ICT in Education in Uganda

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Source: *World Fact Book*[1]

Please note:

This short *Country Report*, a result of a larger *info*Dev-supported *Survey of ICT in Education in Africa*, provides a general overview of current activities and issues related to ICT use in education in the country. The data presented here should be regarded as illustrative rather than exhaustive. ICT use in education is at a particularly dynamic stage in Africa; new developments and announcements happening on a daily basis somewhere on the continent. Therefore, these reports should be seen as "snapshots" that were current at the time they were taken; it is expected that certain facts and figures presented may become dated very quickly.

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Overview

As it adopts ICT in education, Uganda faces the same challenges as most developing economies – poorly developed ICT infrastructure, high bandwidth costs, an unreliable supply of electricity, and a general lack of resources to meet a broad spectrum of needs. However, with the rapid emergence of wireless network capacity and the ubiquitous growth of mobile phones, the context of the infrastructure is changing. A national ICT policy is in place and an education sector ICT policy is before Cabinet. The Ministry of Education and Sports is taking steps to co-ordinate ICT development and has allocated resources to support implementation of its ICT strategy.

Country Profile

While Uganda has had significant economic growth over the last decade, with a concomitant reduction of poverty, it remains one of the poorest countries in the world. It is, nevertheless, on track to meet the Millennium Development Goal (MDG) of universal primary education and, according to the 2006 National Report,[2] is committed to achieving the MDGs of universal completion of secondary schooling by 2015 and elimination of gender disparity in both primary and post-primary levels.
Table 1 provides some selected socio-economic indicators for the country.[3,4,5]

Table 1: Selected Country Data

Indicator	
Population	27.8 million
Languages	English (official national language), Ganda or Luganda (most widely used of the Niger-Congo languages and may be taught in school), other Niger-Congo languages, Nilo-Saharan languages, Swahili, Arabic
Adult literacy rate	73.6 % (2004)
2005 economic activity (% of GDP)	Agriculture: 33.5% Industry: 20.9% Services: 45.6%
Human Development Index	145 (out of 177 countries)
Human Poverty Index	62 (out of 102 countries)
Per capita gross national income (US dollars)	$280 (2005)

The Education System

The Uganda system is based on an initial seven years of primary education. Students who successfully complete primary schooling have the option of enrolling in four years of lower secondary or taking a three-year craft course in a technical school. Those who successfully complete the lower secondary level may then choose to enroll in the two-year upper secondary programme after which they may progress to university studies or a technical/vocational programme.

Universal primary education was introduced in Uganda in 1997,[6] resulting in a near doubling of enrolments over the next year and creating a need for more schools, more teachers, more learning materials, and curriculum reforms.[7] A commitment to introduce universal free secondary education was made during the last election in 2006. This has since been expanded to include universal post-primary education and training. An implementation plan is being prepared.

Tertiary education includes 20 universities (four public), five colleges of commerce, five technical colleges, 10 teachers' colleges, and several specialised training inistitutes.[8] The tertiary sub-sector is growing very rapidly and, according to the National Council for Higher Education,[9] it is neither integrated nor diversified, and it lacks a credit system to ease student mobility among disciplines and institutions. A strategic plan to address most of these issues is in the pipeline.

The statistical data in Table 2 provides a quantitative picture of education in Uganda.

Table 2: Selected Education Data

Indicator	
Primary enrolment (% gross)*	134 (2003); 125 (2004); 118 (2005)
Secondary enrolment (% gross)*	19 (2003); 19 (2004); 16 (2005)
Primary completion rates (% of 6- to 12-year age group)	22.4 (2003); 37.4 (2004)
Tertiary enrolment	2.8 % gross (2004)
Ratio of girls to boys in primary and secondary (%)**	96 (2003); 100.1 (2004)
Trained teachers (primary)	80 %

*Percent of gross is the number enrolled as a percentage of the number in the eligible age group.
**Ratio of girls to boys is the percentage of girls to boys enrolled at primary and secondary levels in public and private schools.

