
Impact of ICT-based distance learning: the African story

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Abstract

Neither distance learning courses nor utilising information and communication technologies (ICT) to enhance these courses are new to sub-Saharan Africa. "Long-distance" training by correspondence has been practised here for decades. ICT as basic as e-mail has the potential to enable the remotely situated student to interactively take part in a particular programme. Additional equipment can simulate the lecture environment by allowing the student to watch a video of a presentation while communicating via telephone. This article is an investigation of the status quo of ICT-based distance learning in sub-Saharan Africa. Broad trends were derived from the multitude of sources on the topic, depicting just as many examples of programmes currently being maintained. ICT inroads in Africa are addressed; the problems to acquire and maintain these are discussed, as well as ICT's potential role in future distance learning programmes. Examples of public-private partnerships are highlighted. It is emphasised that only through these partnerships will African tertiary institutions succeed in increasing the output of their much needed graduates.

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Introduction

The phenomenal developments with regard to information technology (IT), and particularly within the information and communications (ICT) domains, are having a significant impact on all areas of human activity. Among the developed nations most of these developments are taken for granted. In their higher education systems teachers and students alike exchange ideas with colleagues via e-mail. They sometimes out of necessity deliberate an important scientific issue "live" by means of interactive chats or videoconferences. It has become an automatic and day-to-day endeavour to effortlessly move between different search engines, information hubs or directories, recognized for their provision of high quality current full-text scientific information. This effortlessness is replicated nowadays on one's personal computer sporting a sophisticated suite of applications software, already viewed by end-users as the absolute essential requirements for getting the job done. However, the capability of importing and exporting segments of text from/to external and internal sources was once seen as a difficult task to accomplish.

ITC developments, especially since the conception of the Internet and the Web, also made inroads into a more specialised field of tertiary education, namely distance education (also known as distance teaching and learning). In today's developed countries, using e-mail and the World Wide Web for teaching and learning, without being restricted by time and space, is seen as a necessity; no distance learning programme is feasible without the interactivity provided by the Internet to both teacher and learner. It is in this ICT-based context that the term lifelong learning could find its real meaning; in a rapidly changing, technology-based world preliminary education is insufficient to prepare an individual for a lifetime's work. Today, all sectors of the distance learning process at all its levels – from mere communication between lecturer and learner to the final assessment of the content learned – are linked to IT-related facilities. It can be said that within the demands of today's world every effective distance learning course uses some aspect of the current ICT.

Furthermore, a new type of ICT-based distance learning is unfolding as a result of the



global learner corps' needs, namely that of the virtual university. The latter is already providing widespread opportunities for new levels of multi-institutional, multi-state and multi-national collaboration to provide higher education learning facilities, specifically via current and emerging global networks of tertiary institutes.

While we accept the directions described above about the increasing importance of ICT in learning, and especially distance learning, we must also remember that IT as an easily accessible basic element of learning is definitely not the case in developing communities. However, especially in sub-Saharan Africa the promise of ICT is enormous. If the long-standing problems of Africa were to be overcome, African communities could profit from ICT, as it could break down traditional barriers to learners with limited (higher) education. As Darkwa and Mazibuko (2000) state:

... we can expand the content, extend the reach and increase effectiveness of existing academic programmes ... while at the same time improving access to scientific and technical information.

What would be the "profits" of ICT for the sub-Saharan peoples? What are the challenges to overcome before we could reap the results of ICT involvement? What efforts are already in place with regard to tertiary education? In this article, discussion is limited to sub-Saharan Africa, hereafter referred to as Africa.

ICT and distance learning: challenges for Africa

In this article we will limit ourselves to the term distance learning as the emphasis is on the learning rather than on the teaching phase. It is not the purpose of this article to deliberate on definitions, although a wide spectrum of terminology can be found. A few examples are: correspondence education, home study (the older terms), then independent study or external studies and until recently open learning, as well as e-learning.

A traditional definition of distance learning, which is not necessarily limited to ICT involvement, reads as follows:

The term ... covers the various forms of teaching and learning at all levels which are not under the

continuous, immediate supervision of tutors present with their students in lecture rooms or on the same premises but which nevertheless benefit from the planning, guidance, and tuition of the staff of a (residential) organisation (Tuijnman, 1996, p. 638).

