

Enhancing the Operational Effectiveness of Information and Communications Technology (ICT) Centres of Nigerian Universities: A Case Study of Ignatius Ajuru University of Education, Port Harcourt

Lawrence Samuel Igenewari
Department of Computer Science
Ignatius Ajuru University of Education
Rumuolumeni, P.M.B. 5047, Port Harcourt
lawusa2002@gmail.com
+234-703-918-6050

ChiefJamaes Phillip Michael
Department of Computer Science
Ignatius Ajuru University of Education
Rumuolumeni, P.M.B. 5047, Port Harcourt
mchiefjames@gmail.com

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Abstract

The modern world is supported and sustained largely by technologies that are developed to sense, measure, acquire, process, store, transmit, transform and display information in digital format. The collection of these technologies constitutes the Information and Communications Technology (ICT) which has the amazing potential to determine the dynamics of life. Understandably, the educational system of any nation must have a transformational relationship with ICT. Consequently, the authors have carried out a deep techno-surgical analysis of the ICT Centre of Nigerian Universities exposing their strengths, weaknesses and opportunities. The goal is to develop a strategic planning programme that will immensely enhance the effective operation and management of the centres and provide the universities with the capacity of delivering the needed quality and technology-driven education in line with the realities of the dynamic society. The Ignatius Ajuru University of Education, Port Harcourt was used as a case study.

Keywords: Information, Communication, Technology, Operational, Effectiveness, Universities, Enhancing.

Introduction

The constraints initially posed by the non-availability of Information and Communication Technology (ICT) facilities and resources in the education sector has led to the establishment of ICT centres in almost all tertiary institutions in Nigeria. It has since become a vital requirement for accreditation of university programmes in the country. Both the National Universities Commission (NUC) and the National Board for Technical Education (NBTE) which are the regulatory bodies for the universities and polytechnics respectively have included it in their list of requirements. Furthermore, the ubiquitous nature of ICT has made every nation to produce, use, import and export ICT products and its enabled services. ICTs revolution has created huge global opportunities for value and extraction (Agada, 2008).

The application of ICT is almost unlimited as its ranges from medical to entertainment, from education to communications, from publishing to photography, from security to power supply, from weather forecast to business transactions and more. ICT has the potential of creating employments (Odekunle et al, 2008). It has already demonstrated so in the telecommunications sector of the Nigerian economy. The serious challenges facing Nigeria's security system has made the federal Government to explore the use of ICT facilities in providing the highly needed security solutions that it demands. The installation of computer-based cameras in Abuja

and Lagos and the utilization of an unmanned aircraft for oil pipelines surveillance operated by the Nigerian Air Force are living examples. No wonder the Nigerian ICT policy as documented in the ICT policy document of 2002 focuses on the production and utilization of its technologies. It is therefore, understandable why the educational system of any nation must have a transformational relationship with ICT.

However, many years after the establishment of ICT centres in Nigerian Universities, it has become imperative to carry out analytical review of the operations of these centres. As a result of the multi-dimensional nature of ICT, a dissectional approach has been applied in the form of a detailed technical audit of one of the universities. The Interview-Based Research were used for the collection of data as it is the appropriate approach when a researcher desired information about the operations of an entity (Avwokeni, 2009).

It is hoped that data collected and analyzed from this university will have a lot of common bearing with a good number of universities in Nigeria since almost all of them are operated with a common goal and with a similar operational approach.

Service Requirements of ICT Centres in the Nigerian Universities

The ICT centres in the Nigerian universities are established to provide the following services or at least provide the platform for the provision of these services:

- **Registration of Students and Payment of Fees:** Currently, almost all Nigerian Universities use the online method of registration of students and in some cases, payment of relevant fees. This is usually achieved by logging into the university portal and supplying information in relevant fields. The information is saved in the database by clicking a save or send button. This registration includes the registration of courses and also enables students to register from different locations. This exercise requires the internet.
- **Uploading and Access to Students' Results:** The ICT centres are responsible for providing the platform and the required infrastructure for uploading of students' academic records by academic staff. It also makes it possible for students of these institutions to have access to their results by logging into the university portal and providing the needed security information such as their passwords and matriculation numbers.
- **Provision of Online Research Materials:** In the modern world, information needed for the purpose of research can easily be acquired through the internet and other online connectivity. The ICT centres are vested with the responsibility of providing of providing the university system with access to e-learning materials to support that which is provided by the library.
- **Provision and Management of a Computer Network:** It is the responsibility of the ICT centres to provide the university community with a computer network. This requirement is vital to enable communication and sharing of resources. A network is also required for the implementation of group policies, authentication of users and other related security policy management issues.
- **Provision of Access to the Internet:** The ICT centres are expected to make the provision for access to the internet. The internet is a worldwide network of computers and servers. They are expected to achieve this by sourcing, selecting and contracting an Internet Service Provider (ISP) to deliver internet connectivity to the university with a bandwidth adequate enough to cope with the size of the university community.
- **Provision of Information Technology (IT) Based Training to the University Community:** The staffs of the universities are expected to be trained by the ICT centres on various skills in Information Technology (IT). These skills includes how to use the computer to compute results, how to access the university portals and upload, edit and view students' results in

