

A Comparative Study Of Information and Communication Technologies at Higher Educational Institutions in Africa: Case Studies from Nigeria & Mozambique

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Abstract

The Internet has emerged as arguably the most visible component of the dynamic developments of Information and Communication Technologies (ICTs). The rate of adoption of the Internet exceeds that of all technologies before it. Its uses range from communication and publishing to research. It has impacted, albeit differentially, every sector, from manufacturing and services to education. Higher education is particularly crucial to long running economic growth because it is the source of knowledge workers and an important source of inventive outputs. The role of universities as centers of research and diffusion of findings will become increasingly important in the 21st century.

The focus of this paper is on the usage of ICTs on the higher education sector, particularly the impact of the Internet. Relatively little is known about the impact of ICT on the higher education sector of the developing world. This research is focused on how undergraduate students of Nigeria and Mozambique use ICT, in particular the Internet and what the Internet is used for among the students.

Keywords: Internet, information and communication technologies, educational sector, developing world, diffusion

Introduction

Information and communication technologies (ICTs) have impacted the educational sector of the world, though it is accepted that the rate of deployment of new technologies has been lower in developing countries, especially those of sub-Saharan Africa. Naidoo and Schutte (1999), state that there have been fundamental differences in the way educational change towards technology has been approached and implemented between developed and developing countries. For the latter, emphasis has largely been on the physical infrastructure, such as telecommunications sector development, purchase of hardware, developing electronic networks and so on. There has been less emphasis on training of educators, the development of appropriate content, and especially on the maintenance of the educational technology infrastructure.

There are three different ways in which the Internet might affect teaching and research in universities:

- Provide greater student access to education,
- Improve curriculum and quality of instruction, and
- Increase productivity of academic publications.

It is, however, unclear how African universities will respond to the potentials of the Internet given the great difficulties they face as a result of reduced funding and severe pressures of lowering teacher/student ratios brought by “brain drain”. New Technologies, while holding the promise of creative ways of improving higher education, exert pressure on the university system in Africa to produce better graduates in ICT, engineering and sciences. This pressure is unlikely to diminish in the coming years, and the need to utilize the Internet and other ICTs is on the rise.

Worldwide, the higher education sector is undergoing significant changes. Processes of expansion and differentiation characterize these changes. "Problems of quality and lack of resources are compounded by the new realities faced by higher education, the first of which is expansion, as higher education institutions battle to cope with ever-increasing student numbers. Not only have higher education systems expanded worldwide, the nature of the institutions within these systems has also been shifting, through a process of differentiation" (World Bank 2000: 26, 28).

The Internet has emerged as arguably the most visible component of the dynamic developments of Information and Communication Technologies (ICTs). The rate of adoption of the Internet exceeds that of all technologies before it. Its uses range from communication and publishing to research. It has impacted, albeit differentially, every sector from manufacturing and services to education. Higher education is particularly crucial to long running economic growth because it is the source of knowledge workers and an important source of inventive outputs. The role of universities as centers of research and diffusion of findings will become increasingly important in the 21st century (Rosenberg, 2001).

Secondly, higher education produces skilled engineers and scientists whose skills and knowledge drive the industrialization process. Again, as competitiveness becomes less price-based and more innovation-driven, the dual role of universities listed above will become decisive factors in transforming economies. As Rosenberg (2001) remarked, the Internet is the most remarkable technological breakthrough of the 1990s. Undoubtedly the Internet is, and will continue to play an important role in transforming higher education itself, just as the universities have contributed in remarkable ways in generating new technologies in ICT, life sciences, and biotechnology.

Jensen (2001), argues that each computer with e-mail and/or full Internet access in Africa usually supports at least 5 users. The current population of African Internet Users in sub-Saharan Africa, excluding South Africa, is about 1.5 million. With regard to the rate of Internet usage it is found that the ratio of Internet users to the overall population in Africa is 1:200 while the world average is 1:30, and the North American and European ratio is 1:3. Nevertheless, this is a considerable improvement for Africa where in 1995 the ratio was 1:5000.

In a nutshell, the ‘digital divide’ issue can be paralleled to some extent with the economic development problem. The challenge that many African countries face is how to deploy, harness and exploit the opportunities brought by the new ICTs to advance their socio-economic

development; they are exploring ways to ensure more access to ICTs is available to various sectors of the economy.

It also appears that the slow development of some aspects of ICTs, for example the Internet, in many African countries has mostly been a consequence of poor technical and financial management and other inefficiencies on the part of the telecommunications sector. On the other hand, the delay observed in ICT adoption could in certain sectors place the very survival of some organizations in jeopardy. It is a fact that the Internet infrastructure in the African tertiary institutions is still inadequate. It is, however, also true that even in cases where the infrastructure exists, the usage levels are far below those in developed countries. Nevertheless, many people simply use the Internet for e-mails, partially due to the cost element (Ukwe, 2000). There are about 575 public ISPs across sub-Saharan Africa. Most sub-Saharan countries had 64Kbps connection to the International Internet. Sub-Saharan Africa in this context excludes South Africa.