E-learning, as a more advanced teaching mode, encompasses instructional content or learning experiences specifically delivered or enabled by electronic technology, and incorporating a wide variety of learning strategies and technologies, from CD-ROMs and computer-based learning, to video-conferencing, satellite-delivered learning, and virtual educational networks (Commission on Technology and Adult Learning, 2001). Defined in this way, e-learning can involve the delivery of course materials, tuition or assessment by means of:

- Asynchronous (one-way) learning, that is, learning where interaction occurs intermittently with a time delay and at the learner's own pace.
- Synchronous (two-way) learning, or real-time online learning, at the same time and same pace.

This investigation of the ICT status in distance learning in Africa will therefore address processes and measures which could employ both delivery approaches mentioned above. Also, the term e-learning will be seen as part of distance learning, since most modern tertiary institutions follow a so-called multi-modular approach. This in practice means that traditional teaching methods are being supplemented or supported by ICT, to an extent where certain sections of a programme can be offered without the physical presence of the lecturer.

For a better perspective on the ICT saturation in Africa, it is essential to provide brief statistics on the significance and size of the global distance learning market in some developed countries of the world. The following figures clearly illustrate the prominent size of the current market:

- In the USA, e-learning is one of the fastest-growing sectors in the teaching and learning market, with the total dollar value of all products and services projected to reach US\$40.2 billion in 2005.
- In Canada, 57 per cent of universities were offering online courses in 2000, with 3,000 courses offered in total.

- The European market is forecast to be worth US\$6 billion by 2005, with The Netherlands, Sweden and the UK being the biggest markets.
- In Japan, 34 per cent of four-year tertiary institutions use the Internet for online learning, with 23 per cent more planning to do so. More than 120 universities there have installed a communications satellite system for organising lectures, seminars and meetings (LaRocque and Latham, 2003, p. 12).

Furthermore, the need for lifelong learning facilities and programmes that enable adults to upgrade their skills and maintain competitiveness within rapidly developing economies is creating a worldwide demand for distance learning. As a result of the e-learning facilities made available via the Internet and World Wide Web, tertiary and adult education is becoming an internationally tradable commodity (Saint, 1999, p. 3).

To understand the African distance learning market, it is essential to contrast the typical Western-like marketplace with the African situation. Africa is a very large continent, spanning over 53 independent countries, with a population of over 700 million people, over 50 per cent of whom are under 20 years of age (African Virtual University, n.d.a). The demand for quality education is therefore enormous. The following statistics are to be faced when planning for strategies to improve the distance learning situation in Africa:

- More than 200 million adults are illiterate (33 per cent of the adult population), with the gross enrolment figures in sub-Saharan Africa being 73.1 per cent for primary school level, 23.1 per cent for secondary school, with 3.3 per cent of 18 to 25-year-olds enrolling for tertiary level education (Commonwealth of Learning, 2000, p. 43).
- At least 16 countries will need to double their current tertiary enrolments over the coming decade (that is, increase the intake to 7 per cent) just to enable a constant share of their population to aim at tertiary level qualifications (Saint, 1999, p. 3).
- The HIV/Aids epidemic in Africa, which accounts for 70 per cent of all new Aids cases in the world, will require many of

these countries to produce an even higher number of graduates, in order to maintain existing human resource capacities (Saint, 1999, p. 4).

- The public expenditure per tertiary student is constantly dropping, even falling below the \$1,000 per student, which is believed to be necessary to provide an acceptable level of tertiary education in today's world. It is a given fact that very few countries will be able to maintain current levels of tertiary education using the traditional residential campus model.

How to address this seemingly unsolvable situation? Measures to drastically increase the student intake could be effective, if ICT is to be implemented within well-planned and globally coordinated distance learning programmes. Distance learning is not the ultimate solution to the African problem, but with the help of ICT it can make a much greater impact on solving at least some of the tertiary education problems. However, the chances for success are slim, if governments and relevant educational bodies do not accept that distance learning is fundamentally different in its approach, structure, delivery and assessment techniques from those of ordinary face-to-face teaching programmes. The following advantages of distance learning indicate why larger investments in ICT, especially from the private sectors, should bear some fruit:

- Enrolment from any global distance tertiary institute is now possible – a potential student can now select applicable courses from across the borders of a particular country.
- New online, hands-on learning techniques can be implemented, with greater emphasis on research, thus enhancing lifelong learning skills.
- Resources of the many international virtual institutions and links can be shared by current tertiary institutes, thus also simplifying the delivery of material at remote sites (Darkwa and Mazibuko, 2000).