accordance with the privilege that is granted to the user. Training on other basic IT courses such as the use of Microsoft office, CorelDraw, etc. are also to be provided by the centres.

- **Provision of Training and other Relevant Services to the Society to generate Revenue:** The society is also expected to benefit from the university ICT centres. Similar training programmes are also provided to the society. However, these training and services are expected to generate revenue for the university.
- **Resolution of Problems and Conflicts encountered in the use of ICT Services:** It is expected that problems encountered in attempt to use the facilities and services provide by the ICT centres should be successfully resolved at these centres. This is possible because they have the administrative privileges of the network and also have skilled manpower to handle such complaints. This also includes systems maintenance.
- **Provision of Computer-Based Testing Centre:** The university ICT centres are required to establish and manage a computer-based testing centre for the university and other relevant establishments. The Post-UTME examinations currently taken by candidates seeking admission into Nigerian Universities is one example of this requirement. Recently, the United Tertiary Matriculation Examination (UTME) Board is also administering a computer-based examination.

The Strengths of ICT

The discussions on the strengths, weaknesses, opportunities and threats are centred on the data collected from the oral responses and the technical audit carried out by the researchers. Although, these discussions relates to the ICT centre of the Ignatius Ajuru University of Education, Port Harcourt, they are very common to many Nigerian Universities.

- The ICT centre of the Ignatius Ajuru University of Education (IAUE), Port Harcourt and those of many Nigerian Universities have qualified IT personnel. The data collected shows that a good number of staff has various qualifications in terms of degrees and certificates in computer science and other IT-related fields.
- The centre has also provided a number of IT training programmes to the staff and is currently training the staff in the use of the University portals and Cisco-based trainings.
- There are adequate computer systems and room spaces for various training programmes.
- The ICT centre has also liaised with IT Company to create a domain name, designed the university website and uploaded relevant records to the portals. Consequently, activities of the university can be viewed online and students academic records can be uploaded and accessed from any location.
- Staff of the university has also been issued domain e-mail addresses to enhance communication.
- The centre enjoys massive support from the Department of Computer Science. These include the staff that has immensely assisted it in its service delivery.
- All the technical staff of the centre are registered with the Computer Professional Registration Council of Nigeria (CPN) - the regulatory agency for all IT related activities in Nigeria.

Weaknesses of ICT Centres

- **Lack of Effective Intranet:** The centre has not been able to install and manage an effective intranet that covers each of the three campuses.
- **Lack of professionals with Professional Qualifications.** Interviews with a good number of staff indicates that there are few certificied personnel with professional qualifications such as MCP, MCSE, CCNA, MCTS, SCSA, CCNP, CCSA, etc.

- **Poor Method of Funding:** In spite of the fact that the ICT centre do lack sufficient funding, the method of funding of the centre represents a major set-back in providing the centre with the required capacity for effective service delivery. Imprests are ridiculously meager and funding is based on approvals from the Vice Chancellor (VC) of the University on request and not based on annual budget - a typical retrogressive syndrome in Nigerian university system. The most frustrating issue is that approved fund are hardly released as at when needed. According to the responses, only approvals that have the imprimatur of the bursar are released promptly.
- **The centre has not been able to develop an IT policy for the institution:** In spite of the years of existence, there is no IT policy in place for the university. Computer systems with various conflicting capabilities and operating systems are procured for the various departments. This has serious implications in the installation and configuration of group policy and user authentication in the network when an effective intranet is eventually installed.
- **It is also a weakness of the ICT centre of the IAUE for its inability to link the three campuses of the University for effective and toll-free communications.** The university has three campuses namely: The Main Campus (located at Rumuolumeni), St. John s Campus and the Ndele Campus. The Ndele Campus is about 45km from the main Campus and about 65km from St. Johns Campus. This calls for the need to link them with an effective communication system.
- **The responses also show that very few fund-generating training programmes have been organized by the centre since its inception.**
- **There is no computer-based testing Centre:** The centre has not been able to install and configure a functional computer-based testing facility of its own.
- **Extremely Poor bandwidth for Internet Service:** The data below shows a comparative analysis of the bandwidths used by some selected tertiary institutions in Nigeria. The table shows the bandwidths of some institutions from the Western and Southern parts of Nigeria.

