

University of Nebraska - Lincoln

**DigitalCommons@University of Nebraska - Lincoln**

---

Library Philosophy and Practice (e-journal)

Libraries at University of Nebraska-Lincoln

---

Summer 3-23-2015

# Information and Communication Technology Adoption and Use Among Students Of A Nigerian University For Distance Learning

Akimkunmi Oluseun Omotosho Mr.

Elizabeth Bukunola Lateef Mrs.

Oyintola Isiaka Amusa Mr.

Taoffik Olatunde Bello Mr.

Follow this and additional works at: <http://digitalcommons.unl.edu/libphilprac>

 Part of the [Scholarly Communication Commons](#)

---

# **Information and Communication Technology Adoption and Use Among Students Of A Nigerian University For Distance Learning**

**BY**

**AKINKUNMI OLUSEUN OMOTOSHO,**

Nimbe Adedipe Library  
Federal University of Agriculture,  
PMB 2240,  
Abeokuta, Nigeria;

**ELIZABETH BUKUNOLA LATEEF**

The University Library,  
Crawford University,  
Igbesa, Nigeria;

**OYINTOLA ISIAKA AMUSA**

[ishaqamusa@hotmail.com](mailto:ishaqamusa@hotmail.com),

+2348088362969

**And**

**TAOFFIK OLATUNDE BELLO**

Nimbe Adedipe Library  
Federal University of Agriculture,  
PMB 2240,  
Abeokuta, Nigeria;

## **Abstract**

This study investigates the use of ICT for distance learning by students of the National Open University of Nigeria. A descriptive survey design was adopted for this study and the main instrument for data collection was questionnaire. Copies of the questionnaire were administered on students of the National Open University of Nigeria, main campus, Lagos. Findings from the data analysis revealed that the level of ICT use among the respondents was high and; easy accessibility to most of the ICT facilities needed for distance learning is identified as the major factor responsible for the high level of usage of ICT by the respondents. Benefits, such as enhanced access to quality education, improved level of knowledge, opportunity to study through a variety of methods, cost effective education opportunities as well as overcoming time barriers were some of the benefits the use of ICT for distance learning highlighted in this study. Although considerable benefits are derived from the use of ICT for distance learning, constraints such as erratic power supply, frequent breakdown of ICT facilities, and controlled access to ICT facilities were identified as some of the factors militating against the use of ICT for distance learning. Findings from this study, it can be concluded that the level of ICT use for distance learning and the benefits derivable from it are high although there are few constraints to their effective and maximum use among distance learning students. Recommendations were made on how to overcome these constraints.

**Keywords: Distance Learning, Distance learning-Nigeria, Information and Communication Technology (ICT), National Open University of Nigeria (NOUN)**

## **Introduction**

Wikipedia defines distance education as a method of teaching and learning in which the learners are not required to be physically present at a specific location during the term (Wikipedia 2005). Most often, regular mail is used to send written materials, videos, audiotapes and CD-ROMs to the learners and to turn in their exercises. At this point in time, e-mail, the web and video conferencing over broadband network connections are also used. Students are required to come to meetings at specified locations on specific periods for revision and to write exams. A fundamental characteristic of distance education is that it is learner centered. A learner centered educational process is a departure from the conventional teaching and learning method that employs a wide range of tools to effect learning outcomes. These tools are designed for self-learning. They include printed course units, tutor and computer marked assignment and feedback systems, radio and television broadcast, audio and videotapes and electronic mail among others. In a developing country like Nigeria, delivering instruction through the distance mode presents a significant challenge to educators. In a country where the concern of most people is meeting their basic needs for food, clothing and shelter, access to information and communication technologies (ICT) especially the modem ones is very low on priority lists and oftentimes, not considered a priority at all. Distance education is not a new concept in Nigeria. In the 1930's some Nigerians

passed different examinations and earned various qualifications from universities all over the world especially British Universities, and other examination bodies through distance education while staying at home. Omolewa, (1981) revealed that correspondence education was the earliest manifestation of distance education in Nigeria and it afforded those who could not travel abroad the opportunity to access various forms of higher education until the establishment of the University College, Ibadan in 1948.

The impacts of information and communication technology (ICT) on all spheres of human endeavors have been tremendous. Most remarkable is education sector which has been transformed by the use of ICT. Where ICT are used for learning, evidences suggests that they are chiefly used to present and disseminate information as tools for presentation rather than the often cited promotion of 21<sup>st</sup> century skills. Librero (2006) observed that conventional universities and other educational institutions are now using ICT to achieve blended learning environments which blend traditional face-to-face classroom delivery with distance delivery.