Even more important, with applicable ICT, a stronger distance learning approach can increase educational access by reaching out to four normally excluded groups (Saint, 1999, pp. 14-16):

- (1) Secondary school graduates who fail to gain admission to university (see the small intake in most African countries (3.3 per cent; discussed above)).
- (2) Women with household responsibilities: currently women comprise 35 per cent of tertiary enrolments in Africa. This under-representation implies potential for an increase in the general intake, as home-based study within a flexible schedule is well suited for those who must also fulfil family responsibilities. Figures from a few successful distance learning programmes address this issue: in South Africa, 70 per cent of one of the tertiary institutes' intake (Vista University) are women, with 50 per cent of the other one (University of South Africa). In Namibia, 77 per cent of distance learners are women.
- (3) Learners in remote rural areas, small towns or refugee camps who do not have convenient access to tertiary institutions: savings such as travel time, travel expenses, as well as the continuation of income while studying can be considerable. Distance learning, strengthened by basic ICT facilities, can reach a portion of the approximately 6 million refugees currently in temporary shelter, as well as for those who may in future be displaced by social and political tensions. Relevant programmes can help refugees to obtain the skills needed for self-sufficiency and responsible citizenship. One such programme is already very successful: since 1994 refugees from Burundi who lived in camps in Western Tanzania can enrol for courses in basic English, as well as mathematics, history, geography and Swahili.
- (4) Impoverished or socially marginalized communities: if governments can effectively address their budgets with regard to distance learning, it can benefit these communities, as the approach allows students to work and study simultaneously.

To what extent can sub-Saharan Africa address these obvious advantages that distance learning has to offer? This is not an easy to solve issue, as the spectrum of challenges is extremely wide. As this article is limited to the role ICT could play in reaching

the indigenous peoples of Africa, the next two sections will rather investigate the status quo of ICT use in this region, and consequently what distance learning programmes or initiatives can be found where ICT was used successfully.

ICT availability in Africa

African countries, like anywhere else in the world, must divide their income wisely between such typical spheres as health services, communication, transport infrastructure, education, and many more. ICT development, especially for education, must therefore compete with other sometimes "more important" budgetary issues. The following is a brief overview of what is available in ICT in Africa – despite monetary limitations. The overview is definitely not comprehensive, but merely a few trends to demonstrate ICT's current position.

In general, Africa has access to various types of modern ICTs. Access is available to the Internet via Vsats and fibre optic cables, satellite-based telephony (that is Thuraya and Iridium), mobile cellular phone services (largely based on the digital global system for mobile communication (GSM) standard), digital satellite television, cable television, computers, facsimile services, satellite radio services (World Space Radio), and many more. However, compared with the rest of the world, Africa still lags behind in many areas of ICT usage. There is a growing digital divide between Africa and the rest of the world, and between African countries themselves. In addition, within the countries, a digital divide exists between social groups with different levels of income and education, between young and old, rural dwellers and urban dwellers. While most homes in the developed world have access to a telephone, a television set and a computer with access to e-mail and the Internet, this is not the case in sub-Saharan Africa. The cost of computers is too high for many to afford, monthly Internet access rates are exorbitant, and the charges for satellite television are unaffordable for most people. A brief review of the summary statistics regarding access to personal computers (PCs), telephone facilities and the Internet illustrates the overall picture on the continent.

Desktop computers

While the invention of the PC took computers into the homes and on the desktops of many people around the world, the availability of desktop computers in Africa is the lowest in the world. Statistics provided by the International Telecommunications Union (ITU) indicate that in 2002 Africa had 1.23 desktop computers per 100 inhabitants (International Telecommunications Union, 2003a). This is in sharp contrast with the 3.95 for Asia, 20.01 for Europe, 27.49 for the Americas, and 38.94 for Oceania. The low number of personal computers can be attributed to a number of factors, the major ones being the high cost of computers and low wages. Owing to high import duties and sales tax imposed on computer equipment in most African countries, the cost of computers is out of reach for the majority. Even when computer prices in the developed world have gone down tremendously, it has not been the case in most African countries. The situation is compounded by the average wages of the majority of Africa's inhabitants being too low to enable them to afford a computer. In the meantime access to computer facilities for most people is largely available at workplaces.

