to communicate with peers, browsing a whole library and downloading the latest idea needed for their work (Ballentyne 2003); In other words, with ICT facilities, there is increased visibility of non-Western journals, posted to the Internet (Prosser 2003). Evidently, the presence of African Journal Online (AJOL) an initiative of the International Network for the Availability of Scientific Publication (INASP) based in United Kingdom which offers free online access to the Table of Content (TOC) and abstracts of scholarly journals published in Africa and the Database of African Theses and Dissertation (DATAD) Project, an initiative of the Association of African Universities (AAU) are classical examples of ICT role in making African scholarly works available for use worldwide .

Chuene (2001) in her work informed that ICT has eliminated many routine tasks and increased speed in the acquisition of materials for learning, teaching and research

especially in Universities. Through ICT, online journals are acquired, free web journals are identified and there is access to online version of current print subscriptions. The Library will be able to register to any database of their choice, which will provide subscription services to electronic journals and newsletters. Stunbley (1996) maintained that electronic journals raised the enticing prospect of researchers (e.g. in higher institutions) having all the needed information on their desktops. Nicholson (1996) also noted that electronic journals are easier to revise, more interactive, capable of providing more added value through graphics and full text indexing.

In this regard, Geran (1995) reporting on the outcome of American Library Association Annual Conference, mentioned that the advantages of electronic journals as their speed of delivery, wide access, limited handling and processing by library staff and the opportunity to have vendors maintain the journal archives. Since journals and other serials represent a veritable source of knowledge and information for academics, especially in the area of currency since recent ideas, inventions, innovations, patents, reports / communiqué, issues / developments, etc. are first published in journals, the role of ICT facilities in serials availability and use cannot therefore be overemphasized, this then is summarised by Malinconico as cited by Anunobi (2006) while enumerating the advantages which journals in electronic form have over those in print form. These include:

- Electronic journals can be accessed in a variety of innovative ways and their contents may be downloaded for further analysis and manipulations.

- Arguably, they do not need additional indexing and also they impose no page limitations on authors permitting an interactive dialogue between and among readers and authors.

- They do not need to be bound or shelved hence; they make minimal demands on space and present a more manageable conservation and preservation pattern.

- Many individuals can use them simultaneously (online), thereby, eliminating the need for multiple subscriptions.

- They can be accessed wherever an institution's telecommunication network or the Internet reaches making possible a wealth of value added services.

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Apart from ICT application in producing e-journals, Ebijuwa (2005) opined that ICT can also be used in support of:

i.   Administration: In higher institutions on which this paper focuses, administrative computing systems are concerned with students administration such as admissions, enrolment / registration and examinations; accounting (financial management, purchasing and inventory); personnel (staffing, payroll and positions); and physical plant (room assignment, planning and maintenance).

ii.   Management information which involves enhancement of availability of information, enhancement of overall efficiency and effectiveness, enhancement of speed of operation, and support of group processing of incoming and outgoing information.

iii. Teaching and learning - the traditional use of ICT in support of teaching and learning is via computer-assisted learning as discussed in Goodison (2001) assessment of the role of ICT as a stimulus for improving the three principal instructional functions in higher educational institutions: teaching, learning, and assessment.

iv.   Research and national networking - This is the area where the impact of ICT is most visible. This is because it would be unthinkable to pursue research especially at the tertiary education level, national or international without computers. To assist this endeavour are Local Area, National and International networks.

v.   Libraries and information services – These are to provide lecturers, students, administrators, researchers and the general public with information efficiently and effectively with the aid of ICT. Information categories include bibliographical information, catalogue information, access to original publications wherever they are located; and access to information in media other than books (Audio, Video and CD-ROMS software).

Though, staff and faculty use ICT for administrative works, research and collaboration, teaching and leisure; in many universities, students constitute the major category and heavy users of information and communication technologies for communication, academic purposes and recreation. This is because students are

increasingly sophisticated in their information needs. They are mobile and seek information sources that are compatible with their emerging life styles. Nigerian students are becoming computer frenzy and rely heavily on electronic sources for their information needs as they get more exposure to these new technologies. Williamson (1999:8) says that students are coming to expect both recreational and educational opportunities from the electronic forms of data, i.e. information about friends and holidays as well as learned papers. Word processing, www, and e-mail have recreational potential while only the specialized databases are related purely to subject / curricular studies. Students also expect electronic information to be quick, convenient, and free and all encompassing, these needs are however satisfied by ICT. Hence, the role of ICT in teaching, learning and research can never be overemphasized.

ICT as a facilitator of Teaching, Learning and Research

It has been found that information is vital to the overall academic development of university students. The role of information and communication technology can thus be described as multidimensional, affecting both staff and students of institutions of learning, especially, universities. Alabi (2004) writes that the most important assets in every form of university education are the faculty and students, and note that "if quality people are not put at the center of the process of giving and receiving knowledge, the process is bound to fail". In recent times however, teaching methods, learning styles and research methods have changed. This means that the knowledge and skills required by the faculty are also changing.

ICT use could provide university students, lecturers and researchers in developing countries the opportunity to bridge the knowledge gap between them and their counterparts in developed countries. With the concept of the global village, graduates are increasingly expected to compete for jobs globally, and universities are expected to prepare them for gainful employment (Agbonlahor, 2005). It therefore follows that to remain relevant in the current information age, university lecturers and students have to adopt ICT to enhance their teaching, learning and research activities. The use of such technologies by the students is however, dependent on availability and accessibility. ICTs

facilitate communication between teachers and students. It also provides students with additional opportunities to write, edit, and undertake multi-media project.

Raguel Bebhunan–Fich (2002: 94-99) however, distinguishes between uses of ICT, from the pedagogical dimension, she categorizes ICT use in university education under the following two models.

i. The objectivist model which emphasizes the unidirectional flow of concepts from a professor to his students. Here, she sees information technologies as complementing or replacing the traditional roles of teachers and printed materials.

ii. The constructivist model where we find an emphasis on interaction as the source of knowledge. Here it is used to provide a conducive learning environment that enables students to collaborate with their professors and colleagues beyond class time.

The traditional classroom can, in fact, be converted via ICT to an electronic class or what is now known as Virtual Learning Environment (VLE) where Lecturers and Students can interact and where students can be taught, examined and assessed or graded on-line. Adetimirin (2007) in her research found that the academic tasks for which ICTs were used by undergraduate in Nigerian Universities were assignments, class work, projects, seminar and term papers.

Keogh (2001:255-226) supporting the promotion of ICTs as authors and providers of life-long learning, considers their benefits as immense in the provision of access to a vast wealth of information sources and learning experiences, the provision of new channels of communication and interaction between students, their peers, tutors and the provision of the opportunity for life-long learning for those who may normally not have an opportunity to be educated or access the information.

In summary the role of ICT in the university according to (Liverpool, 2001) includes:

i. ICT as a gateway to vast resources of information for staff and students in academics. This includes the case of ICT having great potential to increase access to knowledge. Access to computers and the Internet has increased the ability of professors to carry out much more informed research. It has also provided opportunities to establish contact, cooperate, and maintain beneficial relationships

with other researchers of similar interests. It has broadened the course of their analysis and research and improved the quality of their work with the opportunity for diverse views from other colleagues acquired over increasingly short periods of time.

ii. ICT as a tool for increased productivity and professional effectiveness. This is an impact of ICT felt by all in the education sector extending beyond professors and students to administrative and management staff, as well. Here ICT enable staff in the education sector to do what they have been doing, only much faster and more effectively. As such, this role of ICT includes administrative software packages which keep student records, generate and store payroll information and schedule classes to e-mail and word processing for improved communication to specially designed teacher tools like computerized grade books, test worksheet generators, and curriculum templates.

iii. ICT as a promoter of conducive teaching and learning environments. ICT has been shown to have positive impact on the learning environment and students generally. Today, students use multimedia to learn interactively and work on class projects. They use the Internet to do research, engage in projects, and to communicate. The new technologies allow students to have more control over their own learning, to think analytically and critically and to work collaboratively. This also involves the use of ICT as an information processing and productivity software like word processors, databases, spreadsheets, presentation programs, multimedia authoring tools, e-mail, video production equipment, digital reference materials, electronic indexes, and network search engines to complete, complex, and authentic projects and other instructional use of technology.

iv. ICT provides an avenue to improve educational outreach and standards across Continents. In developing countries, especially Africa, affordable ICT could attain this goal in three important ways. Firstly, it could be used to support and expand existing curricula by increasing the accuracy, presentation, user-friendliness, and attractiveness of courses. Secondly, for lecture delivery to Off-campus / Distance Learners and for Extension Services to Students who are home-bound or who prefer learning at home and for Staff who prefer to work from home. Talk of telework. Thirdly, it could forge strategic linkages between educators in Africa

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and those in other countries, at one level, and between students and the wider global community on the other, this is in line with the study of Gilpin (2000).

v.   ICT as a course and programme of study. ICT plays a critical role in the further development of ICT, serving as a training tool for future development and users of ICT. As stated somewhere in this work, there is presently a lack of human capacity (inadequate trained technical and support staff) for the development and use of ICT in most developing countries and Nigeria is no exception. Beyond the low level of literacy found in many African countries, is the number of people with technical skills which is seen to be highly insignificant.

It should be noted that alongside the role of ICT in education is the role education plays in the development and use of ICT in a nation. It is agreed that for the productive use of ICTs, there is often the need to acquire new skills and restructure the educational system. Though ICT use represents an improvement of human skills and capabilities, there is also hierarchy of skills. This hierarchy then begins with the attainment of basic literacy. What then is the place of computer in ICT?

The place of computer in ICT

Computer is the gateway to ICT, without computer there can be no ICT. All the various applications and dimensions of ICT revolve round the computer. All that ICT can do, it does through computer. The computer is therefore defines as an electronic device that automatically performs a specific sequence of operations on a data to achieve desired results. A computer set as we know it today include the Visual Display Unit (monitor), The Central Processing Unit (CPU), The Keyboard and The Mouse.

On the whole, computer accepts, processes, stores and retrieves information performs arithmetical problems, processes transactions, sorts data accurately, easily and at great speed. French (2001) defined computer as a device that process data or information. According to him, the data is normally held within the computer as it is being processed. The nature of processing may change according to the data entered. There are also differences in the forms in which data is accepted and produced by the computer. These include simple words or numbers to signals sent from or received by other items of technology. Basically, computer involves a process or system which

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includes input, processing, output and storage. Gurtner and Lepper (1989:170-178) sees the computer as a multifaceted invention of many uses, a symbolic tool for making, exploring and thinking in various domains.

This great machine is used in the following ICT processes / applications:

i.   On - Line Public Access Catalogue (OPAC) / Online bibliographic searching:

This is an integrated library catalogue automation system, this can be accessed remotely via computer, not only within the parent organization but also via more widespread but linked networks of databases including catalogues of distant libraries.

ii.   Expert systems:

According to Anyakoha (1987:3) expert systems are software packages aimed at providing expert 'consultancy' advice and assistance with problem-solving in limited specialized fields of science, engineering, mathematics, medicine, education etc through computer. They aid people in decision–making, problem solving, diagnosis and learning.

iii. Videotext:

Anyakoha (1987) earlier referred to asserted that an exciting development in library automation system is the remote accessing of expert computer systems via videotext. Videotext is an interactive system for transmitting text or graphics stored in computer databases via the telephone networks, for display on a television screen.

iv.   Video-teleconferencing:

This is another associated application with immense potentiality. "Supposing one is using a computer and wishes to communicate with a colleague, video–conferencing would allow the one to see the colleague in a window on the computer's monitor (screen) and vice versa, allowing the person to talk face to face as if in a round table." Botto (1993:11).

vi.   Internet:

Another Information and Communication Technologies (ICTs) facility is the Internet. This is a worldwide telecommunications network linking millions of computers and computer-users globally. In fact, the new information society is characterized by information technology revolution whose crowning glory, the electronic superhighway is called "the Internet".

In the words of Alasa and Kelechukwu (1998:1) "the idea of Internet or superhighway is based on the principle that every piece of data held electronically

anywhere is potentially accessible to any person with appropriate computer technology". It is a worldwide collection of networks linked together by the international telephone system. To Onwubiko (2001) the Internet "is a conglomerate of computers hooked to telecommunication system called telephone and linked to the entire globe"

Onyebinama (2007) averred that the Internet offers a worldwide communication capability, a mechanism for information dissemination and a medium for collaboration between individuals and their computer without regard for geographical location. The Internet as a matter of fact has revolutionized the computer and communication worldwide like nothing before.

Ajileye (1996) and Nwosu (2002) refer to the Internet as "the information superhighway". The Internet allows information to flow through many different interconnected computer networks. As messages travel, each network that is reached contains information that assists in connecting the adjacent network. This influences the views of Ibeagwam (2002:49) who says that the Internet is one of the constituencies of cyberspace "the world of computers and the society that gathers round it ... all information available over the Internet". There are several windows (information networks) through which one gets information. Internet is one of such windows. The Internet is a global network of computers connected to share information accessories and even software. The Internet is a remote server with unlimited disc spaces for storing all the information users have uploaded to it. It is an ocean of information. Every other computer connected to it is the client and serves only as a pathway. Thus, the Internet is a global network operating with the "client – server arrangement".

According to Uzoigwe (2004:29) amongst the facilities offered by the Internet are the electronic mail (e-mail) which facilitates the exchange of text messages between users who are located worldwide and NEWS, a facility which allows for interaction between discussion groups. Other services provided on the Internet via: e-mail are: table of content (TOC) services, journal current awareness services, listserver and electronic discussion groups which bring people from the same disciplines together. E-mail is a common application on networks and has become an increasingly popular method of communication especially in a workplace as users communicate quickly and easily with one another. It is also a convenient means of communicating with other e-mail users,

while avoiding the high costs or time delays of conventional telephone, fax and postal systems (United Nations, 1994).

Most e-mail programmes could allow one to:

-     Forward mail to another address
-     Reply to a message directly
-     Send a message to everyone on a mailing list
-     Store mail in different electronic folders
-     Attach documents
-     Use aliases in place of standard form addresses

Kvebbekke (1998:11-12) has aptly put it that "e-mail is probably the most used facility of any electronic network." The use of e-mail amongst academics plays a fundamental role in academic research projects. As with electronic mail, there are several news reader programmes all with similar functions and slightly different commands.

One of the advantages of electronic mail is the de-territorialisation or removal of distance, which has reduced the whole world to what is popularly referred to as global village. It is possible with Internet to send a message from Nigeria to a friend or a relation who lives in the United States of America and get the reply almost immediately. This is contrary to the conventional mail, which takes days or weeks to arrive. Apart from removal of distance, there is reduction of time, which means spontaneity or instantaneity in business transaction. Electronic mail ensures that you get your message across in no time. Obviously this is considerably time saving and there is the inherent safeguard of certain delivery (Lucey, 1997:201). E-mail can be used by researchers to send questionnaires across the world. This makes research efforts easy and simple.

Another facility of Internet for information retrieval, dissemination and communication is the World Wide Web. It should be noted that the terms 'Internet and World Wide Web' are used interchangeably but the two are not synonymous. The Internet is a network, which connects many smaller networks worldwide. The web is only a portion of the Internet. In World Wide Web, users can roam through databases around the world starting from a "home-page" similar to a table of content in a book. Access to the web is provided by browsers, which are programs that allow users to search for

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information and to view documents on the web. Example of browsers includes Lynx, Mosaic, Netscape navigator, Mozilla Firefox and Microsoft Internet explorer.

The web is not the same as the Internet, nor is it a particular computer program rather it is an interface and navigation tool that provides a means of structuring documents and relating them to other documents so that maximum use can be made of the Internet.

v.   Databases

The presence of information technology in our time has made possible the creation of database which is always searched or manipulated through computer. Database according to Willitts (1992:4) is "a collection of data which exists for the purpose of providing information". Matthew (1999:127) refers to it as "an electronic collection of information in a structural format (file) created for searching of specific topics", whereas, Imeraba (1996) sees it as "a collection of records, or units of information, normally stored in a computer system." Or better still, a collection of logically related data elements that may be structured in various ways to meet multiple processing and retrieval needs of organizations and individuals.