However, the accumulation of technological capability is a critical requirement for ICT development in Africa. Yet, it is noteworthy that the type of connectivity a user is able to get also determines the speed and quality of data transmissions and access in general. For example, even with a fast modem, the reliability and speed of transmission may be affected by the physical quality of telephone lines in the region (Dholakia, 1997). Universities were at the forefront of early Internet developments in Africa, mostly with e-mail services. However, in early 1999 only about 20 countries had universities with full Internet connectivity (Jensen, 2000). This was partially attributed to limited resources and high costs of providing computer facilities and bandwidth. In addition, a capacity for ongoing learning is a crucial requirement of this competitive information age as technological developments diminish the usefulness of already acquired skills. It has been argued that construction and reconstitution of the infrastructure requires major investment, which will have various gestation periods, and so requires careful attention to timing. Although access to information infrastructure is critical, it is not sufficient to enable the potential of information to be applied to support the goals of African countries. In reality, access to information (local or global) is meaningless unless it can be converted into relevant knowledge. Therefore, there is an urgent need for investment in human resources and education in addition to the need for investment in infrastructure.

The Internet was designed to provide computer-mediated communication and remote access to information sources for researchers. The Internet has changed the way information is published and disseminated and opened a huge opportunity to scholars from the developing world, but have they really grasped this opportunity? This study is exploratory and focuses on universities in Mozambique (Eduardo Mondlane University, being the only government owned university in Mozambique and Internet Pioneer in Mozambique) and Obafemi Awolowo University, Ile-Ife, Nigeria (being the first university connected to the Internet and have facilities for major Internet services).

Internet In Mozambique and Nigeria

Internet In Mozambique

The Internet in Mozambique was introduced in 1993 by the Eduardo Mondlane University through its Informatics Center (CIUEM). At that time, the main service was E-mail. The full Internet was reached in 1995 (Simbine, 2000). In Mozambique there are currently 4 main links to Internet, one is a 128Kbps satellite link at the Eduardo Mondlane University, the other is 576 Kbps link located at the Telecommunication of Mozambique the PTO, which was sponsored by USAID, the third is located at the Teledata giving a total bandwidth of 256 Kbps, and the fourth belongs to Virtual Connection with a total bandwidth of 128 Kbps. It is expected that this bandwidth will expand in the course of the year and coverage is expected to two other major cities.

There are 6 operational ISP's with about 6000 users that access via dial-up, except those users who access Internet from their local networks (Intranets). Most of them are located in the provincial capitals. The main services they offer are e-mail, Web access, FTP, and Netnews. Data communications systems are now finding use in others such as Telemedicine, E-commerce and Videoconference (Simbine, 2000).

Internet In Nigeria

The Nigerian Internet initiative started with the effort of the Nigerian Internet Group by late 1994. During this period, the only access to the Internet was provided by Nigerian Telecomms Ltd (Nitel) and it was very expensive. The pressure was therefore put on Nitel to build the infrastructure backbone, to make this service more accessible and relatively cheaper, making the effort and awareness drive worthwhile.

This consideration, based on the economic viability and the peoples' need to be part of the global happening, made Nitel conclude all arrangements, and by the end of 1997 provided an Internet backbone of 2 Mbps Bandwidth. Immediately, five points of presence were strategically located within the country (Olayinka, 2000). Obafemi Awolowo University, Ile-Ife, Nigeria is consistently ranked as one of the ICT leaders amongst universities in Nigeria. In 1998 it became the first university to establish an independent satellite link to the Internet.

Relatively little is known about the impact of ICT on the higher education sector of the developing world. This research work is focused on how undergraduate students of Nigerian and Mozambican universities use ICT (in particular Internet) and what they use it for.

Research Method

Three basic research methods were used in this research work on the institutions: observation methods, personal interviews, and use of a questionnaire. In Nigeria, 300 questionnaires were sent out, 249 were returned, and 242 were found useful. Respondents are selected across the different academic disciplines, from different departments and from both sexes, to ensure coverage of all these relevant demographic and academic indicators.

In addition or parallel to the collection of quantitative data, a more in-depth understanding of the research topics is gained through interviews.

In Mozambique, personal interview and observation methods were used between February 23 to 27, 2004. Thirty three students were interviewed and 25 were observed. Structured questions were asked during the interview. Throughout the study, the quantitative and qualitative data were used simultaneously. Computer software (SPSS) was used to analyze the quantitative data.