ICT Policies

National

Uganda developed its initial ICT national policy in 2003. The policy framework document[10] recognised that Uganda would need to embrace the goal of "lifelong education for all." Objective 2 of the policy addresses literacy improvement and human resource capacity-building with strategies that include:

- Integrating ICT into mainstream educational curricula as well as other literacy programmes to provide for equitable access for all students regardless of level
- Developing and managing ICT centres of excellence to provide basic and advanced ICT training
- Setting up mechanisms that promote collaboration between industry and training institutions to build appropriate human resources capacity
- Promoting the twinning of training institutions in Uganda with those elsewhere to enhance skills transfer

A subsequent e-readiness assessment in 2004 revealed that a focused and co-ordinated approach to implementation was required. This led to the establishment of an ICT Working Group that tabled a number of recommendations.[11] One of the recommendations executed early in 2006 was the establishment of a Ministry of ICT to address the convergence of ICT and to provide co-ordination of policy development. The mandate of the ministry is to:

- Oversee and harmonise operations of its affiliated agencies: the Uganda Communications Commission, the National Information Technology Authority, the Broadcasting Council, and the proposed Information Management Commission
- Collaborate with the National Planning Authority to spearhead activities for developing sectoral ICT plans for integration into the National Development Plan
- Oversee periodic policy reviews for the telecommunications sub-sector for both mobile and fixed-line telephony, postal, Internet, and e-mail services
- Oversee and guide the implementation of the Uganda e-Government Strategy Framework by various government ministries and agencies
- Develop and implement a prudent monitoring and evaluation system for the ICT sector

Education Sector
Another recommendation from the Working Group was that an ICT policy for schools be developed. This, together with the evolution of the national policy, has provided impetus for the Ministry of Education to expand its focus on the use of ICT.

While the national policy focuses on the importance of developing the ICT competencies of learners, the interpretation by the ministry appears to be moving toward a more integrated vision. Evidence for this comes from the 2005-2006 sector review[7] in which the following initiatives were reported:

- Guidelines on the use of ICTs were developed.

- An agreement with Microsoft has been signed to subsidise software licenses and training of teachers. In addition, the Microsoft Partners in Learning Program has endorsed a number of activities for implementation.
- An ICT budget for all secondary schools is now required.
- Subsidised rates from ICT service providers have been negotiated.
- Training teachers in ICT skills has begun.
- Ordinary level curriculum on ICT was operational and is examinable by the Examinations Board.
- Operational funds to support ICT in some schools have been provided.
- Some ICT infrastructure has been provided to schools.

The review also identifies the following actions as necessary if the goal of transforming Uganda from a mere "information society" to one that is knowledge-based is to be realised:

- Update the legal and security measures for the effective use of ICT in education. In addition, security management is required to ensure that access to confidential data is controlled and authorised.
- Address the language, socio-economic, disability, and cultural barriers to accessing ICT.
- Adopt cost-reducing measures to counter the high cost of ICT equipment, installation, and maintenance, paving the way for more equitable access.
- Revise the curricula.
- Produce more ICT-literate teachers.
- Streamline operations of the different ICT providers in order to avoid duplication and conflict of interest, and to secure everyone's co-operation.
- Provide the requisite ICT infrastructure to the poor rural schools during the first phase of implementation.
- Define the minimum technical specifications of the ICT equipment.
- Routinely update a record of the existing ICT initiatives to avoid duplication.

The ministry also developed a draft sector policy on ICT in education that is currently being considered by Cabinet.[12] The draft policy is intended to:

- Apply to all education sub-sectors, including non formal education
- Focus on the development of ICT competencies as well as using ICT to teach across the curriculum
- Include strategies for the development of digital learning content
- Develop teachers' ICT competencies
- Foster research in the educational applications of ICT

An implementation and budget plan, procurement and connectivity strategies, and a policy management structure are also included in the policy. Funding will come from a variety of sources including the national education budget, the donor community, and the private sector.

Infrastructure

National
Liberalisation of the telecommunication sector in 1997 resulted in significant growth in infrastructure and access, but this occurred primarily in the urban areas. An analysis of the telecommunications sector undertaken in 2004[13] concluded the following:
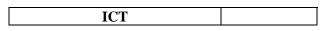
- In terms of the general population, there was almost no access to computers or the Internet outside the major urban centres.
- Access to electricity was a serious constraint to ICT use because 97.7% of rural and 59.9% of urban households had no access.
- Mobile voice telephony was the exclusive means of communication for the typical Ugandan citizen and there were hardly any fixed line services in people's homes.
- The spread of mobile phones coincided with an increase in the number of private FM radio stations that has enabled a synergy between the two technologies. The stations provide near total national coverage in local languages with programmes ranging from political debates to health issues, agriculture, education, gender issues, and the environment. Listeners participate by calling the station with comments and questions.