ICT use in education especially distance learning is also re-shaping Universities entire organizational structures. Westbrook (2001) observed that the introduction of ICT in education has resulted in changes in four core areas of education such as curriculum, role of teachers and students, organizational structure and, learning environment. Given that a growing number of transactions now take place on-line at a distance, appropriately automated systems for recording these transactions, tracking them, keeping and retrieving students records and so forth must be supported by holistic policies and procedures that take into account all academic related activities. Obviously, ICT has made the culture of learning to shift from the culture of students passively listening in a classroom where attendance matters, to the culture of pro-active reading, encoding and decoding anytime, anywhere. There are wide variations of ICT used in various distance learning institutions around the world. Further specific applications and combinations of these applications are very much shaped by the context of their target user populations.

Quality of distance learning has always been contentious. Those against distance education somehow equate quality of distance education with that of the physical face-to-face traditional education in the classrooms. Distance education providers must strive to use quality and reliable ICT hardware and software with access available every time of the day. Just as important, these systems must be supported by highly skilled individuals, armed with the knowledge and skills they need to ensure hardware and software run smoothly.

To accomplish the human aspect of ICT, institutions need to offer training to various user groups (i.e. students, teachers, administrators, etc.). offering such training helps to ensure the efficient and effective, use of ICT for all stages of the teaching and learning process, from accessing online classrooms, to course registration, to managing digital library materials, to manipulating databases to get the information students need to do their work or complete an assignment and so forth.

The growth of ICT in education has given rise to new concepts and realities that are now becoming mainstream. The concept of socialization in distance education setting for instance is often technology - mediated and for many students, the only mode of socialization available to them. Time and space ceased to matter in terms of social and transactional distance in distance education. Several distance learning institutions have acquired and deployed ICT into their services. An example of these distance learning institutions is National Open University of Nigeria, (NOUN).

National Open University was initially established on the 22<sup>nd</sup> July 1983 as a spring – board for open and distance learning in Nigeria. However, it was suspended on 25<sup>th</sup> April 1984 by the then military head of state. However, upon recognition of its tremendous roles in tackling the country’s educational problems and providing access to education for all, it was resuscitated on 1<sup>st</sup> October 2002. The National Open University of Nigeria is designed to increase access to formal and non-formal education, to Nigerians, in a manner convenient to their circumstances. It is to also cater for the continuous educational development of professionals such as teachers, Accountants, Bankers, Lawyers, Nurses, Engineers, Politicians, self-employed, businessmen and women.

NOUN dedicates itself to preparing professionals in various disciplines through the distance learning mode and it offers a chance of qualifications from Certificate, Diploma to Degrees and postgraduate degrees. To accomplish this, the university employs a range of delivery methods to take education to the people and make learning an enjoyable activity. These methods include printed instructional materials, audio, video tapes and CD-ROM. It is also include Television and Radio broadcast of educational programmes, electronic transmission of materials in multimedia (voice, data, graphics, and video) through fixed line (telephone or leased lines), terrestrial and VSAT wireless communication systems.

NOUN has study centers in every state of the country and some local government areas to perform critical roles in the delivery of instructions. Study centers are resource places where study materials are collected by students, it also enables students interact with instructors/ facilitators, and for examinations. A number of other learners support facilities including internet browsing, e-mail, library and a range of communication channels are also available at the study centers.

NOUN has deployed appreciable ICT facilities for her staff and student use. However, the influence of information and communication technologies (ICT) on distance learning in a developing country like Nigeria needs critical evaluation. The need to understand the potential effects of ICT on distance learning is essential for all those involved in the development and delivery of distance education. ICT utilization as a viable option to enhance distance learning in Nigeria may not be as feasible as intended due to various obstacles. This work will attempt to address some of these issues and proffer useful and constructive solution to policy makers on distance education. This study is necessary as it will assess the effectiveness of ICT use for

distance learning and the benefits of using these ICT as well as create awareness for NOUN students.

## **Objectives of the Study**

The specific objectives of this study are

1. determine the ICT skills possessed by NOUN students;
2. determine the level of access of NOUN students to ICT facilities;
3. examine the benefits of ICT to Distance Learning;
4. identify the constraints experienced by NOUN students in using ICT to facilitate learning.

