

**TRENDS IN THE DEVELOPMENT OF INFORMATION COMMUNICATION  
TECHNOLOGIES IN THE USMANU DANFODIYO UNIVERSITY, SOKOTO**

By

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## 1.0 Introduction

Usmanu Danfodiyo University, like most other Nigerian Universities is beset by an array of problems one of which is communication. Communication is presently the weakest area of the University development. Presently, there are two major campuses in the University, the City Campus and the Permanent Site; and communication between the two is largely by vehicular transportation. The few functional networks of telephones within the University are only accessible to few members of the University community. National and International communications on the other hand are heavily dependent upon regular postal and courier services. This greatly hinders academic and research activities in this age of information technology.

Access to teaching and research materials in form of periodicals journals and books by our academic staff is now a thing of the fast. Similarly, international conferences, workshops and seminars attendance as well as collaborations with other academic staff are also highly limited. Our library is largely empty, with only obsolete and few books and journals. Access to current editions of books and international journals is increasingly becoming difficult as a result of limited funds and the weakness of the Naira against major international currencies.

This picture is no different in most, if not all, of Nigerian Universities. It was the realisation of this problem that spurred the National Universities Commission (NUC) to making concerted efforts to arrest the trend by setting up the e-mail committee in 1994 and the Nigerian Universities Network (NUNet) in November of 1995.

## 2.0 Before the NUNet project

Before the introduction of NUNet in Usmanu Danfodiyo University, the use of Information Technology was mainly in the processing of administrative data and minor academic computing in the MIS Unit and Computer Unit located in the VC's office and Mathematics department respectively. The activities of the MIS are mainly the processing of Payroll, General Ledger, Personnel and Students Records System. The Computer Unit of the Mathematics Department mainly provides computing facilities for students of

computer science program. Whereas the MIS was blessed with several state of the art Personal Computers, the computer unit suffered lack of facilities and personnel due to insufficient funding and the difficulty in attracting and retaining personnel. In 1994 the University experienced its first Local Area Network when the computers in the MIS (ten in number) were networked using Novell Netware Version 4.11 (later migrated to Windows NT). In the same year, the library witnessed its first use of Information Technology with the purchase and installation of three PCs that were later used in a library automation project using TINLIB, which has failed due to lack of support from the vendors.

The only relationship between the MIS, Computer Unit and the Library is in the use of technical personnel. The MIS, having the most skilled personnel as well as the most sophisticated set of IT equipment assisted the units in the training of staff and maintenance the equipment. In addition to the computers in these units, there were some computers here and there in the campuses. However, all the computers were used for word processing related activities.

It was in this environment that the NUNet project was born at the Usmanu Danfodiyo University.

### 3.0 The NUNet project

In 1995 the NUNet project took off in Usmanu Danfodiyo University through the constitution of the NUNet Committee by the University Management. The committee was charged with the following responsibilities among others:

1. To define the scope of the University network needs.
2. Mount campus-wide awareness programmes towards strong user base. This will involve computer awareness trainings, workshops, seminars and conferences as well as the production of brochures and pamphlets.
3. Design and co-ordinate the gradual networking at all levels.
4. Ensure effective utilisation and maintenance of the NUNet resources.

However, due to lack of facilities and limited technical know-how the project did not fully take-off until January of 1997. The NUC organised a capacity building training for all NUNet Chairmen and Engineers in November of 1996 at the International Centre for Theoretical Physics Trieste (ICTP), Italy. Upon return from the training, the NUC supplied some basic equipment necessary for the take-off of the e-mail project. At the Usmanu Danfodiyo University, a single computer was dedicated at the office of the Director MIS for the e-mail services. The system used the Linux Operating System and a UUCP connection to connect to a Server in NUC to upload/download mails. The system allowed us to create independent e-mail accounts for all staff of the University using the `udusok.edu.ng` domain being hosted by ICTP.

#### 4.0 The NUNet plan

The NUNet Management Committee came up with a five-year plan aimed at making the NUNet project in the University a reality. The plan was aimed at making e-mail and Internet services available to all staff and students of the University in a sustainable way. The plan was broken down into:

1. ICT infrastructure
2. Technical Personnel
3. ICT awareness
4. Building Structures

#### 4.1 ICT infrastructure

The committee opted for a Core/Periphery structure for a Campus-Wide Network and access to the Internet. The plan identified the NUNet centre as the nerve centre (core) and the gateway to the outside world. The rest of the University community was divided into Strategic Business Units (SBUs) namely:

- Vice-Chancellor's Complex
- Arts and Humanities Complex
- Science and Agric Complex

- City Campus Complex
- Bursary/Registry
- Library/PG School
- Works & Services/Secondary/Primary Schools
- Health Services/Energy Research

Each SBU was to be connected to the NUNet centre through a high-speed backbone made-up of fibre-optics cable. Each of the SBUs will have its own Server(s) and an access laboratory where about 10 or so PCs will be provided as a short-term plan. In the long run, all offices are to be provided with computers. Computers within each SBU will be connected in a Local Area Network using UTP cabling. The NUNet centre will provide access of the Internet to all the SBUs through a very high speed Very Small Aperture Terminal (VSAT) which is to be located in the NUNet centre. The City Campus SBU, which is located some 15 kilometres away from the NUNet centre, will be connected using dial-up access in the first instance. This will later be upgraded to wireless technology. Similarly, residences of staff located off the campus will also use dial-up access.