Table 1: Internet Bandwidths of Some Institutions

Institution	Internet Bandwidth	Voice Service
Obafemi Awolowo University, Ile-Ife	45Mbps	No
Rivers State University of Science and Technology (RTUST), Port Harcourt	2Gbps	No
University of Ibadan	45Mbps	Yes
IITA, Ibadan	10Mbps	No
Ignatius Ajuru University of Education, Port Harcourt	3Mbps	No

Source: *iPNx and IT Centre of Rivers State University, Port Harcourt (2012)*

From the data shown above the IAUE ICT is with the least bandwidth that is not even adequate to sustain a small secondary school.

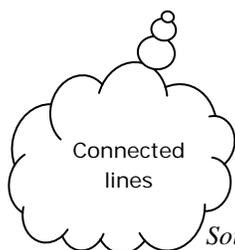
- **Poor Maintenance Culture:** Computer systems, radios for wireless access including batteries for inverters are poorly maintained. The centre is unable to effectively support the University in the maintenance of computers and other IT related systems.

Opportunities for ICT Centres

- **There are opportunities to earn reasonable amount of revenue from the provision of research resources to the University Community and the society:** Various online tools exist to improve the availability of technical resources and increases students' interest in Science, Technology, Engineering and Mathematics (STEM) topics, Daniel A. O. et al (2012).
- According to the data presented below, there are wonderful opportunities in the development of mobile applications.

Table 2: Monthly Subscriber Data for Active GSM lines

Operator	March, 2017	April, 2017
Mobile (GSM)	151,999,197	148,774,015
Mobile (CDMA)	217,566	217,566
Fixed wired/wireless	152,500	153,804
Total	152,369,263	149,145,385



Source: Nigeria Communication Commission (NCC, 2017)

The World Bank in its World Development Indicator (WDI) of 2004 puts the total GSM lines in Nigeria at thirty two million (32,000,000). Also Nigeria is the largest GSM market after China Agada (2008). It is observed that from the data provided by NCC, there is amazing increase in mobile lines within a month. Between March 2017 and April 2017, there is an increase of three million two hundred and twenty-eight thousand eight hundred and seventy-eight (3,228,878).

However, Techpoint puts the current figure at two hundred and sixteen million lines (Techpoint, 2018).

- **There is a large market for IT training in the country:** This is evidenced by the proliferation of numerous training centres in both the urban and rural areas. A well developed ICT centre can earn revenue from this. The presidential initiative on computer literacy has created additional opportunities for ICT centres across the country to support computer literacy and even earn revenue from it.
- **There are also opportunities for the centres to create employment:** It has been shown that IT has reliable potential of generating employment whether classical, keyisian or the growth employment model is considered (Odekunle et al, 2008).
- **The security challenges faced by the security agencies in Nigeria require modern solutions built around IT:** There are opportunities in creating IT-based security solutions that can be patented for amazing income in the future.
- **The fact that a University ICT centre is not a secular business corporation presents good opportunity for effective service delivery:** According to Aaron (2010), a business corporation's operation is rooted in the logic of the pathological pursuit for profit inherent in the nature of the corporation. He argued that corporation cannot even with the best of intentions, make meaningful impact on host communities, mainly because of the structural constraints arising from the profit-seeking ethos which drives corporate behaviour. A University ICT centre is a unit under the University administration and does not pay taxes and is therefore not subjected to the unhealthy competition that business corporations experience. Thus, the major

goal will be effective service delivery instead of the primary goal of profit and can therefore support its host community better.

Threats in the Future Operation of the Centre

- **A major threat identified by the study is that of funding:** The poor method of funding constitutes a major threat to its future operation. The threat is escalated by the financial abnormality practiced by the bursary department of the institution. The situation where approval can only be released if it has an express declaration of nihi obstat from the bursar is a crucial threat to the entire system.
- **Lack of an IT policy is another major threat to the smooth operation of the ICT centre:** There is no IT policy in place, so computers of different versions of operating systems (OS) are procured and this has serious implications on the network especially in the smooth implementation of group and security policies.
- The ridiculously low Internet bandwidth is a crucial challenge to the future operation of the IAUE ICT centre.
- The lack of adequate fund-generating programmes places additional financial burden on the centre.