## **Research Questions**

1. What are the ICT skills possessed by NOUN students?
2. How accessible are ICT facilities to NOUN students at the study center?
3. What are the benefits that could be derived from application of ICT to distance learning?
4. What are the problems encountered in the use of ICT for distance learning by NOUN students?

## **Literature Review**

The increasing need for education of those who cannot obtain it in the traditional way and the ease of acquiring the means of distance education has quite naturally led to institutional interest where previously there may have been little or none.

Since the colonial period, correspondence colleges from the United Kingdom have provided intermediate and advanced level training to a number of suitably qualified Nigerians via correspondence courses (Owoeye, 2004). Being the only method of distance education available at the time, a large number of secretarial, commercial and middle level administrators were trained using this mode of education. To bridge the gap between participants in distance learning process, open universities structured learning in which the instructor and learners are separated by time and space making use of instructional materials, audio and video cassettes, CD Rom, television and radio broadcast as well as multimedia components such as computer and satellites transmission (Owoeye, 2004).

Ray and Day (1998) stressed that to foster interaction between learners in certain cases, on-line support is offered through real time chat, advice and e-mail discussion groups with staff and students by open Universities. Unlike conventional educational delivery methods, there are no structured face-to-face contacts between the learners and teachers in Open Universities. Instead, high quality, self-directed, learner-centered instructional materials made available to

students while instructional facilitation is carried out when necessary, typically after arrangements have been made by the Open University based on agreement between students and course facilitators.

In efforts to meet the new and changing demands for education and training, Open Universities may be seen as complements and in some circumstances, a more appropriate substitute to the conventional Universities that dominate most educational systems (Dede 1996). There are tens of thousands of instructional Programmes for distant learners provided by colleges, Universities and Schools. Most of these are delivered by a single teacher using a particular medium. The vast majority of what claims to be research about distant education consists of how one or more multimedia or communication media have been used to link a classroom teacher to one or more distant classes. The media use includes correspondence, broadcast and recorded video, audio-graphic, video, and computer conferencing. Dede (1996) stressed that in the late 1950's and early 1960s television production technology was largely to studios and live broadcasts, in which teachers conducted widely-broadcast classes. Unfortunately, teachers who are experts in the subjects matter were not necessarily the best and most captivating television talents.

Willis (1992) described the instructional development, process for distance education, consisting of the customary stages of design, development, evaluation and revision. In designing effective distance instruction, one must consider not only the goals, needs and characteristics of teachers and students, but also content requirements and technical constraints. If unusual delivery systems are required, they must be made accessible to all participants. Successful distance education systems involve interactivity between teachers and learners, between learners and the learning environment and among learners themselves, as well as active learning in the class room. McNabb (1994) noted that though students felt that the accessibility of distance learner courses far outweighs the lack of dialogue, there is still a considerable lack of dialogue in distance education when compared to face-to-face classes.

The National Open University was initially established in Nigeria in 1989 and was suspended in 1994 but resuscitated in 2002. The National Open University of Nigeria dedicates itself to preparing professionals in various disciplines through the distance-learning mode and offers a choice of qualification from certificates, Diplomas to Degrees and Postgraduate degrees. With the vast improvement in technologies it is just a matter of time before virtual learning environments dominate or perhaps replace the traditional classroom. There are currently thousands of schools and colleges operating on the Internet and it are now possible to get a degree without ever having to leave the comfort of your home.

Virtual learning environments are hugely diverse in size; capabilities and services offered and can cater for individuals at different levels of education, age and special needs. ranging in attainment levels, ages and special needs. Dieberger (1999) opined that the users of a virtual leaning environment are inside the information space and see a representation of

themselves and others in the space. Dillenbourg et al (1999) stressed that virtual learning environment cannot be restricted only to websites; it ranges from the text based interfaces to the most complex graphical outputs. They believe that the key issue in virtual leaning environment is not entirely about the representation but what students do with this representation. The specificity of virtual learning environments is that beyond direct text, voice or video massages, users may communicate in other ways, which include exchanging objects and moving in the space. Schrages (1990) stressed that many virtual environment include a shared space made up of an interface where users see the same collection of objects, can add objects, take them in their private space, edit and delete them. A virtual learning environment integrates a variety of tools supporting multiple functions.