Results and Discussion

Table 1. Usage of Internet among Mozambican and Nigerian Students

Internet Facilities	Nigeria Usage	Mozambique Usage
	%	%
1. Electronic Mail	91.3	90.6
2. Teleconferencing	-	-
3. Internet Faxing	7.4	6.9
4. Internet Telephoning	35.5	30.2
5. Uploading	12.4	27.9
6. Downloading	93.8	95.3
7. Internet Chatting	41.3	58.1
8. E-Commerce	46.3	65.1

Use of E-mail

From the percentage of Internet usage in table one above, Nigerian students seem to use e-mail more than their Mozambican counterparts. Though the figure is nearly the same, 91.3 percent of Nigerian students and 90.6 percent of Mozambican students used electronic mail. This shows that nearly all the students in the two countries use e-mail to communicate with their friends, colleagues, and parents outside their campuses. Ukwe (2000) states that many people simply use the Internet for e-mail, partially due to the cost element. It also confirmed Jensen who says that universities were at the forefront of early Internet developments in Africa, mostly with e-mail services (Jensen, 2000).

Use of Internet for E-Commerce

The result of the study shows that 65.1 percent of Mozambican students use Internet for electronic commerce to purchase goods while only 46.3 percent of Nigerian students use it for the same purpose. In Maputo, where Eduardo Mondlane University is located and is also the capital of Mozambique, the use of a value card is very common. In fact, you can pay with a value card at filling stations. The use of value card is common among Mozambicans, but in Nigeria, the use of value card is not as widely use as in Mozambique. This may be the reason why Mozambique has a higher percentage in the use of the Internet for e-commerce. During a visit of one of the researchers to Mozambique, he discovered that some Mozambican order the spare parts of their automobiles electronically.

Use of Internet Chatting

Chatting is one of the most popular activities on the Internet. It involves people from all walks of life and just about all ages, coming together in a variety of topics with people from all around the world. In Nigeria 41.3 percent use the Internet to chat with their colleagues, parents, and friends as opposed to 58.1 percent in Mozambique. This shows that Mozambican students make use of Internet for chatting more than Nigerian students.

Use of Internet for downloading and uploading

Almost 94 percent of Nigerian students use the Internet to download as opposed to 95 percent in Mozambique. This shows that the students in the two countries are making full use of the Internet. From the Interview conducted on the students from the two countries, it was discovered that they download academic materials from the Internet to supplement their lecture notes. A majority of them said that it is the fastest method of obtaining information on their field of study. Though Mozambique has the highest percentage of using Internet for downloading the difference is insignificant. Almost 28 percent of the Mozambican students use it to upload files as opposed to 12.4 percent in Nigeria. This implies that Mozambican students upload documents from the Internet more than their Nigerian counterparts.

Use of Internet for Phoning and Faxing

The use of the Internet for phoning and faxing documents is becoming popular. From the table above, 35.5 percent of Nigerian students use Internet for phoning in comparison to 30.2 percent of Mozambican students. This is very low for the two countries, and the fact may be due to the advent of the mobile phone that is commonly used by the students from the two institutions since with less than \$20 one can easily get a mobile phone. It may not be necessary for students to use the Internet for phoning except for those that do not have a mobile phone. The percentage of Nigerian students who use the Internet for faxing is 7.4 while that of Mozambique is 6.9 percent; this shows that the use of fax is not popular among the students in these countries. It may be due to the use of e-mail since any document can be scanned and sent as an attachment anywhere in the world.

Major Constraint

Internet facilities are found in both institutions, yet the students face a lot of constraints. Some of the students find it difficult to combine the rigors of academic work with the use of Internet. But the major problem in Nigeria is an epileptic power supply that affects Nigerian students in using Internet. This is not a problem in Mozambique. When one of the researchers was in Mozambique for about a week, he didn't experience any power outages, but in Nigeria, power outages are a way of life. It is impossible to be in Nigeria for a week without experiencing epileptic power supply.

Conclusion

The focus of this paper is on the impact of ICTs in higher education, particularly the impact of the Internet. The study has dealt, to some degree, with the use of the Internet among students of Obafemi Awolowo University, Ile-Ife, Nigeria and the Eduardo Mondlane University, Maputo in Mozambique. The study revealed that electronic mail and downloading are the major Internet facilities that students from the two countries most utilize. Nigerian government should assist other universities in Nigeria not connected to the Internet by providing funding and even encouraging other tertiary institutions to hook on to the Internet. The Mozambiqan government is really trying to make the Internet available for students. In fact it is establishing Internet connections to its high schools. Though both countries are in Africa, it seems as if Internet usage is most common among the students in Mozambique. This may be due to the population of the two countries; Mozambique's population is less than twenty million while that of Nigeria is more than one hundred twenty million. Not withstanding, the Nigerian government should encourage other universities not connected to the Internet to get connected by providing funding for them.

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