Strategic Planning Programme to Enhance Effective Operation and Management of University ICT Centres

The strategic planning programme provides solutions to the weaknesses, explores ways of tapping into the numerous opportunities revealed in this paper, presents a guideline for sustaining the strengths and overcoming the threats posed in the future operation and management of ICT centres in Nigerian Universities.

- **A major requirement for effective operation of a University ICT centre is the installation and management of an intranet.** A reliable network highly optimized to cope with the complexity of university academic and service requirements is a sine qua non.
- **Funding of the ICT centre must be based on annual budgets and supplementary budgets.** This will enable the centre to plan for its programmes effectively.
- **The centre must set up advanced hardware and software laboratories capable of supporting academic activities and developing products and applications that are essential to the development of IT.**
- **Fund-generating training programmes calendar must be prepared and implemented effectively.**
- **Installation and configuration of an e-mail exchange server to enhance communication even when internet service is not available.**
- **Formulation of IT policies for the universities to enhance smooth deployment of IT resources in a cost-effective manner.**
- **Development of a realistic maintenance programme for effective maintenance of computer system and other IT resources.** The study revealed that remote access points for wireless connections within the main campus are powered via small inverters with small back-up batteries. I recommend regular inspection and voltage measurements in every two weeks. Computer maintenances should include regular software updates and defragmentation of the systems in every twelve weeks (3 months).
- **Use of inverters fitted with circuitries that can disconnect battery power after exceeding a minimum current reserve threshold.** This will avoid draining the batteries completely and destroying the cells.
- **Implementatiion of training programme for its staff to cope with the highly dynamic nature of ICT.**

- **Setting up of a functional computer-based testing centre is an essential component of a university ICT centre.**
- **Partnering with other corporate bodies in terms of service delivery and in terms of sponsorship.** IAUE is in very close proximity to a reasonable number of corporate institutions and can easily secure partnership.
- **Linking of the three campuses together through a microwave connection.** It is our recommendation that radios and other microwave-based equipments should be powered with solar power stations. The diagram below gives a graphical illustration of this recommendation.