The study also noted that in 2003 Uganda had created the Rural Communication Development Fund[14] to facilitate implementation of the country's policy of universal access to communication technologies. The Fund aims to encourage development of infrastructure in rural areas by offering subsidies and grants to investors in the following areas:

- Internet access points in all districts in the country – all districts will be covered by 2006
- Universal access to telephony – access target changed from one public access point per 5,000 inhabitants to one per 2,500 inhabitants
- Multipurpose community telecentres – 20 telecentres in 20 districts by 2007
- ICT training centres and Internet cafés – the target is to cover all the districts of Uganda by June 2006
- District information portals to provide information about health, agriculture, education, commerce, etc. – district Web sites are now active and can be accessed
- Public pay phones – installation of public pay phones in 316 selected sub-counties across the country has been achieved since 2004

Table 3 provides further information about national usage of ICT in Uganda[15] for the years 2000, 2004, and 2006 where available.

Table 3: ICT in Uganda

ICT	

Telephone main lines (per 1,000 people)	3 (2000) 3 (2004)
Mobile subscribers (per 1,000 people)	16 (2000) 45 (2004)
Population covered by mobile telephony (%)	16 (2000) 70 (2004)
Internet users (per 1,000 people)	2 (2000) 6 (2004) 18 (2006)[16]
Personal computers (per 1,000 people)	3 (2000) 5 (2004)
Households with television	5 (2000) 6 (2004)
VSAT providers	8 (2006)
Mobile cellular operators	3 (2006)
Private FM stations	145
Private TV stations	34

Schools

According to a report based on 2003 data,[17] Uganda had only 106 of its 13,353 primary and 2,070 secondary schools connected to the Internet. Uconnect and SchoolNet Uganda, two major NGOs involved in ICTs for schools, led these projects. Connectivity is much more prevalent in urban than rural schools, basically because access to ICT infrastructure for schools mirrors the national rural-urban divide. The more specific factors constraining connectivity in rural areas are the overall poor communications infrastructure, low electricity coverage, and high capital costs involved in setting up a computer laboratory. No doubt this has changed since 2003, and will continue to change, as access to electricity and connectivity improves.

Although many schools have computers as a result of initiatives with NGOs, religious organisations, and international donors, few are connected to the Internet. Those that are in place are typically used for teaching basic computer skills and administrative purposes.

The Ministry of Education and Sports has become much more proactive over the last two years as a result of the recent policy emphasis on ICT. For example, in its Review for 2005-2006, the ministry listed the following achievements:

- Over 300 teachers have been trained.
- Three generators and 300 computers have been provided to NEPAD e-schools.
- Software and upgrades for 6,000 desktop computers already in schools have been procured.
- Preferential rate agreements with Uganda Telecom for voice and data connectivity have been secured.
- Work has started on introducing ICT into the teaching and learning process in primary and secondary schools.

Computers are typically set up in a one-room lab with 10 to 20 machines. A television receiver with a VCR may also be included depending on reception capability. Classes generally have scheduled use of the lab two or three times per week. Overcrowding is common because of large class sizes.

Tertiary education
The tertiary education sector is not particularly integrated at this point and consequently there are no overarching ICT policies or implementation programmes. Typically, initiatives are taken on an individual institution basis with the ministry and/or with other partners.

However, in terms of the adoption of ICT, the ministry's 2005-2006 Annual Review[7] reports an increase in ICT accessibility among tertiary institutions:

- E-mail addresses increased from 79 in 2004 to 97 in 2005.
- Institutions with Web sites increased from 34 in 2004 to 42 in 2005.
- The computer-student ratio in Makerere University has improved to 1:15 on average.
- Mbarara University for Science and Technology upgraded its connectivity bandwidth to enable access for all faculties.
- Kyambogo University finalised its policy document on ICT.

Distance education at the tertiary level has been underway in Uganda for some years, provided by both public and private institutions. Makerere and Kyambogo Universities are particularly active and both are partners with the African Virtual University. Makerere University's B.Ed. (External) is specifically developed for upgrading teachers to the bachelor's level and is the largest distance education programme for teachers in the country. A recent survey[18] of students enrolled in the distance education programme at Makerere University concluded that while the potential of ICT use is huge, student access to the infrastructure is a major constraint.