Virtual universities or ‘virtual learning environments’ have taken the education world by storm. Virtual Universities are one of the latest forms of 26<sup>th</sup> century education. It has been suggested that the aim of virtual universities is to practice totally online course delivery through the use of computer networking (Harasim, 1995). According to Harasim (1995) virtual universities support the delivery and design of courses and programs for any form of post – secondary education which could include University degrees, corporate education professional development and workplace training. Ahmad, et al (1998) stated that virtual learning environments offer a wide range of advantages over traditional environments including convenience, flexibility, lower cost, and access to current materials, increased retention of knowledge and elimination of geographical boundaries. Also Harasim (1995)) posited that virtual learning environments outline and explore the evolution of distance learning technologies, provide emerging opportunities for education delivery and will change the role of the student from a passive learner to an active participant in the learning process. Ahmad, et al (1998) further emphasized that virtual learning environments suit the needs of all students and allows students to learn at their own pace. Owston (2000) observed that claim have been made that web can free teaching and learning from the physical boundaries of classrooms and time restrains of class schedules. Under the circumstances, traditional lectures and demonstration can become web based multimedia learning experience for students. Cognizance of the substantial opportunities that ICT can provide Universities, there are a number of problems and challenges that tend to present themselves. Universities operating at a distance are confronted with outside problems coming from their environment as well as inside problems coming from their own structure and culture.

## **Methodology**

Survey research method is adopted for this study. The target population of this study is the students of the National Open University of Nigeria, Lagos Study Center. The Lagos study center is sited within the headquarters of the National Open University. The center has a



population of 2,800 registered students. These data were sourced from the academic section of NOUN registry.

The sampling technique adopted for this study was the simple random sampling. The National Open University of Nigeria has six schools; these are schools of Science and Technology, Education, Arts and Social Sciences, Business and Human Resource Management and center for continuing Education and Workplace Training. To ensure adequate representation, each of the six schools was selected and a study population covering 10% of the registered students chosen from the six schools which is 280 made up the study population. Data for this research work was collected through copies of the questionnaire administered to the students as well as observations made while administering the questionnaire. The data covered responses from the various categories of students ranging from diploma, degree, postgraduate diploma and postgraduate degree. A breakdown of the registered students showed that there were 680 diploma students, 1,487 degree students, 340 post graduate diploma students and 293 master’s degree students. Data obtained were analysed using descriptive statistics. Tables of frequencies distribution and simple percentages were used to present the data.

## Data analysis and Discussions

### Demographic distribution of respondents

**TABLE 1: Distribution of respondents by sex**

Responses	Frequency	Percentage
Male	120	48.0
Female	130	52.0
<b>Total</b>	<b>250</b>	<b>100.0</b>

The table shows that 120 (48.0%) of the respondents were male, while 130 (52.0%) were female.

This reveals that, there were more female respondents than male. **TABLE 2: Distribution of Respondents by School in the University**

School	Frequency	Percentage
Science and Technology	62	24.8
Law	18	7.2
Education	44	17.6

Art and Social Science	51	20.4
Business and Human Resource Management	41	16.4
Continue Education and work place training	34	13.4
<b>Total</b>	<b>250</b>	<b>100.0</b>

Table 2 showed that 62 respondents (24.8%) were from the school of Science and Technology, 18 of them (7.2%) were from the school of Law, 44 respondents (17.6%) were from the school of Education, 51 respondents (20.4%) were from the school of Art and Social Science, 14 respondents (16.4%) were from the school of Business and Human Resource Management and, 34 respondents (13.6%) were from the school of Continue Education and Work place Training. Meanwhile, the table revealed that majority of the respondents were from the school of Science and Technology, and school of Art and Social science i.e. 62(24.8%), 51(2.4) respectively.

**TABLE 3: Distribution of Respondents by Academic Programme**

<b>Academic Programme</b>	<b>Frequency</b>	<b>Percentage</b>
Diploma	63	25.2
Degree	137	54.8
Post graduate dip	25	10.0
Master's degree	25	10.0
<b>Total</b>	<b>250</b>	<b>100.0</b>

Table 3 showed that 63 respondents (25.2%) were diploma students from different faculties, 137 respondents (54.8%) were students undergoing degree programmes, 25 respondents (10.0%) were undergoing post graduate Diploma and master's programme in different faculties respectively. This revealed that NOUN students undergoing degree programs are more than those pursuing Diploma, post graduate master's programme.

