

Uganda

Introduction

Despite its abundant natural resources, Uganda became one of the poorest countries in the world during the turbulent regimes of Idi Amin (1971–1979) and Obote II (1980–1985). In 1987, the new government, led by President Yoweri Museveni, embarked on an economic recovery programme aimed at reducing poverty and restoring fiscal discipline and monetary stability by rehabilitating the economic, social and institutional infrastructure. The recovery programme encompassed civil service reform, revised investment and incentive structures, and made a rapid move to a market-determined exchange rate.

In 2002, Uganda had a population of 24.7 million, with a stable annual growth rate of 2.6 per cent. The GNP per capita was US\$280, which is low compared to the average of US\$470 for sub-Saharan Africa. The Ugandan economy is largely informal, with 88 per cent of the labour force working outside the formal sector.

Uganda is predominantly a rural country – only 13 per cent of the population live in urban areas. Life expectancy at birth is 42 years, which is low compared to the sub-Saharan average of 46. Adult literacy rates, at 78 per cent for men and 58 per cent for women, are high for the region. The infant mortality rate is 83 per 1 000 live births. Fifty per cent of the population have access to improved water sources, which is high for the region.

In 2003, only 2 out of every 1 000 people in Uganda had access to a daily newspaper, as compared to 12 for sub-

Saharan Africa. Only 127 out of 1 000 people had access to radios. Twenty-eight out of 1 000 people had televisions and 2.5 out of every 1 000 people had a personal computer. There were only 0.07 Internet hosts for every 10 000 people, 25 000 Internet users, and one secure Internet server in the entire country (Liang, 2004).

Although the majority of the population in Uganda are still dependent on conventional and traditional information delivery systems, especially the radio, new ICT can greatly enhance the efficiency of systems in delivering development information. ICT has been identified as one of the rapidly growing areas that have the potential to 'leap-frog' Uganda to benefit from the globalised economy. E-commerce and ICT-based services have been earmarked as being among the eight priority areas for export development, particularly through the strategic partnership programme between the government, private investors and development partners (MOWHC, 2002).

The mandate to oversee media and information management falls under the Directorate of Information, President's Office, and that of overseeing telecommunications is under the Ministry of Works, Housing and Communications (MOWHC). However, since information and communications cut across many sectors, policy implementation involves various ministries, district and local authorities, development partners, NGOs and the private sector. The opportunities brought about by developments in ICT require a new regulatory and legal framework. When the policy is successfully implemented, it will stimulate

greater participation in socio-economic, political and other developmental activities, which should lead to improved standards of living for the majority of Ugandans and, ultimately, should enhance sustainable national development (Hon. John Nasasira, Minister of Works, Housing and Communications, in MOWHC, 2002).

The penetration of computers in the private and public sectors in Uganda is fairly high. All banks have some level of computerisation, and most of the large private sector organisations use ICT to support some of their activities. Several NGOs (the international ones, in particular) and international agencies operating in Uganda are reasonably computerised.

Penetration of personal computers (PCs) is recognised as an effective indicator of the extent of ICT in society. Although the level of penetration of computers within the public service is reasonably high, the level of utilisation of computers to support organisational activities and operations is still very low. In most cases, computers are used for basic tasks like word-processing. Not many organisations utilise their computer systems for high-end, value-added applications like management information systems (MIS), database management systems, personnel management systems, accounting and budgeting. There are very few local area networks (LANs) in organisations within the public service, and there are hardly any wide area networks (WANs) (Republic of Uganda, 2002).

The Internet and other forms of ICT are readily available in Kampala, the capital city of Uganda. Limited access to these technologies by medium- and lower-income populations (in rural areas, especially) is widely perceived to be a major impediment to increased economic growth and prosperity in Africa; Uganda is no exception.

Broadening equitable access to ICT requires a political commitment from the region's leaders, and Uganda has the human and technical resources to exercise substantial leadership in this arena. Given the fact that there is already an ICT 'big-push strategy' in place in the country, and the various efforts that are being put in place by different government bodies, political commitment is a necessity in order to put ICT at the forefront of the government's strategies for the future.

The very nature of ICT requires that the case for broader access be made at a regional level. The construction of the proposed Commission for East African Co-operation (EAC) high-capacity digital transmission link is one of the most appropriate actions for regional ICT co-operation.

For a nation to embrace a technology and make effective use of it, it is vital that substantial investment is put into understanding the technology and adapting it to the environment and circumstances that the technology is going to operate in. ICT projects, including pilot projects, must be undertaken to enhance the application of ICT for development work. Currently, most ICT projects are funded by government, quasi-government and private institutions (Republic of Uganda, 2002).

In this regard, Uganda has received a substantial amount of support from donor agencies in the past decade in the area of ICT for development. For example, Uganda was a focus country of both the ACACIA initiative of the Canadian International Development Research Centre (see IDRC, 1997) and the ICT programmes of the Netherlands International Institute for Communication and Development (IICD).

This has translated into myriad ICT projects being implemented in various sectors of Ugandan society, most notably in rural infrastructure, education, livelihoods and health. It would seem essential that Uganda learn as much as possible from these experiences, as lessons from implementing these projects could play an important role in ensuring that Uganda develops an appropriate ICT strategy and action plan. These lessons could also be useful for other African countries, particularly countries such as Kenya, which are embarking on the road towards defining ICT strategies and plans.

Currently, there are efforts within a number of government ministries and agencies to design and implement sectoral ICT policies, strategies and plans. Many of them are not in line with the national ICT policy framework, strategies and action plans. Also, the new paradigm shift of information technology, communications technology, information management, and broadcasting services converging at the technology and service-delivery fronts requires unified co-ordination at policy and regulatory levels. In the light of the above critical issues affecting the harnessing of ICTs in Uganda, the government has developed a coherent national e-government strategy framework geared towards the integration of ICTs into the national planning framework, elaborated in terms of the national vision, long-term, medium-term and annual plans, and putting ICTs under one political leadership for synergy, co-ordination and harmonisation of ICT initiatives in the country (Torach, Okello & Amuriat, n.d.).

It is in this regard that we highlight ICT's broader national imperatives and limitations, as well as the challenges for higher education, in this report.

Communications infrastructure

Uganda is one of the nations falling on the wrong side of the digital divide (i.e. the have-nots), with among the least developed telecommunications infrastructures. No countrywide telecommunications network has been established in Uganda, and given the current low level of infrastructure development for ICTs, it is obvious that the majority of Ugandans will not be able to have access to distance education (DE) through these technologies. Wherever there is some form of rural connectivity, mainly through dial-up telephone lines, its use is affected by traffic congestion due to severe capacity constraints, institutional inefficiency, inadequate maintenance, low levels of skill, diversity of equipment and lack of common operating standards and procedure (Looker, 2003).

Furthermore, up to 80 per cent of the digital telephone lines and modern switching equipment is located in the capital city, Kampala, with other areas having largely old and unsuitable lines. Resulting problems include high usage costs due to the low rates at which data can be transmitted and received, a high percentage of failure due to the poor quality of the lines, and limitations on the applications that can be used (in some areas, for instance, it is not possible to access the Web). Because most of the new technologies depend on an effective telecommunications infrastructure, access to DE by many Ugandans, especially those in the rural areas, has been restricted.

National infrastructure

Various methods to improve broad access to national ICT infrastructure in Uganda have been formulated and adopted by several actors, including the government, the private sector and multilateral organisations.

Several ICT infrastructure projects in Uganda have been identified; potentially, the most important are in the following sectors:

- telecommunications, including Internet connectivity;
- radio;
- television;
- multipurpose community telecentres;
- health;
- education;
- satellite; and
- e-commerce (UNCST, 2002).

As a result of the liberalisation policies adopted by the government during the 1990s, the *National information communication technology policy framework* (UNCST, 2002) indicated that the infrastructure situation has changed as depicted in Table 8.1.

The growth of ICT infrastructure between 1996 and 2004 can be seen in the increase in the number of fixed telephone lines, which has risen from 46 000 to 71 272; more impressively, mobile phone subscribers increased from 3 500 to an incredible 987 456 in the same period. FM radio stations also increased from 14 to 129, and television stations from 4 to 25. The government plans to award service agreements to three or more Internet service providers to render universal Internet access services (through Internet points of presence) in 32 designated districts. The growth in the ICT sector is but one aspect of Uganda's impressive first steps into what some call 'the new economy', the knowledge and information economy. It is also essential to understand the various ways in which projects and experiences using ICTs have had an impact on the most important aspects of Ugandan life – governance, education, health and livelihoods (MOWHC, 2002).

Prior to 1996, Uganda's communication infrastructure was among the least developed, not only in the world, but also in Africa. Furthermore, 70 per cent of the communication services were concentrated in urban areas, leaving the rural areas with the least access to these vital communication services.

Although Table 8.1 depicts tremendous growth in ICT infrastructure, the level of infrastructure and services remains way below the global average. Moreover, most of the developments are still concentrated in urban areas, benefiting a small percentage of Ugandans. It is clear that more needs to be done to further develop the infrastructure.