The development of an open university has been under consideration for some time and, according to the ministry's 2005-2006 Review, it will be actively considered in 2007. However, as has been pointed out,[8] there are a number of constraints that need to be addressed if ICT-based distance education is to be viable in the country.

Current ICT Initiatives and Projects

Table 4 summarises the current and recent ICT initiatives and projects in Uganda. [19]

Table 4: ICT Initiatives and Projects

Project: Providing donated computers to schools plus capacity-building support to recipient local partners.
• *Organisation(s)/funding sources:* World Computer Exchange in partnership with local organisations.
• *Geographic scope and time frame:* National

• *Contact:* www.worldcomputerexchange.org/

Project: The Village Phone Project provides micro loans to eight local businesses to enable establishing a community phone service. Testing of additional technologies will be done.
- *Organisation(s)/funding sources:* Grameen Foundation in partnership with MTN Uganda
- *Geographic scope and time frame:* Started in 2003 in selected communities; ongoing.
- *Contact:* www.grameenfoundation.org/where_we_work/sub_saharan_africa/uganda/village_phone_uganda/

Project: I-Network Uganda is a national network of individuals and organisations that act as a platform for sharing knowledge and information on applying ICTs. One of its programmes, DistrictNet, focuses on providing public information using ICTs.
- *Organisation(s)/funding sources:* ICT4D practitioners including IICD project partners; policy makers such as ministries; students and teachers; NGOs; rural communities
- *Geographic scope and time frame:* National; over 700 registered members from the public, private, and civil society sectors. Begun in 2002; ongoing.
- *Contact:* www.i-network.or.ug/

Project: The spread of mobile phones and FM radio stations has enabled the development of an interactive public discussion forum in local languages on topics such as politics, health issues, agriculture, education, gender issues, and the environment.
- *Organisation(s)/funding sources:* Over 100 FM radio stations
- *Geographic scope and time frame:* National; ongoing.
- *Contact:* http://researchictafrica.net/index.php?catid=18

Project: Uconnect is a non-profit NGO that aims to advance public education by using ICT to improve the quality and efficiency of communications. Activities focus on providing computer connectivity and training for schools and recently on providing ICT training to officials of 22 mostly rural districts.
- *Organisation(s)/funding sources:* More that 225 schools have benefited to date and 22 district offices have been connected to the Internet. Multi-sponsors are involved such as telecom, hardware, learning software, transportation, and Internet provider companies.
- *Geographic scope and time frame:* National; began in the late 1990s and continues to thrive.
- *Contact:* www.uconnect.org/

Project: The Uganda Ministry of Education and Sports is taking several initiatives over the next year as part of its policy implementation agenda. Examples include providing equipment and training to selected schools, providing Microsoft software to government-aided secondary schools, and including the approval of a curriculum for ICT training for secondary schools.
- *Organisation(s)/funding sources:* The ministry has allocated some funds for these initiatives and is discussing provision of additional support with various donors.
- *Geographic scope and time frame:* National; 2006-2007.
- *Contact:* ICT Co-ordinator, Ministry of Education and Sports

Project: The Reflect ICT resource centre has been equipped with computers (Internet connected), printers, digital camera and video, generator, UPS, public address system, WorldSpace radio, and solar-operated radios, along with other office equipment including a photocopier. The aim is to facilitate access to agricultural, health, and commercial information based on needs that the

community identified.
- *Organisation(s)/funding sources:* DIFD, and community contributions.
- *Geographic scope and time frame:* The project is located in Bukuuku sub-county in Kabarole district, western Uganda.
- *Contact:* http://217.206.205.24/Initiatives/ict/home.htm

