

ICT connectivity in schools in Uganda

by: John Eremu

Introduction

YVONNE of Uganda Martyrs Secondary School Namugongo smiles as information on the 2002/2003 household survey unfolds on the computer screen in front of her. Her other colleagues are equally glued to their Personal Computers as they take advantage of the information super highway. They had taken advantage of the lunch break to surf the Internet from the school's computer laboratory. At Kaberamaido Secondary School, situated in a rural setting 450 kilometres east of the capital Kampala, the story is different. The students are gathered under tree shades to gossip the lunch break away on typical afternoons. Not that they are not interested in surfing, but the school has not a single computer.



Like there is disparity in performance between the urban and rural schools, there is also the growing digital divide between urban and rural schools. It was perhaps against that background that in 1996, the World Links for Development Programme, an initiative of the World Bank Institute started connecting schools in developing countries to the Internet.

However, while the benefits of Information and Communications Technology (ICT) are enormous and schools could be the launching pad to a computer literate society, Uganda is one of the developing countries still without an ICT policy, thus, making it miss the advantages of the information super highway in this digital age. The would-be policy has remained in a draft form since 1997.

The draft policy document has an ambitious programme of ICT connectivity in schools, but it will be a tall order fulfilling the dream because of the colossal amounts of money that shall be required for capital investment.

Albert Byamugisha, the assistant commissioner for planning in the Ministry of Education and Sports says no budgetary provisions could be for ICT because the policy was still in a draft form and is yet to be discussed by the ministry's top management before it is forwarded to Cabinet.

Although Uganda's school curriculum has an ICT component, it is not yet examinable, giving a leeway to students to concentrate on subjects that are assessed in the national examinations.

While the Bill and Melissa Gates Foundation has donated free soft ware for all schools in Uganda, most schools lack computers (hardware) in which to install the programmes. The initial investment in computer hardware is usually enormous. Byamugisha could not give the likely investment saying such estimates could only come after the ICT policy is approved. He said the ministry was currently trying to have a wide area network (WAN) and if the policy is approved, the roll out would be in phases starting with schools on the national electricity distribution grid.

Nevertheless, several initiatives have been taken to make ICT available to schools. The major initiatives in this direction include the Uconnect and the SchoolNet projects.

Implementation

The implementation of both the Uconnect and the SchoolNet project is being done within the Ministry of Education and Sports ICT framework. The ministry has provide free office accommodation for the two projects at the ministry's headquarters in Kampala.

As stated by Byamugisha, there is not yet any budgetary provision to cater for ICT within the ministry due to the absence of an ICT policy.

The basis of hosting the two projects within the ministry is in anticipation of a comprehensive ICT policy as schools start implementing the reviewed curriculum that has an ICT component.

The Uconnect School Project.



The Uconnect Project aims at promoting ICTs in schools. It was incorporated in Uganda as a non-governmental organisation (NGO) in 1996 with the object of advancing public education in Uganda using ICT as well as improving the quality and efficiency of communications through the provision of the necessary hardware and software such as word processing, communications-Internet, electronic mail and web browsers.

The Uconnect project coordinator, Joan Amaniyo, says they have to date managed to connect 64 secondary schools to the Internet, the majority of them urban-based. In addition, another 34 primary schools have been hooked to the worldwide web through the project while 75 have filled in forms to join the project and additional 15 have made contacts with them. She also said as many as 145 secondary schools have filled in the project forms and another 28 made contacts.

Uconnect also trains teachers and managers in the use of communications software, especially electronic mail (e-mail), and the World Wide Web, not only for education but also for health, agriculture and other sectors.

Uconnect delivers educational resources to schools through a programme adopted from Advanced Interactive (AI) Inc., a Canadian ICT firm. The project system administrator, Moses Abilli, said through AI's programme for the delivery of technology-assisted teaching and learning, the students and teachers have access to educational resources that are equivalent to that of their peers in connected urban communities.

Through the Education Axxess programme, educational resources are delivered via the web to meet the needs of the various categories of students.

One of the applications is the StudentAxxess, where the web content is tailored to meet the individual needs of a particular student. The SchoolAxxess on the other hand is tailored to the group need of the entire student population. The design of the SchoolAxxess is based on the Canadian Education system of 12 levels. The content downloaded suits all the 12 levels. Under the programme, a student or a teacher identifies a site with the relevant information and orders the site, which then becomes locally accessible. There is also the CampusAxxess, which is oriented to colleges and universities.

With increased globalisation, the Internet is a vital tool because of the need to continuously learn in order to remain competitive. AI's proven family of education solutions provides reliable, affordable and sustainable approach to learning anywhere, anytime. So, through the EducationAxxess solutions, the students get education resources distributed through the Distance Learning partnerships with international schools, colleges and universities.

Funding Model

Information posted on the Uconnect website by the project director, Daniel Stern, says the project, which initially started as a computer literacy project uses recycled Personal Computers (PCs) to connect the schools.

Amaniyo says the refurbished Pentium II computers, mainly donations from Swiss organisations upgrading to better computers, are made available to the schools at a cost of US \$170.