Major telecommunication infrastructure providers

The Communications Act of 1997 provided for two 'national telephone operators', a duopoly that was designed to offer incentives to private investors in the telecommunication sector. Some services were to be provided only by the two operators for a period of five years, starting in July 2000. This made them the main telecommunication infrastructure providers; thus, their current status is important to the policy. The two national operators are Uganda Telecom Limited (UTL) and MTN Uganda.

Table 8.1: Uganda ICT infrastructure, 1996–2004

Services provided	1996	1998	1999	2000	2001	2002	2003	June 2004
Fixed telephone lines	46 000	56 000	58 000	58 000	56 149	59 472	65 793	71 272
Mobile telephone subscribers	3 500	40 000	70 000	140 000	276 034	505 996	777 563	987 456
National telephone operators	1	2	2	2	2	2	2	2
Mobile cellular operators	1	2	2	2	3	3	3	3
Internet access service providers	2	7	9	9	9	n.a.	n.a.	n.a.
Internet/e-mail subscribers (wireless access)	n.a.	n.a.	n.a.	500	6 500	6 500	7 024	8 000
Internet/e-mail subscribers (dial-up)	n.a.	n.a.	n.a.	4 000	4 500	n.a.	n.a.	n.a.
VSAT international gateways	n.a.	n.a.	n.a.	4	8	8	8	8
Public Internet service providers (cafes)	n.a.	3	8	17	17	17	18	18
Public payphone licenses	n.a.	7	13	19	18	n.a.	n.a.	n.a.
Paging service providers	2	3	3	3	3	n.a.	n.a.	n.a.
FM radio stations	14	28	37	40	110	117	125	129
Television stations	4	8	11	11	20	22	23	25
Private radio communications operators	453	530	688	688	1 210	n.a.	n.a.	n.a.
National postal operators	1	1	1	1	1	1	1	1
Courier service providers	n.a.	7	8	10	10	11	19	19

Source: Uganda Communications Commission (UCC) <http://www.ucc.co.ug> [2004, October 28]

Uganda Telecom Limited

UTL took over the telecommunication services of the former government-owned Uganda Posts and Telecommunications Corporation (UP&TC), which until 1995 was the only major telecom operator in Uganda. UP&TC was privatised in 1996, with the Ugandan government retaining 49 per cent of the shares and the remaining 51 per cent being held by a consortium comprising Telecel (from Switzerland), Detecon (a subsidiary of Deutsche Telecom of Germany) and Orascom (from Egypt). UTL comprises three divisions, namely Landline, Mobile and ISP & Data.

Landline Division

- Largest landline network, with 100 000 capacity countrywide.
- 55 000 customer connections.
- Basic rate and primary rate ISDN services.
- Prepaid landline service (Tele-save 95x).

Mobile Division

- Mobile network covering Kampala, Entebbe, Mukono, Lugazi, Jinja, Iganga, Tororo, Mbale, Masaka, Mbarara,

Kabale (plus towns in between). Expansion is still occurring.

- 90 000 customers (end of April 2002).
- Prepaid services.
- Post-paid services.
- SMS.
- Voicemail.
- E-mail to mobile.

ISP & Data Division

- Internet.
- Dial-up Internet and e-mail services (analogue line, ISDN).
- Dedicated Internet bandwidth (broadband wireless, xDSL).
- Web-hosting.
- Domain name registration.
- Mail-hosting.
- Virtual private networks.
- Data:
 - dominant provider of data connectivity services; and

- countrywide data network providing digital leased lines (local, national, international), frame relay services (data packet switching), points of presence for Internet services, and professional services (consultancy, solution design and implementation for customers).
- **Transmission:**
 - two international gateways – voice, data, Internet;
 - national SDH and PDH microwave systems for inter-exchange transport;
 - fibre-optic rings in Kampala; and
 - PCM copper-based systems for inter-exchange transport.
- **Switching:**
 - GSM mobile switch at Mengo;
 - analogue and digital telephone exchanges all over the country for landline services; and
 - data nodes for countrywide data network.
- **Access:**
 - copper cable access network in major towns;
 - GSM base stations;
 - Fibre-optic in Kampala; and
 - broadband wireless system.

MTN Uganda Limited

MTN Uganda launched mobile phone operations in October 1998 as the second national operator. Its licence requires coverage of all Uganda's districts and county headquarters.

Mobile phone

- 220 000 subscribers.
- Coverage in 85 towns, translating into 65 per cent coverage countrywide, 93 per cent urban coverage, and 75 per cent population coverage.
- Products and services: voice mail; call forwarding, call waiting, call holding; SMS; short mail (e-mail to mobile); SMS Info; and roaming (66 operators in 43 destinations).

Fixed line services, using fixed wireless terminals on the GSM network, wireless local loop, and fibre-optic line

- Basic telephony.
- Voice and fax digital lines.
- High-speed dial-up data service.
- ISDN services (first operator to offer ISDN services in

East and Central Africa).

- Leased lines.
- Internet bandwidth.

International gateway

- MTN owns two international gateways (connecting to 260 countries), with the second offering resilience.
- MTN has direct links to Kenya and Rwanda.

Mobile cellular operators

The average growth rate for fixed lines has been much less than that of mobile phones, which is in conformity with developments elsewhere in the world where mobile phone service has had tremendous growth. There have been different reasons for this trend, but in Uganda, mobile services provide a viable solution to problems arising out of:

- an inadequate spread of fixed line infrastructure;
- the need for quick deployment and ease of installation; and
- requirements for general mobility.

Additionally, mobile phones can offer a cost-effective means of providing service to rural and remote areas, especially those with mountainous terrain, where it is difficult to install fixed line infrastructure.

All mobile phone operators offer prepaid and post-paid/contract services. Competition between the mobile phone operators has brought some advantages to users, including:

- lower airtime charges;
- increased coverage; and
- the introduction of value-added services such as voicemail and text messaging.

The introduction of value-added services has raised new regulatory issues. For example, should these new services be treated as value-added services, and should value-added service providers be licensed to provide these new services alongside network operators? Apart from the two national telephone operators, there is a third mobile phone operator, Celtel Uganda Limited (Celtel).

Celtel Uganda Limited

In 1995, Celtel became the first mobile phone operator in Uganda. At the beginning of 2001, the Celtel customer base stood at around 40 000 subscribers. By March 2001, the Celtel network had reached the following towns:

Arua, Bombo, Bushenyi, Busia, Entebbe, Iganga, Ishaka, Jinja, Kabwohe, Kalangala, Kampala, Katikamu, Koboko, Kyazanga, Lugazi, Malaba, Masaka, Matuga, Mbale, Mbarara, Mityana, Mpigi, Mugamba, Mukono, Njeru, Nkozi, Nsangi, Sembabule and Tororo.

CelTel is owned by Mobile Systems International of the Netherlands, and the International Finance Corporation.

Internet service providers

By February 2002, there were 17 licensed Internet service providers (ISPs) in Uganda. Statistics from 2006 show that there are 1 365 Internet hosts and 500 000 internet users in Uganda (CIA, n.d.).

Most ISPs provide Internet/e-mail access only in Kampala. Internet/e-mail subscribers outside Kampala have to make 'national' calls to connect to their ISP's access point, which makes these services very expensive. There is a need to have e-mail/Internet access throughout the country at affordable cost, by making it accessible through local points of presence (PoPs) in all the major towns (Republic of Uganda, 2002).

There are several ways in which local Internet PoPs can be established in most towns in the country. ISPs can be encouraged or required to install international data gateways in these towns; or they can be encouraged or required to lease capacity on the trunk routes of the main national infrastructure providers.

Table 8.2: Statistical profile of the 'typical' Uganda Internet cafe user

Category	Percentage
Median age	25 years
Single	73
Male	60
Graduated from high school and above	91
Graduated from university	39
Graduated from other tertiary institution	17
Has landline phone at home	44
Has a mobile cellular phone	77
Has a computer at home	30
Has alternative access to the Internet	60
Median experience with Internet	2 years

Source: Torach et al. (n.d.)

The use of the Internet has grown substantially in recent years. Some subscribers have corporate accounts with multiple users, but most access the Internet via dial-up lines, mostly UTL fixed lines. However, the use of broadband wireless connections is increasing. The new data services offered mainly by the two national operators are attracting users from the corporate world.

There is a growing number of private and NGO-operated telecentres that offer a broad range of communication services, including telephone, fax, e-mail, Internet, computing and photocopying. The first pilot telecentre in the country was established at Nakaseke in Luwero District. It was started with the support of UNESCO, IDRC, ITU and UTL. There are other telecentres in Buwama and Nabweru, which are run under the ACACIA initiative, and were implemented by UNCST (UNESCO/ITU/IDRC, 1999).

VSAT international data gateways

The Uganda Communications Commission (UCC) stopped issuing new international data gateway licenses in July 2000 at the start of the 5-year exclusivity period for the national telecom operators. However, by then, eight providers had been licensed. The cost of VSAT terminals has dramatically dropped in recent years. Whereas such terminals used to cost several tens of thousands of US dollars, now a terminal can be purchased and installed for less than US\$4 000, for small to medium Internet access needs. This technology is likely to play a crucial role in providing Internet access to rural Uganda.