Project: Phase I of the Connectivity for Educator Development Project (Connect Ed) set up computer centres and Internet points of presence at Kyambogo University (KyU) and at eight primary teachers' colleges (PTCs). It provided computer literacy and materials development training for teacher educators, and began to re-purpose the print-based national PTC curriculum into an interactive, accessible online version. Connect-ED Phase II builds on the infrastructure established in Phase I but with closer collaboration with the Ministry of Education and Sports and KyU. The focus is on sustainability and long-term ICT strategies for KyU and the PTCs and on continuing to provide computer training and completing the digitisation and enhancement of the national PTC curriculum.
- *Organisation(s)/funding sources:* Phase I was funded by USAID. Initial partners included Computer Frontiers (for Internet connectivity), World Links (for Development for training in the colleges), Schools Online (for equipment procurement), and Academy for Educational Development (for the projects at ITEK). Phase II is supported by International Education Systems, a division of Education Development Center, an international, non-profit organisation.
- *Geographic scope and time frame:* National. Phase I: 2001-2003; Phase II: 2003 to present.
- *Contact:* http://ies.edc.org/ourwork/project.php?id=3448 (For an evaluation report of Phase I for lessons learned and recommendations, see www.eduaction.net/connect-edtext.pdf.)

Project: The National Curriculum Development Centre (NCDC) established the CurriculumNet project in an effort to create electronic learning materials using CD-Roms. The project is now using ICTs to provide instructors with multimedia materials they can use in selected core subjects. Government approval was given in 2004 for ICT-based curriculum materials in mathematics and geography for primary schools and mathematics and science for secondary schools, thus enabling use of the material by all schools in the country.
- *Organisation(s)/funding sources:* SchoolNet Uganda with funding from IDRC
- *Geographic scope and time frame:* National; 2001-2005.
- *Contact:* www.idrc.ca/en/ev-64993-201-1-DO_TOPIC.html

Project: A project using VSATs to offset the high cost of connectivity and to demonstrate the use of ICT-equipped schools as school-based community learning centres.
- *Organisation(s)/funding sources:* World Links, Schools Online, the Bill and Melinda Gates Foundation, and SchoolNet Uganda
- *Geographic scope and time frame:* Rural focus; ongoing.
- *Contact:* www.schoolnetuganda.sc.ug/homepage.php?option=vsatproject

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Project: The British Council has launched a project to link schools in Uganda to other schools in Africa and the UK. The project, code-named Connecting Classrooms, is aimed at co-ordinating ICT, science, vocational skills, global citizenship, and cultural science in the schools.
- *Organisation(s)/funding sources:* The British Council
- *Geographic scope and time frame:* Limited number of schools; 2006-2007.
- *Contact:* www.britishcouncil.org/uganda-governance-connecting-classrooms.htm

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Project: The Women of Uganda Network (WOUGNET) is a place to share news, information and

activities on female-related issues in Uganda. WOUGNET's goal is to promote the use of ICTs by women's organisations and individuals for the better being of Ugandan women.

- *Organisation(s)/funding sources:* Three levels of membership: individuals, women's organisations based in Uganda, and affiliated organisations interested in ICT4D. WOUGNET is supported by a number of volunteers, including those based in Uganda as well as online. There is no fee for WOUGNET membership.
- *Geographic scope and time frame:* National; launched in 2000 and ongoing.
- *Contact:* www.wougnet.org/aboutus.html

Project: Improving health care delivery through continuing medical education (CME) for rural health workers by using ICTs and multimedia. The major focus is on gathering and repackaging high-quality health information for dissemination through ICTs. Training in the use of basic ICTs is provided.

- *Organisation(s)/funding sources:* Co-sponsored by Cordaid and IICD and implemented by Uganda Martyrs University, Faculty of Health Sciences, and the three hospitals of Itojo in Ntungamo district, Nkozi in Mpigi district and Mutolere in Kisoro district
- *Geographic scope and time frame:* District-based; ongoing.
- *Contact:* www.iicd.org/projects/articles/iicdprojects.2005-12-09.7746900390

Project: ICT maintenance facilities for rural Uganda have been established at five technical colleges. An ICT maintenance facility will be set up at each college to provide technical support and to introduce a new course called ICT Installation and Maintenance to train technicians.

- *Organisation(s)/funding sources:* The Uganda Institute of Information and Communications Technology, established by Uganda Communications Commission, manages the project with the support of the International Institute for Communication and Development.
- *Geographic scope and time frame:* The five UTCs are located in or near upcountry towns and are geographically well distributed throughout the country. Launched in 2005; ongoing.
- *Contact:* www.iicd.org/projects/articles/iicdprojects.2005-07-29.8068367475

Project: Makerere University Faculty of Computing and Information Technology has won an Africa Union (AU) bid to create an e-network that will provide connectivity for eastern and central African countries to a pan-African network through fibre optics and wireless links. This will enable the sharing of resources such as BlackBoard digital learning software, backups, and e-learning courses. The faculty has a department that trains staff in e-learning and supports e-learning in the whole of the university.