Data in the database is generally structured so that it can be sought for and retrieved automatically. Timeliness, accuracy, comprehensiveness and appropriate delivery are among the attributes of a database, in retrieving the information required. The keywords are organized into specific listing of words and phrases (called thesaurus). During an electronic search many databases can be examined from one location in a relatively short time. Retrieval of required information from any database (whether on the system or in any other storage devices) however, require the use of computer.

Closely related to database is the "portal" which is the electronic collection / collation of links, articles or works in related or same discipline / field. However, the main difference is that while databases can be stored outside the system (e.g. in CDs or Flash disc) a portal can only be stored or accessed via computer.

vi.   Compact Disc – Read Only Memory (CD-ROM):

This is a generic term for permanent unmodifiable Compact Disc use in backing storage, a version of high fidelity audio / optical recording disk employed as a ready only memory device for computer. CD-ROM is a form of information technology that is acclaimed for handling of large volumes of data in a flexible manner. It has the ability of

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accessing and storing information from the computer screen, floppy disc or for direct printing.

According to Uzoigwe (2004:37) some of the advantages of CD-ROM are: "minimal physical storage space requirement; more information at lesser cost; does not require telecommunication for access, user friendly, manual driven database system" (p37). CD-ROM is ideal for the distribution of computer software, courseware, maps, database, reference materials and multimedia. Okoye (2000:140:150) opines that CD - ROM is the most useful item that audio- visual librarians make use of in information dissemination and research. A CD-ROM of inestimable value is The Essential Electronic Agricultural Library (TEEAL). This is an Electronic Agricultural Library on CD-ROM, which provides developing countries access to more information on over 140 of the best scientific journals affordable only to the developed world.

Ezeani (2004:8) opines that:

> the annually updated CD-ROMs contain more than 1.5 million pages of literature, diagrams and photographs of the world's best articles in agriculture and agriculture related materials. Access to the current journals included in TEEAL is improving the quality of research conducted at Universities and research centres around the world (p8).

According to Fapohunda (1996:40-41) TEEAL, like any other CD-ROM has two operational modes - a search mode and browse mode. There are database on CD-ROM containing current information in other fields, e.g. EBSCO Host, DATAD, etc. Other databases of interest are AGORA in Agriculture (an initiative of the Food and Agricultural Organisation (FAO) of the United Nations. Presently, AGORA has almost swallowed up TEEAL because of its higher capacity); HINARI in Health sciences; OARE in Environmental sciences; eGranary in almost all fields; MedLine in Medical sciences; etc.

Any piece of information - audio, data, photograph and video can be digitized and stored on CD. Because of its ability to store large amount of data, CD-ROM is gradually taking the place of magnetic disks. Publications on CD-ROM now exist in many forms. The most common are encyclopaedias, complete works of Shakespeare, etc. Much application software or operating systems are now sold on CD-ROMs as well as floppy disks. Ephraim (1991:302) and Ojo - Igbinoba (1998:157-165) have extolled the virtues

of CD-ROM and highlighted its potentials for researchers in Africa that apart from storage space economy, the CD-ROM provides access to information held by important databases without laying cables.

Another type of CD available in the market and often used by researchers and authors is the Compact-Disc Read and Write (CD-RW). This CD allows future modification, deleting or alteration of information stored on it. Hence, a single CD can be used as many times as possible. The Digital Video Disc (DVD) which is also a Compact Disc type has a higher storage capacity and can be used to store text, graphics and video displays.

These and many more are the ways computer can be used in ICT application. How then do we access computer?

Access and types of access to computer

Although availability of computer may not necessarily translate to accessibility because accessibility has to do with the use of the computer rather than its mere presence, Adetimirin (2007) in her study revealed that Nigerian University Students can access computer and hence ICT in the university libraries, computer laboratories, school cybercafes and commercial cybercafes. She also noted that apart from a highly competitive price advantage, commercial cyber cafes use to open for longer periods than the university sponsored cybers. This made the students to have access to the ICTs for a longer period than would have otherwise been possible.

To her, the accessibility to ICTs will facilitate communication as the world has become a global village. It would also lead to access to large amount of information that a library cannot provide. Since the global trend is more on access than ownership, he maintained that access to ICTs will make more information available to students and staff for their various academic tasks.

In that regard, McMahon, J., and others (1999) opined that access to computer and ICT would improve learning, expand knowledge through access to various online databases, Internet access, email, group discussions and other activities.

However, computers can be accessed by both staff and students via: school (i.e. educational institutions), work environment, home, or through government / community and parental efforts. With regard to computer accessibility, The Tenafly Board of

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Education, Tenafly, New Jersey, USA, believes that the members of its educational community should be able to utilize every possible learning resources to maximize achievement and increase the probability for future success; providing students and staff with easy access to 'state of the art' computer technology and opportunities for instruction which will foster problem solving ability and the application of critical thinking skills. One of the Board mission statements is that Educators should be given opportunities to acquire, adapt, and develop materials that incorporate technology into the learning process and that the District should utilize technologies effectively to minimize the cost of administrative services. To ensure improved productivity and learning, therefore, students, faculty and staff are provided with on-going training and appropriate resources.

In addition, The Board of Education believes that all students in the Tenafly Public School District must develop expertise in using and applying current and emerging technologies which include hardware (e.g. computers, satellite, interactive video), software, network communications, and information resources, to support lifelong learning as these technologies have a tremendous potential to enhance curriculum, provide opportunities for individual learners, and enable the community to become a partner in the District's educational enterprise. Through the use of technology, students can access extensive information resources, participate in global communication and utilize powerful tools for creating and learning across the curriculum.

The Board appoints an Officer who will be responsible for: developing a formal district-wide process for assessing instructional materials and technology-based tools to determine their benefits to the educational process; reviewing and purchasing software; ensuring that technology is accessible to and usable by all in the school community, bearing in mind the importance of equity among schools; developing and enforcing rules of conduct related to the ethical and legal use of technology. In order to ensure that the above statement of belief is implemented and remains current, the Board directs the Superintendent or his or her designee to develop plans for a formal district-wide process for funding the necessary resources (hardware, software, communications, support services, subscriptions, training, among others).

The success story of Tenafly Board of Education, New Jersey is therefore an example of best practice at computer and hence ICT application in education which is

worthy of emulation by universities in developing countries. Are there any implications (legal, etc.) to computer and hence ICT accessibility?

Computer and ICT accessibility and legal implications

School sponsored computer networked services should be provided exclusively for educational purposes. Educational purposes however, are those that relate to or necessitate preparing for or completing lessons or classroom assignments, and, for employees, those purposes that relate to job performances. Though, the School ought to supports access by staff and students to information sources but should reserves the right to limit in-school use to materials appropriate to educational purposes; therefore, the School should provide electronic filtering while retaining the right to have personnel monitor network activity, in any form necessary, to maintain the integrity of the network and insure its proper use. The users of the school computer facilities will adhere to the university's contractual responsibilities as well as Local, State, Federal and International laws (Tenafly Board of Education, 2005).

Therefore, users should be prohibited from engaging in the following conduct and shall be subject to discipline and/or legal action for such conduct:

- using the computer system for or in support of illegal activities
- using the computer system in a way that violates university policy
- using the computer system to obtain or to transmit obscene materials
- using the computer system to send or display harassing, demeaning offensive speech or materials
- using the computer system to violate intellectual property rights
- using the computer system in a way that intentionally disrupts the network or the operation of the computer system, or wastes limited resources
- violating copyright laws that adhere to the provision of Public Law
- Illegal copies of copyrighted programs shall not be used on school equipment. The legal or insurance protection of the school shall not be extended to employees who violate copyright laws
- using others' accounts or giving others access to your account

- trespassing in others' folders, work or files, employing the network for commercial purposes, financial gain, or fraud. Hackers are involved in this nefarious act
- posting anonymous messages, gaining or seeking unauthorized access to resources, entities, or areas

Individuals violating this policy should be subject to appropriate discipline which could include, but not limited to:

1. use of network only under direct supervision; suspension of network privileges;
2. revocation of network privileges; suspension from school for students; letters of reprimand,
3. increment withholding or loss of employment for employees; and legal action and prosecution by the authorities without liability by the University.

Acceptable Use of Educational Technology Policy, including the Network and Internet agreement, should be signed by both the student and the student's parent/guardian before access is granted. This agreement will be in effect for the length of time that the student is enrolled in the school. Parents may request revocation of Internet privileges at any time. The Vice Chancellor should distributes to faculty and staff this policy while Faculty and staff sign an agreement stating that they have received the Acceptable Use of Educational Technology Policy and promise to adhere to it (Tenafly Board of Education, 2005). Notwithstanding the benefits of computer and ICT, there are many factors militating against their effective application and / or use.

Constraints to computer and ICT accessibility

The adoption of any learning tool in higher education is dependent on awareness, availability and ability to use it. Barraket and Scott (2001) in their study on students' experiences of ICT use in University of Technology, Sydney, Australia highlighted ready access to infrastructure, availability of facilities, maintaining and upgrading equipment as factors that affect the effective use of ICT. However, McMahon *et al.* (1999) in their

study on the factors that influence the way undergraduate students in UK universities use computers listed access, training and time as factors.

Impediments to the use of ICT facilities are also traced according to Anunobi (2006) to the society / government; university funding body and management; personnel and users and the peculiarity of ICT use. From the societal / government angle, Ogunleye (1997) pointed out that poor electricity supply, unfavourable government policy, lukewarm attitude towards the alleviation of the sufferings of the academic institutions, high cost of importation of ICT facilities, and insufficient fund allocation are some of the problems that hinder ICT use in Nigerian Universities. This viewpoint is supported by Adeyemi (2002). Oketunji, Daniel and Okojie (2002) included lack of telecommunication/ telephone facilities and Internet accessibility as constraints in their research on the use of ICT facilities in Nigerian Libraries.

Ayo (2001) informed that funds, which could have been used for ICT facilities are diverted. Attitude of some university management which are avert to electronics was mentioned by Ayo as another constraint. Lack of budget provision for purchase of ICT facilities by parent body and management was noted by Shaw (1982) and Chisenga (2004). The cost of purchase and maintenance of ICT facilities constituting a problem is clarified by Ogunleye (1997), Rubin (1998) and Obajemu et al. (2004) who informed that the use of ICT facilities require funds for the purchase of software and hardware, wiring, furniture and training. They also mentioned that accommodation could be a problem where new accommodation is required or the old ones modified to house the new facilities. Dankwa (2004) also asserted that the use of ICT facilities requires huge sum of money as fund is needed for cabling, networking cards, software administration and maintenance of file servers. Such money is not usually available for universities.

The impediments associated with personnel involve the unavailability of trained technical staff and difficulties in their recruitment. Even when they are recruited, according to Oni (1994), they require orientation on ICT operations. Also, some of those trained may leave immediately after their training. Adeyemi (2002) corroborated this view when he revealed that apart from the difficulties involved in getting them, the mobility rate of system analysts, programmers, engineers and technicians employed in universities is high due to poor pay structure. When trained, such staff moves to more lucrative areas. Dada (1994) also informed that fear and anxiety hinders ICT skill

acquisition by staff. Other writers who pointed out the problem of skilled staff and users as impediment to the use of ICT facilities include Cisse (2004), Badu (2004) and Akintunde (2004).

Again Elly (2003) noted that some of the electronic materials (offline) lend themselves only to single use. For instance, Gracia (2004) indicated that The Essential Electronic Agriculture Library (TEEAL) database, which is on CD-ROM, is not responsive to multiple use required by universities. According to him the cost of duplication of such ICT material is high.

Mckee (1996) identified the creation of new workflow and difficulty in taking statistics of use of materials in ICT form, fear of incomplete online serials materials, preservation and copyright provision difficulties as problems. Furthermore, Line (1996), informed that different CD-ROM and Internet portals present themselves through different operating systems and search engines, which therefore pose some difficulties in their use. He maintained that the use of electronic resources is also discouraged by small screen, slower process, prolonged scanning and lack of standards for automation. Other constraints to the provision of electronic information are the method of system selection and acquisition and how it is to be used. However, there will be need for increased knowledge of automated systems and electronic communications as well as network stations.

Madu and Adeniran (2005:84-85) says that another factor that has seriously affected the use of information technology in developing countries like Nigeria is political instability. This frequent change in government brings about changes in development programmes and policies. These policies affect not only the administration but also infrastructures. Some of these infrastructures are very relevant for successful implementation of a policy that supports information technology. For instance, the availability and use of telecommunication facilities and regular and uninterrupted power supply will enhance the use of information technology.

Entsua-Mensah (1998:118-125) sees another problem to the use of ICT in universities in African countries as the lack of the necessary organizational infrastructure to benefit from Internet access while Alemna (1999:167-170) identified the absence of national information policy. Kangulu and Wood (1995:343-358) on the other hand

identified lack of effective and efficient Government sponsored and supported National ICT Coordination Committee.

Janczewski (1992:187-311) in his opinion says that temperature, humidity and sterility are imperatives to the effective operations of electronic equipments in Tropical countries like Nigeria. It is true that computers are products of Western civilization, and anyone who wants to implement them must be aware of the climatic and cultural differences.

Villars (1996:259-272) in his own view enumerated some of the problems of the application of new technologies to include: the general lack of a strong conviction of the importance of scientific and technological information in all spheres of national development. Due to high level of poverty and inadequate basic infrastructure in the country, the potential ICT- using population lack what Soyibo, et al. (2002) call "buyer power".

Finally, Akinde (2005) in a related work on ICT application for library automation enumerated the following as constraints:

1. Computer system operational problems;

2. High cost of human- hardware - software necessary for ICT deployment;

3. The fast pace of change in technology;

4. Censorship through denial of access to some materials and people via password, user name, pin, encrypting, encoding and decoding, and so on;

5. Lack of standardization of local databanks and formats;

6. Lack of efficient local software vendors and/or computer contracting agencies and

7. Erratic electric power supply coupled with surges and spikes.

In another work on the possibilities of establishing a functional and sustainable virtual library, another application of ICT, Akinde (n.d) identified other constraints to include:

- Fear of job loss or staff becoming less important which may lead to sabotage of the ICT project;

- Insincere computer and ICT application installers causing "intentional breakdowns" in order to make inordinate gains;

- Problems with computer viruses, worms, macros, spasm, hackings and other malware which often cause setbacks and the attendant lags;

- Lack of adequate and/or required staff expertise to manage the ICT projects;

- Problems with 'back-ups' and data loss as a result of system and/or human errors and other unauthorized changes to data (whether deliberate or accidental);

- "Hangings" and computer system's slow response time;

- Problems of compatibility between or among versions of hardware, operating systems and other software within a particular University and between that University and other Universities as to allow for data migration, interaction and resource sharing;

- Intellectual property rights issues and problem with legal deposit of some digitized work made electronically available in the public domain;

- Deterioration of digital products when expose to hot, humid and dusty working environments common in the Tropics;

- Over-reliance on Consultants, System Analysts, System/Computer Engineers and Internet Service Providers (ISPs) and unduly mystifying technology instead of staff taking initiative to trouble-shoot whenever there is problem;

- A not-too-effective ICT Project Implementation Committee which will neither be able to provide technological leadership nor articulate a mission and/or vision statements that will drive the project and

- Lack of management commitment and lip-service to the ICT Project.

These, among others, are the constraints to computer and ICT accessibility. However, since it has been argued from the literature that computer and ICT is so beneficial, what then can we do to overcome these constraints in order to harness the gains of ICT as a facilitator of teaching, learning and research in FUTO?

Promoting computer and ICT accessibility in Higher Education

Nothwistanding the impediments to ICT use, many writers are optimistic that opportunities abound to improve its use. To improve the use of ICT therefore, Ojedokun (2000) suggested cooperation among developing countries in the areas of telecommunication industries development and ICT skills. Chesenga (2004) labeled it formulation of consortium.

Partnership for Higher Education in Africa (2002) and Cisse (2004) are of the view that formulation of Information Technology policies which will regulate tariff on ICT software and hardware importation and the use, will be of necessity. The policy should also include guidance and encouragement to institutions on the use of ICT facilities, also, external support should be sought to develop "information network" infrastructure. There is great information in African countries like Nigeria that could be used for development if it were appropriately accessed. Government should allocate financial resources towards documenting such information.