"The US \$170 is a cost-sharing figure to cover the cost of shipping the computers from Switzerland and for facilitating the IT volunteers who instruct the teachers and students on computer applications," Amaniyo says.

"We offer a one-week intensive network training for three teachers and two students such that at the end of the training, they are capable of networking a few computers in their laboratory," she said adding that the computers go with a one-year warranty.

SchoolNet Uganda

SchoolNet Uganda is another project establishing ICT capacity in Ugandan schools. Incorporated as an NGO in December 2003, project is a national network of professional educators and schools whose aim is to transform the Ugandan educational system from an industrial model (learning by assimilation) to a knowledge-based model in order to prepare the youth of Uganda to effectively enter a global economy based on knowledge, information and technology.

Its mission is to make graduates of Uganda's education system more globally competitive. The project supports Uganda educators and learners by providing pedagogical and technical expertise and advice, infrastructure and human resources, coordination, training and capacity building and developing local and international partnerships in the areas of Internet Connectivity, content and curriculum development and capacity building among others.

It works in partnership with all Uganda educational institutions (public or private, primary, secondary or tertiary) to setup their ICT facilities and to develop technical and pedagogical capacity necessary to use ICT to enhance teaching and learning. To date, the project has a membership of 42 secondary schools spread across the country but mainly urban based.

SchoolNet Uganda specifically strives to create awareness of the use of ICT in education through press articles, education ICT demos and conferences, seminars and exhibitions. It also lobbies and advocate for the utilization of ICT in education to all levels of Government, Business and Civic Society.

It also nurtures ICT talents through ICT holiday camps, Website development competitions and encourages and facilitates the generation of local content. In future, they plan to expand to more rural schools and establish a computer refurbishment and assembling center.

Currently, SchoolNet Uganda is piloting connecting rural schools to the Internet using VSAT (earth -satellite) technology. This is the first ever satellite-based school connectivity in Africa.

The Very Small Aperture Terminal (VSAT) Pilot Project is part of an on-going international initiative by World Links Program to pilot new concepts in technology and pedagogy to integrate ICT in education in developing countries.

Uganda, as already mentioned was the first World Links country program and is now again the first of the twenty-seven World Links countries in Africa, Latin America, the Middle East and Asia to pilot the use of VSAT technology for school connectivity.

Funding Mechanism

Like Uconnect, SchoolNet is also a contributory scheme working in partnership with a host of other organisations and agencies to subsidise the otherwise high cost of ICT connectivity to schools.

It works in partnership with Links Organisation, which is subsidising half the bandwidth cost for the net two (2) years (US \$ 3,000 a month), training (technical and pedagogical), business and technology plan development.

The other partner organisations are Bill and Melissa Gates Foundation, which donated the earth-satellite dishes (VSATs), Ministry of Education and Sports (MoES) which paid for the duty-tax clearance, Schools Online USA provided 10 of the participating schools with computer labs

of 10 networked computers and a printer each and the micro-wave wireless equipment for four schools based in Jinja, 80 kilometres East of Kampala.

Wilken AFSAT has handled the school-based VSAT installation and commissioning; Verester, a global Communication Solution Provider is providing the satellite bandwidth at a very competitive price of US\$ 6,000 a month for whole network.

Participating schools host the VSATs, provide insurance and security, burglar-proofed rooms for the computers, underwrite the computer lab costs like chairs, desks, power points; financing recurrent costs such as electricity, satellite bandwidth, maintenance, paper, toner, diskettes and staffing.

The participating schools also have the obligation of protecting the VSAT antenna from human interference and paying a monthly fee of US \$ 200 per month for the bandwidth.

Impact

Although the Uganda telecommunication sector was liberalised in 1996 by a policy framework and the Uganda Communications Commission (UCC) established in 1997 to spearhead the development of the telecom industry, less than one percent of Uganda's 26 million population has access to the Internet or ICT services.

At the school level, the impact is still very low. Uganda has 13,353 primary and 2,070 secondary schools but only 106 schools have so far been connected to the Internet through both the Uconnect and SchoolNet projects.

While the two organisations have taken the ICT initiative to the rural communities through telecentres, the services are still mainly confined to major urban centers such as Mbarara, Masaka, Jinja, Mbale, Soroti, and Gulu.

A study by Makerere University researchers, Samuel Gitta and J.R. Ikoja-Odongo found that very few prominent schools in the villages have Internet facilities, which only benefit the staff and students, many of whom come from towns and cities where services are already established. When these schools close, the facilities are never opened to the community even if Internet skills are locally available.

Challenges

The low level of Internet connectivity in Ugandan schools is due to the overall poor communications infrastructure, the low electricity coverage and the high capital costs involved in setting up a computer laboratory.

One of the requirements for a school to benefit from either Uconnect or SchoolNet project is the installation of a telephone line in the computer lab. Until recently, Uganda had only one fixed line national telephone operator – the Uganda telecommunications limited with a very poor and dilapidated network. This denied many rural schools a chance to get Internet services.

However, other operators, Mobile Telecom Network (MTN) and Celtel with their advanced systems have some what alleviated the problem of limited network coverage, but they are very costly for an average rural school in Uganda.