Internet usage

A survey reported by *ScienceDirect* found that the typical Internet cafe user in Uganda is a 25-year-old single male with no children, and who has completed at least high school. See Tables 8.2 and 8.3.

Table 8.3: Uganda Internet cafe users by age category

Age category	N=188
Under 20	10%
20–29	70%
30–39	17%
40–49	3%
Total	100%

Source: Mwesige (2004)

Looking at the results of this survey, it is clear that Internet use has caught on in Uganda. While it has been suggested that Internet cafes offer 'ordinary' people a chance to get online and, therefore, offer a major solution to the problem of universal access, the Ugandan results suggest that a majority of cafe users are already advantaged in terms of access, not only to the Internet, but also to other ICT infrastructure such as computers and telephones. Although a significant 40 per cent of the respondents said they did not have Internet access elsewhere, 60 per cent said they had other avenues of access. A majority of these (66 per cent) had access at the workplace, 13 per cent had access at home and another 13 per cent used the Internet at school. Furthermore, 68 per cent had computers at the workplace, while 30 per cent said they had computers at home. Sixty-three per cent of the respondents used computers outside the Internet cafe 'several times a week', at the very minimum. Forty-four per cent of the respondents had fixed telephone lines at home, while 77 per cent said they had mobile cellular phones. On average, the respondents spent Ushs. 42 277 (US\$23.49) per month in Internet cafe fees. While these figures are hardly impressive by Western standards, in a developing country such as Uganda, they seem to suggest that even with the advent of cyber cafes, access to the Internet is still very much an elite phenomenon.

Ugandan cafe users also singled out slow connection as a major problem. Sixty-six per cent of the respondents cited this as the biggest problem they faced as Internet users, while the next biggest problem was high costs, cited by only 22 per cent of the respondents. 'In most cafes, the minutes I buy are sometimes finished before I can even access the page I am looking for,' a 21-year-old student lamented. 'Sometimes the Net is damn slow,' a 26-year-old businessman complained. Other respondents said the cafes deliberately used slow computers in order to make more money, but cafe managers blamed the ISPs. They also complained about the lack of a government policy on ICTs, and the high import taxes on computers (Torach et al., n.d.).

The private sector and NGOs have made efforts to expand ICT centres in rural areas and to increase infrastructure coverage. In addition to CEEWA-Uganda, other examples of NGOs working to achieve similar goals are Busoga Rural Open Source Development Initiatives, the Community Organisation for Empowerment of Young People in Uganda, Conservation Through Public Health, Uganda Development Services and SchoolNet-Uganda. Generally, private sector efforts have been through the large-scale telecommunication operators – MTN, UTL and Celtel (UNCST, 2002).

Infrastructure: emerging issues/ challenges

Overall, the section above highlights the fact that a large part of rural Uganda has no telecommunication infrastructure. While the convergence of information and communication technologies has enabled the creation of new services (e.g. voicemail and text-messaging), there has been the resultant challenge of creating an appropriate regulatory framework. Anomalies exist with regard to local participation in the ownership of licensed telecom service providers, and the cost of available services remains beyond the reach of most Ugandans.

With regard to the media, print and television are urban-oriented, leaving rural areas to be served mainly by radio, and a trend towards concentration/monopolies has started to emerge. While most FM and television stations offer lively entertainment programmes, little airtime is dedicated to informational/educational programmes. Indeed, the bulk of the programmes and films aired are imported at relatively low cost, which makes it difficult for the local film and media production industry to take off. There is ample room for the full utilisation of local theatre artists and traditional communication channels in the communication of development information, and ICTs can be used to reinforce the traditional communication channels. ICTs could also be employed in providing libraries, archives and documentation centres with more up-to-date materials, thereby strengthening their service provision (UCC, 2001).

Economic constraints

Access to ICT facilities is expensive, especially in the rural areas where Internet access means a trunk call to a city that has an ISP presence. What is more, it can be very expensive to provide Internet access and/or technical support for communities that are a long distance from an urban centre. Given these considerations, rural communities cannot afford the same levels of ICT facilities (and thereby benefit from DE opportunities) as their urban counterparts. It is important to note that as more and more resources become available via the Internet, the discrepancies, if not countered, may have serious implications for the divisions among communities in terms of their access to the presumed benefits of the information society and with respect to continuing education (Kasozi, 2002).

Even in urban areas, acquiring or accessing the necessary equipment required to use ICTs for DE may have significant

cost components, in terms of not only the capital expense of purchasing the equipment, but also of maintenance and obsolescence. With the use of newer ICTs, access to the Internet through an ISP, for instance, will be another expensive learner cost. In Uganda, Internet service subscribers can expect to pay an average of about US\$65 per month in service fees, in addition to a telephone usage charge for the time they are online. Telephone prices are very high for any meaningful DE initiative to be utilised effectively. In addition, learners may have to bear the cost of any training necessary to acquire the skills to use the ICTs for DE (Ayoo, 2002).

Electricity constraints

Most ICT equipment depends on electrical power. In Uganda, electricity is available only in towns and in very few rural areas (where over 80 per cent of the population live). Rural electrification amounts to only 8 per cent of the national coverage. In remote districts like Moyo, Adjumani, Moroto, Kotido, Nakapiripirit and Bundibugyo, electricity is supplied by thermal generators, and is available between 7.00 pm and 11.00 pm. Even in places where electricity is available, there are frequent outages because of rationing and poor equipment. The unreliability of electricity supply negatively affects the use of new ICTs in DE.

Equipment access

Universal access to more traditional forms of DE equipment, including radios, televisions and videocassette players, is still a major problem in Uganda, especially in rural areas. Whatever access there may be to computers and the Internet is concentrated in the major urban centres, and most often is found at the workplace rather than in people's homes.

The lack of technology (or of an adequate technical infrastructure) is a significant barrier to the use of ICTs for DE, not only for the newer, computer-based ICTs, but even for traditional ICTs such as audio and video, and radio and television broadcasting.

Technical support

Access to computer equipment is short-lived without access to technical support. In Uganda, as in most African countries, all ICT facilities are imported, and this makes servicing them and providing training in them difficult. Because of the high cost of services and spare parts for computers and other ICT equipment, fear of damaging them sometimes hinders their effective use in DE.

Skills

The use of any technology, especially ICT, for DE requires the learner to obtain the requisite skills. Training in the use of digital ICT facilities is still low for the majority of the population expected to enter DE.

Along with computer literacy, many DE applications using digital ICTs require English language skills. The use of digital ICTs is usually restricted to English-speakers, because of the dominance of the English language on the network. For most rural communities in Uganda, who may know only how to read and write in their local languages, this can constitute a major barrier. The language problem is part of the reason why most DE initiatives still target mature learners. In addition, teachers may need training in adapting DE learning materials to the new electronic media, and in their new roles of teacher, facilitator and mentor.

Socio-cultural barriers

Even if equipment were available, there are other reasons, relating mainly to socio-cultural beliefs, that might hinder sections of the population from accessing it. In Uganda, ICTs are classified amongst the technical fields that are best left to men, and women have not embraced the use of these facilities with as much enthusiasm as their male counterparts (Tusubira, 2002).

National ICT policies

The government of Uganda recognises the critical importance of ICT in national development, and has a policy framework to start implementing these technologies throughout the country. Several policies, statutes and other initiatives have been undertaken towards this goal. The developing national ICT policy and implementing programmes are the result of efforts by several government ministries and agencies, together with the published plans, programmes and corresponding provision and availability of infrastructure and service delivery of the national telecommunications providers.

Uganda's journey towards an ICT policy is traceable to political commitment and to privatisation efforts. The Press and Journalist Statute of 1995, the Electronic Media Statute of 1996, the Communications Act of 1997 and the Rural Communications Policy of 2001 are related to this process. The outcomes of these initiatives are evident in increased investment in communications infrastructure, notably in mobile telephony, FM radios, televisions and Internet services (as reflected in Table 8.1 above).

Other recent policy developments include the following:

- a national ICT policy, approved in 2003, with the aim of promoting the development of ICT infrastructure in the country, with the MOWHC as the primary co-ordinating agency within the government;
- a draft broadcasting policy is in place;
- the private sector has become the main driver in the ICT sector;
- the UCC is implementing a rural development policy;
- the new draft communications policy seeks to connect all schools, sub-counties, urban centres, health centres and public libraries by 2010; and
- the government is promoting public-private partnerships to build the requisite backbone infrastructure.