Development and improvement in the national and regional infrastructures needed for the use of ICT was advocated by Raseroka (1999); Shibands (2000) and Obajemu *et al.* (2004). These infrastructures include telecommunication facilities and electric power supply. Within the university environment, the acquisition and management of fund is recommended as one of the ways of enhancing the use of ICT facilities. This is necessary considering the enormous funds required to acquire, install and maintain ICT facilities in the university. Raseroka (1999) informed that government should provide and sustain financial support for ICT development to the universities in Africa. She also suggested that faculties should allocate a percentage of their budgets for development.

Omekwu (2001) advised that different allocation formula should be used for institutions with conventional information resources and those on electronic information resources, according to their relevance to the need of the users. Supporting that, Partnership for Higher Education in Africa (2002) encourages the provision of ICT budget different from the library budget. Obajemu *et al.* (2004) proposed increased expenditure ratio for the acquisition of non-print and above all, soliciting for grants locally and internationally to supplement university vote while external agencies should relate aid programmes to scientific and technological information where relevant, with emphasis on IT and related services as an integral component of assistance.

Another internal approach to improved ICT use is training of both staff and users. Chesenga (2004) and Akintunde (2004) recommended capacity building on the already employed staff and the recruitment of information professionals who are disposed to face the challenges of the newly electronically-enabled environment. The training should contain principles of maintaining systems, operating and caring for computers, sending and receiving e-mails. There should be skills on modern information and communication technology, electronic publishing, digital information management and knowledge management. Furthermore, they suggested training on management of text, voice and graphics found in new media of storage and access. There is also a need for such information professionals to be knowledgeable on the ways and means of search engines, electronic resources, Internet searching and connectivity, e-mail, software and hardware trouble-shooting.

British Library R&D (1993) recommended that in view of the widespread ignorance of the availability of the new research tools, libraries in academic and research institutions should routinely provide training for users and information providers in information access. In other words, the plan to provide and sustain funding followed by the provision of infrastructure and other logistics should be accompanied by the training of the information providers and consumers.

While Emeghara (2001) advocated that institutions should opt for very cheap, open and free library software and source for free online serials, Morino (1998:12) proposed changes in library organization to suit the current trend. Raseroka (1999) indicated that software and hardware should regularly be maintained and upgraded for data interaction, migration and longevity purposes. Tenafly Board of Education (2005) maintained that School Authorities should also provide both a comprehensive professional development plan for lecturers and administrators and an on-going support for the use of technology in education.

Riley, Richard W., a one-time U.S. Secretary of Education in a speech called on teachers, students, parents, and business people to build partnerships to advance the use of computers and the Internet for learning. Talking further he opined that:

> all of our students deserve well-trained teachers, Internet access, and appropriate educational technology in order to help them learn, to help

them get to college, and to help them succeed in 21st century jobs. To achieve this goal, we need to reach out to the poorest of the poor, which means working hard to provide equal access to a quality education. That is a key civil right for the 21st century. (IIP E-Journals, 2000).

In fact, the United States of America's bold and enviable step in ICT application in education is an example worth of emulation by the Nigerian government. This is because as U.S. educators and technology experts think about the classroom of the future, they see many new tools and possibilities, from e-books that carry literally limitless amounts of information to global classroom communities gathering scientific data in joint projects.

Furthermore, ensuring that teachers and students in U.S. schools -- particularly those in rural and economically disadvantaged areas -- have access to effective technology has been one of the President Clinton administration's major education initiatives since 1994. The passage of the Telecommunications Act of 1996 was one of the first steps to help accomplish this goal. The act increased access to telecommunications by establishing the "E-rate." Also known as the Universal Service Fund for Schools and Libraries, the E-rate gives discounts on the cost of telecommunications services and equipment to all public and private schools and libraries. Since its enactment, the program has provided more than $4,000 million in universal service funds -- lowering the cost of access to the Internet for schools and libraries.

This is confirmed by the study of the E-rate's implementation up to the year 2000, carried out by the Urban Institute (a Washington-based research organization), with funding from the U.S. Department of Education, It found that 75,000 schools, 13,000 school districts, and 4,500 library systems have applied for funding under the E-rate program to improve telecommunications equipment and services. The Urban Institute's analysis found that E-rate targeting works. The neediest schools were getting the most funds. According to the study, the poorest schools (those in which half their students were eligible for free and reduced-cost lunches) represented only 25 percent of public schools but received 60 percent of the funds.

Continuing, Riley (2000) in his earlier speech revealed that:

...that's only part of the progress. There's been more, as educators and policy-makers all over USA have come to the same realization about the imperative to incorporate the newest computer and communications technologies into the experiences of students. Developed with broad input from educators, academic experts, technology developers, and state business leaders, the U.S. Department of Education's National Plan for Educational Technology focused public, private, state, and local attention on educational technology for the first time.

In response, every state (in USA) has developed a plan to integrate the use of technology into instructional programs, to develop teacher training in these technologies, and to devise financing plans. In addition:

- Between 1993 and 1999, the percentage of classrooms with Internet access grew from 3 percent to 65 percent. By the end of the year 2000, 100 percent of schools are likely to be connected to the Internet and individual classroom connections will continue to increase.

- In 1993, only 19 percent of the nation's poorest schools had Internet access. By 1999, 90 percent were online.

- The percentage of teachers receiving professional development training in the use of information technologies increased from 51 percent in 1994 to 78 percent in 1998.

With these achievements as a strong foundation, and with the passage of six years since the development of the first plan, the USA Department of Education is now revising its National Plan for Educational Technology. The use of technology in education has catapulted to the forefront of USA national interest, based largely on its ever-increasing influence on economic growth, and its potential to transform the teaching and learning experience.

According to the Bureau of International Information Programs (IIP), U.S. Department of State (2000), the major priorities, in other words, are:

- All students and teachers will have universal access to effective information technology in their classrooms, schools, communities, and homes. This is because fostering learning anytime and anywhere requires the universal availability of the appropriate learning tools.

- All teachers will effectively use technology. The need for training is ongoing and must not only be about how to use technology, but also about how to support student learning.

- All students will be technologically literate and responsible cybercitizens. As understanding how to locate information, determine its relevance and accuracy, and then integrate it with other sources will be an ever-more important skill in a rapidly changing world.

- Research, development and evaluation will shape the next generation of technology applications for teaching and learning. The incorporation of technology into educational programs is not foolproof. It is critical that we know which methods are working and which are not as e-learning becomes a greater component of the instructional system.

- Education will drive the e-learning economy. The delivery of educational and related services over the Internet could well become the next most significant innovative application of the Internet, so we must also foster innovation in learning techniques.

The Bureau going further opined that information and computer technologies offer students multimedia, interactive capabilities, and access to knowledge and expertise located far from their classrooms. Hence, it insisted that technology must be an integral part of educational reform, but technology alone is not sufficient. Just as important is high-quality learning resources and well-trained, dedicated teachers in every classroom. Only then can students make the most of the new technologies. (IIP E-Journals, 2000).

Finally, Corbett and Williams (2002) and Nwankuo (2006) asserted that:

- The application of ICT will better equip the students with ICT knowledge necessary for rapid employment and enhance job performance in this prevalent information age;

- The application of ICT will improve the quality of education in schools;

- The application of ICT for communication will facilitate information transfer between staff and students in schools;

- The application of ICT will help the Schools to produce students with appreciable level of practical ICT knowledge and also widened their employment opportunities.

Summary

Relevant literature, on the concept and components of ICT, evolution of ICT in Nigerian university education, the role of ICT in teaching, learning, and research, the place of computer in ICT, access and types of access to computer, computer and ICT accessibility and legal implications, constraints to computer and ICT accessibility and promoting computer and ICT accessibility in higher education, have been reviewed under this section.

However, it should be noted that, presently, there is a dearth of empirical studies on access to and use of ICTs by both Nigerian university (teaching and non-teaching) staff and (postgraduate and undergraduate) students. It therefore, becomes imperative to carry out a study to investigate the scenario in some Nigerian universities and determine how computer and hence ICT is accessible to staff including faculty and undergraduates and graduate students of these universities. The main thrust of this paper therefore, is to investigate the accessibility or otherwise of computer and ICT to the Staff (Academic and Non-academic) and Students (Graduate and Undergraduate) of Federal University of Technology, Owerri, Nigeria.

RESEARCH METHODOLOGY

Introduction:

This chapter deals with the procedures and methods that were used in the study. By procedures and methods, the researchers mean the manner in which the research was carried out. Both primary and secondary sources of data were used in this research. The primary data were collected via the instruments while the secondary data were gathered from books, journals, past projects and theses, dictionaries, databases and the Internet.

This section therefore, will cover the following: Research design, Population of study, Sample size and sampling techniques, Instrument for data collection, Validation of Instruments, Procedures for data collection and Method of data analysis.

Research design:

Survey research design was adopted for the purpose of this study. This served as a guide for data collection. The use of survey research scheme became necessary because of the need, in this work, to intensively study and analyze situations or population's characteristics "as they are" without any control or manipulation after which conclusions and generalizations are made based on the research findings.

Population of the study:

The target population of this study is the total number of FUTO Students and Staff, which is 21,867 and 2,335 respectively (as at December, 2006). This figure is arrived at from an official document made available by the Office of the University Librarian.

Sample size and sampling techniques:

The sample size was 67% of Staff and 15% of Students while the sampling technique was stratified random sampling; the population was first stratified into departments / units taking into cognizance the department / unit staff and / or student size, after which the questionnaire was administered on both the students and staff randomly via the Heads of Department / Unit / Section.

Instrument for data collection:

The main instrument that was used for data collection in this study is the questionnaire, which was combined with documentary sources and observation for good effect. The choice of questionnaire became necessary because of the fact that it is fast, easy and cheap to administer considering the number of respondents, their dispersion, the time and financial constraints.

The two types of questionnaires were served on FUTO Students and Staff as stated earlier, they contained three sections. Section A was on biographical data while Section B dealt with Access, Type of access to computer and the constraints to computer accessibility. Section C however, invited suggestions on how to enhance FUTO Students and Staff access to computer as we seek to realize an ICT-compliant FUTO. In all, the Students' questionnaire had four (4) unstructured, open-ended questions and seven (7) structured, close ended questions while the Staff questionnaire equally had four (4) unstructured, open-ended questions and ten (10) structured, close ended questions. This is to enable easy collation and empirical analysis. The said questionnaire was developed by the researchers from the insight gotten from the review of related literature on access to computer and ICT.

Documentary sources like FUTO @ 25; FUTONEWS; Reports, Addresses, Speeches, Minutes of Management meetings, among others were consulted and used to collect data on FUTO past initiatives on ICT applications instead of the interview earlier proposed.

Validation of instrument:

Validation of instrument is for the purpose of verifying whether a measuring instrument measures what it is designed to measure, to validate the said questionnaires therefore, the researchers subjected them to several touches and vetting by some experts in the field who helped in verifying the exhaustiveness or otherwise of the content in line with the research objectives, also, the exercise helped in removing some ambiguities and items that might have otherwise been misconstrued.

Procedure for data collection:

The researchers visited all FUTO academic and non-academic Departments or Units to give the questionnaires to the Head of Department / Unit with a cover letter appealing to these Heads for assistance in administering the questionnaires to their staff and / or students. However, the questionnaires were (normally) collected back at the first / second visit after they were given out.

Method of data analysis:

Descriptive analysis was adopted. Descriptively, data were analyzed using tables, simple percentages, and frequency distribution.

DATA ANALYSIS AND INTERPRETATION OF FINDINGS

Introduction:

This chapter contains the analysis and interpretation of data, which were collected via the use of questionnaire from FUTO Staff and Students. While tables were used in the presentation of the data, simple percentages, and frequency distribution were employed in the analysis of the data. The analysis and interpretation of data were, therefore, grouped under three broad headings as follows: Distribution and return rate of instrument, Analysis of biodata and Analysis of data on research questions and objectives. The data were thus grouped, to allow for easier and clearer presentation.

Distribution and return rate of instrument:

In all, 1,557 copies of the questionnaire were given out to Staff and 3,280 copies to Students. Out of the 1,557 questionnaires distributed to Staff, only 494 were retrieved. The 494 being 31.73% rate of return and 21.16 % of FUTO Staff population. While 1,642 copies were duly completed and returned by Students; the 1,642 represented 50.06% rate of return and 7.51% of FUTO Students' population. Thus, subsequent analysis will be based on the copies of the questionnaires returned by the respondents.

ANALYSIS OF STAFF DATA

Staff's data will be analyzed as it pertained to their biographical data and research objectives.

Analysis of staff's bio-data:

The analysis of bio-data is necessary to find out whether access to computer is a function of qualification obtained, rank / designation, sex, age, marital status, job status, nature of appointment and work, and parental status.

Hence, Questions 1-10 of the staff's questionnaire will be used in analyzing the biographical details of the staff respondents of this study.

Table I indicates the qualification obtained to date by FUTO staff.

Table I: QUALIFICATION OBTAINED TO DATE

S/N	QUALIFICATION	FREQUENCY	(%)
1	First School Leaving Certificate	7	1.42
2	WASCE,GCE,NEC,NABTEB, etc	81	16.40
3	NTC, OND, NCE, HND, etc.	73	14.78
4	PGD, Bsc, B.A, B. Eng/Tech; B.ed	119	24.09
5	Msc, MBA, M.Eng/Tech; M.Edu, MA, M. Phil, etc.	125	25.30
6	Ph.D.	41	8.30
7	No response	48	9.72
	Total	**494**	**100**

In Table 1, a total of 125 or 25.30% of the staff respondents were Master degree holders; 119 or 24.09% had either a Bachelor degree or Postgraduate Diploma in various field; 81 or 16.40% had Senior Secondary School Certificate or equivalent; 73 or 14.78% had Ordinary National Diploma, Higher National Diploma, National Certificate in Education, among others while 41 or 8.30% and 7 or 1.42% had Doctorate Degree and First School Leaving Certificate respectively. However, 48 or 9.72% of the staff respondents did not indicate their qualification.

Table II shows the rank or status of the staff respondents. It was found as shown in Table II that 127 or 23.18% of the academic staff employed by FUTO participated in the study while 309 or 17.29% of the non-academic FUTO staff participated in the study. In all, 54 or 17.48% of the non-academic staff representing 10.93% of Staff respondents are Secretaries, Computer Analysts, Data Analysts, Typists and Computer Operators while 34 or 11.00% of the non-academic staff representing 6.88% of Staff respondents are Assistant Registrars. 33 or 25.98% of the academic staff representing 6.68% of Staff respondents are Lecturers / Librarians II while 30 or 9.71% of the non-academic staff representing 6.07% of Staff respondents are Library Supervisors, Assistants, Attendants and/or Porters.