**Research question 1: ICT skills possessed by NOUN students?**

**TABLE 4: Distribution of Respondents by ICT Skills Possessed.**

Responses	Frequency	Percentage
Yes	223	89.2
No	27	10.8
<b>Total</b>	<b>250</b>	<b>100.0</b>

Table 4 showed that 223 (89.29) of the respondents are skilled in the use of ICT, while 27(10.8%) of the respondents revealed that they are not skilled in the use of ICT. This revealed that the level of skilled respondents in the use of ICT was very high compared to the level of the unskilled respondents in the use of ICT according to the figure discovered.

**TABLE 5: Distribution of Respondents by level of ICT Application Skills Possessed**

Level of skill	Internet browsing	Word processing	Database Management	E-mail	Computer graphics	Information retrieval
Highly skilled	145(58.0%)	44(17.6%)	33(13.2%)	99(39.6%)	21(8.4%)	68(27.2%)
Skilled	64(26.0%)	78(31.2%)	79(31.69%)	94(37.6%)	58(23.2%)	102(40.8%)
Barely skilled	18(7.2%)	99(39.6%)	94(37.6%)	41(6.4%)	70(28.0%)	39(15.6%)
Unskilled	22(8.8%)	29(11.6%)	44(17.6%)	16(6.4%)	101(40.4%)	41(16.4%)
<b>Total</b>	<b>250(100.0%)</b>	<b>250(100.0%)</b>	<b>250(100.0%)</b>	<b>250(100.0%)</b>	<b>250(100.0%)</b>	<b>250(100.0%)</b>

Table 5 showed that 145 (58.0%) of the respondents has adequate knowledge of the use of computers for internet browsing to gather and retrieve materials for their studies unhindered, 64(26.0%) are skilled in internet browsing, 18(7.2%) and 22(8.8%) respectively are barely skilled or unskilled in the use of computers for internet browsing which implied that they require assistance during internet browsing and electronic mails are the ICT application in which a large percentage of the respondents gather and retrieve information for their studies.

**Research Question 2: How accessible are ICT facilities to NOUN students at the study center?**

The National Open University has ICT facilities such as Computers, Printers, Photocopiers, Video(DVD/VCD), Scanners and Dedicated Radio Transmission channel for students at the Lagos study center as observed while on the fields while some members of staffs interviewed mentioned telephones and digitals cameras as some of the ICT facilities that are available in the different schools/ faculties. NOUN has adequate ICT facilities which are located in the ICT laboratory of the study center and in the different faculties/ schools.

**Table 6: Distribution of Respondents showing Accessibility to ICT Facilities**

<b>Level of accessibility</b>	<b>Computer</b>	<b>Printers</b>	<b>Photocopiers</b>	<b>Video (DVD/VCD)</b>	<b>scanners</b>	<b>Dedicated Radio transmission</b>
Highly accessible	156(62.4%)	154(61.6%)	168(67.25)	131(52.4%)	82(32.8%)	110(44.0%)
Accessible	47(18.8%)	53(21.2%)	45(18.0%)	46(18.4%)	64(25.6%)	80(32.0%)
Barely accessible	31(12.4%)	35(14.0%)	23(9.2%)	46(18.4%)	57(22.8%)	39(15.6%)
Not accessible	16(6.4%)	8(3.2%)	14(5.6%)	27(10.89)	47(18.8%)	21(8.4%)
<b>Total</b>	<b>250(100.0%)</b>	<b>250(100.0%)</b>	<b>250(100.0%)</b>	<b>250(100.0%)</b>	<b>250(100.0%)</b>	<b>250(100.0%)</b>

Table 6 above revealed that 156(62.4%) of the respondents agreed that they have high accessibility to computers, 154(61.6%) agreed that they have high accessibility to printers, 165 (67.2%) agreed that they have high accessibility to photocopiers, 131(52.4%) agreed they have high accessibility to video (DVD/VCD), 82(32.8%) agreed they have high accessibility to Scanners while 110(44.0%) agreed they have high accessibility to Dedicated Radio Transmission. This table revealed that computers, printers, photocopiers, Video (DVD/VCD), Scanners and Dedicated Radio transmission are the ICT facilities that are highly accessible to the students at the Lagos study center.