Despite these initiatives, major gaps continue to characterise the ICT environment in Uganda, namely:

- teledensity, although growing, is only about 5 per cent, implying that 95 per cent of Ugandans still do not have telephone connectivity;
- while 16.6 per cent of urban dwellers own mobile phones, only 2 per cent of rural inhabitants have them;
- fixed-line phone ownership is even lower, with a rate of 3.7 per cent for urban dwellers and 0.5 per cent for rural dwellers;
- only 7 per cent of households have televisions, and 70 per cent have radios;
- Internet access is available mainly in Kampala, and the number of people using the Internet is only 20 000 out of a total population of 26 million; and
- daily circulation of major national newspapers is only 30 000–35 000. (MEGA_TECH, 2006)

Initial ICT policy interventions

The MOWHC has undertaken a series of initiatives to co-ordinate the implementation of the national ICT policy. In January 2004, the MOWHC completed the first draft of an e-readiness assessment, followed by an initial national ICT strategy document, completed in March 2004, which focused on developing infrastructure, implementation and processes. This study was further elaborated in February 2005 with the completion of the draft National ICT Policy for Uganda Implementation Framework, which focused on the formation and activities of an ICT co-ordination unit and the establishment of an operational and management framework between that unit and other sectors/ministries in implementing the ICT policy (MEGA_TECH, 2006).

Through the UNCST, the government has formulated a national ICT policy framework to enhance and streamline developments in the ICT sector. The aim is to meet the challenges and harness the potential and opportunities offered by ICTs (UNCST, 2002).

Other efforts by the government include the establishment of the Rural Communications Development Fund (RCDF), administered by the UCC (UCC, 2001). The fund provides subsidies to facilitate access to basic communication services such as telephones, computers and the Internet within reachable distances for all in Uganda. The implementation focus areas for the RCDF are those considered commercially unviable by commercial telecommunication operators. The government has also removed taxes on all imported ICT equipment; gradually, this is reducing the costs of providing ICT services. When the UCC instituted zero license fees for the provision of public communication services, a new and vibrant industry erupted in telephone kiosks and Internet cafes (UCC, 2005).

However, few people in Uganda use e-mail, due to a lack of either computer skills or access to ICTs (Tusubira, Kaggwa & Ongora, 2005). Generally, access to e-mail is through Internet cafes, which are located only in large towns. Fleming (2002) alludes to the idea of basic Internet access being closely associated with economic privilege, thus keeping popular access to the Internet in the hands of a well-educated minority.

Recent ICT policy initiatives

Recent government initiatives also recognise the need to provide more centralised planning and implementation of ICT initiatives. The January 2006 final draft of the Uganda E-Government Strategic Framework proposes a fully fledged ministry of ICT to provide political and technical leadership in the overall co-ordination and harmonisation of policy development and implementation for information technology, information management services, communications services, and information and broadcasting services, to avoid the duplication that exists in both central and local government (MEGA_TECH, 2006).

Implementation of ICT policy initiatives

Despite the above efforts, concerns of access, utilisation and the application of ICT remain largely gendered to the disadvantage of women (poor women, in particular). A number of issues emerged in the process of developing the national ICT policy. These issues are quite diverse and provide a learning experience for countries that are in the

process of developing policies. The sum of these issues accounts for why women's access to and utilisation of ICTs are still limited and why collective effort is required to address them.

In general, the development and integration of ICT within and by the government has been uneven, characterised by a lack of adequate resources to dedicate to ICT programmes. Accordingly, programmes that enlist support from international donor organisations have been the primary catalyst for ICT penetration into the government sector. Some ministries, such as the Ministry of Finance, have substantial electronic record processing and information retrieval systems, databases, and internal and external networks.

Concerns about the ICT policy framework include the following:

- research on women and ICT needs to be undertaken to generate gender-desegregated data, in order to mainstream gender in ICT policies and programmes;
- a large part of rural Uganda, where 80 per cent of women live, has no telecommunications infrastructure;
- women's participation in planning, implementation and ownership of ICT services is low;
- women are not represented in forums where major decisions on ICTs are made, resulting in programmes that are insensitive to women;
- low incomes still affect women's access in areas where ICTs are available; and
- better co-ordination of ICT training in the country is required (for example, integrating ICT training in school curricula to provide IT literacy courses to all students, and to build the capacity of women in ICT at all levels) (CEEWA, 2003a).

The Uganda national ICT policy framework that was approved by the Cabinet in December 2003 envisions a country where national development, especially human development and good governance, are sustainably enhanced, promoted and accelerated by the efficient application and use of ICTs, including timely access to information.

The policy draws on a number of strategies to accomplish its vision, including mainstreaming gender into policy programmes and implementation strategies; sensitisation and awareness creation; ICT capacity development among rural people; building appropriate infrastructure; supporting a favourable investment environment; supporting innovative ICT projects; stimulating production, storage

and dissemination of national information; and facilitation of access to public-domain information. The government envisages that by implementing the above strategies, major problems such as access, application and utilisation will be addressed appropriately (APC, 2004).

Uganda's education system: an overview

The education system in Uganda covers eight years of primary (basic) education, four years of ordinary-level secondary education, two years of advanced-level secondary education, and two to five years of tertiary education. Alternative tracks branch off from ordinary-level secondary to technical colleges and primary teachers colleges. Tertiary education covers post-advanced-level secondary education; this sector includes universities and other institutions of higher learning such as polytechnics.

Primary education and ICTs

The Ugandan government adopted a two-pronged strategy to address literacy concerns through functional adult literacy campaigns, with the most robust intervention being implemented under the Social Sector Investment Plan. The second strategy is Universal Primary Education (UPE), started in 1997 with the overall goal of increasing primary school enrolment and national literacy rates, estimated to be 61 per cent in 2002 (MoEs, 2003). Consequently, primary school enrolment increased from 2.5 million children in 1995 to 7.5 million children in 2003, a 200 per cent increase (MoEs, 2003).

UPE is in line with the global commitment to achieving universal primary education by 2015 and the United Nation's Millennium Development Goals adopted by the general assembly and endorsed by governments in 2000 (World Bank, 2003). In preparation for the first UPE graduates, the Ugandan government is already considering rolling out Universal Secondary Education (USE) to ensure that UPE graduates continue with their education. Critics of the programme have identified a lack of infrastructure, poor performance in schools, a critical shortage of teachers, inadequate provision for special-needs students and the absence of a clear long-term vision as major obstacles to programme sustainability (Ndeezi, 2000; Aguti, 2002). Although the government is committed to integrating ICT into the formal and informal education system, it has yet to come up with a national ICT policy and clearly detailed strategies for achieving the same. This means that the literacy programmes address only 'traditional literacy', with small ICT

components limited to schools at which civil society efforts have made ICT applications available for education and training.

It is important to note that by the end of the 1980s, the Ugandan education system had collapsed under protracted civil strife and accompanying economic deterioration. From having the highest literacy rate in the region at independence, Uganda had the lowest literacy rate in East Africa. In 1996, President Museveni promised free primary education for all school-age children, up to a limit of four per family. The immediate result of the policy was a dramatic increase in school enrolment, with the number of pupils in state primary schools nearly doubling by mid-1997, reaching a net enrolment rate of 91 per cent. UPE has since sent shock waves through the education system, and capacity to deliver even a basic standard of education is severely constrained. It is against this background that the National Curriculum Development Centre (NCDC) proposed a pilot project for an ICT-based curriculum delivery strategy for primary and secondary schools entitled CurriculumNet (Baguma, 2000).

With IDRC support, researchers undertook a participatory needs assessment at the primary and secondary level; trained a cadre 12 participating teachers and four curriculum specialists in basic computer techniques and ICT curriculum design and development; developed computer-based instructional materials in two selected core subjects; tested and delivered these materials in three primary and three secondary schools in rural, peri-urban and urban settings; documented, monitored and evaluated the performance of participating students, teachers and schools; and disseminated the knowledge generated by the project. The experience gained in this project informed the policy recommendations with respect to technology-enhanced education (Bellanet, 2004).

In 2004, the CurriculumNet project received formal government approval for its ICT-based curriculum materials in mathematics and geography for primary schools and mathematics and science for secondary schools. The significance of government approval is that the curriculum could be used immediately by all schools in Uganda, provided they had IT access and could go through the formal examination process of the Uganda National Examination Board.

It is true, therefore, to say that ICT has already been incorporated in the academic programmes of several primary and secondary schools, especially those in and around Kampala. Each school conducts the training according to its

own convenience and capacity and the technical know-how of the instructors.

The MoEs has since approved a curriculum for ICT training in secondary schools, and a limited number of primary schools offer ICT training. These schools are being equipped under various programmes, including the Schoolnet and ConnectEd projects. However, it should be pointed out that only a very small percentage of secondary schools offer ICT training and, in almost all cases, the facilities are inadequate for reasonable hands-on experience.

The MoEs is in the process of formulating an ICT policy for education that it hopes to adopt, so as to drive ICT training in schools and other institutions under its mandate (MOWHC, 2002).

The school-based telecentre (SBT) model, the first of its kind in Uganda, was introduced by SchoolNet Uganda, a civil society organisation involved in ICT initiatives for schools. SchoolNet represents and co-ordinates the project on behalf of World Link, with support from the Bill and Melinda Gates Foundation. World Link provided seed money to acquire the technology for participating schools in the form of VSAT, computers and local networks, on top of subsidising monthly connectivity fees (Mayanja, 2002). Unlike multipurpose community telecentres (MCTs), SBTs are tailored around existing administrative structures in schools to run the centre sustainably into the future. SBTs serve both schools and neighbouring communities, thereby providing 'access to ICT facilities without necessarily carrying directly the total burden of management and operation of the facilities' (Mayanja, 2002: 25). So far, the project has led to the establishment of 15 SBTs nationwide.