Table II: RANK / DESIGNATION

S/N	RANK Academic	FREQUENCY	TOTALS	% OF ACADEMIC	OVERALL %
1.	Professors and UL	9		7.09	1.82
2.	Readers, Associate Professors / DUL	8		6.30	1.62
3.	Senior Lecturers/ Librarians	19		14.96	3.85
4.	Lecturers/ Librarians I	10		7.87	2.02
5.	Lecturers/ Librarians II	33		25.98	6.68
6.	Assistant Lecturers/ Librarians	29		22.84	5.87
7.	Graduate Assistants	19		14.96	3.85
	Totals		127	100	
	Non-Academic			% OF NON-ACADEMIC	
1.	Deputy Registrars	5		1.62	1.01
2.	Assistant Registrars	34		11.00	6.88
3.	Administrative Officers	15		4.85	3.04
4.	Executive Officers	11		3.56	2.23
5.	Secretaries / Computer Analysts / Data Analysts / Typists / Computer Operators	54		17.48	10.93
6.	Clerical Supervisors / Officers / Assistants	28		9.06	5.67
7.	Bursar and Accountants	10		3.24	2.02
8.	Masters (of the University Staff School and FUTO International School)	19		6.15	3.85
9.	Catering Officers	2		0.65	0.41
10.	Security Officers	6		1.94	1.22
11.	Library Officers	16		5.18	3.24
12.	Library Supervisors / Assistants / Attendants / Porters	30		9.71	6.07
13.	Medical Doctors / Pharmacists / Pharmacy Technicians	5		1.62	1.01
14.	Nursing Officers / Midwives	8		2.59	1.62
15.	Health Assistants / Supervisors	3		0.97	0.61
16.	Academic Planning Officers	3		0.97	0.61
17.	Technologists	14		4.53	2.83
18.	Farm Officers / Supervisors / Agric. Superintendents	5		1.62	1.01
19.	Craftsmen / Foremen / Engineers	13		4.21	2.63
20.	Laboratory Attendants	2		0.65	0.41
21.	Transport Supervisors / Drivers / Mechanics	4		1.30	0.81
22.	Store Officers / Supervisors	3		0.97	0.61
23.	Caretakers / Messengers	9		2.91	1.82
24.	Others	10		3.24	2.02
	Totals		309	100	
25.	No response	58	58		11.74
		Grand total	494		100

Furthermore, a total of 29 or 22.84% of the academic staff representing 5.87% of Staff respondents are Assistant Lecturers/ Librarians while 28 or 9.06% of the non-academic staff representing 5.67% of Staff respondents are Clerical Supervisors /

Officers and / or Assistants. 19 or 14.96% of the academic staff representing 3.85% of Staff respondents are Senior Lecturers/ Librarians and Graduate Assistants while another 19 or 6.15% of the non-academic staff representing 3.85% of Staff respondents are Master from the University Staff (Primary) School and FUTO International (Secondary) School. 16 or 5.18% of the non-academic staff representing 3.24% of Staff respondents are Library Officers with 15 or 4.85% of the non-academic staff representing 3.04% of Staff respondents as Administrative Officers. While 14 or 4.53% of the non-academic staff representing 2.83% of Staff respondents are Technologists, 13 or 4.21% of the non-academic staff representing 2.63% of Staff respondents are Craftsmen / Foremen and / or Engineers.

In addition, 11 or 3.56% of the non-academic staff representing 2.23% of Staff respondents are Executive Officers while 10 or 7.87% of the academic staff representing 2.02% of Staff respondents are Lecturers/ Librarians I. Another 10 or 3.24% of the non-academic staff representing 2.02% of Staff respondents are Bursar and Accountants. Finally, it is interesting to note that 9 Professors including the University Librarian participated in the study.

Table III on the other hand, indicated the sex of the staff respondents.

Table III: SEX (STAFF)

S/N	SEX	FREQUENCY	%
1.	MALE	237	47.98
2.	FEMALE	249	50.41
3.	No response	8	1.62
	Total	**494**	**100**

It was shown in Table III that 249 or 50.41% of the staff respondents are female while 237 or 47.98% of them are male. A total of 8 or 1.62% of them did not reveal their sex.

Table IV however, displays the age of the staff respondents as follows:

Table IV: AGE (STAFF)

S/N	AGE	FREQUENCY	%
a.	30years and below	92	18.62
b.	31-40years	194	39.27
c.	41-50years	142	28.75
d.	51-65years	50	10.12
e.	No response	16	3.24
	Total	494	100

From Table IV, it was revealed that 194 or 39.27% of the staff respondents are within the 31-40years age bracket while 142 or 28.75% of the staff respondents are within the 41-50years age bracket. 30years and below are 92 or 18.62%; 51-65years, 50 or 10.12% and 'No response' 16 or 3.24%.

Table V shows the marital status of staff respondents as displayed below:

Table V: MARITAL STATUS (STAFF)

S/N	STATUS	FREQUENCY	%
i.	Married	347	70.24
ii.	Single	119	24.09
iii.	Divorced	-	-
iv.	No response	28	5.67
	Total	494	100

Table V reveal that a total of 347 or 70.24% of the staff respondents were married, 119 or 24.09% single, none admitted to be a divorcee while 28 or 5.67% did not give any response to the question probably because they were divorced and are not ready to accept the social stigma that goes with it especially, in developing countries like Nigeria.

The Job Status of Staff respondents are shown below in Table VI as indicated:

Table VI: JOB STATUS (STAFF)

S/N	STATUS	FREQUENCY	%
a.	Full time	449	90.89
b.	Part time	14	2.83
c.	No response	31	6.28
	Total	494	100

In Table VI, it was shown that 449 or 90.89% of the staff respondents were on full time appointment while 14 or 2.83% were on part time. However, 31 or 6.28% for reasons best known to them did not indicate their job status.

Table VII displays the nature of the respondents' appointment as follows:

Table VII: NATURE OF APPOINTMENT

S/N	NATURE	FREQUENCY	%
1.	Tenure	430	87.05
2.	Temporary	23	4.66
3.	Contract	8	1.62
4.	No response	33	6.68
	Total	**494**	**100**

It was found as displayed in Table VII that 430 or 87.05% of the respondents are on tenure appointment; 23 or 4.66% on temporary appointment while 8 or 1.62% are on contract appointment. 33 or 6.68% however, gave no response.

Table VIII on the other hand indicated the nature of work of the staff respondents.

Table VIII: NATURE OF WORK

S/N	NATURE	FREQUENCY	%
i.	Academics	127	25.71
ii.	Administrative / Professional	314	63.56
iii.	Technical	43	8.71
iv.	Others	10	2.02
	Total	**494**	**100**

It was revealed in Table VIII that a total of 314 or 63.56% of the staff respondents perform Administrative / Professional duties while 127 or 25.71% are academics. 43 or 8.71% offer Technical services whereas the remaining 10 or 2.02% did not disclose the nature of their work.

The result in Table IX revealed the parental status of the staff respondents as shown below:

Table IX: PARENTAL STATUS OF STAFF

S/N	STATUS	FREQUENCY	%
A	Parent (of child above 18years)	99	20.04
B	Parent (of child under 18years)	226	45.75
C	Non parent (no child yet)	148	29.96
D	No response	21	4.25
	Total	494	100

As revealed in Table IX, a total of 226 or 45.75% of the staff respondents are parents of at least a child under 18years; 99 or 20.04% are parents of at least a child above 18years; 148 or 29.96% however, have no child yet while 21 or 4.25% gave no answer to the question.

Findings:

From the analysis and interpretation of staff respondents biographical details, it can therefore be said that majority of the staff respondents are second degree holders, administrative / professional staff, female, in the 31-40 years age bracket, married, on full time, tenure appointment, and parents of (at least) a child under 18 years.

Analysis of data on research questions:

In all, the research had four research questions. The data collected will be analyzed to satisfy and answer these questions.

Research Question I:

Do FUTO Staff have access to computer?

Answers to Question 11 of the staff's questionnaire will be analysed to answer this research question. Hence, Table X was therefore generated to display staff access to computer.

Table X: ACCESS TO COMPUTER (STAFF)

S/N	RESPONSE	FREQUENCY	%
1.	Yes	482	97.57
2.	No	12	2.43
	Total	494	100

Table X discloses that 482 or 97.57% of the staff respondents have access to computer while 12 or 2.43% have no access to computer whatsoever.

Findings:

Majority of the staff respondents have access to computer. This is not surprising because of the fact that many staff who confessed to be computer illiterate and who probably may not have access to computer, refused filling or returning the questionnaire administered on them.

Research Question II:

What type of access to computer FUTO Staff has?

This research question is divided into four (do they have access at school, work, home and through government / community / parental efforts?) as contained in question 12 of the Staff questionnaire. Tables XI - XIV were as a result developed.

Table XI: ACCESS AT THE SCHOOL ATTENDED (STAFF)

S/N	NATURE	FREQUENCY	%
(i)	Computer training required for partial fulfillment of the requirements of a course I attempted or a Degree I acquired	170	39.26
(ii)	Occasional seminar / workshop on computer skills acquisition organized by the school I attended (or I am attending)	96	22.17
(iii)	The Business Centers operating in the environment of the school I attended (or I am attending)	128	29.56
(iv)	Past Industrial Attachment / NYSC postings	39	9.01
	Total	433	100

From Table XI, 170 or 39.26% of the staff respondents had access to computer at the School they attended (or are attending) via computer training required for partial fulfillment of the requirements of a course; 128 or 29.56% had access to computer at the School they attended (or are attending) via Business Centers operating in the environment of the said School. However, 96 or 22.17% maintained that they had access to computer while at School via occasional seminar / workshop on computer skills acquisition

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organized by the said School. Finally, 39 or 9.01% had access to computer via past Industrial Attachment and / or NYSC postings.

The result displayed in Table XII shows the nature of staff access at work.

Table XII: ACCESS AT WORK

S/N	NATURE	FREQUENCY	%
(i)	Computers assigned to perform official duties	149	38.21
(ii)	Computers made available in other Sections of my Department	90	23.08
(iii)	Computers made available in other Departments of FUTO (e.g. The Library, Computer centre, ICT centre, EEE cyber café / Energy centre, Etc.)	117	30.00
(iv)	Sponsorship (by FUTO) to computer skill acquisition and capacity building courses and conferences	34	8.72
	Total	390	100

In Table XII, 149 or 38.21% of the staff respondents had access to computer at work in the course of performing their official duties. While 117 or 30.00% had access to computer at work via computers made available in other Departments of FUTO (e.g. The Library, Computer centre, ICT centre, EEE cyber café / Energy centre, Etc.), 90 or 23.08% had access to computers made available in other sections of their Department (i.e. computers not found on their tables or in their immediate vicinity). Finally, 34 or 8.72% remembered that they had access to computer via sponsorship (by FUTO) to computer skill acquisition and capacity building courses and conferences.

Table XIII on the other hand, shows staff respondents' access to computer at home as follows:

Table XIII: ACCESS AT HOME (STAFF)

S/N	NATURE	FREQUENCY	%
(i)	Personally acquired computer (e.g. mobile and portable Laptops which gives access mainly to the owner)	208	43.15
(ii)	Neighbours' computers	15	3.11
(iii)	Business Centers in my home environment	178	36.93
(iv)	Family computers (e.g. Desktops stationed at home which provides access to members of the family)	60	12.45
(v)	Computers placed on rentals	21	4.36
	Total	**482**	**100**

Table XIII shows a total of 208 or 43.15% staff who revealed that they had access to computer at home via personally acquired computers; 178 or 36.93% had access to computer at home via Business Centers in their home environment while 60 or 12.45% had access to computer at home via family computers (i.e. computers acquired by spouses and relations). Finally in this regard, 21 or 4.36% of the staff respondents had access to computer at home via computers placed on rentals while 15 or 3.11% had access to computer at home via neighbours' computers.

Table XIV displays the nature of other types of access the staff respondents have as follows:

Table XIV: ACCESS VIA GOVERNMENT / COMMUNITY / PARENTAL EFFORTS

S/N	NATURE	FREQUENCY	%
(i)	Public / Community Libraries	36	19.57
(ii)	Communities' telecentres or via computers placed in other public domains	40	21.74
(iii)	Sponsorship to computer training by philanthropic organizations and individuals, NGO, Government Agencies (e.g. NUC, ETF, etc.), parents, trade unions, etc.	56	30.44
(iv)	Gift and donations of computers by Government Agencies, well-meaning individuals and organizations, parents and relations, etc.	52	28.26
	Total	**184**	**100**

Table XIV shows that a total of 56 or 30.44% of the staff respondents had access to computer via sponsorship to computer training by philanthropic organizations and individuals, NGO, Government Agencies (e.g. NUC, ETF, etc.), parents, trade unions, and etc. while 52 or 28.26% had access to computer via gift and donations of computers by Government Agencies, well-meaning individuals and organizations, parents and relations, etc. On the other hand, 40 or 21.74% had access to computers via Communities' telecentres or computers placed in other public domains while 36 or 19.57% had access to computer via Public / Community Libraries.

Findings:

It was found that majority of the staff respondents had access to computer at home via personally acquired computer; Business Centers in their home environment; at School attended via computer training required for partial fulfillment of the requirements of a course and Business Centers operating in the environment of the School attended (or attending); at work via computers assigned to perform official duties (included among these are Secretaries, Typists and Computer Operators) and finally, via sponsorship to computer training by philanthropic organizations and individuals, NGO, Government Agencies (e.g. NUC, ETF, etc.), parents, trade unions, etc.

Research Question III:

What are the various constraints to computer accessibility as perceived by FUTO Staff?

To satisfy this research quetion, question 13 of the staffs' questionnaire was utilized. Table XV was therefore drawn as a result.

Table XV showed the constraints to computer accessibility as perceived by FUTO Staff respondents.

Table XV: CONSTRAINTS TO COMPUTER ACCESSIBILITY

S/N	DESCRIPTION OF CONSTRAINTS	FREQUENCY	(%)
(a)	Low income / salary level	244	11.96
(b)	Low exposure and poor educational level	163	7.95
(c)	Sex	10	0.49
(d)	Age	48	2.34
(e)	Lack of personal interest, drive and motivation	176	8.58
(f)	Conservatism and aversion to innovation	107	5.22
(g)	Family commitment	118	5.75
(h)	Computer hardware and other accessories are too expensive	203	9.90
(i)	Technophobia and lack of self confidence	89	4.34
(j)	Computer is seen as a threat to tenure and human resources staffing	38	1.85
(k)	High cost of acquiring computer skills and aptitude by individual staff	186	9.07
(l)	Lack of time because of heavy workload	210	10.24
(m)	Non - familiarity with new technologies	135	6.58
(n)	Worry about porn, theft, fraud and other crimes perpetrated through computer	49	2.39
(o)	Government and FUTO inaction at providing computers and computer training to staff	269	13.12
(p)	Others (please, specify) Erratic power supply 3 Lack of maintenance culture 1 Lack of Internet facilities in every department 1 Misappropriations of funds meant for technical innovation 1	6	0.29
	Total	**2,051**	**100**

The result in Table XV reveals that a total of 269 or 13.12% of the staff respondents identified Government and FUTO inaction at providing computers and computer training to staff as a constraint to staffs' computer accessibility while 244 or 11.96% saw low income / salary level as a constraint. 210 or 10.24% insisted that lack of time because of heavy workload is a constraint to their accessing computer. 203 or 9.90% on the other hand opined that the high cost of computer hardware and other accessories is responsible for their inability to access computer while 186 or 9.07% identified high cost of acquiring computer skills and aptitude by individual staff as a constraint.

However, 176 or 8.58% of them saw lack of personal interest, drive and motivation as an hinderance to computer accessibility while 163 or 7.95% maintained that low exposure and poor educational level is a constraint to computer accessibility. 135 or 6.58% revealed non-familiarity with new technologies as another constraint. In addition, 118 or 5.75% of the staff respondents which the researchers believed are married identified family commitment as a constraint to computer accessibility while 107 or 5.22% saw conservatism and aversion to innovation also as a constraint.

Findings:

The constraints to computer accessibility as perceived by FUTO Staff respondents, among others, are: Government and FUTO inaction at providing computers and computer training to staff; low income / salary level; lack of time because of heavy workload; high cost of computer hardware and other accessories; high cost of acquiring computer skills and aptitude by individual staff; lack of personal interest, drive and motivation; low exposure and poor educational level; non-familiarity with new technologies; family commitment; conservatism and aversion to innovation; lack of maintenance culture and misappropriations of funds meant for technical innovation.

Research Question IV:

How can FUTO Staff's access to computer be enhanced in order to realise an ICT-compliant FUTO?

This research question was answered by analyzing the answers to question 14 of the Staffs' questionnaire. Hence, Table XVI was designed as a result.