**Research Question 3: What are the Perceived Benefits that could be derived from Application of ICT to Distance Learning?**

**Table 7: ICT Enhanced Access to Quality Education**

<b>Responses</b>	<b>Frequency</b>	<b>Percentage</b>
Strongly Agree	183	73.2
Agree	35	14.0
Disagree	4	1.5
Undecided	28	11.2
<b>Total</b>	<b>250</b>	<b>100</b>

The table above showed that 183(73.2%) of the respondents agreed that the use of ICT for distance learning has enhanced their access to quality education, 35(14.08) agreed to the argument, 4(1.6%) Disagreed, while 28(11.2%) were undecided. From the table, it was discovered that majority of the respondents' agreed that ICT has improved their access to quality education through the use of the various ICT facilities they apply to their studies at NOUN without having to be in a particular place at a particular time.

NOUN students agreed that the application of ICT facilities to their studies has helped them in areas such as, their course work, assignments, and group discussions, exchange of ideas and in examinations.

### 8: Respondents' Perception of ICT Influence on their knowledge

Responses	Frequency	Percentage
Strongly Agree	162	64.8
Agree	50	20.0
Disagree	32	12.8
Undecided	6	2.4
<b>Total</b>	<b>250</b>	<b>100</b>

Table 4.3.5 showed that 162(64.8%) of the respondents strongly agreed that the use of ICT for distance learning has improved their level of knowledge, 50(20.8%) of the respondents agreed, while 6(2.4%) were undecided; the table above revealed that ICT use for distance learning has improved the level of knowledge of maturity of the respondents.

Furthermore, 135 (54.0%) of the respondents strongly agreed that the use of ICT for distance learning breaks down time barrier and facilitates cooperation and collaboration among students, 65 (20.0%) agreed 45(18.8%) disagreed while 5(2.0) of the respondents were undecided. NOUN students use ICT facilities on their own and at their own pace for their studies.

**Research Question 4: What are the problems encountered in the use of ICT for distance learning by NOUN students?**

**Table 9: Distribution of respondents' by inadequacy of ICT skills as a problem in using ICT for distance learning**

Responses	Frequency	Percentage
Never	63	25.2
Barely	126	50.4
Often	45	18.0
Very often	16	6.4
<b>Total</b>	<b>250</b>	<b>100</b>

Table 9 showed that 63 (25.2%) of the respondents agreed that inadequate skills in using ICT is never a constraints in their use of ICT for distance learning, 126 (50.4%) barely agreed, 45(18.0%) revealed that they often encounter problem due to their inadequate skills in using ICT for distance learning, while16 (6.4%), agreed that inadequate skill in the use of ICT for distance learning is a problem they encounter very often.

Concerning erratic power supply as a problem in using ICT for distance learning, 20 (8.0%) of the respondents responded that erratic power supply had never been a problem in their use of ICT, 71(28.4) of the respondents stated that erratic power supply is a problem they barely encountered, 99(39.6%) responded that it is a problem they often encountered, while 60(24.0%) of the respondents said erratic power supply was a problem they encounter very often. This implied that erratic power supply is a major problem going by the percentage of those that mentioned it is a problem they encountered in their use of ICT for distance learning by students of NOUN.

## **Conclusions and Recommendations**

Information and communication technologies (ICT) have brought about drastic change in the distance learning process at the National Open University of Nigeria. ICT is extensively used in the University for students' admission, registration, distribution and access to course materials, continuous assessment, communication and social interactions. The university has a social interaction medium called "ilearn". This study has provided insights into the usage, benefits and constraints of ICT use for distance learning by students of the National Open University of Nigeria. Consequent upon the findings of this study, it can be concluded that ICT is a major and inextricable component of distance education.

Major findings in this study showed that majority of the respondents are skilled on the use of ICT and, ICT applications such as internet browsing and electronic mails. Also, this study showed a high level of accessibility to ICT facilities for distance learning by students of the National Open University of Nigeria. Majority of the respondents agreed that ICT use for their studies has been beneficial. It has enhanced access to quality education, improved level of knowledge, provision of access to studying through a variety of methods and, eradication of time constraints or barriers.

Problems associated with the use of ICT for distance learning are erratic power supply, frequent breakdown of ICT facilities, controlled access to information and virus incursion, and inadequate bandwidth.