Telephone facilities

There is an acute shortage of fixed telephone lines in sub-Saharan Africa. According to ITU statistics, in 2002, Africa had 2.70 telephone lines per 100 inhabitants compared with 12.13 for Asia, 35.25 for the Americas, 40.93 for Europe and 40.44 for Oceania (International Telecommunications Union, 2003a).

The shortage of fixed telephone lines on the continent has provided great opportunities for the growth in the mobile cellular telephony industry. Slowly mobile phones are becoming the basic and most reliable means of communication on the continent, and available statistics indicate that the number of mobile phone users has already passed those of fixed telephone lines. In addition, various mobile phone operators are providing value added services, such as data transmission, short message sending, WAP-based Internet access and even financial transactions, thus making the use of the mobile phone services more attractive to most people (Jensen, 2002).

In 2002, 61 per cent of all telephone subscribers in Africa were mobile phone

subscribers (International Telecommunications Union, 2003b). By May 2003, total number of global mobile users was about 1.3 billion and by then the total of mobile cellular phone subscribers in Africa had reached 34.3 million (Cellular online, 2003), of whom about half are living in South Africa. Compared with global figures, the number of Africans using mobile phones is still small.

Internet access

Although exact figures of individuals who have access to the Internet at home and at work are hard to obtain, in general terms there seems to have been an increase in access to the Internet in Africa since the late 1990s. This is due to a number of factors, amongst them the proliferation of Internet cafés. Another factor contributing to the relative growth of people having access to the Internet is the fact that in Africa a computer with an Internet or e-mail connection usually supports a range of three to five users (Jensen, 2002). Internet cafés have emerged as the major Internet access point for those people who cannot afford a desktop computer, a telephone line and dial-up connection to an Internet service provider at home. Although in some countries charges for Internet access at Internet cafes can be said to be quite high, in general an hour access costs less than US\$1.00. Nevertheless, in the sub-Saharan region where the majority of the population lives on less than US\$1.00 per day, the growth rate of Internet access will stay limited.

Compared with world trends, the number of Internet users is very low, and most of them are to be found in South Africa. For example, in October 2002, Reuters reported that, when the more developed South Africa and Northern Africa are excluded from the statistics regarding Internet use, only one in 250 people in Africa uses the Internet, compared with one out of every two in North America and Europe (NUA, 2003). Similarly, in a 1999 report mention is made that, of the 1 million Internet users in Africa, 7 million live in South Africa; or, to put it in another way, Internet use in South Africa is about one in 65 people compared with one in 5,000 for the rest of the continent (Commonwealth of Learning, 2000).

Despite these examples of shortcomings, radio (especially digital radio networks),

television, telephone, the Internet and satellite broadcasting facilities are present and can be embraced to enlarge the impact of distance learning. The following section investigates how ICT is already utilised to reach out to those that cannot attend formal classes at a residential tertiary institute.

Inroads made by ICT-based distance learning

The use of ICT in formal primary, secondary and tertiary education in sub-Saharan Africa is slowly taking root. Over the years, the use of radio and to some extent television has been more predominant especially at primary school level, even though this has been with mixed results. Murphy *et al.* (2002) observe the following regarding the use of ICT in education in sub-Saharan Africa:

- High costs tend to constrain the potential use of technologies like television and computers in schools and favour the use of print and radio. At primary school level, the use of interactive radio instruction has been the most successful to date.
- Information technologies in secondary schools have most often been used to increase students' access to secondary education, although there is also an increasing interest in using technology to assist in the development of maths, science, and technology skills at secondary level.
- While, in developed countries, the trend is to use computers in ways closely linked to the curriculum and normal classroom activities rather than as separate stand-alone experiences, in Africa applications of computers in secondary schools tend to be supplementary to the curriculum.
- Introducing computers and Internet connectivity in national systems of secondary education in Africa for the purpose of increasing quality has been limited to pilot programmes and has many of the same cost challenges experienced at the primary level.
- African universities are making significant investments in computer technologies to strengthen ongoing functions, to extend their programmes to distant centres, and

to link with resources and programmes offered internationally.