Secondary education and ICTs

The World Link for Development (WorLD) programme was conceived in the framework of a public-private sector partnership for education, and was sponsored by the World Bank Institute. The stated objectives of the programme for Uganda are to:

- provide Internet connectivity and training for teachers, teacher trainers and students;
- use ICT in education; and
- link students and teachers in secondary schools with industrialised countries for collaborative learning via the Internet.

Internally, the availability of computers and appropriate software would accord the teachers and students the opportunity to develop teaching and learning materials,

computer models and programmes that could enhance student learning in science, mathematics and ICT (SMICT) and other subjects at school.

Uganda Connect Schools Project

The project focus is to make computers available to schools at a minimum fee, and to help schools gain access to the Internet. The Uganda Connect Schools Project (Uconnect) has over 1 000 refurbished Pentium computers, printers and networking equipment for distribution to schools. More than 35 primary and secondary schools have benefited so far, with the establishment of LAN and connectivity. Uconnect is an MoEs-based project, and beneficiary institutions are provided with basic training for selected staff and students, who then will train others at the school. The expectation is that students will benefit from access to DE materials that exist on the Internet. Business models for turning computer labs into public telecenters (Internet cafes) after school hours and during school vacations are being explored. Part of this initiative will be directed at hands-on training in specific ICT skills needed by local communities.

Other ICT projects

The NCDC intends to make various useful educational resources available online to teachers in the school system. It is also hoped that schoolteachers will post their experiences, questions and teacher-development activities on CurriculumNet for the benefit of others

Together with ICT company One2net, MTN Formal Education is extending support to selected educational institutions by providing LANs, computers and connectivity via MTN, according the beneficiaries access to Internet teaching and learning resources.

Institutions of tertiary education

The tertiary education sub-sector encompasses the following licensed institutions:

- public universities;
- private universities;
- national teachers, colleges;
- technical colleges;
- colleges of commerce;
- agriculture and animal husbandry institutions;
- forestry colleges;
- co-operative colleges;
- hotel and tourism institutes;
- medical/health sector institutes;

- vocational institutes;
- weather/earth institutes; and
- management institutes.

Added to these are nine other universities and 12 non-university unlicensed tertiary institutions operating in Uganda. The National Council for Higher Education, whose responsibility it is to regulate higher education in the country, only began operations in January 2003 and has yet to gather the required data on tertiary education in Uganda (*The New Vision*, 29.09.03).

Tertiary education gross enrolment ratio

In 1995, Uganda's gross enrolment ratio at tertiary level was 2 per cent, way below the 3.2 per cent sub-Saharan average. However, between 1995 and 2003, tertiary enrolment increased by 230 per cent (Ayoo, 2003). The average annual rate of increase in tertiary enrolments has been 46 per cent over the last decade (*The Statesman*, 27.04.07). This has raised the gross enrolment ratio to an estimated 2.8 per cent. With improved access to secondary education, the projected demand for higher education is expected to reach 126 396, amounting to only a 3.1 per cent gross enrolment ratio (MoEs, 2003).

In the 1950s, Uganda had a single university, Makerere University College, which had an enrolment of about 250 students at its peak. By the year 2000, Uganda had 29 tertiary institutions catering for 55 000 students. The current total enrolment at tertiary level is estimated at between 75 000 and 85 000 people aged between 15 and 25. Of these, about 39 per cent are female and 61 per cent are male (*The New Vision*, 29.09.03).

Most of the growth in tertiary education in the past decade in Uganda has been in the universities sub-sector, which accounts for 65 per cent of total tertiary enrolment. The remaining 35 per cent is shared by other tertiary institutions in the following proportions: national teachers' colleges, 21 per cent; colleges of commerce, 7 per cent; technical colleges, 2 per cent; vocational training institutes, 1 per cent; and other tertiary institutions, 4 per cent. Between 15 per cent and 17 per cent of the students registered in these tertiary institutions take science-based courses; the rest are arts-based. The proposed national strategic plan for higher education envisages a shift in the balance to 50 per cent science-based and 50 per cent arts-based disciplines.

Tertiary education and ICT

Most of the institutions of higher learning, both private and public, offer varying levels of ICT skills training, mostly as

part of their programmes for formal academic qualifications. At Makerere University, the Institute of Computer Science provides high-level academic training in the field for students specialising in computer science. Most other departments have incorporated ICT training in their curricula. However, in many cases, facilities are not adequate to cater for the required exposure; for example, there are not enough computers to provide students with sufficient hands-on practice. The university is in the process of implementing a plan to improve ICT infrastructure for the main campus, as well as affiliated campuses. An ICT directorate has been set up to co-ordinate ICT training at the university.

Makerere University is part of the African Virtual University (AVU) programme, which offers teleconferencing facilities for DE. The Global Distance Learning Centre (GDLC) at the Uganda Management Institute (UMI) also offers such facilities. Institutions of higher learning with similar training programmes include:

- Islamic University in Uganda;
- Mbarara University of Science and Technology;
- Kyambogo University;
- Uganda Communications Institute; and
- Uganda Martyrs University, Nkozi.

There is a growing feeling among ICT professionals that an independent course in communications engineering should be offered at university level, in recognition of the role it plays in the development of ICT and, consequently, in the development of the country.

ICT training

Other institutions offer a variety of ICT skills training, and range from small companies with a handful of PCs to larger well-equipped establishments. Most of these institutions are privately owned. The ICT skills training provided by them includes:

- basic end-user skills such as word processing, and the use of spreadsheets and databases;
- computer programming skills;
- and networking skills.

The courses are of widely varying duration and content, making it impossible to judge the competence of graduates from these institutions by looking at their certificates. There is a need to standardise these short ICT courses, so that the market can have a reliable measure of what it is getting by way of ICT skills.

Three main categories of people are targeted by these institutions:

- school-leavers who wish to improve their chances of employment;
- persons with other academic qualifications wanting to enhance their employment prospects; and
- persons already in employment who wish to improve their chances of promotion, or even simply to retain their jobs.

Although there has not been a comprehensive survey of human resources in ICT in Uganda, it is fairly obvious that the demand for ICT skills exceeds the current supply. Various levels of skills are required, and only some of the needs are being met by the existing training institutions.

There is a need to assess the national requirement for ICT skills, to establish how much is available, and then to determine the best strategy of meeting the appropriate ICT skills demand. However, the ICT skills that will be needed, and therefore the kind of training that will be required, depend very much on the ICT policy adopted by Uganda as a nation and the government in particular. For example, if the government should adopt a policy of information-sharing using modern ICT, then LANs and WANs will be introduced in government ministries, departments and agencies. This would require government employees to acquire a range of ICT skills that otherwise would not be necessary.

Makerere University and the e-Granary Project

Makerere University has adopted both ICT and an e-learning strategy. The campus is well equipped with modern computers and is in the process of installing an on-campus fibre-optic network. Even with this technology in place, the Makerere professors are still concerned about Internet connectivity at the university. Off-campus Internet capacity is considered to be far too small, and too little funding is available for Internet connectivity.

In August 2006, Makerere University's Faculty of Computing and Information Technology won an African Union bid to set up an ICT institution in East and Central Africa (*The New Vision*, 14.08.06). In October 2006, the *East African Business Week* reported that Kampala International University, which has a reputation for attracting scholars from across East Africa, would launch a digital library known as the 'e-Granary'. The article described the e-Granary as a Web-based content package that enables students to read material via the campus Intranet by inserting the E-granary software into their computers. It noted that the material would also be available online via the university network.

While the e-Granary, brought to the university by the University of Iowa in the United States, was initially available only within the Kampala International University, through a single computer laboratory, it is anticipated that with the purchase of a central server worth US\$800 000, total network connectivity will be available in all campus user facilities. It was noted that more than 110 computers are ready for the project and 800 000 digital books on nursing and medicine are due to arrive at the university.

Until 2005, the university's IT centre was in reality a student computer laboratory comprising 100 computers, which catered mainly for document production and Internet services. The number of computers had risen to 6 000 by the time of publication of the article, and according to the university's IT manager, Mr. Alex Mbazira, the centre plans to add voice and data services to the Intranet and had invested over US\$100 000 in the first phase of the project. According to Mbazira, 'the programme will make it easier to package learning resources so that they are accessed in study laboratories, offices and lecture rooms. This is a diversion from the traditional book shelving which would take a lot of space.'

In conclusion, the article noted that in addition to enhancing the distance learning process, the project would enable the two university campuses to transmit information on admissions, reports, accounts, inquiries and other procedures. Currently, the university runs on a bandwidth connection of 512 Kbps, most of which is pumped into online studies. These developments have been taking place at a time when the MoEs is encouraging large institutions to obtain appropriate ICT to enhance learning programmes.

