

THE DEPLOYMENT OF FOSS TOOLS FOR LONG DISTANCE E-LEARNING IN AFRICAN UNIVERSITIES

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Abstract

The quality of educational delivery and mass access to education in Nigeria and most African countries is currently being impaired due to poor or inadequate materials (books, journals e.t.c), curriculum, facilities, teachers and funding. In order to increase both access and quality of educational delivery system, we believe that ICT can be successfully deployed. This paper based on the reviewers comments, will focus on the status of ICT in Nigerian Universities and some of examples of what we are doing to facilitate long distance e-learning.

Keywords: *Information and Communication Technology, Usmanu Danfodiyo University, Free/Open Source Software*

1. Introduction

Statistics has shown that despite the large population of students without access to education, Nigeria's allocation to education is the least compared to other African countries with significantly smaller population. Nigeria spent 7% of its budgetary allocation to education in 2001. When computed as a percentage of the GNP and compared with other African Countries, Nigeria's spending on education was about 0.76% compared to 7.9% for South Africa, 5% for Cote d'ivoire and about 6.5% for Kenya (Dike, July 14 2000).⁽¹⁾

In UDU alone, in the year 2002, 18, 000 students applied for admission but only 3, 000 could be admitted. The situation of the educational sector is not encouraging. The World Bank report of 2002 indicates the recent FME school census (carried out in March, 2002) estimated that in 2001, there were almost 19.4 million children in 49, 300 primary schools (all public and the majority of private schools) throughout the country, with 460, 406 teachers. Estimates are that about 30% of the 6-11 years old are not in primary school, but with wide variations between states. The combination of poor educational quality at all levels; lack of curriculum relevance and high unemployment of tertiary graduates (at 22%) has eroded the confidence of students' parents in the education system. For many of the poor, and we assume the majority of the core-poor, children do not attend school, because of the direct and indirect costs associated with schooling.⁽²⁾

In order to increase both access and quality of educational delivery system, we believe that ICT can be successfully deployed. Specifically e-Learning centres and facilities are considered. Distance learning will allow learners to enrol from many remote locations for a course in UDU that used to be offered to only about 40 students. Lectures can be recorded and re-used by students in the school, from their houses or hostels, thereby providing the concept of "learning anywhere any time". Internet technology can also be used to have access to very high quality materials. This can dramatically improve the quality of teaching and learning. The poor funding in our educational institutions is making the deployment of both infrastructure and contents very difficult.

¹ *African Economic Analysis*

<http://www.africaneconomicanalysis.org/articles/gen/education10204234737htm.html>

² S.N. Mumah, "Information and Communication Technology (ICT): challenges in the Technical and Vocational Education and Training Sub Sector" world bank report of 2002

2. The Nigeria paradox

Despite its high priorities, Nigeria can investigate how to better use the opportunities presented by the emergence of Free/Open Source software in the context of limited financial resources and capacities. Taking into account all major cost elements, Open Source Software environments are significantly less expensive than proprietary software environments. Open Source provides a way for Nigerian educational institutions to help themselves, not to wait for the first world but to get up and do it themselves. This will help Nigeria and other African countries leapfrog into the information age through reduced costs, less dependency on imported technology and its ability to be customized to local languages. Moreover, by giving users access to its inner workings, Open Source could stimulate the local software industry. The open source philosophy lends itself to making technology available to the masses. But without ICT, divide will widen. A solution to this paradox is use FOSS to minimize cost.³

3. Status of ICT in Nigerian Universities

The table on the next page⁴ summarizes the status of ICT in some Nigerian universities. With few examples of what the National Universities commission is doing and the Usmanu Danfodiyo University in improving the quality of educational delivery system in Nigeria.