Table XVI: SUGGESTIONS FROM STAFF RESPONDENTS

S/N	ITEMS	FREQUENCY	%
1.	Computerization of all aspects of administrative and academic activities in FUTO	8	2.03
2.	Staff should be given computer in their offices and be assisted through Soft loans, Private / Public Partnership Initiatives, etc. to acquire personal computers	124	31.47
3.	Intranet and Internet facilities / services should be provided free to staff to allow for efficiency in administration and to ease communication	16	4.06
4.	There should be reward and recognition for staff who excel in computer operations and applications	2	0.51
5.	Computer literacy should be a prerequisite for future employments and promotions	8	2.03
6.	Computer maintenance workshops to promptly take care of breakdowns and repairs internally should be established	5	1.27
7.	Transparency of leadership and administrations & Re-orientation of Leaders and Staff	7	1.78
8.	Creating a functional computer pool, laboratories, etc. where staff will have free access with a special password or pin	10	2.54
9.	Computer laboratories in each Department / Unit which will be accessible to all categories of staff	63	15.99
10.	Free, seasonal and mandatory staff training during work hours and long vacation by collaborating with private computer training institutes	143	36.29
11.	Power supply	8	2.03
	Total	**394**	**100**

From Table XVI, 143 or 36.29% of staff respondents suggested that there should be free, seasonal and mandatory staff training during work hours and long vacation by collaborating with private computer training institutes while 124 or 31.47% advised that staff should be given computer in their offices and be assisted via Soft loans, Private / Public Partnership Initiatives, etc. to acquire personal computers. 63 or 15.99% appealed to the management to establish Computer laboratories in each Department / Unit which will be accessible to all categories of staff while 16 or 4.06% recommended that Intranet and Internet facilities / services should be provided free to staff to allow for efficiency in administration and to ease communications.

Finally, 8 or 2.03% of them suggested that of all aspects of administrative and academic activities in FUTO should be computerized and that Computer literacy should be a prerequisite for future staff employments and promotions while 7 or 1.78% advised that there should be transparency of leadership and administrations & re-orientation of leaders and staff.

Findings:

The staff respondents suggested, among others, that: there should be free, seasonal and mandatory staff training during work hours and long vacation by collaborating with private computer training institutes; staff should be given computer in their offices and be assisted via Soft loans, Private / Public Partnership Initiatives, etc. to acquire personal computers; Computer laboratories should be established in each department / unit which will be accessible to all categories of staff; Intranet and Internet facilities / services should be provided free to staff to allow for efficiency in administration and to ease communications; all aspects of administrative and academic activities of FUTO should be computerized; computer literacy should be a prerequisite for future staff employments and promotions; transparency of leadership and administrations & re-orientation of leaders and staff and that there should be a Computer maintenance workshops to promptly take care of breakdowns and repairs internally.

ANALYSIS OF STUDENTS' DATA

Students' data will be analyzed as it pertained to their biographical data and research questions.

Analysis of Students' bio-data:

The analysis of bio-data is necessary to find out whether access to computer is a function of type of course in view and the level, sex (as male are said to be more computer compliant than female), job status (since an employer can provide a computer in the office and also because job will give an employed student financial edge over unemployed counterparts) and marital status (as spouse may help in procuring a computer). Hence, Questions 1-7 of the students' questionnaire were used in analyzing the biographical details of the students' respondents, while the result is displayed in Table XVII.

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Table XVII: SCHOOL (FACULTY)

S/N	OPTION	FREQUENCY	PERCENTAGE (%)
1.	SMAT	118	7.19
2.	SOSC	278	16.93
3.	SOHT	162	9.87
4.	SEET	819	49.88
5.	SAAT	196	11.94
6.	SPGS	37	2.25
7.	Pre-degree	5	0.31
8.	Anonymous	27	1.64
	TOTAL	1,642	100

From Table XVII, it was discovered that 819 or 49.88% of the students studied were from the SEET, while 278 or 16.93% were from SOSC. This is followed by 196 or 11.94% from SAAT and 162 or 9.87% from SOHT. SMAT, SPGS and Pre-degree had 118 or 7.19%, 37 or 2.25% and 5 or 0.31% respectively. However, a total of 27 or 1.64% did not state their School / Department.

Table XVIII shows the level of study of the student respondents as follows:

Table XVIII: LEVEL (if undergraduate)

S/N	OPTION	FREQUENCY	PERCENTAGE (%)
A	100	187	11.89
B	200	252	16.02
C	300	409	26.00
D	400	228	14.50
E	500	387	24.60
F	Postgraduate and others	110	6.99
	Total	1,573	100

The result shown in Table XVIII revealed that a total of 409 or 26% of the students studied were in 300 Level; 387 or 24.60% in 500 Level; 252 or 16.02% in 200 Level; 228 or 14.5% in 400 Level; while 187 or 11.89% of the Undergraduate Student respondents are in 100 Level. However, 110 or 6.99% of the Student respondents are Graduate student respondents including those undergraduates who did not indicate their level.

Table XIX shows the sex of student respondents as follows:

Table XIX: SEX (STUDENTS)

S/N	OPTION	FREQUENCY	PERCENTAGE (%)
A	MALE	1,150	70.04
B	FEMALE	483	29.42
C	No response	9	0.55
	Total	1,642	100

According to the result shown in Table XIX, 1,150 or 70.04% of the student respondents are male while 483 or 29.42% are female. However, 9 or 0.55% did not state their sex.

The result in Table XX shows the job status of the student respondents.

Table XX: JOB STATUS (STUDENTS)

S/N	OPTIONS	FREQUENCY	PERCENTAGE (%)
A	Fully-employed	50	3.05
B	Part-time	66	4.02
C	Unemployed	1,093	66.57
D	No response	433	26.37
	Total	1,642	100

In Table XX, it was revealed that 1,093 or 66.57% of the students were unemployed, 66 or 4.02% were partly employed while 50 or 3.05% were fully employed. However,

433 or 26.37% gave no response to this question probably because they are not presently employed.

Table XXI reveals the marital status of the student respondents as indicated:

Table XXI: MARITAL STATUS

S/N	STATUS	FREQUENCY	PERCENTAGE (%)
1.	Married	33	2.01
2.	Single	1,590	96.83
3.	No response	19	1.16
	Total	**1,642**	**100**

As revealed in Table XXI, 1,590 or 96.83% of the students were singles while 33 or 2.01% of them were married. However, 19 or 1.16 of the student respondents did not disclose their marital status possibly because they were not married.

Findings

From the analysis and interpretation of student respondents' biographical data therefore, it can be said that majority of the student respondents for this research were, from the School of Engineering and Engineering Technology (SEET) (this is not surprising since SEET is the largest School in FUTO), in 300 Level, Male, Unemployed and Single.

Analysis of data on research questions:

In all, the research fielded four questions. The data collected was analyzed to answer these research questions.

Research Question I:

Do FUTO Students have access to computer?

Question 8 of the students' questionnaire was analysed to answer this question.

Table XXII displays student respondents accessibility or otherwise to computer.

Table XXII: ACCESS TO COMPUTER

S/N	RESPONSE	FREQUENCY	%
1.	Yes	1,587	96.65
2.	No	55	3.35
	Total	1,642	100

As displayed in Table XXII, student respondents totaling 1,587 or 96.65% have access to computer while 55 or 3.35% of them have no access whatsoever to computer.

Findings:

Majority of the student respondents have access to computer.

Research Question II:

What type of access to computer FUTO Students have?

This research question is divided into three (types of access at school, home, and government / community / parental efforts) as contained in questions 9 of the Students questionnaire. Tables XXIII - XXVI were as a result developed.

Table XXIII: ACCESS AT THE UNIVERSITY

S/N	NATURE OF ACCESS	FREQUENCY	(%)
(i)	Computer training required for partial fulfillment of the requirements of a course	440	23.31
(ii)	Occasional seminar / workshop on computer skills acquisition organized by my Department / School	157	8.32
(iii)	Business Centers operating in the School Environment	989	52.38
(iv)	Industrial Attachment / Students Work Aid Scheme	301	15.94
	Total	1,888	100

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From Table XXIII, 989 or 52.38% of the student respondents had access to computer at School via Business Centers operating in the School environment; 440 or 23.31% had access to computer at School via Computer training required for partial fulfillment of the requirements of a course (e.g. CSC 201); 301 or 15.94% of them had access to computer at School via Industrial Attachment / Students Work Aid Scheme undertook in the past while 157 or 8.32% had access to computer at School via occasional seminar / workshop on computer skills acquisition organized by their Department / School.

Table XXIV shows the nature of computer access the students have at home.

Table XXIV: ACCESS AT HOME

S/NO	NATURE OF ACCESS	FREQUENCY	(%)
(i)	Personally acquired computer	463	20.70
(ii)	Friends' and Neighbours' computers	173	7.73
(iii)	Business Centers in my home environment	917	40.99
(iv)	Parents' or relatives' computers	273	12.20
(v)	Computer gift by parents and relatives	97	4.34
(vi)	Sponsorship to computer training by parents and relatives	314	14.04
	Total	2,237	100

In Table XXIV, 917 or 40.99% of the student respondents had access to computer at home via Business Centers in their home environment; 463 or 20.70% of them had access to computer at home via personally acquired computer; however, 314 or 14.04% of the students had access to computer at home via sponsorship to computer training by parents and relatives; another 273 or 12.20% of them had access to computer at home via Parents' or relatives' computers while a total of 173 or 7.73% of the student respondents had access to computer at home via friends' and neighbours' computers. Finally, 97 or 4.34% of them had access to computer at home via computer gift by parents and relatives.

The result in Table XXV indicates the access to computer by student respondents gotten through government, community, parental efforts, among others.

Table XXV:

ACCESS VIA GOVERNMENT / COMMUNITY / PARENTAL EFFORTS

S/NO	NATURE OF ACCESS	FREQUENCY	(%)
(i)	FUTO library, Public / Community libraries	269	30.57
(ii)	Sponsorship to computer training by philanthropic organizations and individuals, NGO, Government agencies, etc.	191	21.71
(iii)	Gift and donations of computers by government agencies, well-meaning individuals and organizations, etc.	161	18.30
(iv)	Computers placed on rentals	189	21.48
(v)	Computers in my workplace	70	7.96
	Total	**880**	**100**

In Table XXV, 269 or 30.57% of the students had access to computer via FUTO library, Public / Community libraries while a total of 191 or 21.71 had access to computer via sponsorship to computer training by philanthropic organizations and individuals, NGO, Government agencies, and others. A total of 189 or 21.48% of them had access to computer via computers placed on rentals while an additional 161 or 18.30% of the student respondents had access to computer via gifts and donations of computers by government agencies, well-meaning individuals and organizations, and such others. However, 70 or 7.96% of the students who were either fully or partly employed had access to computer in their workplace.

Findings:

Though, majority of the student respondents seems to have access to computer at School / Home, such access is provided mainly by the Business Centers / Commercial Cyber-cafes operating in the School and in their Home environments, while some on the other hand get their computer access through personally acquired systems, parental and employers' efforts and Libraries. FUTO effort in providing access to computer via "computer training as a requirement for partial fulfillment of a course (e.g. CSC 201)" is somehow reasonable but become insignificant when compared with access given by the private sector.

Research Question III:

What are the various constraints to computer accessibility as perceived by FUTO Students?

To answer this research question, question 10 of the students' questionnaire was analyzed. Table XXVI was therefore drawn as a result.

Table XXVI: CONSTRAINTS TO COMPUTER ACCESSIBILITY

S/N	DESCRIPTION OF CONSTRAINTS	FREQUENCY	(%)
(a)	Poverty and low income	809	12.30
(b)	Low exposure and educational level	648	9.85
(c)	Sex	13	0.20
(d)	Age	22	0.33
(e)	Lack of personal interest, drive and motivation	414	6.30
(f)	Conservatism and aversion to innovation	220	3.35
(g)	Computer hardware and other accessories are too expensive	666	10.13
(h)	Technophobia and lack of self confidence	218	3.32
(i)	High cost of acquiring computer skills and aptitude by individual student	798	12.14
(j)	Lack of time because of heavy workload	842	12.80
(k)	Non familiarity with new technologies	464	7.06
(l)	Worry about porn, theft, fraud and other crimes perpetrated through computer	139	2.11
(m)	Lack of adequate computers and computer training provided to students by Government and FUTO	1,155	17.58
(n)	Computer is seen as a threat to tenure and human resources staffing	72	1.09

(o)	Others (Please, specify)		96	1.46
	- Leaders and Lecturers are not computer literate	7		
	- Computer literacy is not emphasized in all courses of study in FUTO	12		
	- Lack of Computer orientation as part of School Orientation for new intakes	12		
	- Little practical or hands-on exposure of Students, even those studying Computer Science	8		
	- Inappropriate Computer – Students ratio leading to overcrowding of facilities during practical	9		
	- Erratic power supply	10		
	- Little or no private / public initiatives in computer acquisition	4		
	- Ill-equipped Computer and ICT Laboratories and Libraries	24		
	- Lack of maintenance culture and Leaders covetousness in diverting the money meant for that purpose	9		
	- Health hazards from exposures to the emissions from computer	1		
Total			**6, 576**	**100**

Table XXVI displays various constraints to computer accessibility as perceived by the student respondents. 1,155 or 17.58% of the student respondents identified lack of adequate computers and computer training provided to students by Government and

FUTO as a constraint to computer accessibility; 842 or 12.80% opined that lack of time because of heavy workload is a constraint to students' computer accessibility; 809 or 12.30% saw poverty and low income as another constraint to computer accessibility; 798 or 12.14% maintained that high cost of acquiring computer skills and aptitude by individual student is a constraint to computer accessibility; on the other hand 666 or 10.13% asserted that computer hardware and other accessories are too expensive while 648 or 9.85% identified low exposure and educational level as factors affecting students' access to computer.

Another 464 or 7.06% of the student respondents stated that their non-familiarity with new technologies is an hinderance to their computer access. Furthermore, 414 or 6.30% opined that lack of personal interest, drive and motivation is responsible for their lack of access to computer while 220 or 3.35% maintained that conservatism and aversion to innovation is a constraint to computer accessibility. In addition, 218 or 3.32% insisted that technophobia and lack of self-confidence can hinder students' access to computer while 139 or 2.11% are worried about the pornographies, theft, fraud and other crimes perpetrated through computer.

Findings:

The student respondents identified, among others, lack of adequate computers and computer training provided to students by Government and FUTO; lack of time because of heavy workload; poverty and low income; high cost of acquiring computer skills and aptitude by individual student; high cost of computer hardware and other accessories; low exposure and educational level; non-familiarity with new technologies; lack of personal interest, drive and motivation; conservatism and aversion to innovation; technophobia and lack of self-confidence; worry about the pornographies, theft, fraud and other crimes perpetrated through computer; lack of maintenance culture and leaders covetousness in diverting the money meant for that purpose, as constraints to computer accessibility.

Research Question IV:

How can FUTO students' access to computer be enhanced in order to realise an ICT-compliant FUTO?

This research question was answered through question 11 of the students' questionnaire. Hence table XXVII was as a result designed.

Table XXVII: SUGGESTIONS FROM STUDENTS' RESPONDENTS

S/N	SUGGESTIONS	FREQUENCY	%
i	Free and compulsory computer training across all levels in an enabling environment especially during holiday and weekends (NIIT& other computer training institutes can be invited)	230	15.47
ii	At most, two students per computer ratio during practical	49	3.30
iii	Computer laboratories in each FUTO academic departments and / or school and integration of computer appreciation into every course / programme run by FUTO at all level of study.	226	15.13
iv	Constant power supply made possible by standby (24hours) power generating plants	15	1.01
v	Qualified computer experts should be employed; while computer literacy should be made compulsory for all FUTO Lecturers and Technologists and a requisite for graduating students	78	5.25
vi	Free computer, computer subsidy and computer loan made possible by Governments, NGO, Computer-manufacturing companies, Oil companies, FUTO Co-operative, SUG, PMF, etc.	133	8.94
vii	Computer orientation via seminars, workshops, FUTO posting students on SIWES to ICT-compliant industries, etc.	128	8.61
viii	More computers, more and affordable (preferably free) cyber cafés, expanded e-library, functional and accessible computer laboratories, all located within students' proximity (AfriHUB can be contacted)	386	25.96
ix	Lecturers should give more computer-oriented assignments and lectures instead of stale notes (Projects, Seminars, IT report should be presented in PowerPoint Slides)	57	3.83
x	CSC 201 for instance and other computer related courses should be made more practical oriented	113	7.60
xi	Intensify security to protect students who are computer owners and secure their computers while in school	4	0.27
xii	Officers should be held accountable for funds placed in their custody to stop corruption and inefficiency from those at the top	12	0.81
xiii	Site visit to other Schools who have distinguished themselves in ICT applications e.g. UNILAG, UNIBEN, Covenant University, UNEC, NAU, Federal Polytechnic, Nekede, etc.	11	0.74
xiv	More indigent students should be enrolled in the Student work aid schemes, also bursaries, involvements in paid manual labour for building contracts awarded by the University, etc. should be given to improve students' financial status. Also, Best Student, Best Behaved Student, Most Computer Literate Student, etc. can be given computer prizes	22	1.48
xv	Faulty computers should be repaired, obsolete ones upgraded or disposed of and tutorials on computer programming and applications should be reviewed to reflect recent / modern trends	23	1.55
	Total	**1,487**	**100**

From Table XXVII, a total of 386 or 25.96% of the student respondents suggested that there should be more computers, more and affordable (preferably free) cyber cafés, expanded e-library, functional and accessible computer laboratories, all located within students' proximity while 230 or 15.47% of them advised that there should be free and compulsory computer training across all levels, in an enabling environment, especially during holiday and weekends. They advised that NIIT & other computer training institutes can be invited;

A total of 226 or 15.13% of the students appealed passionately to the management to establish Computer laboratories in each FUTO academic Departments and / or Schools and integration of computer appreciation into every course / programme run by FUTO at all levels of study while an additional 133 or 8.94% of the students suggested that there should be computer gifts, computer subsidy and computer loan made possible to students by Governments, NGOs, Computer-manufacturing companies, Oil companies, FUTO Co-operative, SUG, PMF, etc. In addition, 128 or 8.61% of the student respondents pleaded for computer orientation via seminars, workshops, FUTO posting students on SIWES to ICT-compliant industries, and such other trainings.