More specific examples of the inroads made by ICT-based distance learning programmes, and specifically at the tertiary level, are provided in LaRocque and Latham's (2003) timely report entitled "The promise of e-learning in Africa: the potential for public-private partnerships". They argue that Africa has considerable experience using distance learning (or e-learning, for that matter), although, as mentioned in the previous paragraph, most of this experience has been of the correspondence (thus paper-based) variety. This is changing, however, and, quoting a recent Commonwealth of Learning report, they listed the following range of ICTs currently being used in Africa (LaRocque and Latham, 2003, pp. 13-16):

- financially assisted telephone dial accessed Internet connectivity for schools in rural communities;
- satellite transmission and e-mail;
- advanced fibre-linked "skills centres" equipped with videoconferencing for university courses;
- software job re-training packages; and
- telecentres, that is public sites that offer access for a fee to ICTs, which are being expanded to offer access to learning.

The same report by LaRocque and Latham (2003, pp. 13, 15) listed a number of examples of ICT initiatives occurring at some tertiary institutions. Table I clearly illustrates that a wide spectrum of these institutions is serious in bringing educational materials and guidelines right to the learner's desktop.

In another outstanding report, Saint (1999, pp. 9-11) noted the following examples of the growing use of ICT in distance learning in Africa:

- Namibia and Ghana have formally declared a dual-mode instruction to be their national policy.
- Botswana, Cameroon and Zambia are using a university-based Internet system to support interactive regional study centres for distance students.
- Zimbabwe Open University already enrolls approximately 10,000 learners in nine programmes and recently launched a Master's degree in education for in-service teachers.

Table I Selected ICT initiatives in African distance education

Country	Projects	ICT in use
Côte d'Ivoire	Francophone Virtual University	Satellite, CD-ROMs, video, print
Ethiopia	African Virtual University	Satellite broadcasts, Internet, print
Ghana	African Virtual University	Satellite, video broadcast, PCs, Web site
	SchoolNet	PCs and Internet, broadcasting (radio and video), CD-ROMs, databases, satellite
	Multipurpose community centres	Telephones, PCs, fax, e-mail, scanners, photocopiers
Guinea	Francophone Virtual University	Computers, Internet, print
Mauritius	University of Mauritius	Internet, computers, audio, video, print
Mozambique	SchoolNet	PCs and Internet, broadcasting (radio and video), CD-ROMs, databases, satellite
Nigeria	University of Abuja	Audio/video tapes, digital radios, print
South Africa	SchoolNet	PCs, Internet, Web site
	Community information services/Technology Enhanced Learning Centres	PCs, Internet, touch screen kiosks, CD-ROMs, information delivery systems, Web site
	Distance Education Digital Learning System	PCs, LANs, scanners, photocopiers, and other office services
	African Virtual University	Planning a wide range of open learning technologies, satellite, video broadcast, PCs, Web site
	Multipurpose community telecentres	Telephones, Internet, PCs, fax, e-mail, scanners, photocopiers, etc.

- Uganda enrolls 1,400 students in a distance Bachelor of Commerce course, and plans to expand into areas such as law, technology and sciences.
- Madagascar has pioneered the use of audio-cassettes for university programmes in law and the social sciences.
- Senegal supports teacher training and Master's degree programmes in health and law.
- The Confederation of Open Learning Institutions in South Africa (COLISA), a partnership of this country's three main tertiary distance learning universities, is developing, *inter alia*, a Web-based student-teacher interaction system, as well as a series of local Internet access points for students who do not have similar facilities at home.

An interesting example of the innovative use of ICT in distance learning has been reported by the Working Group on Higher Education (1997). The case is to be found in Djibouti, a country with a population of only 550,000 and thus too small to support a national university. However, distance learning ICT, specifically, Internet sites, is being used which allows teachers to consult by e-mail with advisers in French universities. Future plans call for the creation of a distance learning training centre and the establishment of links

to the World Bank's African Virtual University (see the discussion of the AVU below).

Mention must also be made of two initiatives that can tremendously boost the spread of distance education in Africa: the African Virtual University, as well as progress so far achieved regarding public (tertiary sector) and private (corporate sector) partnerships.