Emerging issues and challenges

Lack of technical expertise is a constraint facing provision and quality of infrastructure. Uganda lacks people who are appropriately trained and experienced in designing and managing ICT projects. As observed earlier, the current ICT training schools are inadequate in the Ugandan context. Among institutions of higher education, only the Makerere, Nkozi and Kyambogo Universities, the Mbarara University of Science and Technology and the UMI offer bachelor's degrees and diplomas related to computer science and information management. Makerere also offers a postgraduate diploma in computer science and a master's degree in information science. In co-operation with a Malaysian institute, Kyambogo University offers computer science programmes at various levels up to a master's degree. These courses are depicted in Table 8.4.

It is clear that only a few elite universities are well advanced in ICT infrastructure, including connection to the Internet. The average student-computer ratio for institutions has been surveyed at 50 students per computer; in some cases, a single computer is shared by over 300 students (Liang, 2004). The following observations are made:

- there is a need for better co-ordination in ICT training in the country (for example, IT literacy courses could be standardised so that it is easier to compare course content covered by students from different IT training institutions);
- there is a need to recognise the value of intellectual assets, if Uganda is to become a full participant in the 'knowledge society';
- there is a need to find financing for ICT innovations, in order to turn them into productive enterprises;

Table 8.4: Training in modern ICT

Institutional category	Institution	Courses offered
University programmes for IT specialists	Makerere University Nkumba University Nkozi University Kampala International University Mbarara University of Science and Technology	Degree Diploma-based courses
Tertiary institutions (main)	Uganda Communications Commission Makerere University Business School Uganda Management Institute Management Training and Advisory Centre APTEC	Certificate and diploma courses

Source: UNCT (2002)

- there is a need to set minimum standards for ICT training at all levels of education;
- there is a need to standardise training curricula at various levels;
- there is a need to take into account media convergence (ICT integration into media training is essential to keep abreast of opportunities offered by new developments like online journalism); and
- there is a need to put in place mechanisms for enforcing observance of professional media ethics.

As in most developing countries, universities obtain the most sophisticated ICT applications and infrastructure. The majority of the 12 existing institutions of higher education (four of them located in Kampala) have access to the Internet to some degree. However, only Makerere, the country's most important university, has obtained a campus-wide LAN, which has a dedicated 256 Kbps connection provided by MTN, and has developed an overall strategy to apply ICT within the university's ongoing research programmes, its administration and curricula to provide distance learning facilities and ICT-related courses. The programme is sponsored by USAID, NORAD, SIDA, the ADB and the government of Uganda (See Makerere, n.d.).

Universities in Uganda operate in overcrowded and deteriorating physical facilities, with limited, obsolete or irrelevant library materials. Although the curricula of most of the courses are internationally acceptable, being modelled on leading international institutions, limitations arise in practical laboratory sessions where high-end equipment is generally scarce. Thus, practical exposure is hampered. Nevertheless, the number of graduates is steadily growing.

As in many developing countries, those who can afford it and are looking for an optimised training head abroad, to South Africa, Europe or the USA, where they often remain to make their living. This certainly leads to a significant loss of human capacity but also constitutes a chance for its enrichment, provided the respective professionals are offered incentives to return.

The most important aspect of ICT skills development in Uganda appears to be carried out mainly by computer vendors and private computer training institutions. These institutions generally offer short courses on standard applications such as MS Office, including spreadsheet development and database management. However, the majority of the training institutions lack proper teaching materials, and often employ trainers who are inadequately qualified. A few, mostly private, training institutes offer certified, but rather expensive, qualifications (e.g. Microsoft

certificates). However, these are far from affordable even for well-to-do Ugandans, and are usually paid for by employers (e.g. the big service providers).

An exception in this respect appears to be the training initiatives sponsored by donors and the private sector offering high-quality training on a scholarship basis. Moreover, Germany's Carl Duisberg Association has been involved in supporting the training of ICT professionals, but most of the courses are conducted in Germany and thus exclude a large proportion of potential Ugandan candidates.

Against this background of shortcomings, ICT-based education is not yet a broad issue at school level. Only a few well-equipped and expensive institutions in and around Kampala have computer labs and teach basic applications such as MS Office and, more rarely, Internet and e-mail usage. Donor projects at the secondary and primary levels have focused largely on training teachers in ICT applications. Under the sponsorship of USAID, the Connect-Ed programme provides an ICT-based curriculum to the Institute of Teacher Education, Kyambogo (ITEK) and a network to ten primary teachers' colleges (PTCs) (see LearnLink, n.d.). In this programme, it is also intended to create telecentre models at the PTCs, which will be open to the broader public. Together with the SchoolNet Uganda project described earlier and funded by the Gates Foundation, the programme aims to train the trainers, thereby seeking to enhance computer literacy. Due to the early stage of implementation of these projects, trickle-down effects and impacts cannot yet be assessed.

Distance and electronic learning

In Uganda today, DE at tertiary level is provided by both public and private institutions. Some of the programmes offered through DE are locally sourced while others are internationally sourced. The growth of DE has been associated with ICTs, although the choice of technologies depends on a variety of factors, including the 'desirability, feasibility, affordability and sustainability' of such technology (Haddad & Jurich, 2002: 55).

In Uganda and at Makerere University in particular, several programmes (including teacher education) have been offered using DE. However, many of these programmes have not fully utilised the technology, but have depended largely on first-generation print and second-generation face-to-face sessions. There have been some efforts at integrating computers in education.

E-learning is sometimes perceived to be gender- and colour-neutral; this was one of the major issues that attracted 21 professors from Makerere University to the Global Virtual University (GVU). The GVV is a consortium of universities working together to enhance learning for environmental sustainability. Through a range of online study programmes and courses, the GVV's goal is to increase people's sensitivity to and involvement in finding solutions for environment and development issues. The consortium acknowledges the importance of education for development and is designed specifically to meet the educational needs of the developing world. Current partners include Agder University College (Norway), Kwame Nkrumah University of Science and Technology (Ghana), Makerere University (Uganda) and the University of Pretoria (South Africa) (GVU, n.d.). The first master's degree programme began in August 2005 with 30 students (15 from Africa) under the theme of Global Environment and Development Studies (UNU, n.d.).

ICT-enabled content

In all the educational establishments where ICT has been introduced, students are taught basic computer skills using off-the-shelf applications, which are mainly Microsoft Office products like:

- word processing using Microsoft Word;
- spreadsheets using Microsoft Excel;
- database management using Microsoft Access; and
- electronic presentation using Microsoft PowerPoint.

Connect-Ed Phase I was originally established in 2001 by USAID under the LearnLink initiative. The programme set up computer centres and Internet points of presence at Kyambogo University and at eight PTCs throughout the country, provided computer literacy and materials development training for teacher educators and began to redesign the print-based national PTC curriculum into an interactive, accessible online version. Connect-Ed Phase II, which started in 2003, builds on the infrastructure established in Phase I with a central focus on sustainability and long-term ICT strategies for Kyambogo University and the PTCs. Working in close collaboration with MoEs and Kyambogo, activities include developing business plans and policy reform to financially sustain the PTC labs, using ICTs to increase teachers' capacity to incorporate student-centred teaching practices in the classroom, developing a Web presence for the university and each PTC, continuing to provide computer training, and completing the digitisation and enhancement of the national PTC curriculum. Connect-Ed is also using its experience and expertise to assist MoEs in improving its national ICT-in-education policy (iConnect, n.d.).

Impact of ICT usage in educational institutions

There was a widespread belief among Ugandans (and many others) that exposure of students to computers would increase their educational achievement and greatly enhance their employability after school. Various technocrats are of the view that integration of ICT into their world of work will improve their own performance and commitment. However, the development budgets in all the districts are characterised by low local revenue collection, with the bulk of the budget being financed by donors and central government grants.

To most teachers at various levels in the school system, ICT in education has great potential for mitigating the shortage and the lack of variety in teaching and learning materials for all schooling levels and for vocationally oriented out-of-school youths and adult learners. In institutions where it is functional, ICT has lowered the cost of accessing teaching and learning materials. The NCDC, for example, through its CurriculumNet project, has intentions of making available various useful educational resources online. One of the anticipated benefits of this technology expressed by potential users is institutional efficiency, which is perceived to be the capacity to communicate accurately and quickly. Most potential users indicate that their expectation is to be able to access and disseminate various sources of information more rapidly and, preferably, at minimal cost.

Makerere University, together with the National Joint Admissions Board (which is responsible for processing applications and admission to institutions of higher learning), has developed plans to introduce online application and admission processing. The technology provides an invaluable opportunity for teacher upgrading. Teacher training institutions, such as the Department of Distance Education and the Department of Science and Technical Education, could exploit the use of these facilities to make their programmes more accessible and more effective to the teachers based in rural schools. For example, these departments are developing an in-service training programme for science teachers, with inbuilt credit course units enabling teachers both to improve their performance skills and to upgrade their formal academic and professional qualifications. If such a programme is provided, with online interactive components, it could mitigate the costs usually incurred by teachers in attending full-time courses at university and the associated risk of losing their jobs due to prolonged absence from their duty stations.