The committee planned for a NUNet centre with adequate offices to cater for:

- Staff offices
- IT maintenance centre
- Access laboratories
- Training centre

#### 4.2 Technical Personnel

Having realised the difficulty of attracting and retaining technical staff, most especially in the field of information technology, the NUNet committee decided as follows:

1. To continue to look for highly skilled staff for employment.

2. To look inward and identify potential IT staff and retrain them internally.

The committee later added a third idea borrowed from the University of Jos. To identify interested and sharp students in their 200 and 300 levels who could be trained in relevant areas. The students, who should serve as volunteers, will in turn assist in maintaining the IT infrastructure as well as supporting staff in the University.

#### 4.3 ICT awareness

The committee, having realised the importance of campus-wide awareness training for the success of ICT in the University, came up with an elaborate plan for that. It planned for:

- Conferences, seminars and workshops
- Production of fliers to spread the NUNet programs
- Creation of an intranet with a special section on on-line training
- Campus-wide computer awareness training for all staff and students

However, the sheer number of the students makes it almost impossible for them to be provided with hands on training with the little facilities at the disposal of the project. It was however observed that part of the NUC guidelines for degree programs in Nigerian Universities is that each student must obtain 6 credit units of computer before graduation. The committee therefore decided to encourage the continuation of this program until such a time when adequate computers are available for hands on training.

The NUNet plan was submitted to the management and was approved for implementation.

#### 5.0 The Journey so far

The implementation of the plan was very difficult due to poor financial position of the University. However, a lot of progress has been made in the following areas.

## 5.1 Infrastructure

In 1998 the NUNet project was allocated an office block, which was refurbished and furnished with two administrative offices, an access laboratory, a computer maintenance workshop, a store and an office to serve as the Server room.

The centre was provided with 14 Pentium computers, 2 dot matrix printers, two LaserJet printers and 7 UPS units. Our internal staff using UTP cables networked the computers. This allowed our users to access their e-mail accounts from all the 14 computers.

The success of the NUNet project encouraged the University Authority to provide computers to many departments in the University. Presently, each department in the University has at least one personal computer set with some departments having more. Also each faculty office has a computer set. In addition, all the principal officers of the University have been provided with a computer set each. From 1998 to date, the population of computers in the University has risen from about 30 to over 150 now.

The University Authority has recently approved another block of offices and a third one is under construction. With these buildings, the NUNet centre will have enough offices for its staff, a computer repairs workshop, access laboratories for staff and students and a training centre.

The explosion of computers in the University has triggered the need to use them, most especially in the area of information communication. The available computers in the NUNet centre became inadequate to handle the rising demand in the University. Also the present method for sending and receiving e-mails as well as access to the Internet proved inadequate. The University is using dial-up access through Nitel to access the Internet. The unreliable nature of Nitel phone lines and the slow speed of dial-up access became a great barrier to full Internet access. In addition, the intercom system in the University and the direct phone lines to the University all collapsed. The University Authority, through the able leadership of the present Vice-chancellor Professor Aminu Salihu Mikailu, so vividly the vital role information technology plays in the development of any University.

To this end, the University Authority embarked on the rehabilitation of these infrastructures. The direct telephone line cables to the University were changed and a contract was awarded for a new digital intercom system for the University. Also contract for the supply, installation and training on Very Small Aperture Terminal (VSAT) was awarded. When completed, the equipment will provide for a full 24 hours Internet access to the University community at a speed of 128 kbps downlink and 64 kbps uplink. Access to the Internet will however be restricted to the NUNet centre where access laboratories will be provided for both staff and students. In addition, dial-up access will all so possible for the City Campus and staff residences off the main campus. The decision to limit the access was as a result of the followings:

- Inadequate technical skills to handle full-blown campus-wide access.
- Poor financial position of the University. This limits the ability of the University to provide higher speed and wider campus access

The concentration of the access at the NUNet centre will provide our staff the opportunity to develop necessary skills required to maintain a campus-wide access. With additional skills and experience, the network will be expanded gradually to cover the whole campus in a period of five years.