World Bank's African Virtual University

The introduction to the *About AVU* pages of the African Virtual University's Web site summarises and intends to address the much discussed economic, communication and educational problems of Africa, already mentioned in this article:

The AVU is a first-of-its-kind "interactive-instructional telecommunications network" established to serve the countries of Africa. The objective of the AVU is to build capacity and support economic development by leveraging the power of modern telecommunications technology to provide world-class quality education and training programs to students and professionals in Africa (African Virtual University, n.d.a).

On the same page, in its "vision", it is stated that by 2007 the AVU aims at becoming:

... [a] reputable, independent African organisation contributing to the continent's capacity-building efforts, harnessing the power

of ICT to expand access to quality, and affordable at tertiary level throughout Africa.

So how does AVU work? Through a combination of synchronous video broadcasting, online materials, pre-packaged learning materials on CD-ROMs and DVD, as well as synchronous chat sessions, a network of African institutions was established, working with internationally recognised external universities (African Virtual University, n.d.b). These external universities are required to accredit a particular programme and initially award degrees, but assist the AVU in capacity building, so that it will eventually take full responsibility for the programme. Academic staff from universities around the world deliver their lectures in front of TV cameras in their own classrooms. The video is consequently routed via fibre optics, ISDN lines or satellite to AVU's central uplink facilities in Clarksburg, Maryland, which then beams it via satellite to its various learning centres in Africa.

A typical AVU classroom consists of about 30 students, sitting at their desks and watching the broadcast on large screen projectors, television monitors or computer screens. During a class, they have the opportunity for real-time interaction with the lecturer via phone or e-mail. On-site moderators are available to guide the students through the course material. Each learning centre is equipped with at least 50 computers and Internet access. Courses targeted are, among others, maths, science, engineering, computer science, executive business management, English and French.

By the end of 2002, the AVU had already achieved the following ground-breaking achievements:

- created a network of partner institutions in 17 African countries, with learning centres hosted mainly in public universities;
- become affiliated to a global network of leading universities;
- established 31 sites in 17 African countries;
- delivered in excess of 3,000 hours of teaching programmes, sourced from leading universities in the USA and Europe;
- registered over 23,000 students in its semester courses;

- enrolled nearly 2,500 professionals in executive business seminars;
- provided 1,000 PCs to learning centres;
- created a network of 45,000 e-mail account holders and a digital library of over 1,000 journal titles; and
- achieved over 40 per cent participation of women in AVU's pre-university courses (African Virtual University, n.d.a).

Africa needs success stories like those of the AVU. Typically with ventures of this magnitude, its future financial viability has to be ensured. During its start-up period, the AVU was financed largely by grants from the World Bank. For obvious reasons the Bank will be looking for private partners to share both the costs and the benefits (Light, 1999). The following section discusses exactly this: possibility of partnerships in Africa between public institutes and global private companies.

Public-private partners

The following discussion is based on an in-depth investigation published in January 2003 (LaRocque and Latham, 2003). Sponsored by the IBM Endowment for the Business of Government, the report examines the contribution that distance learning (including e-learning) has made and how it can be made to improve the quality of life of Africa's peoples. Two of its main findings are very relevant to what has been argued in this article (LaRocque and Latham, 2003, p. 4):

- While Africa has joined the bandwagon of the ICT revolution, it should now address the institutionalising of the development of ICT and allocating its benefits to schools and universities. Despite the 52.1 per cent growth of the Internet in Africa from 2000 to 2002, usage was limited to 1.2 per cent and penetration to 0.8 per cent for a population of 859 million.
- The challenges to increase ICT development and penetration can be overcome: current initiatives to leverage ICT development indicate that the key solution lies in public and private partnerships that can offer lower costs and greater access – especially to ICT-based distance learning programmes[1].

LaRocque and Latham (2003, p. 26) mention some of the partnerships in which ICT is utilised in typical distance learning fashion:

- Shoma Education Foundation, which delivers teacher professional development training in South Africa.
- SchoolNet Africa, which uses modern ICT to provide sub-Saharan countries direct access to higher education.
- World Links for Development, which aims to link secondary school students and teachers around the world via Internet connectivity.
- Digital Partnership, facilitating affordable access to technology, training and the Internet for learning and development in developing and emerging market economies.
- The African Virtual University (discussed above).