Delivery models for technology: enhanced education in Uganda

Nearly all DE programmes in Uganda use print as the main delivery medium. Print is usually supplemented with face-to-face tutorials, audiotapes and telephone contact between tutors and learners, and among learners. The use of ICTs for DE in Uganda is a relatively new development. The only exceptions to the norm are the AVU learning centres and the GDLC. The AVU and GDLC programmes rely mainly on satellite-based and computer-mediated interaction; print and other media are used as supplementary media.

Because nearly all the DE programmes in Uganda are based at dual-mode institutions, the main focus when introducing ICTs in these institutions has not been on enhancing DE delivery; rather, the emphasis has been on the use of ICTs for enhancing face-to-face delivery. For instance, Makerere University and Kyambogo University have made significant strides in introducing ICTs in the management and teaching and learning processes, but no infrastructure has been developed or policy formulated that puts a primary emphasis on DE.

The proposed single-mode Open University of Uganda is the only institution of higher learning in Uganda whose policy documents and proposed structures are directed at the application of ICTs for DE. The Open University of Uganda proposes to use radio, videoconferencing, and satellite-based and computer-mediated instructional technologies as the main media of instruction (Creed, 2001).

Public institutions of tertiary education offering DE programmes

Of the four public universities – Makerere University, Kyambogo University, Mbarara University of Science and Technology and Gulu University – only the first two offer DE programmes. Both Makerere University and Kyambogo University are dual-mode institutions. Although the UMI is not ranked as a university, it is a degree-awarding higher institution of learning that also has a DE component. The Nsamizi Training Institute for Social Development (NTI) is yet another tertiary institution offering at least one programme through DE.

Makerere University

Founded in 1922, Makerere University is the oldest institution of higher learning in Uganda. The DE programme

at Makerere University was started in 1967 in the Department of Extramural Studies. The department has been upgraded since to a Centre for Continuing Education and then an Institute of Adult and Continuing Education. Plans are underway to transform the institute into an affiliate College of Lifelong Learning.

From 1967 to the mid-1980s, Makerere University offered correspondence courses in formal and non-formal education. The formal programmes awarded preliminary and intermediate certificates in areas such as the English language, mathematics, government, and economics and a course for government clerical workers.

In 1991, Makerere University introduced DE degree programmes for the first time in Uganda. The degree programmes offered through DE at Makerere University include: Bachelor of Education, Bachelor of Commerce and Bachelor of Science. The Department of Distance Education in the Institute of Adult and Continuing Education also services the Commonwealth Youth Secretariat Diploma in Youth Development Work, accredited by the Open University of Tanzania.

Makerere University also awards the DE Diploma in Palliative Care offered by Hospice Africa. The university is in the process of developing two DE master's programmes – in public health and in education (ICT), the latter to be supported by UNESCO. Postgraduate diplomas in education and in project planning and management are at an advanced stage of planning.

When the DE degree programmes were introduced at Makerere University in 1991, the total student enrolment was about 7 000. Since then, the number of students has risen to about 30 000, of whom approximately 30 per cent are distance learners (Ayoo, 2002).

In addition, Makerere University hosts an AVU learning centre.

Kyambogo University

Kyambogo University was formally established in 2002, following the merger of three tertiary institutions – ITEK, the Uganda Polytechnic Kyambogo (UPK) and the Uganda National Institute of Special Education (UNISE). By the time of the merger, ITEK was offering a diploma in primary education through DE, UNISE was offering a certificate programme in special needs education, and UPK was hosting an AVU learning centre (Ayoo, 2002).

Under the auspices of the new university, efforts are underway to merge the three DE units into one. There are

also plans to start additional DE programmes – the Bachelor of Education (Primary) External, Diploma in Special Needs Education External, and Bachelor of Education (Special Needs Education).

Through the former ITEK, Kyambogo University supervises all National Teachers' Colleges (NTCs) and PTCs. Through these colleges, the university supports distance learners countrywide.

Uganda Management Institute

UMI is a degree-awarding public institution that is not a university. It is a host to the the World Bank's GDLC. The centre provides mainly short courses and seminars for top executives and professionals, using satellite technology and other computer-aided modalities. UMI is planning to extend the services of the GDLC to more towns in the near future.

Nsamizi Training Institute for Social Development

NTI is a dual-mode public tertiary institution that offers a diploma in adult and community education through DE, in addition to many other social development certificate and diploma programmes.

Private institutions of tertiary education offering DE programmes

Of the 12 private universities in Uganda – Uganda Martyrs University (UMU), Uganda Christian University (UCU), Bugema University, Busoga University, Ndejje University, Nkumba University, Namasagali University, Kampala University, Kigezi International School of Medicine, Aga Khan University and Kampala International University – only UMU and UCU are known to run DE programmes. Kampala International University has mooted plans to start computer-based DE programmes in the near future.

Uganda Martyrs University

Established in 1993 by the Roman Catholic Church, the UMU has a DE unit that runs certificate and diploma programmes in school management and church administration. The programmes target personnel working in church-founded schools and local parishes. UMU works very closely with the diocesan education secretary to offer both administrative and student support for the programmes. The UMU is also host to an AVU learning centre.

Uganda Christian University

Founded by the Anglican Church of Uganda in 1999, UCU has a DE unit that manages its theological education

by extension (TEE) programmes. The TEE programmes offered by UCU are certificate and diploma courses for lay Christian leaders. Plans are underway to offer a regionally collaborative bachelor of theology degree through DE.

International Institute of Education

The International Institute of Education is a private institution that offers administrative and student support to distance learners from various foreign universities, including the University of South Africa. The institute does not develop and run programmes of its own.

African Virtual University

The AVU started as a World Bank project relying on an interactive instructional telecommunications network established to extend much-needed science-based tertiary education to the countries of sub-Saharan Africa. The AVU uses interactive satellite- and computer-based technologies to share academic faculty and laboratory experiences, and library resources. In its pilot phase, the AVU concept was implemented and tested in 14 Anglophone and 8 Francophone universities. Internationally, the AVU offers degree programmes and seminars that are open to the general public for a fee.

In Uganda, the AVU started in 1997 with sites at Makerere University, Uganda Polytechnic Kyambogo and the Uganda Martyrs University at Nkozi.

In the operational phase, the AVU was transformed from a project of the World Bank into an independent intergovernmental organisation. Its head office was moved from Washington in the USA to Nairobi in Kenya. It now has over 34 learning centres in 17 African countries. Although three of the AVU learning centres are in Uganda, not one of the three has been able to mount the electronic learning degree programmes offered through the AVU, instead offering mainly short courses and seminars for professionals. The primary bottleneck for the AVU in Uganda has been a mutual failure to come up with policies on incorporating AVU activities into those of the host institutions where AVU learning centres are based.

Open University of Uganda

The White Paper on Education (1992) proposed the setting up of the Open University of Uganda by the year 2000. However, the government task force on the project was formed only in November 1999. The brief of the task force was to investigate all aspects pertaining to an open university and to set out the modality for establishing the institution. The task force completed its work in 2000 and submitted its report to the government. Since then, no

known action has taken place towards the formation of the Open University of Uganda.

Private computer-training institutions

There are several institutions in Uganda that offer computer training. These institutions are found mainly in major towns, with the majority in Kampala city. Many are international, with branches in several different countries, but the majority are local.

A survey of these institutions indicates that they generally offer courses with similar course content, which cover off-the-shelf applications such as:

- introduction to computers and DOS;
- graphical user interface operating systems (Windows 95/98/2000/NT); and
- Microsoft Office (MS Word, MS Excel, MS Access and MS PowerPoint).

Barriers to technology-enhanced education in Uganda

According to Kasozi (2002), DE is faced with various barriers; the swiftness of ICT developments, their increasing spread and availability, the nature of their content and their declining prices have profound implications for learning. There is a need to tap the potential of ICT to enhance data collection and analysis, and to strengthen management systems in educational institutions; to improve access to education by remote and disadvantaged communities; to support initial and continuing professional development of teachers; and to provide opportunities to communicate across classrooms and cultures.

It is clear that in spite of the tremendous growth in the range of new ICT applications in some sectors of the Ugandan economy, the impact of these technologies in DE has not been significant. Various factors have contributed to the low absorption rate of the new technologies into DE; some of these are discussed below.

Lack of policy on DE

In recognition of the catalytic role that information plays in national development, the government of Uganda has set up a policy framework on ICT to ensure optimum utilisation of this resource towards the socio-economic development of the

country. However, there is still no policy governing DE, nor the use of ICT towards that end.

The ICT policy document places its emphasis on the Telecommunications Act of 1997, the main objective of which was 'to increase the penetration and level of telecommunication services in the country through private sector investment rather than government intervention', and the Rural Communications Development Policy of 2001, which was aimed at providing access to basic communication services within a reasonable distance of all people in Uganda.

In spite of the recognition of the need to use ICTs in all areas of national development, the lack of a policy document guiding the development and sustainable application of this resource in DE has affected the rate at which it has been embraced.