Table XXVII also reveals a total of 113 or 7.60% of the student respondents advising that CSC 201 for instance and other computer related courses should be made more practical oriented.

Findings:

The student respondents suggested, among others, that to enhance students access to computer in order to realize an ICT-compliant FUTO, there should be more computers, more and affordable (preferably free) cyber cafés, expanded e-library, functional and accessible computer laboratories, all located within students' proximity; free and compulsory computer training across all levels, in an enabling environment, especially during holiday and weekends; establishment of Computer laboratories in each FUTO academic departments and/or school and integration of computer appreciation into every course and/or programme run by FUTO at all level of study; computer gifts, computer subsidy and computer loan should be given to students by Governments, NGOs, Computer-manufacturing companies, Oil companies, FUTO Co-operative, SUG, PMF,

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and others; computer orientation programmes to be organized via seminars, workshops, FUTO posting students on SIWES to ICT-compliant industries, and so on; faulty computers should be repaired, obsolete ones upgraded or disposed of and tutorials on computer programming and applications should be reviewed to reflect current trends and that CSC 201 and other computer related courses should be made more practical oriented.

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Introduction

In this section, the summary of the findings were discussed, conclusions were reached based on the findings while recommendations based on the conclusions reached were presented. The section concluded with the limitation of the study.

Summary and Discussions:

Following the literature review and the presentation, analyses and interpretation of data, it was found that:

Though, majority of the student and staff respondents have access to computer, such access is provided by the Business Centres and/or Commercial Cybercafés operating in the University and in their home environments, while some, especially staff, get their main computer access through personally acquired systems. For some others, their access to computer was made possible via computers assigned to perform official duties at work and via sponsorship to computer training by philanthropic organizations and individuals, NGO, Government Agencies (e.g. NUC, ETF, etc.), Parents, Trade Unions, Libraries, etc. FUTO effort in providing students' and staff's access to computer via "computer training as a requirement for partial fulfilment of a course (e.g. CSC 201)" and "computers assigned to perform official duties" is somehow reasonable but become insignificant when compared with access given by the private sector.

These findings are in line with the study of Adetimirin (2007) who revealed that Nigerian university students can access computer and hence ICT in the university libraries, computer laboratories, school cyber cafes and commercial cyber cafes while Akinde (2005) also opined in her work that computers can be accessed by both students and staff via: school (i.e. educational institutions), work environment, home, or through government / community and parental efforts.

Furthermore, some of the students and staff studied saw, among others, lack of adequate computers and computer training provided to students and staff by FUTO and Government as a constraint to their access to computer and hence ICT. This finding is related to the finding in the research carried out by Kangulu and Wood (1995:343-358)

where they identified lack of effective and efficient Government sponsored and supported National ICT Coordination Committee. Anunobi (2006) corroborated this view further, while writing on the impediments to the use of ICT facilities, according to her, these impediments are traced to the society and/or government; university funding body and management. From the societal and/or government angle, Ogunleye (1997) and Adeyemi (2002) pointed out that poor electricity supply, unfavourable government policy, lukewarm attitude towards the alleviation of the sufferings of the academic institutions, high cost of importation of ICT facilities, and insufficient fund allocation, according to them, are some of the problems that hinder ICT use in Nigerian Universities. In this regard, lack of budget provision for purchase of ICT facilities by parent body and management was noted as a constraint by Shaw (1982) and Chisenga (2004) as stated earlier in the literature.

Poverty and low income or salary level as a constraint was identified by Soyibo, et. al. (2002) when he argued that "because of high level of poverty and inadequate basic infrastructure in the country, the potential ICT- using population lack what is called "buyer power".

High cost of computer hardware and other accessories being a constraint is pointed out by Rubin (1998), Dankwa (2004) and Obajemu *et al*. (2004) who informed that the use of ICT facilities require huge sum of money for the purchase of software and hardware, software administration, wiring, cabling, networking cards, furniture, training, maintenance of file servers, etc. For instance, Gracia (2004) indicated that *The Essential Electronic Agriculture Library (TEEAL)* database, which is on CD-ROM, is not responsive to multiple use required by universities. Hence, for Universities to make an effective use of this resource it need to be duplicated and the cost of duplication of such ICT material, according to him, is high. Such money is not usually available for Nigerian Universities.

Conservatism and aversion to innovation as a constraint was supported by Ayo (2001) who insisted in his study that the attitudes of some university management are averse to technology. Related to this constraint is another one highlighted in the work of Dada (1994) and also found in this study as technophobia, lack of self-confidence and non-familiarity with new technologies; which in other words he termed "fear and anxiety".

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Misappropriations of funds meant for technical innovation as constraints to computer accessibility was mentioned by Ayo (2001) who alleged that funds, which could have been used for ICT facilities are diverted by University Managers and Administrators.

However, other constraints as identified by the study are lack of time because of heavy workload; high cost of acquiring computer skills and aptitude by individual student and/or staff; low exposure and educational level; lack of personal interest, drive and motivation; family commitment; lack of maintenance culture and worry about the pornographies, theft, fraud and other crimes perpetrated through computer.

In addition, respondents to this study, suggested, among others, that to enhance students' and staff's access to computer as we seek to realize an ICT-compliant FUTO, there should be more computers, more and affordable (preferably free) cybercafés, expanded e-library, functional and accessible computer laboratories, all located within students' and staff's proximity.

Both the student and staff respondents suggested that Computer laboratories should be established in each FUTO academic departments and/or school which will be accessible to all categories of staff and students which may be made possible, according to Raseroka (1999) by faculties allocating certain percentage of their budgets for ICT development. Supporting that, Partnership for Higher Education in Africa (2002) encourages the provision of ICT budget different from the library budget. Obajemu *et al*. (2004) proposed increased expenditure ratio for the acquisition of non-print and above all, soliciting for grants locally and internationally to supplement university vote while external agencies should relate aid programmes to scientific and technological information where relevant, with emphasis on IT and related services as an integral component of assistance.

The respondents also asked for free regular and compulsory computer training across all levels, in an enabling environment, especially during work or lecture hours, holidays and weekends by collaborating with private computer training institutes while qualified computer experts should be employed and computer literacy be made a requisite for staff employment and promotion. This was the opinion of Chesenga (2004) and Akintunde (2004) when in their study they recommended capacity building on the already employed staff and the recruitment of information professionals who are disposed

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to face the challenges of the newly electronically-enabled environment. According to them the training should contain principles of maintaining systems, operating and caring for computers, sending and receiving e-mails. Also, there should be skills on modern information and communication technology, electronic publishing, digital information management and knowledge management. Furthermore, they suggested training on management of text, voice and graphics found in new media of storage and access. There is also a need for such information professionals to be knowledgeable on the ways and means of search engines, electronic resources, Internet searching and connectivity, e-mail, software and hardware trouble-shooting.

In this regard, British Library R&D (1993) recommended that in view of the widespread ignorance of the availability of the new research tools, libraries in academic and research institutions should routinely provide training for users and librarians in information access. In other words, the plan to provide and sustain funding followed by the provision of infrastructure and other logistics should be accompanied by the training of the information providers and consumers while the School Authorities should, according to Tenafly Board of Education (2005), also provide both a comprehensive professional development plan for lecturers and administrators and an on-going support for the use of technology in education. This is similar to the suggestions made in this study that lecturers should give more computer-oriented assignments and lectures to students instead of stale notes; that projects/ theses/dissertation, seminar papers and IT reports should be presented in PowerPoint Slides and that computer literacy should be made compulsory for all FUTO lecturers and Technologists like in USA where all teachers are expected to effectively use technology and where the need for training is ongoing and must not only be about how to use technology, but also about how to use it to support student learning.

Advising further, the respondents insisted that computer appreciation should be integrated into every course or programme run by FUTO at all level of study. This is in line with the proposal by the USA Government to every state in USA, that each state should develop a plan to integrate the use of technology into instructional programs, to develop teacher training in these technologies, and to devise financing plans (US Department of States, 2000).

While student respondents advocated for computer gifts, computer subsidy and computer loan by Governments, NGOs, Computer-manufacturing companies, Oil companies, FUTO Co-operative, SUG, PMF, among others; staff respondents appealed for computers in their offices and that they should be assisted via Soft loans, Private and/or Public Partnership Initiatives, and such like to acquire personal computers. This, according to Riley, Richard W., (a one time U.S. Secretary of Education), should not be seen as asking for too much, this he said in a speech, while calling on teachers, students, parents, and business people to build partnerships to advance the use of computers and the Internet for learning. To him, all of USA students deserve well-trained teachers, Internet access, and appropriate educational technology in order to help them learn, to help them get to college, and to help them succeed in 21st century jobs. To achieve this goal, therefore, the US Government is poised to reach out to the poorest of the poor, this means working hard to provide equal access to a quality education. That is a key civil right for the 21st century. According to the Bureau of International Information Programs (IIP), U.S. Department of States (2000), the major priority, in other words, is that all students and teachers will have universal access to effective information technology in their classrooms, schools, communities, and homes. This is because fostering learning anytime and anywhere requires the universal availability of the appropriate learning tools.

Hence, the U.S. Department of Education's National Plan for Educational Technology focused public, private, state, and local attention on educational technology (IIP E-Journals, 2000), while the use of technology in education has catapulted to the forefront of USA national interest, based largely on its ever-increasing influence on economic growth, and its potential to transform the teaching and learning experiences (US Department of Education, 2000). What a challenge! Little wonder the student respondents of this study demanded that computer literacy should be made a requisite for graduating students as in the case of USA where all students are expected to be technologically literate and responsible cybercitizens. This is because understanding how to locate information, determine its relevance and accuracy, and then integrate it with other sources will be an ever-more important skill in a rapidly changing world.

However, both student and staff respondents of this study insisted that there should be transparency and accountability of leadership and administrations. This was in line with the studies carried out by Raseroka (1999); Shibands (2000) and Obajemu *et al.*

(2004) where they recommended in addition to these, a good management of fund. Talking of re-orientation of leaders and staff Riley (2000) revealed that "educators and policy-makers all over USA have come to the same realization about the imperative to incorporate the newest computer and communications technologies into the experiences of students". It has been realized that that technology must be an integral part of educational reform, but technology alone is not sufficient. Just as important is high-quality learning resources and well-trained, dedicated teachers in every classroom as mentioned earlier, only then can students make the most of the new technologies.

Raseroka (1999) indicated that software and hardware should regularly be maintained and upgraded for data interaction, migration and longevity purposes. This is in line with one of the suggestions of staff respondents of this study that there should be Computer maintenance workshops to promptly take care of breakdowns and repairs internally while student respondents advised that Bad computers should be repaired, obsolete ones upgraded and tutorials on computer programming and applications should be reviewed to reflect recent trends.

Finally, staff respondents asked for free Intranet and Internet facilities /services, to allow for efficiency in administration and to ease communications. They also desired to see all aspects of administrative and academic activities of FUTO computerized while student respondents suggested that computer orientation programmes should be organized via seminars, workshops, FUTO posting students on SIWES to ICT-compliant industries, among others; and that CSC 201 and other computer related courses should be made more practical oriented. More importantly, we should not forget that education will drive the e-learning economy. The delivery of educational and related services through computers could well become the next most significant innovative application of ICT; hence, we must foster innovation in learning techniques.

Conclusions

Based on the findings of the study, the following conclusions have been reached:

- Majority of the student and staff respondents have access to computer.

- The access is provided by the Business Centres and/or Commercial Cyber cafés operating in the School and in their home environments, while some,

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especially staff get their main computer access through personally acquired systems. For some others, their access to computer was made possible via computers assigned to perform official duties at work and via sponsorship to computer training by philanthropic organizations and individuals, NGOs, Government Agencies (e.g. NUC, ETF, etc.), Parents, Trade Unions, Libraries, etc. FUTO effort at providing students and staff access to computer via "computer training as a requirement for partial fulfilment of a course (e.g. CSC 201)" and "computers assigned to perform official duties" is somehow reasonable but become insignificant when compared with access given by the private sector.

- Lack of adequate computers and computer training provided to students and staff by FUTO and Government; lack of time because of heavy workload; poverty and low income or salary level; high cost of acquiring computer skills and aptitude by individual student and/or staff; high cost of computer hardware and other accessories; low exposure and educational level; non-familiarity with new technologies; lack of personal interest, drive and motivation; conservatism and aversion to innovation; technophobia and lack of self -confidence; family commitment; lack of maintenance culture and worry about the pornographies, theft, fraud and other crimes perpetrated through computer, were identified among others, as constraints to computer accessibility.

- Respondents to the study, suggested, among others, that: there should be more computers, more and affordable (preferably free) cybercafés, expanded e-library, functional and accessible computer laboratories, all located within students' and staff's proximity; free, seasonal and compulsory computer training across all levels, in an enabling environment, especially during work or lecture hours, holidays and weekends by collaborating with private computer training institutes; qualified computer experts to be employed; Computer laboratories should be established in each FUTO academic Department and/or Schools which will be accessible to all categories of staff and students and that computer appreciation should be integrated into every course/programme run by FUTO at all levels of study; computer gifts,

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computer subsidy and computer loan by Governments, FUTO, NGOs, Computer-manufacturing companies, Oil companies, FUTO Co-operative, SUG, PMF, among others; free Intranet and Internet facilities and/or services, to allow for efficiency in administration and to ease communications; all aspects of administrative and academic activities in FUTO computerized; computer literacy to be a prerequisite for future staff employments and promotions; transparency of leadership and administrations & a re-orientation of leaders and staff; computer orientation programmes organized via seminars, workshops, FUTO posting students on SIWES to ICT-compliant industries, and such others; CSC 201 and other computer related courses should be made more practical oriented; computer literacy to be made compulsory for all FUTO Lecturers and Technologists and a requirement for graduating students; lecturers to give more computer-oriented assignments and lectures to students instead of stale notes and that projects/theses/dissertation, seminars, IT reports should be presented in PowerPoint Slides; Computer maintenance workshops should be established to promptly take care of breakdowns and repairs internally while faulty computers should be repaired, obsolete ones upgraded or disposed and tutorials on computer programming and applications should be reviewed to reflect current trends.

Recommendations

To further enhance the access of FUTO Students and Staff to computer and ICT in order to realize an ICT-compliant FUTO, the following recommendations were made based on the conclusions of the study:

- FUTO should take steps to strengthen existing ICT related centers like the University Computer Centre, MIS, ICT Directorate, EEE Cyber café, Energy Research Centre, e-Library in the University Library, among others and encourage the setting up of new ICT training Units, update and standardize curriculum of Computer Science Department, Computer Engineering Department, Information Management Department and other IT-related departments; introduce new technologies through linkages with global IT firms, develop strong local

ICT-compliant faculty, and provide students scholarships to study ICT related-courses via Public-Private Partnership initiatives.