³ Gideon Hayford Chonia, "Free and open Source Software in Africa" 2003 Round Table on Developing countries Access to Scientific Knowledge. The Abdus salam ICTP, Triesty, Italy

⁴ see : <http://www.foundation-partnership.org/linchpin/profiles.php>

University	ICT Status
Bayero University, Nigeria	<p>ICT plans are incorporated into Bayero University's overall strategic plan. The university established a small Local Area Network (LAN) in 1997/98, with three computers, one of which was used by the entire university to send and receive email. Since then, the university has installed several LANs, and email capacity has improved considerably. The university has two internet cafés. One has a dial-up connection; the other is connected to the ISP with a wireless link. One café has 56Kbps capacity, the other 64 Kbps. There is some networking on campus, but no campus backbone yet.</p>
Obafemi Awolowo University, Nigeria	<p>The Vice Chancellor and other senior administrators have been involved in all aspects of decision-making pertaining to ICT. The university currently has a VSAT, with a bandwidth of 512Kbps/128Kbps, for which it spends \$153,600 annually. Plans are in place to upgrade to a downlink of 1Mps. There is a campus backbone, mainly wireless, and almost every department is networked. The university teaching hospital, which is outside the main campus, is linked to the network by radio. Faculty housing and the conference centre guesthouses are also connected. The university has also put in place eight internet cafés.</p>
University of Jos, Nigeria	<p>ICT at the University of Jos receives considerable support from the university's administration, which is involved in all facets of implementation. Jos has a VSAT, with a connection of 64/128 Kbps, at a cost of \$4,332 per month. There is a fibre optics backbone, with some LANs. Because electricity supply is so unreliable, Jos uses solar power as a backup system.</p>

Source: <http://www.foundation-partnership.org/linchpin/profiles.php>

3.1 The National Universities Commission

The National Universities Commission (NUC) is the federal umbrella organization, which oversees the administration of higher education in Nigeria. With 27 federal universities and dozens (soon to be hundreds) of teaching hospitals and colleges under its wing, the NUC has the potential to change the lives of a million Nigerian scholars and academics.

Efforts made by NUC in ICT for teaching and learning include the following:

3.1.1 Virtual Institute for Higher Education Pedagogy (VIHEP)

This initiative is geared towards a take-off National Education Pedagogic Center to deliver modern method of teaching and learning as well as to enhance knowledge and skills of academic staff on different topics. <http://www.nucvihep.net>

3.1.2 Nigerian Virtual Library Project

The mission is to provide, in an equitable cooperation and cost effective manner, enhanced access to national and international library and information resources with libraries all over the world using digital technology. <http://www.nigerianvirtuallibrary.com>

3.1.3 Virtual Institute for Higher Education in Africa

This is a training site where participants though not physically present in a brick and mortar physical space, are able to update their knowledge and skills on a subject matter using internet protocol as a platform. A collaborative effort with UNESCO Harare cluster office. <http://www.viheaf.net>

The main objectives of the institute include:

- To enhance the knowledge and skills of academic staff in institutions of higher learning on such issues as (i) teaching large classes; (ii) effective utilization of (meagre) resources; (iii) modern methods of assessment and evaluation;
- To provide internet based training on HIV/AIDS education for teachers at the primary, secondary and higher education level in Africa; and,
- To provide internet based training on the development of materials for open distance learning.

4. The Usmanu Danfodiyo University (UDU) Experience

In order to improve the quality of teaching and learning in the university, the following strategies were developed at UDU.

4.1 Vision

- To use ICT to improve the quality of the educational delivery system in Usmanu Danfodiyo University and its immediate community. The university will serve as an educational portal for higher educational institutions and secondary schools through common and shared infrastructure accessing and utilizing educational resources at the university and the internet.

4.2 Mission

- UDUNet provides access to information and knowledge to the Usmanu Danfodiyo University community as a way to improve teaching, learning, research and community services to its stakeholders.

4.3 Infrastructure

- Installed a Very Small Aperture Terminal (VSAT) for access to internet at 128/256kbps uplink/downlink. (c-Band);
- Installed a Very Small Aperture Terminal (VSAT) for access to internet at 64/128kbps uplink/downlink. (KU-Band) to provide redundancy;
- Installed a wireless campus network using Cisco 350 series equipment. The wireless links the two campuses of the university together. It also provides signal coverage of the two campuses;
- Installed a 2k VA Solar system in each of the two campuses. The solar system is to be used as power backup in case of NEPA failure;
- Installed a 37KVA standby generator for power backup at the permanent site;
- Employed Computer Science graduates to maintain the infrastructure;
- Construction of access laboratories at both the City Campus and Permanent Site;
- Purchased and supplied at least one computer set for each department;
- Secured and disbursed computer loan to staff ; and,
- Distributed 100 notebook computers to staff on loan in conjunction with a private firm.