While the benefits of ICT are enormous, and schools could be the launching pad for a computer-literate society, Uganda is one of the developing countries still without an ICT policy, and therefore missing out on the potential advantages of the information super-highway in this digital age. The would-be policy has remained in draft form since 1997.

It has an ambitious programme of ICT connectivity in schools, but it will be a tall order to fulfil this dream in the light of the colossal capital investment that will be required (iConnect, n.d.).

Cost

Much as the average cost of computers has gone down, the recurrent costs remain too high to be affordable by most educational institutions. The majority of institutions that have computers have acquired them through donations or grants by NGOs. This has left the many without access to such facilities at a considerable disadvantage. Schools where computers have been introduced are characterised by very high fee structures (see Table 8.5).

Equipment and connectivity

In general, the greatest challenge to educational institutions seeking to implement ICT-enhanced teaching and learning is the acquisition of software that is appropriate in the context of the variability of operating systems, speed, storage and range of applications. The purchase of ICTs that end up not meeting the functional needs required of them is a mistake few individuals or institutions can afford to make.

In the past few years, with the privatisation of the economy, credible ICT outlets have made it into the country. Now, the

Table 8.5: Fees of schools offering computer training courses

School	Category	Aided by	Fees per term
Kyambogo College	Secondary	Private	Ushs200 000
Kabojja	Secondary	Private	Ushs680 000
Kings College-Buddo	Secondary	Government	Ushs468 000
Kiira College-Butiki	Secondary	Government	Ushs200 000
Busoga College-Mwiri	Secondary	Government	Ushs220 000
Vienna College	Secondary	Private	US\$400
Gayaza High School	Secondary	Government	Ushs500 000
Kampala Parents	Primary	Private	Ushs390 000
Sir Apollo-Mengo	Primary	Private	Ushs232 000
Buganda Road	Primary	Government	UPE

Note: The conversion rate at the time of the study was US\$1 = Ushs 1 750

Source: Scan-ICT Project (2002)

purchase of computer hardware and software is limited only by funds. In 2002, a draft national ICT policy emerged to moderate and guide the acquisition and use of ICTs. The average cost of a desktop computer is about US\$1 300. For institutions, connectivity to a satellite through a company like VSAT or AFSAT can be as high as US\$10 000 per annum, depending on bandwidth. Cheaper options involve the end-user acquiring a short-range antenna, which costs an average of US\$3 000 with all the accessories, plus an average monthly charge of about US\$100. Such connectivity provides full Internet access. The e-mail-only options are cheaper, requiring only a landline connection to a provider.

Although most of the educational institutions visited and consulted are keen to participate in ICT, the capacity to do so is varied and is determined mainly by resource availability and infrastructure development. Some schools have ICT-friendly buildings, furniture, electricity and telephone access, computers, a degree of technical expertise and the capacity to raise funds to sustain the technology.

To many teachers and students in Uganda, the computer and the Internet are still a mystery. This situation is even worse in the rural areas, where the majority of Ugandans (about 80 per cent) live without electricity and connectivity to the global information network. These communities are unable to reap the numerous benefits of ICT. Initiatives such as those by the World Bank's WorLD, Uconnect, and One2net with MTN are pathfinders in Uganda in the provision of ICTs to connect remote, isolated schools to the global information network in order to improve their potential for development.

Educational software

The greatest challenge on matters of software in educational institutions is choice and purpose. In the schools with computers, students are exposed in some way to the use of the Internet and e-mail, word-processing using MS Word, spreadsheets (the commonest being Excel), CD-ROMS like *Encarta* and *Encyclopaedia Britannica* (which have excellent teaching and learning resources, including animations) and, to a limited extent, actual computer programming. Only a few schools, however, have purchased learning tools such as CD-ROMS due to the relatively high cost (often in the range of US\$1 000).

Relevance of content

Most of the content available on the Web is in English, which, to an extent, poses a language problem. Learners encounter barriers to the use of ICTs when the learning content is not directly relevant to their livelihoods, and when it does not value local knowledge, wisdom and experience. Designers of DE programmes have a challenge to ensure that extra skills are developed that will ensure relevant content for the various courses.

Tackling the challenges of technology-enhanced education in Uganda

In spite of the constraints and challenges confronting the advancement of technology-enhanced DE in Uganda,

there is a growing interest in the concept. DE continues to be appreciated as an important innovation within higher education. As a means for delivering university instruction, for instance, it is gradually gaining acceptance in the conventional universities in Uganda. However, the future of technology-enhanced DE in Uganda depends very squarely on how the constraints described above are addressed. During a presentation on the IITE specialised training in ICTs for distance e-learning in sub-Saharan Africa, Ayoo and Siminyu (2003) highlighted possible ways and means of overcoming the barriers of the digital divide. Some of these are discussed in the sections that follow.

Provision of appropriate technology

DE must be learner-centred, and the medium selected should be based on an assessment of learner needs, taking into account the desired knowledge and skills, as well as the broader technical environment. The establishment of telecentres in various parts of the country may provide isolated DE learners with access to ICTs, thereby enabling them to have access to relevant information available in the various networks and databases. Initially, the telecentres could be located at existing local institutions, such as the Ministry of Education offices, national and community libraries and schools, given that these institutions could already have some infrastructure, including buildings, electricity and telephone connections. From these centres, DE learners could make use of low-end computer services like storing and forwarding e-mail, and other e-mail-based applications such as mailing lists and e-mail-enabled access to web sites.

Reduction of costs

Reducing the cost of ICT, including equipment and Internet access, would greatly enhance the provision of DE using ICTs. The government of Uganda has been experimenting with the provision of tax exemptions on ICT equipment such as computers. Ideally, this should be extended to other technologies for DE initiatives. Use of equipment at the various DE access points such as telecentres should also be subsidised by the government and other development partners.

Addressing skills needs

Individuals with low or no ICT skills are unable to use the technology even if it is available to them. Users need basic computing and ICT skills before they can make use of access initiatives. Appropriate training should be provided for those accessing DE using new technologies. An expansion of the national curriculum to include ICT topics at the

primary, secondary and higher education levels will produce learners who have not only a high level of basic educational competence, but also the ICT skills necessary for them to venture into other educational pursuits through DE.

Addressing socio-cultural barriers

Socio-cultural issues that bar some sections of the community from taking advantage of ICT facilities to access DE must be addressed, sometimes through affirmative action. In particular, there should be campaigns to inform women about ICT and DE. Such sensitisation campaigns should be used to demystify technology and help women and other groups to understand what technology can do for them, by relating it to their lives. Other strategies would be to conduct ICT awareness seminars and hands-on workshops for the affected sections of the population.

Policy development

In Uganda, there is a need for effective educational policy and theory aimed at informing the selection of appropriate technologies and the development of relevant material, taking into account user experience. At a high level, there could be the need for a national DE agency to formulate national DE policy and to co-ordinate this effort at a broader level. This is made more urgent by the fact that new technologies continue to be placed in institutions on a large scale, with little or no policy on how they should be deployed.

Research

The whole area of DE, especially with respect to the use of new technologies, has not been researched or understood sufficiently in Uganda. There is a need in this area for ongoing research, including national surveys on the requirements of learners, current ICT provision and the appropriateness of different ICTs for DE.

Networking

In Uganda, DE is still provided by residential institutions as part of their strategy to broaden access to higher education. There is a need for all the institutions presently involved in DE in the country to network and share the scarce ICT and intellectual resources available. This will contribute towards quality and cost-effective provision of education.

Private-public partnerships

Higher education institutions will have to form partnerships with businesses and the government to promote DE. These

partnerships will be crucial in advancing the development of DE. The private sector will assist with technologies for the delivery of DE; government agencies will formulate national policies to promote DE and will initiate campaigns to heighten awareness about the potential of DE; and academicians will create locally based content.

Conclusion

In the light of the above, we can conclude that higher education in Uganda ought to play a new role in order to lessen the widening gap between the highly educated elite and the masses, and to ensure extensive participation in the education of the general population. DE is seen as an effective, appropriate and acceptable method of extending educational opportunities, thereby supporting the prospects for enhanced economic growth. New ICTs have opened up a range of opportunities for course- and resource-based learning, and they are increasingly being embraced in DE to distribute teaching materials and to stimulate learning by means of one-way or two-way communication.

A study by Aguti and Fraser (2006) revealed that in Uganda, access to ICTs is still a huge problem for students and staff. Personal ownership of video, TV and computer technology and access to the Internet is limited, so programmes that presuppose personal ownership of these ICTs cannot work effectively and efficiently.

Alternative ways of ensuring access have to be utilised; collaborative ventures and the use of centres and government subsidies are some of the strategies that have been suggested. The same applies to financing the integration of ICTs into DE; alternative sources of funding have to be solicited, since the existing tuition-fee funding is inadequate.

This should all be done bearing in mind that technology should not be chosen and used simply because it is available, but because of what it can add to the teaching and learning experience. It should be based on the tasks it will be expected to perform and the outcomes expected from the programme (Aguti & Fraser, 2006).

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