- Teacher/lecturer training should remain a top-priority which should be organized to meet the growing demand for qualified teachers in ICT and for upgrading their skills regularly. To rapidly build human capacity in ICT, short-term, on-the-job and hands-on training programs should be launched. Special ICT center for the lecturers should be established and lecturers should use relevant technologies to communicate with students in other to enhance ICT access at school.

- To ensure maximum utilization of existing facilities, FUTO should collaborate with the private sector in conducting training programs during vacations and at other times when the facilities are not in use to help prospective students and those students on holidays to use their waiting / leisure time profitably.

- The Federal Government should introduce mandatory ICT literacy courses for all levels of technical and administrative personnel in Federal Universities using engineers, scientists, technologists and technicians engaged in these universities.

- Governments and FUTO should also make a special effort to train and induct women and people with special needs in ICT use in order to give them equal opportunity in the workplace and bridge the digital divide.

- FUTO goal should be that by the end of 2009, there should be a core group of ICT users and professional trainers in each Department and/or Unit of the Institution, who were trained both inside and outside the country.

- The nation's development partners and/or corporate bodies should be utilized as training consultancy firms for consistency in transfer of knowledge.

- A study should be undertaken and sponsored by the government to determine the most appropriate computer to student ratio for adoption at all levels of the educational system, since it has been found that providing students with greater access to schoolroom computers will facilitate skills development and help prepare them for life and work in the digital economy.

- After the completion of the study recommended above, The *Computers for Schools* (CFS) *Programme* should be put in place to explore the feasibility of governments and private sector organizations "donating" their surplus computers

for use in universities. It should be remembered that the use of recycled computers also provides an opportunity for on-the-job experience for recent IT graduates working in specialized refurbishing or training centers. School-based computer repair workshops can also be incorporated into the general curriculum providing real world skills and entry-level employment opportunities and experience for students.

- Another critical component of ICT-enhanced education will be the professional training and support of School Heads, and School ICT Managers so that they have a greater understanding of ICT and how it can be use both as a classroom tool and as educational content. The first phase of the said *Professional Development Programme* will be the training of a group of teachers and school administrators who will serve as ICT managers/coaches in their respective Schools/Faculty. An intensive training programme, focused on basic computer use and maintenance, the use of the Internet and school network, and basic ICT education will then follow. Later phases of the *Professional Development Programme* will seek to broaden the number of teachers and administrators who have basic ICT skills and to integrate ICT's into all aspects of the curriculum and educational management system in order to develop the ICT-use skills for life-long learning, career and/or labour information, interview and recruitment.

- "Student Connections", a programme of specialized ICT training for company Chief Information Officers (CIOs), Policy makers and planners and Senior Managers could be developed through FUTO Consult. This programme will help senior business people to better understand how ICTs and the Internet can be effectively applied as business tools to increase productivity, profitability and organizational effectiveness. This programme will also serve as another important step in developing local capacity and technological empowerment of the private sector which will impact positively on the economy. Specially trained students from FUTO could also be seconded to small businesses or non-profit organizations to assist with the adoption of ICTs. The companies will benefit from increased understanding and better use of ICTs. In return, the students, who will be paid for their services, will gain valuable job experience.

- The management of Nigerian Universities should increase the numbers of computers and other ICT resources provided in their universities and *improve computer access* in libraries, laboratories and in all other information resource centres on their campuses and *enhance collaboration* with other campuses within and outside the nation.

- Nothing less than 30% of the budgets should be devoted to technology development in the libraries. Besides, some five to ten percent should be set apart annually for maintenance of ICT equipment and infrastructure in the university libraries. The libraries would also need to subscribe and provide access to more online journals, electronic databases, procure CD-ROMs and other electronic materials. The intervention of the private sector organizations, philanthropists, alumna and other donors could be solicited for this task. However, quality should not be compromised in accepting donations. Support could also be obtained from some international organizations. Consortium with other academic libraries may improve access to electronic resources, cooperation on acquisition and cataloguing and other opportunity for resource sharing. Virtual libraries would be more viable as databases could be developed. Library resources could be shared and accessed by clients of all the libraries in Nigerian universities and globally.

- Users should be personally charged for any unauthorized costs incurred in their use of the technology and held responsible for any damages caused by their intentional misuse of the data or voice network.

- The proposal from Oceanic Bank to provide 200 computers and Internet facility through endowment should be vigorously pursued. Also, two or more private Internet providers can be allowed to co-exist in the Campus with their activities streamlined in such a way that registered students and staff can have one or two hours free browsing per week.

- Government emphasis on ICT education in both primary and secondary schools could also be supported, encouraged, elaborated and furthered. Since this will catch them young and serve as a basis for ICT use in higher education.

- Local businesses and private sector training organizations should be encouraged to offer greater levels of ICT training. Major employers and providers of distance

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learning should work with Government to examine the finance and ICT architecture needed for the development of a national life-long-learning (i.e. continuing education) ICT model for Nigeria.

- Since Business Centers and Commercial Cybercafés at FUTO get the most patronage (for now) from both Students and Staff of FUTO, it is hereby recommended that they should be given due recognition by the authority and their activities and prices controlled, in other to allow for healthy competition among them and a price-advantage on the part of FUTO students and staff.

- Since the present work has to do not only with computers, but also with ICT, it is therefore suggested, with regards to electronic backup and documentation, that any individual who is responsible for the creation and maintenance of a particular part of the University ICT content should also be trained to be responsible for the backup of his or her work. This include saving all documents and/or work, so that *a new staff will be able to seamlessly continue work from where his predecessor stops.*

- Finally, The University System Administrator should maintain the servers with the goal of providing continuous service, constant server-up time and timely responses to requests from users. Whenever possible, this Officer will keep the servers' software current, prominently displaying contact information for users, roaming the University Web site for broken links and/or pages out of compliance with University's policy and blocking or deactivating such and immediately notifying the appropriate authorities concerning any violations and their implications on the System. He should also promptly update information on the University Web and ensure that the pages present an overall professional quality that reflects organization, validity and consistency.

Limitations of the study

This study has some limitations arising from the following constraints:

The researcher encountered no less difficulty in winning the interest and commitment of some respondents, especially staff, in promptly filling and returning the questionnaire administered on them. Some of the respondents felt that the questionnaire

was more or less a source of public exposure of their personal secrets and hence approached the filling with suspicion. Many who were not computer literate were afraid that the outcome of the research will lead to their retrenchment while some bluntly refused to fill the questionnaire in spite of persuasions and many visits.

Hence, many of the questionnaire that were given out could not be retrieved on the second visit(s) after administration as earlier proposed in the study, a lot of time and money were therefore spent in shuttling between the offices and/or classrooms of the respondents in order to collect back copies of the questionnaire given out, as a result, some copies of the questionnaires could not be filled and/or retrieved while many of the questionnaire were declared lost or misplaced by some Heads of Department and/or Unit and sometimes the Secretaries and/or the Departmental Administrative Officers (DAOs) who were often delegated or assigned to help in the questionnaire administration. Though, such lost questionnaires were always replaced but the responses at these second attempts were not always encouraging. It was also discovered during sorting and analysis that two DAOs and/or Secretaries filled the questionnaires by themselves instead of taking the pains of administering them to the actual respondents. Therefore, staff rate of return of the questionnaire was low. To boost this low return rate, some questionnaires were later administered in the lecture rooms, libraries, lecturers' personal offices, and other venues like the meeting of the Congregation, among others. Friends and family members were also mobilized to ensure the success of the questionnaire administration.

While some students were so passionate in their appeal to the management to provide more and easy access to computers, others were not in any way polite in their (written) language when asked to advice on how to enhance students' access to computer in order to realise an ICT-compliant FUTO. However, the researchers were able to 'sieve the wheat from the tare' in compiling the student respondents' suggestions. Notwithstanding these difficulties, the research was conducted and successfully completed.

REFERENCES

Adetimirin, A. E. (2007). Availability, accessibility and use of Information and Communication Technologies by undergraduates in Nigerian universities: What role for University Libraries? (Pp.25-30). In: Compendium of papers presented at the Nigerian Library Association Annual National Conference / AGM, Uyo, Akwa Ibom, 9th-14th September, 2007.

Adeyemi, B. M. (2002). Problems and challenges of automating cataloguing process at Kenneth Dike Library, University of Ibadan, Nigeria. *African Journal of Library Archives and Information Science.*12 (2), 13-222.

Agbaje, A. A. (2002). Great expectations: serials management and information technology. In: Madu, E.C & Dirisu, M.B.(Eds.) *Information science and technology for library schools in Africa.* (Pp. 25-36).Ibadan: EVI- Coleman Publication.

Agbonlahor, R. (2005). Utilisation levels and attitudes towards Information Technology among Nigerian university lecturers. Ph. D Thesis. Africa Regional Centre for Information Science. University of Ibadan, Nigeria.

Ajileye, E. D. (1996). Internet technology in the academics: implications for libraries in Nigeria. A workshop report on the effective management of polytechnic libraries. Nov. 19-21.

Akinde, T. A. (2005). Automation of Nigerian libraries: The preliminaries, implications and constraints. *Owena Journal of Library Science.*Vol.2 (2), December, 2005.

Akinde, T. A. (n.d). Towards establishing functional and sustainable virtual libraries in Nigerian universities (Yet to be published).

Akintunde, S.A. (2004). Libraries as tools for ICT development. Paper presented at the 42nd National Conference & AGM of the Nigerian Library Association at Solton Hotel, Akure. 20-25 June, 2004.

Alabi, G. (2004). A survey of information policies in Nigeria. Preliminary report.

Alasa and Kelechukwu (1998). Internet and academic library services development in Nigeria. A paper presented at the National Conference/AGM of the NLA held in Abuja on May 4-8 1998. Pg. 1.

Alemna, A. A. (1999). The impact of new information technology in Africa. *Information Development.*15 (3). Pp. 167-170.

American Library Association (1993*). The ALA glossary of library and information science*, Chicago: ALA .

Anunobi, C. V. (2006). ICT application to serial management: A study of some selected academic libraries in the South Eastern Nigeria. PhD thesis. University of Nigeria, Nsukka.

Anyakoha, M. W. (1987). The new information technology: report of a recent course in Great Britain. Paper presented at the University of Nigerian Library Staff Seminar, Nsukka. Pg. 3

Asiegbu, L.C. (Ed.) (2006). Federal University of Technology, Owerri at 25 (1980-2006) Owerri: O'Desy Concerns Nigeria Ltd.

Ayo, T. A. (2001). Information and communication technologies and the information professionals in the information age: The Nigerian perspectives. In: Compendium of papers presented at the 39th National Annual Conference and AGM, Imo Concorde Hotels Owerri, 17-22, June.

Badu, E.E. (2004). Strategic management of information technology (IT) in university libraries in Ghana. *The Information Technologist* 1(1&2), 25-37.

Ballentyne, P. (2003). Information management trends. INASP Newsletter 23, 5-6.

Barraket, J. and Scott, G. (2001). Virtual equality? Equity and the use of Information Technology in Higher Education. *Australian Academic and Research Libraries,* Vol. 32 (3) Retrieved from http://alia.org.au/publishing /aarl/32.3/full.text/barraket.scott.html.

Blurton, C. (1999). *New directions in education.* UNESCO's World Communication and Information 1999 – 2000. Paris: UNESCO, 46 – 61.

Botto, F. (1993). *Multimedia, CD-ROM and compact disc: A guide for users and developers.* 2nd ed. Wilmslow: Sigma Press.

British Library R&D Report 6123 (1993). *The Scientific, technical & medical information system in UK.* London: Royal Society.

Bureau of International Information Programs (IIP) (2000). E – Journals. U.S. Department of State, USA.

Capron, H. I. (2000). *Computers: Tool for an information age.* New Jersey: Prentice Hall.

Chesenga, J. (2004). ICT in Libraries: an overview and general introduction to ICT in

libraries in Africa . INASP ICT Workshop, Kopanong Hotel & Conference Centre, Johannesburg South Africa 21st-23rd July, 2004. <http://www.inasp.into/isp /ict-workshop2004>.

Chuene, M. M. (2001). The effect of information technology on library acquisitions: Experiences at the University of the North, South Africa. *African Journal of Library, Archives and Information Science 11* (2), 25-28.

Cisse, C. (2004). Access to electronic information and information research. *SCAULWA Newsletter 5* (1), 14-17.

Cochrane, P.A. (1992). Information technology in libraries and Ranganathan's five laws of library science. *Libri* 42 (3), 235 – 241.

Corbett, B. & Williams, J. (2002). Information and Communication Technology: Access and use. *Education Review Quarterly,* Vol. 8(4): 8-14.

Compton, A. (1994). CD-ROM technology: Hardware and software. In Lisbeth, A. (ed.) *CD-ROM for African research needs: Some basic guidelines.* (Pp. 1-5), Levey Washington: American Association for the Advancement of Science.

Dada, A.S. (1994). On-line information retrieval. Paper presented at the National workshop on computers in libraries at Nigerian Institute of International Affairs, Lagos. March, 1994.

Daniel, J. O. & Matthews, O.G. (2000). Strategies and new tools for information delivering in the research and academic libraries in the new millennium. *Paper* presented at the Annual Conference of the Nigerian Library Association, Abuja, 25th –30th , June, 2000.

Dankwa, W.A. (2004). Networking computers: how it works (technical aspect). Paper presented at the Standing Conference of Africa University Libraries Western Area (SCAULWA) at Gimpa Greenhill, Accra Ghana, September 10-11.

Duncombe, R and Heek, R. (1999). *Information, ICTS and small enterprise*: *Findings from Botswana.* Manchester: University of Manchester, Institute for Development Policy and Management. *Working paper*

Ebijuwa, A. S. (2005). Information and communication technologies in university libraries: the Nigerian experience. *Journal of Library and Information Science.* 7(1&2), 23-30.

Ejimanya, J.I. (1998). F*UTONews platform (1) on NUNET special interviews*. FUTO News, Vol.18 (3), Tuesday July 19, 2-5.

Elly, T. (2003). Meeting information needs of the growing university population in the

21st century: Case of Sokoine National Agriculture Library University of Dares Salaam. *Library Journal.* 5 (1). < http://www.inasp.org>

Emeghara, L. (2001). Implementation of IT project in three corporate libraries: The question of scope and effectiveness. Paper presented at a seminar on the application of ICT in library management at the University of Ibadan Guest House, April 17-19.

Ephraim, P.C. (1991). The development of CD-ROM and its potential for African researchers. *Journal of Information Science.* 17(5), 302.

Entsua-Mensah, C. (1998). The Internet: New challenges for information professional for African researchers. *Journal of Information Science* 17(5), 302.

Ezeani, C. (2004). *Access to Global On-line Research in Agriculture (AGORA) and the Essential Electronic Agricultural Library (TEEAL).* A seminar paper presented at University of Nigeria Nsukka Library on the Workshop on AGORA and TEEAL held at the University of Agriculture, Abeokuta, Nigeria. Pg. 8.

Faphounda, A. (1996). *Introductory computer science for children and adult beginners.*

Abuja: AFLON Books.

Foster, A. (1996). What role for libraries in the electronic landscape. *Library Acquisition: Practice and Theory.* 20 (4), 475-482.

French, C. S. (2001). *Data processing and information technology.* (10th Ed.) London: Continuum.

Geran, L. (1995). Surviving the serials crisis: Are e-Journals an answer? *Library Acquisition: Practice and Theory 20* (3), 199-200.

Gilpin, V. (2000). Best practices in innovative learning: information technology as a catalyst for change. Retrieved from: <http://www.unesco.org/education/educprog/lwf/doc/IA2.html

Goodison, T. (2001). The implementation of e-learning in higher education in the United Kingdom: The road ahead [electronic version] *Higher Education in Europe.* 26 (2), October 2000.

Gracia, C. (2004). Module 3: Online versus CD access. Paper presented at AGORA / TEEAL Workshop held at the University of Agriculture, Abeokuta, Sept. 21-24.