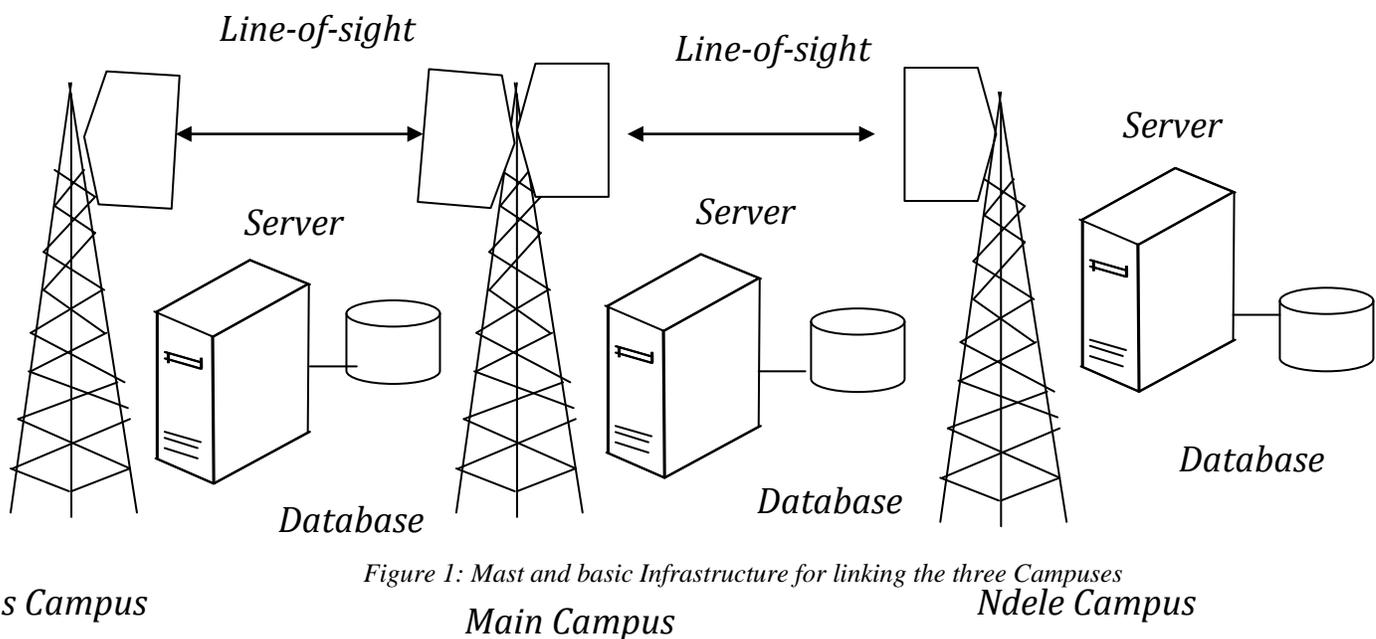


Figure 1: Mast and basic Infrastructure for linking the three Campuses

High quality radios from Teletronics or Cisco should be used. A voice service should be activated to enable inter-campus toll-free telephone communication. This will also enable video conferencing and computer-based security installations and controls.

- **An ICT centre that must remain strategic to the modern society must develop capabilities in computer security:** This is because the future war is a cyber war. An ICT centre must be capable of defending the university network and contributing same to national development. ICT personnel should be trained on advanced security and must acquire relevant certification in this field.

Conclusion

Attractive opportunities exist for a sufficiently developed ICT centre. An effective University ICT centre can contribute immensely in placing the University on the global top list, if it is adequately equipped and properly managed. Its potential to determine the dynamics of life cannot be over-emphasized.

Nevertheless, the parallel, conflicting and duplicating financial control disorder observed in IAUE during the study, posed a serious threat to the development of ICT and academic activities. The practice where approval are only honoured if it has the imprimi potest of the bursary department has the potential of generating centrifugal and centripetal forces aggressive and asynchronous enough to cause serious developmental comatose and administrative chaos not only to the ICT centre but the entire university system. The Vice Chancellor is the chief executive of the University in the Nigerian University system and has the final approval to all requests. This should be observed and implemented in line with the principle of corporate administration.

The centre should acquire capacity to develop mobile applications. The author strongly recommend the use of J2ME or Java ME as this is a highly optimized JAVA runtime environment targeting a wide range of consumer products including pagers, cellular phones, printers, screen phones, Blu-ray Disc players, digital set-top boxes, embedded devices, M2M modules, car navigation systems and more. This is because there are wonderful and amazing opportunities in this area as reflected in study.

Advanced software and hardware laboratories should be established and properly equipped as they are essential resources to support academic activities in: Data communications, Microwave studies, Telecommunications, Microcontroller and Microprocessor-based studies, Systems engineering, Biotechnology, Computer Science and so on.

The cooperation between the department of computer science and the ICT centre should be encouraged and sustained. While the author recommends that funding must be based on annual budget; the ICT centre must intensify effort to run adequate fund-generating programmes and possibly become financially autonomous in the future.

The implementation of the strategic planning programme outlined in this study will no doubt produce a viable ICT centre with adequate capacity to support academic activities and immensely contribute to projecting the university on the top global list.

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APPENDIX

Dear Respondents, this document is intended to collect information that will assist in enhancing the capacity and service delivery of the Information and Communications Technology Centre (ICTC) of the Ignatius Ajuru University of Education Rumuolumeni, Port Harcourt, Nigeria. Please feel free to comment freely. The information is strictly for the purpose of research intended to achieve the above stated aim. Your responses will be treated in confidence, please.

Igenewari, L.S. and Micheal, C. P.
Researchers

Interview Questions

- 1) What is your Rank/Job Description?.....
.....
- 2) What is your last Qualification?.....
- 3) Do you have professional qualification.....
- 4) If you have professional Qualification write the qualification.....
.....
- 5) How is the ICT centre funded.....
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.....
.....
- 6) Do the ICT centre have training programmes for the University staff
.....
- 7) If there are training programmes for the staff list them.....
.....
.....
.....

- 8) What are training programmes (if any) available for other members of the society.....
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.....
.....
.....
- 9) Do you have a software laboratory?.....
- 10) Do you have a Network laboratory?.....
- 11) Do you have a Computer-Based Testing (CBT) resources designed and implemented by the centre for the University?.....
- 12) Do you have an intranet (LAN) covering each campus?.....
.....
- 13) Are the three campuses of the University linked or connected together by a computer network by any means?.....
- 14) Can the Teaching staff upload results to the school Portal?.....
- 15) Can Students register their courses or access their results using the University portal?.....
- 16) Can the students pay their fees online using the portal?.....
- 17) Comment freely on the challenges and suggestions for improving the capacity and service delivery of the ICT centre.....
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