Consequent upon these conclusions, the following recommendations are proffered towards effective and efficient use of ICT in distance learning in the National Open University of Nigeria:

- Although findings in this study indicated that majority of the students have access to ICT facilities such as computers, printers, photocopier, video/ VCD, this study recommends that provision and access should be provided to multimedia that will be illustrative and interactive in e-learning to complement the high access that the students have to the ICT facilities at the study center.
- Poor access to the Internet due to low bandwidth subscription can be addressed by increasing the width being subscribed to by the institution.
- Erratic electricity supply is another problem limiting the use of ICT in the institution. It is recommended that provision should be made by the management of the institution to find a lasting solution to the problem of erratic power supply through the provision of alternative power generation devices.
- The problems of incessant breakdown of the ICT equipment in the institution and that of virus infestation can be address through recruitment of skilled ICT technicians and subscription to antivirus software with network capability. The technicians will be able maintain and repair faulty systems.
- Although majority of the students are skilled in the use of ICT facilities, it is recommended that the institution should provide compulsory training and re-training session for all newly admitted students in order to improve their ICT skills and inculcate the skills in novice among them.



## References

- Aderinoye, R. and Ojokheta, K. Open – Distance Education as a Mechanism for sustainable Development: Reflections on the Nigerian Experience. *International Review of Research in Open and Distance Learning* 5 (1) (2004) 30-35.
- Adesina, S. *The Development of Modern Education in Nigeria*. (Ibadan: Heinemann), 1988, p. 69.
- Aduwa-Ogiebaen, S. E. and Iyamu, E.O. Using information and communication technology in secondary schools in Nigeria: Problems and prospects. *Educational Technology society*, 8 (1) 104-112.
- Aina, L.O and Ajiferuke, I.S.Y *Research Methodologies in Information Sciences: An Africa Perspective*. (Ibadan: Stirling- Horden), 2002, p. 32-54.
- Akinyelure, M.O. A comparative study of access to and use of information and communication technology in some selected public and private secondary schools in Lagos Metropolis. MSc. Project. Africa Regional Center for Information Science, University of Ibadan. (2004) 70p.
- Broekman, I. Enslin, P and Pendlebury S. Distributive Justice and Information Communication Technology in higher Education in South African Higher Education, 16 (1) (2002) 29-35.
- Chao, L. Developing Instructors Personal server for Web Based Teaching: Association for Information Systems 1998 Americas conference. (1998).
- Daves, M. and Danning, K. Transition to virtual Learning. *Association for Learning Technology Journal* 9 (2) (2001) 64 -75.
- Dede, C. Emerging technologies and distributed learning. *American Journal of Distance Education* 10 (20) (1996) 4-36.
- Dewer, O.T. ICTS: The way forward, Internet printouts. (1994). Available at <http://www.witscottland.org.uk>. (Accessed on 4 September, 2014).
- Dieberger, A. Social connotations of space in the Design for Virtual Communities and social Navigation in Munro, A., Hook, K and Benyon, D (Eds), *Social Navigation of Information Space*.( Springer: London), 1999, p.35-54.
- Dillenbourg, P. Mende Isophn, P and Jermann P. Why spartial metaphors are relevant to virtual compuses in Levon in Leveonen, J. and Enkenberg, J. (eds.) *Learning and Instruction in multiple contexts and settings*. Bulletins of the Faculty of Education, University of Joensuu, Finland, 73 (1999).
- Enuku, U.E. and Ojowu, C.N. Information and Communication Technology (ICT) in the service of the National Open University of Nigeria. *Education*, 27 (2) (2006) 12-33.
- Ertmer, P.A. Addressing first and second order barriers to change: strategies for technology integration. *Educational Technology Research and Development* 47 (4) (1999) 47-61.
- Federal Government of Nigeria (FGN). Federal Ministry of Education Blueprint and Implementation for the National Open Distance Learning Programme. 2002.