Gurtner, J. L. & Lepper, M.R. (1989). Children and computers approaching the twenty first century. *American Psychologist.* 44, 170-178.

Ifidon, S. E. (1985). *Essentials of management for African university libraries.* Lagos: Library Services.

Ikpaahindi, L. N. (2002). An overview of current developments in the application of information and communication technology to library management. Paper presented at a seminar on the application of ICT in library management, University of Ibadan Guest House, April 17-19.

Iljon, A. (1998). Objectives and strategies -creating a platform for the library in the information society. *IFLA Journal 24* (2).

Janczewski, L. (1992). Factors of information technology implementation in underdeveloped countries: Examples of West African nations. In: Palvia, S.; Palvia P. and Zilgi, R.M. (Eds.) *The global issues of information technology management.* Hershey, PA: Ideal Group Publishing.

Kangulu, C. M. and Wood, F. E. (1995). An evaluation of the Pan- African Development Information System (PADIS) with particular reference to Zambia. Journal *of Information Science* 21 (5), 343-358.

Keogh, M. K. (2001). National strategies for the promotion of on-line learning in Higher Education. *European Journal of Education.* 36 (2), 225-226.

Kvebekke, M. (1998). Electronic discussion list and professional development. *Personnel Training and Higher Education 15 (2).* Pp.11-12.

Line, M. B. (1996). Access versus ownership: How real an alternative is it. *IFLA Journal 22 (1)*, 35-41.

Liverpool, L. (2001). The Internet and the Nigerian educational sector. Paper presented at the Nigerian National Universities Commission. Sept. 2001.

Lucey, T. (1997). *Management information system.* 8th Ed. London: Continuum.

Madu, E. C. & Adeniran, T. N. (2005). *Uses and preservation of resources in libraries and information center.* 2nd Ed. Ibadan: Evi- Coleman Publications.

Matthew, G. (1999). The role of information telecommunication technologies in democratic culture: Information for the sustenance of democratic culture. (Pp.127-132). In: Compendium of papers presented at the NLA Annual National Conference AGM held in Port-Harcourt, River State, on the 8th -14th, May, 1999.

Mckee, A. E. (1996). ALCTS Serials Section Research Libraries Discussion Group. *Library Acquisition: Practice & Theory 20* (3), 375-376.

McMahon, J.; Gardner, J.; Gray, C. and Mulhern, G. (1999). Barriers to student computer usage: Staff and student perceptions. *Journal of Computer Assisted Learning.* Vol.15 (4), 302-311.

Moll, P. (1982). Information technology and third world aid or aggravation. *Focus on International and Comparative Librarianship.* 13 (3).

Morino. M. (1998). Costs and benefits of investments in technology: How can technology serve the public interest. *Journal of Library Administration.* 26 (1/2), 21-26.

Nicholson, H. (1996). Journals of the future: Orderly shelves versus networked information. *Library Acquisition Practice & Theory.* 20 (4), 481.

Nwankuo, O. (2006). ICT Application in LIS Education: A study of some selected Library Schools in South Eastern Nigeria. An MIS thesis. African Regional Centre of Information Science, University of Ibadan, Nigeria.

Nwosu, O. (2002). Application of information and communication technology in polytechnic/ monotechnic libraries in the 21st C. A paper presented at the National Workshop organised by NBTE, Kaduna for Polytechnics and the University of Daressalaam Library. Some logistical and managerial challenges in University of Dares salaam. *Library Journal.* 3 (1&2).

Obajemu, A.S., Ogunyade, T. O. and Nwoye, E. (2004) . Assessment of CD –ROM usage in academics & research libraries in Nigeria: A case study. *The Information Technologist* 1(1 &2), 17-24.

Ogunleye G .O. (1997). Automating the federal university libraries in Nigeria: A state of the art. *African Journal of Library Archives and Information Science.* 7 (I), 71-79.

Ojedokun, A. A. (2000). Prospects of digital libraries in Africa. *African Journal of Library Archives & Information Science.* 10 (1), 13-21.

Ojo - Igbinoba, M. (1998). The potential of CD-ROM technology in African libraries. *African Journal of Library, Archival and Information Science.* 3 (2), 157-165.

Okebukola, P. (2002). Federal Ministry of Education National Virtual (Digital) Library Project. Abuja: National Universities Commission.

Okegbola, T. (2003). Electronic information for libraries network (ELFL-Net). *Nigerian Library Association Newsletter* 14 (2), 7.

Oketunji, I. (2000). Application of information technologies in Nigeria libraries; problems and prospects. In: Fayose, P. O. & Nwalo, K. I. N. (Eds.) *Information Technology in Library & Information Science Education in Nigeria.* (Pp.7 –20). Ibadan: National Association of Library & Information Science Educators.

Oketunji, I. (2001). Computer application to libraries. Paper presented at the 39th Annual

National Conference and AGM of the Nigerian Library Association at the Imo Concord Hotel, Owerri, June 17 – 22.

Oketunji, I., Daniel, J. O. & Okojie, V. O. (2002). 40 years of information and communication technology (ICT) library services to the nation. In: Compendium of papers presented at the 40th National Conference & AGM of Nigerian Library Association, at Topo-Badagry, June 16-21.

Omekwu, C.O. (2001). Managing information and technology in the knowledge age: Pacesetting of developing economies. In: Compendium of papers presented at the 39th National Annual Conference and AGM, Imo Concorde Hotels, Owerri, June 17-22.

Oni, J .A. (1994). Retrospective conversion of catalogue records. Paper presented at the National Workshop on Computers in Libraries at Nigerian Institute of International Affairs. March 8.

Ononogbo, R. U. (1990). *Information and technologies for its communication*. Enugu: ABIC Books and Equipment

Onyebinama, C. O. (2007). Availability and use of ICT by undergraduates of Universities in Imo State. An MLS thesis. Imo State University, Owerri.

Partnership for Higher Education in Africa (2002). Securing the linchpin: ICT for teaching, learning and research. A workshop for African Universities organized at United Nations International Conference Center, Addis Ababa, Ethiopia, 29th July-1st August .

Prosser, D. (2003). Towards open access to scientific journals. *INASP Newsletter 23*, 3.

Qiang, C. Z. W; Pit, A. & Ayers, S. (2003). Contribution of information and communication technologies to growth. *World Bank Working Paper* No.24. Pg.1.

Raseroka, H. K. (1999). The role of university libraries in African Universities. *Association of African Universities Occasional Paper* (3), 1-23.

Riley, W. (2000). *Global Issues: Internet communities e – journals*. Bureau for International Information Program (IIP), US Department of States, USA.

Roberts, L. (2000). Education for the 21st Century: Using technology to enhance teaching and learning. Office of Educational Technology, U.S. Department of Education, USA.

Rowley, J. (1988). *The basics of information technology*. London: Clive Bingley.

Rowley, J. (1993). *Computers for libraries* (3rd Ed.). London: Library Association Publishing.

Rubin, R.E. (1998). *Foundations of Library & Information science*. New York: Neal Schuman Publishers.

Shaw, D. F. (1982). Serials control. *ASLIB Proceedings 34* (2), 81-89.

Shibands, G. G. (2000). Managing and strategising African's information in global computerization. *African Journal of Library, Archives & Information Science 10* (1), 35-41.

Siddiqui, M. A. (1997). The use of information technology in academic libraries in Saudi Arabia. *Journal of Librarianship and Information Science 29* (4), 195–203.

Stubley, P. (1996). Exploiting your serials: Perspectives from a new building. Library *Acquisition: Practice and Theory. 20* (4), 479.

Tenafly Board of Education (2005). *Acceptable Use of Educational Technology Policy.* Tenafly, New Jersey: Tenafly Board of Education, 6pp.

Thioune, R. M. (2003). *Information and communication technologies for development in Africa.* Ottawa: International Research Development Centre. Vol.1, Pg.11.

Tise, E. (2001). An African librarian's view of online journal management. *INASP Newsletter* (18), 10.

UNECA, (1999). *Nigerian National Policy for Information Technology: "USE IT".* Retrieved from: <http://www.uneca.org/aisi/nici/Documents/IT%20policy%20for%20Nigeria.pdf.

United Nations, (1994). *The Internet: An introductory guide for United Nations Organizations.* Geneva: United Nations.

Villars, J. (1996). *The Ghana national scientific and technological information network project.* In: National Research Council Bridge Builders: African experiences with information and communication technology (Pp. 259-272). Washington D.C.: National Academy Press.

Williamson, D. (1999). *Law students and the use and abuse of electronic forms of information.* 14th BILETA Conference: "CYBERSPACE 1999": Crime, criminal justice and Internet.

Willitts, J. (1992). *Database design and construction: An open learning course for students and information managers.* London: Library Association Publishing.

APPENDIX

QUESTIONNAIRES

COMPUTER ACCESSIBILITY AMONG THE STUDENTS OF THE FEDERAL UNIVERSITY OF TECHNOLOGY, OWERRI (FUTO).

SECTION A: PERSONAL PROFILE

1.   Department………………………………………………………………………

2.   School …………………………………………………………………………

3.   Degree in view   (a) B. Tech / B.Sc./ B. Eng. (   ) (b) M. Tech / M.Sc. / MBA / M. Eng.(   )

    (c) PGD (   )   (d) Ph. D (   ) (e) Pre-degree   (   )

4.   Present level (if undergraduate) ……………………………………………

5.   Sex: (a) Male (   ) (b) Female (   )

6.   Job status (if any) (a) Fully employed (   ) (b) Part –time (   ) (c) Unemployed   (   )

7.   Marital status (a) Married (   )   (b) Single (   )

SECTION B - ACCESS TO COMPUTER BY STUDENTS OF FUTO

(Tick as appropriate)

8. Do you have access to computer?   (a) Yes (   ) (b) No (   )

9. What type of access do you have to computer?

(a) ACCESS AT SCHOOL
    Through:

      (i) Computer training required for partial fulfillment of the
         requirements of a course   (   )

      (ii) Occasional seminar / workshop on computer skills
         acquisition organized by my Department / School   (   )

      (iii) Business Centers operating in the School
         environment   (   )

      (iv) Industrial Attachment / Students Work Aid scheme   (   )

 (b) ACCESS AT HOME
    Through:

    (i) Personally acquired computer   (   )

(ii) Friends' and Neighbours' computers   ( )

(iii) Business Centers / Commercial Cyber cafés in my home
environment   ( )

(iv) Parents' or relatives' computers   ( )

(v) Computer gift by parents and relatives   ( )

(vi) Sponsorship to computer training by parents and relatives   ( )

(c) **ACCESS VIA GOVERNMENT / COMMUNITY / EMPLOYERS' EFFORTS**
     Through:

(i) FUTO Library, Public / Community libraries   ( )

(ii) Sponsorship to computer training by philanthropic organizations
and individuals, NGO, Government agencies, etc.   ( )

(iii) Gift and donations of computers by government agencies,
well-meaning individuals and organizations, etc.   ( )

(iv) Computers placed on rentals   ( )

(v) Computers in my workplace   ( )

- **CONSTRAINTS TO COMPUTER ACCESSIBILITY**

10. Which of the following, in your own opinion, are the constraints to
computer accessibility by FUTO students? (Tick freely)

(a) Poverty and low income   ( )

(b) Low exposure and educational level   ( )

(c) Sex   ( )

(d) Age   ( )

(e) Lack of personal interest, drive and motivation   ( )

(f) Conservatism and aversion to innovation   ( )

(g) Computer hardware and other accessories are too expensive   ( )

(h) Technophobia and lack of self-confidence   ( )

(i) High cost of acquiring computer skills and aptitude by
individual student   ( )

(j) Lack of time because of heavy workload   ( )

(k) Non familiarity with new technologies   ( )

(l) Worry about porn, theft, fraud and other crimes perpetrated
through computer   ( )

(m) Government and FUTO inaction at providing computers and
computer training to students   ( )

(n) Computer is seen as a threat to tenure and human resources
staffing   ( )

(o) Others (Please, specify)..

SECTION C

- SUGGESTIONS

11. Drawing on your experience as a student of FUTO, how can we enhance students' access to computer?...

....

....Thank you.

COMPUTER ACCESSIBILITY AMONG THE STAFF OF THE FEDERAL UNIVERSITY OF TECHNOLOGY, OWERRI (FUTO).

SECTION A: PERSONAL PROFILE

1. Name (Optional)...

2. Qualification obtained to date..

3.   Rank / Designation ....

4.   Sex: (a) Male   (   )   (b) Female   (   )

5.   Age: (a) 30years and below (   ) (b) 31 – 40years   (   )

(c) 41 – 50years   (   )   (d) 51 – 65years   (   )

6. Marital status: (a) Married (   ) (b) Single (   ) (c) Divorced (   )

7.   Job status: (a) Full time (   ) (b) Part time (   )

8. Nature of appointment: (a) Tenure (   ) (b) Temporary (   ) (c) Contract (   )

9.   Nature of work: (a) Academic (   ) (b) Administration (   )

(c) Technical (   ) (d) Others (Please, specify).........................

10. Parental Status: (a) Parent (of child above 18years)   (   )

(b) Parent (of child under 18years)   (   )

(c) Non parent (no child yet)   (   )

SECTION B - ACCESS TO COMPUTER BY STAFF

(Tick as appropriate)

11. Do you have access to computer?   (a) Yes (   ) (b) No (   )

12. What type of access do you have to computer?

(a) ACCESS AT SCHOOL

Through:

(i)   Computer training required for partial fulfillment of the
      requirements of a course I attempted or a Degree I acquired   (   )

(ii) Occasional seminar / workshop on computer skills acquisition organized
      by the school I attended (or I am attending)   (   )

(iii) The Business Centers operating in the environment of the
      school I attended (or I am attending)   (   )

(iv) Past Industrial Attachment / NYSC postings   (   )

(b) ACCESS AT WORK

Through:

(i)   Computers assigned to perform official duties   (   )

(ii) Computers made available in other Sections of
      my Department   (   )

(iii) Computers made available in other Departments
      of FUTO (e.g. The Library, Computer Centre, ICT Centre,
      EEE Cybercafé / Energy Centre, Etc.)   (   )

(iv) Sponsorship (by FUTO) to computer skill acquisition and
      capacity building courses and conferences   (   )

(c) ACCESS AT HOME
Through:

(i)   Personally acquired computer   (   )

(ii) Neighbours' computers   (   )

(iii) Business Centers in my home environment   (   )

(iv) Family computers   (   )

(v)   Computers placed on rentals   (   )

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(d) ACCESS VIA GOVERNMENT / COMMUNITY / PARENTAL EFFORTS

Through:

    (i) Public / Community libraries   (   )

    (ii) Communities' telecentres or via computers placed in
         other public domains   (   )

    (iii) Sponsorship to computer training by philanthropic
         organizations and individuals, NGO, Government
         Agencies (e.g. NUC, ETF, etc.), Parents,
         Trade Unions, etc.   (   )

    (iv) Gift and donations of computers by Government Agencies,
         well-meaning individuals and organizations, parents and
         relations,etc.   (   )

- CONSTRAINTS TO COMPUTER ACCESSIBILITY

13. Which of the following, in your own opinion, are the constraints to
computer accessibility by FUTO staff? (Tick freely)

    (a) Low income / salary level   (   )

    (b) Low exposure and poor educational level   (   )

    (c) Sex   (   )

    (d) Age   (   )

    (e) Lack of personal interest, drive and motivation   (   )

    (f) Conservatism and aversion to innovation   (   )

    (g) Family commitment   (   )

    (h) Computer hardware and other accessories are too expensive (   )

    (i) Technophobia and lack of self-confidence   (   )

    (j) Computer is seen as a threat to tenure and human resources
        staffing   (   )

    (k) High cost of acquiring computer skills and aptitude by
        individual staff   (   )

    (l) Lack of time because of heavy workload   (   )

    (m) Non - familiarity with new technologies   (   )

    (n) Worry about porn, theft, fraud and other crimes perpetrated
        through computer   (   )

    (o) Government and FUTO inaction at providing computers and
        computer training to staff   (   )

    (p) Others (please, specify)...

- **SUGGESTIONS**

14. Drawing on your experience as a staff of FUTO, how can we enhance staff's access to computer?...

....

....Thank you!