4.4 Capacity building

A key constraint for the effective application of ICTs in the Nigerian universities is the shortage of human resources. The professional development of teachers therefore sits at the heart of any successful technology and education program. The Usmanu Danfodiyo University clearly saw the need for the community to be transformed information consumers, using the internet to access resources, not information producers, adapting the information for their particular cultural and educational reality. The university has developed a critical mass of users through vigorous capacity building; technical staff, university staff, students and the immediate community were trained.

5. FOSS in education

Open Source in education exists to promote the use of Free Open-Source Software (FOSS) in Nigerian universities. There are many issues facing educators in Africa who want to use the technology. Lack of money or cost, the digital divide and technology support. But, there is collaboration between several African institutions to bring FOSS to schools. FOSS can save schools thousands of dollars. Staying with FOSS technology, the money could go to buy even more computers. FOSS can be seen as a tool to also bridge the digital divide.

5.1 Why should Open Source Software be used in Nigerian Universities?

It is indeed a strange world when educators need to be convinced that sharing information, as opposed to concealing information, is a good thing. The advances in all of the arts and sciences, indeed the sum total of human knowledge, are the result of the open sharing of ideas, theories, studies and research. Yet throughout many school systems, the software in use on computers is closed and locked, making educators partners in the censorship of the foundational information of this new age. This software not only seeks to obscure how it works, but it also entraps the users' data within closed, proprietary formats which change on the whims of the vendor and which are protected by the bludgeon of the End User License Agreement. This entrapment of data is a strong, punitive incentive to purchase the latest version of the software, regardless of whether it suits the educational purposes better, thereby siphoning more of the school's limited resources away from the school's primary purpose. The use of such closed software in education may be justified only where no suitable open source solution exists.

5.2 FOSS and e-Learning at UDU

5.2.1 What we have done

- *E-mail server*
 - § Postfix as Mail Transport Agent (MTA) using Mandrake Linux 9.2 with SquirrelMail as mail client.
 - § <http://mail.udusok.edu.ng>
- Web server
 - § Apache 1.3 using Redhat Linux 6.2
 - § <http://www.udusok.edu.ng>
- **Domain Name server (DNS)**
 - § Built on Bind 8, using Redhat Linux 7.3
- Mounted staff's training on how to create lecture slides and use of slide projectors;
- Trained the staff on how to use different courseware like the MIT OpenCourseWare;
- Wireless access points deployed to provide internet access to the centers;
- Mounted students internship programme "Knowledge for Service" to provide ICT support;
- Free internet tutorials for students;
- Free and open source training; and ,
- Configured Dokeos¹, which allows you to create web content, generate multimedia tests, manage interaction with students/trainees, structure a learning path step by step, follow students/trainees progress through time, and deliver, live conferences. Is accessible on the UDU local network.

5.2.2 What we intend to do

- We have secured a donation of 100 desktop computers from Computer Aid International² to be configured with FOSS; specifically by the intern students
- Mass training of staff and students on how to use and manage the OpenCourseWare.
- Set up one e-learning centre in each of the 9 faculties of the University.

5.2.3 Challenges

- Poor financial base.
- Poor level of computer skills required by academic staff to integrate computer and internet use into routine teaching and learning.
- Poor level of professional competence to effectively maintain and improve the present level of infrastructure in the university.
- Inability to comprehensively capture, organize, analyze and report information that describes the university's activities, services and related costs and expenditures for effective decision making processes.
- Epileptic nature of electricity supply.
- Harsh weather conditions. Very hot during the hot season and very cold and windy during hamattern.
- Possibility of prolonged downtime due to foreseen or unforeseen circumstances such as equipment failure and natural disasters.
- Continuous rise in software and support costs due to increase in both demand and complexities.

¹ see, <http://www.dokeos.com/index.php>

² see; www.computer-aid.org/

6. Conclusion

Rapid expansion of the internet holds substantial promise for universities in the developing nation, which can benefit greatly from the internet's communication delivery capabilities to help meet the needs. There is the need to provide a forum for African universities to discuss common ICT issues and share experiences. The international donor agencies should help the African universities to leapfrog into the information age through partnership. African universities should integrate and promote Open Source to develop ICT in Africa. It is the authors' belief that universities should share local contents developed by individual universities in Africa.

7. References

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