- Harasim L. et al (1995). *Learning networks: a field guide to teaching and learning online*. Boston, MA: The MIT Press.
- Jonassen, D.H. *Computers as mind tools for schools: Engineering Critical Thinking*, 2<sup>nd</sup> Ed. Columbus: Merrill- Prentice Hall, Upper Saddle River. (2000).
- Jonathan, A and Tom, V.V. *Information and communication technology in Education: A curriculum for Schools and programmes for Teacher's Development*. France, UNESCO. (2002).
- Kemshat-Bell, G. A constructivist learning experience: Reconstructing a web site using web based multimedia authoring tools, *Australia journal of Educational Technology*, 17 (3) (2001) 330-350.
- Kirkwood, A. and Prince, L. Adaptation for a Changing Environment: Developing Learning and Teaching with Information and Communication Technologies. *International Review of Research in Open and Distance Learning*, 3 (2) (2006) 1-14.
- Librero, F. Trends in e-learning of Interest to educators. Paper presented in the National Conference of the Philippine e-learning society on 28-29 November, 2006. Diliman, Quezon City, Philippines. (2006).
- Loing, B. ICT and higher education: 9<sup>th</sup> UNESCO/NGO Collective Consultation on higher education. (2005).
- Longenberg, D.N. Information technology and the university: Integration strategies for the 21<sup>st</sup> century. *Journal of the American Society for Information Science*, 45 (1994) 323-342.
- Luboobi. L. S. (2007). University roles in meeting aspiration for ICT and economic development. Available at: [http://www.foundation\\_partnership.org/pubs/leaders/luboobisession4.pdf](http://www.foundation_partnership.org/pubs/leaders/luboobisession4.pdf). (Accessed on 7May 2014)
- Mamaghani, F. The Impact of the World Wide Web on teaching and learning: Association for information systems 1998, America's conference. (1998).
- McNabb, J. Telecourse effectiveness: Findings in the current Literature. *Tech Trends*, (1999) 39-40.
- Nwogu, B.G. *Education Research; Basic Issues and Methodology*. (Ibadan: Wisdom Publisher), 1999, p.41-65
- Okebukola, P. Old, New and Current Technology in Education UNESCO Africa. 14 (15) (1997) 708.
- Omeku, C.O. Advances in information Technology: implication for future of education in Nigeria. *Teachers Mandate on Education and Social Development in Nigeria*. G.F. Elaturoti, and K .Babarinde, eds. (Ibadan: Stirling – Horden Publishers,), 2004, 158-171.
- Omolewa, M. *Adult Education Practice in Nigeria*, Ibadan, Evans Brothers Limited. (1981).

- Onyago, R.O.A. Research Methodologies in Information Science. *Research in Information Sciences: An African Perspective*. L. O. Aina Ed. Ibadan: Stirling –Horden (2002) 32-54.
- Osborne, M. and E. Oberski, I. University continuity education: The role of communication and information technology, *Journal of European Industrial Training* 28 (5) (2004) 414-428.
- Owoeye, J.S. An overview of distance education in the University of Ibadan. Educational measurements and evaluation in Nigeria. O.A. Ajiferuke and J.G. Adewale Eds. Ibadan: ERSG. (2004).
- Owston, R.D. Evaluating Web-based learning environments: Strategies and insights cyber psychology and behavior, 22 (3) (2000) 427-447.
- Pena – Bandalaria, M. Impact of ICTs on open and distance learning in a developing country setting: The Philippine experience. *International Review of Research in Open and Distance learning*. 8 (1) (2007) 1-13.
- Perraton, H. *A Theory for distance education: International Perspectives*. New York: Routledge. (1988) 34-45.
- Pohjola, M. (Ed.) *Information Technology, Productivity and Economic Growth*. New York: Oxford Press. (2001).
- Ray, K. and Day, J. Students attitudes towards electronic information resources. *Information Research* 4(2) (1998). Available at: <http://www.nformation/ir/4-2/paper54.html>. (Accessed on 06 September, 2014)
- Reitz, M. *Dictionary of Library and Information Sciences*. Westport Connecticut: Libraries Unlimited. (2004). (Accessed on June 16, 2007).
- Schlosser, C.A. and Anderson, M.L. *Distance education: Review of the literature*. Washington, DC: Association for Educational Communication and Technology. (1994).
- Schrage, M. *Shared Minds: The new technologies of collaboration*. New York: Random House, 1990,
- Sichel, D.E. *The Computer Evolution: An Economic Perspective*. Washington D.C. The Pronokings Institutions. The contributions of New Technologies to learning and Technology in elementary and secondary schools. (1997). Available at: <http://www.tact.Unlral.calfr/html/impact>. (Accessed on 18 May 2014).
- Ugu, N.J. and Zewedie, H. *Global issues for ICT in Education: UNESCO-IICBA experience in Africa*. Birmingham. UNESCO. (2005).
- Waterman, M. *Students counseling Report: Statistics 1999*, Coffs Harbour: Southern Cross University, 2000, p. 78.

Westbrook, J. The Esloo design for the digital elementary and secondary education. In A. Loveless and V. Ellis (Eds.) *ICT, Pedagogy, and the curriculum* (55-70). London: Routledge Falmer, 2001, p 23-64.

Willis, B. *Instructional development for distance education* (ERIC Document) Reproduction service No.ED351008), (1992).