The other drawbacks are the prohibitive recurrent telephone costs that makes it possible for only the so-called First World schools in urban areas to afford a maximum of one hour of Internet connectivity per day. Schools typically spend between US \$ 200 and US \$ 300 per month on telephone bills accruing from Internet connectivity, a cost too high for average rural schools even where electricity and telephone services exist.

Due to poor or absence of communication infrastructure and high cost of connectivity, rural schools could not participate in the project. This had the potential danger of widening the already existing disparity in the academic performance between rural and urban schools.

Solutions

Due to the challenges and high costs of connecting Uganda schools to the Internet over fixed/cellular telephone line infrastructure, World Links/SchoolNet Uganda piloted wireless spread spectrum connectivity using microwave modems.

This has proved to be both technically and financially viable for schools in and around the capital, Kampala. Currently, 13 SchoolNet Uganda educational institutions are all using microwave wireless links to connect to the local Internet Service Providers (ISPs).

Though this requires a high capital cost of US \$2500, it has a fixed running cost of US \$ 200 per month with faster speeds and a 24-hour Internet access.

This still has locked out rural schools because the Spread Spectrum microwave wireless connectivity requires a school to be in a 20-30-kilometre radius from a VSAT - earth satellite or a repeater of an ISP but there are no local ISPs in rural areas.

Potential/benefits of Internet Connectivity

The potential benefits of having Internet connectivity to Uganda schools are enormous. There would be the likelihood to offset the shortage and lack of variety in teaching-learning materials across rural schools.

A majority of VSAT schools, which number no more than 13 are located in rural communities in Uganda. However, it should be noted that even while the VSAT stations are located up country, they are in urban centers rather than deep in the villages. Extending Internet Connectivity in less advantaged schools hopefully would help in addressing the rural-urban imbalance in academic performance.

National Curriculum Development Centre, through its project - Curriculum-Net; has intentions of making available various useful educational resources on-line. The VSAT Project offers opportunity to the rural schools access to these materials.

Increasing Institutional efficiency, which to a large extent, depends on the capacity to communicate accurately and rapidly at a minimal cost. The VSAT sites can act as information centers, which the Ministry of Education can use to send circulars to schools and receive feedback.

Makerere University together with the National Joint Admissions Board (responsible for processing applications and admission to Higher Learning) has indicated plans to avail the option of on-line applications and admission processing. ICT connectivity would benefit schools and out-of-school intending applicants to institutions of higher learning.

Information relating to career guidance and to training available both inside and outside the country would easily be accessible in educational establishments. Circulars can be posted by prospective institutions on their web sites for the benefit of students, just as the Uganda National Examination Board may wish to display examination programs guidelines and timetables for candidates.

The VSAT schools could be part of the Centres of Excellence, serving a cluster of nearby schools during term time and used for ICT holiday camps during holiday for schools with no ICT facilities.

The connectivity would also provide an opportunity for teachers up-grading. Teacher training institutions, such as the Department of Distant Education and that Science & technical education (DOSATE) could exploit the use of these facilitates to make their programs more accessible to teachers based in rural schools. This will offset the costs usually incurred by teachers in attending full time courses at the University premises and the associated risk of losing their jobs due to prolonged absence from their duty stations.

Makerere University library is now subscribed to a number of international libraries. By connecting to Makerere library, the schools upcountry will have access to an immense, international resource.

It is a well-known fact that domestic and international commerce is increasingly becoming dependant on modern technology. The capabilities of the Internet have drastically enhanced the frequency and accuracy of e-commerce transactions between government agencies, businesses and individuals. This is expected to reduce administrative costs as well as providing convenience on a daily basis for Ugandans.

Gitta and Ikoja-Odongo in their study recommended that Ugandans, through programs sponsored by the government, corporations, and non-profit organisations, should learn more computing, acquire computer equipment and ready themselves in e-commerce and e-business.

In education, they said, the Internet will encourage a more educated society that will contain the most skilled and financially rewarded workforce in the country. They said the results of the study suggests that ICT policies be instituted and computers and the Internet be part of the school curriculum to equip Ugandans with the necessary skills so as to enjoy the proven benefits of these technologies.

In particular, the government should lay strategies to electrify all the country as well as to improve the infrastructure in all schools. It will in turn enhance the quality of education in Uganda by providing for access to geographically distributed information sources via the Internet. What more convincing reason does one need to know the importance of Internet connectivity in schools from where the communities could access the services?

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www.iConnect-online.org is a knowledge sharing platform for Information and Communication Technologies (ICTs) in sustainable development. iConnect draws content from its partners, links resources and expertise and encourages collaboration. For the International Institute for Communication and Development (IICD), the host of iConnect, this is a way to share experiences, lessons learned and ideas, and interact with communities and people with an interest in development and the applications of ICTs. These experiences can lead to a better understanding of the actual benefits of ICTs for Development (ICT4D). The core of iConnect will be a series of locally written articles on the impact and the use of ICTs for development. The articles have a strong focus on fact finding; objective information on ICT4D practices from a southern perspective: Southern content written by Southern people. i4d is the iConnect partner for Asia, and ECA is the iConnect partner for Africa, disseminating the articles to their public.