Due to financial limitations from the part of the University, it is impossible to provide the number of computers required to the University community within a short time. To this end, the NUNet committee proposed to the University management a computer loan project. The idea is for the University to secure a loan from any bank and give it to any staff that requires buying his/her own computer. The scheme has become completely acceptable to the University community to the extent that the University Governing Council has approved it and has directed that any staff that shows evidence of purchase of a computer be given a 5% subsidy on the interest to be charged. The University has already secured the loan and disbursement will soon commence. This, the NUNet committee believes will allow more staff to have access to the Internet.

## 5.2 Technical staff

As each day goes by at the University, the role of information technology as a vital tool for teaching and research activities continues to grow. This is evidenced from the rapid growth of the population of computers and the growing needs by our staff to use them. This put a lot of pressure to our small population of technical staff most especially in the areas of computer repairs and maintenance as well as training and other support services. Being far away from the centre of the country makes it very difficult for us to attract and retain computer staff. Lack of computer using industries also makes it again difficult to recruit staff even on part-time basis. This forced us to start looking inward in order to develop local capacity. We categorised our staff requirement into three namely: Hardware repairs and maintenance, Network administration and user support and training. The NUNet project then embarked on re-training some of the MIS staff to fit into these roles.

### 5.2.1 Hardware repairs and maintenance

Staff gifted with skills were identified and trained for basic repairs and maintenance of computers. A computer repairs workshop was then established in the NUNet centre with necessary facilities and the staffs assigned the responsibility of maintaining the University computers. In order to further build the local capacity, we try as much as possible to assemble our computers locally. This has proved very successful. Today, the two maintenance staff we have can assemble and upgrade computers.

### 5.2.2 User support and Training

The unit started with no staff. This is because I, Ahmed Isah Chafe, being the only computer person then, belonged to the MIS. When the unit started, I found myself coordinating the activities of both the MIS and the NUNet. The implementation of all the NUNet plans as well as the day-to-day maintenance and administration of the unit fell on my shoulders. It therefore became very difficult to organise training sessions for the University staff. We were however able to attract and employ three Computer Science graduates from the University. Two were employed for the MIS unit and one for NUNet. The staff in the NUNet, with little exposure is today assisting in user support and training

services as well as network administration. However, with the VSAT being presently installed, the demand will be too much for the two of us to cope with. As a result of this we decided to expose the other staff in the MIS to networking administration. Four MIS senior and two junior staff were therefore identified. A train the trainer program has already been designed and the training has commenced. The staff are being exposed in the following areas:-

1. Networking basics including:
  - TCP/IP configuration
  - Dial-up configuration
  - Simple Trouble shooting techniques
  - Cabling using UTP
2. Internet Basics including:
  - History of the Internet
  - Accessing and browsing the Internet
  - Setting up Internet access using dial-up and LAN
  - Using basic Internet services: e-mail, FTP, WWW, etc.
3. Web page design using FrontPage 2000.

Once completed, the staff will be in a position to assist in training the University staff on how to use the Internet. In addition to this, we are embarking on an experimental study based on an idea already in use in the University of Jos. The idea is to identify interested students who are sharp and willing to serve as volunteers. The students will then be given similar training as indicated above. Once trained, they will be used as laboratory assistants as well as to assist in the development of the University website, which has already been in progress.

### 5.3 Campus-wide Awareness Training

In our effort to increase the awareness on campus, we embarked on campus-wide computer awareness training. This started with the training of the principal officers of the University. They were taught how to use computers including using the e-mail system of

the University. The training proved very successful and led to the purchase of computer set for each principal officer. The training of the principal officers was later followed by that of Deans and Directors. A similar training was also organised for staff of Bursary Department.

Our ability to offer more and rapid training was limited due to the fact that

1. There was no adequate staffing in terms of number and skills to conduct the training and carry out other services in the NUNet centre.
2. Only one access lab was available which serves as the training lab and access lab.

However, with the current staff development drive and additional office blocks, more frequent trainings will be organised to rapidly cover the campus.

#### 6. Sustainability

Information communication technology is a very capital-intensive project, most especially in big organisations like universities where access will be required by majority of the population. The state of funding of the Nigerian Universities by the Federal Government is so inadequate that to sustain the project and grow according to plans required us to look elsewhere for funding. The University made some efforts to get external funding from well meaning Nigerians but with no much success. It therefore became necessary for us to find ways to generate revenue to maintain the huge investment being made by the University. To this end, the University Governing Council has approved that:

1. Access to the Internet should be commercialised but heavily subsidised for all staff and students within the campus.
2. Staff requiring dial-up access from their residential houses will pay for the access.
3. The NUNet centre should set-up and run Computer literacy programs to the immediate community of the University.

4. The NUNet centre should also offer other consultancy services aimed at generating revenue.

Revenue generated by the centre should be used to:

1. Finance the acquisition of IT equipment
2. Pay for bigger access speed
3. Maintain the IT equipment
4. Train IT staff