Similar examples of PP partnerships could be traced, mostly in obscure literature such as newspaper clippings. The following “interesting” partnerships illustrate how successful even the “small” ventures could be, mainly because the indigenous populations need relevant information for good decision making, just as is the case within environments of the developed nations:

- The Zambian Radio Farm Programme helps over 21,000 small-scale farmers to develop new skills. Listeners have altered their views on “slash and burn” cultivation and on certain crops previously seen as “women’s” crops. Radio reaches rural households never visited by agricultural extension officers (ID21 Education, 2002).
- In Ghana’s Northern region, over 50,000 people who listen to literacy programmes have changed their attitudes towards family planning, breast-feeding, teenage pregnancy and environmental preservation. Significant numbers of participants/listeners are women (ID21 Education, 2002).
- Grintek Telecom (South Africa) has developed an interactive learning, communication and management system (ICAM) for the Free State Province health department. This distance learning solution facilitates remote learning, while allowing live interaction with lecturers and other students. ICAM makes it

possible to bring lectures to remote locations by using audio, video and data communications in a TCP/IP-based environment. A total of 40 ICAM remote classrooms have been set up across the Free State region with a TV monitor and PC-based satellite receiver. Each student has a response keypad with a built-in microphone (*Business Day*, 2002, p. 11).

- An interesting PP partnership project has been recently launched: “The latest in hi-tech is to be applied to transform South Africa’s rural communities into modern, market-oriented and computer-literate ones” (*Pretoria News*, 2002, p. 13). A training solutions provider, E-Fundi, and Promat College signed a multi-million dollar deal to create virtual villages of distance learning and distance preventive health care, basic and advanced computer skills training and e-commerce and Internet banking enablement across the countryside. Phase 1 of the project is the creation of 1,500 computer centres with an average of 20 units each in rural schools across the country. The centres will also be used outside school hours to train community members in skills ranging from computer literacy to advanced technical and vocational education.

Information literacy and information support services

Although falling outside the scope of this article, the importance of information literacy and, consequently, of rendering quality information services must be emphasised. It is a given fact that no distance learning initiatives can be successful if not supported by strong information and library services. Furthermore, the challenges for an effective service model for distance learners are very different from those for one for residential learners. Not much could be found in the literature with regard to specific models in the African context with regard to distance and direct contact learning. Two distinct trends, however, emerge: on the one hand, there is little cooperation between countries, specifically regarding distance learning. On the other hand, that investments in ICT should also address the provision of information in digital formats, as the transfer and exchange in this format are much more

convenient than traditional interlibrary methods. Two examples are provided to prove this observation:

- (1) Ojedokun (2000), then from the University of Botswana Library Services, found no cooperation to render information services for distance learning programmes between the libraries of Botswana, Lesotho, Namibia, South Africa and Swaziland. Although almost all the countries in Southern Africa offered distance learning courses via about 1,000 such institutions, there were no active partnerships, even where these countries were geographically close to one another.
- (2) This is derived from the virtual library initiatives of the African Virtual University (discussed previously). Its vision and objectives provide thought-provoking ideas on how to deliver quality information services to distance learners. AVU's digital library consist of the following components: a Z39.50 interface gateway allowing seamless access to various databases; some 3,800 primary URLs to research reports and working papers at different universities and research centres in the USA and Europe; electronic access to 1,200 full text scientific journals (Saint, 1999, p. 20). Participating institutions can access the digital library to download material on behalf of legitimate users.

Conclusion

From the above it is clear that the transformation of the distance learning landscape in sub-Saharan Africa is being driven by a number of economic, technological and social trends. Probably the most important trend is the phenomenal increase in the demand for higher education. This has been addressed by the fact that ICT-based distance learning techniques are in a far better situation than residential teaching to increase the annual number of graduates. According to one estimate, the overall demand for higher education is expected to grow from 48 million enrolments in 1990 to 159 million in 2025: an annual growth of 3.5 per cent (LaRocque and Latham, 2003, p. 16). The higher population growth, higher participation rates in tertiary education, the

recognition of the value of a tertiary qualification, and changes in the nature of skills: all factors emphasising the importance of ICT availability. Sub-Saharan countries can reach the required increase in the number of students that enrol for tertiary programmes only by utilising ICT wisely and by establishing partnerships with private enterprise.

Note

- 1 Authors' comment: the African Virtual University fits precisely into the realms of such a partnership.

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