- *Organisation(s)/funding sources:* Funding is through the Government of India through the AU. Makerere will be the lead university serving Comoros, Djibouti, Eriteria, Ethiopia, Kenya, Madagascar, Mauritius, Rwanda, Seychelles, Somalia, Sudan, Tanzania, and Uganda.
- *Geographic scope and time frame:* Eastern and central African regions; project was announced in July 2006.
- *Contact:* http://cit.ac.ug/site/downloads/issue4.pdf

Project: SchoolNet Uganda's mission is to make graduates of Uganda's education system more globally competitive. SchoolNet Uganda supports educators and learners by providing pedagogical and technical expertise and advice, infrastructure and human resources, co-ordination, training and capacity-building, and developing local and international partnerships.

- *Organisation(s)/funding sources:* Multiple partners depending on projects
- *Geographic scope and time frame:* National; ongoing.
- *Contact:* www.schoolnetuganda.sc.ug/homepage.php?option=home

Implementing ICT in Education: What Helps and What Hinders?

The core factors that influence the adoption and diffusion of ICTs in education have been identified in many studies and project reports such as the UNESCO *Meta-survey on the Use of Technologies in Asia and the Pacific*[20] and, in the context of East Africa, by IDRC in its thorough analysis of ICT policy-making in the region.[21] Two other studies that have discussed some of these factors in the higher education sector are those carried out by the United Nations National University[22] and by the African Virtual University.[23] What emerges from these analyses is that the factors are essentially the same in both developed and developing economies, although they differ in terms of importance depending on which side of the "digital divide" they are viewed from. What differentiates the rate of adoption and diffusion is not a difference in the factors at play, but rather the degree to which they have been developed or are present in a given country.

Table 5 provides a summary of the current stage of ICT development in Uganda in terms of enabling or constraining features in the education system.

Table 5: Factors Influencing ICT Adoption

Factors	Enabling Features	Constraining Features
Policy framework and implementation plans	The national policy underlines the importance of ICT in human resource development and has provided a basis for the development of ICT policy in the education sector that is currently pending approval by Cabinet. In the meantime, the Ministry of Education and Sports is planning several implementation initiatives for the next year.	The speed with which the policy can be implemented will depend on available resources and access to electricity and ICT infrastructure. Predictably, implementation will proceed more slowly in rural areas.
Advocacy leadership	The National Planning Authority and the Ministry of ICT are strong advocates and have a mandate to ensure that sector policies are developed and supported. The Ministry of Education and Sports has now created a management structure to provide leadership on ICT applications.	
Gender equity	Gender equity is stressed in the policy statements and in the ICT	Female participation rates, while near even at the primary level, begin

	training being provided to teachers. Some projects are underway that focus on access for women groups; perhaps most significantly is the Women of Uganda Network (WOUGNET).	to drop at the secondary level and much more remarkably at the tertiary level.
Infrastructure and access	Availability and access are improving rapidly in the urban areas aided by the growth of wireless networks and mobile telephony.	The lack of infrastructure and supply of reliable electricity supply seriously constrains the adoption of ICT in rural areas. Further, the cost of bandwidth is a universal constraint to Internet use.
Collaborating mechanisms	The need for collaboration is realised and mechanisms are emerging within government and within the various departments and institutions of the ministry.	It is still "early days" in the process of adapting government structures and business processes to the applications of ICTs. ICT adoption in the education sector has benefited from the efforts of many groups. The ministry will need to develop strategies to ensure this continues in an "added value" manner.
Human resource capacity	Human resource capacity is recognised in policy documents as being critically important. Tertiary-level institutions are being supported in addressing training needs, and the secondary curriculum is being revised to enable increased focus on ICT education.	Comparatively few teachers have the skills to make pedagogical use of ICTs for teaching across the curriculum. Teachers who receive such training are often unable to use their skills because of the lack of access to infrastructure.
Fiscal resources	The ministry is making an effort to spend some of its resources differently in order to begin implementing its ICT strategy.	The lack of resources is a serious constraint and may become more so with the planned introduction of universal access to secondary education. Implementation of the policy will depend significantly on donor support.
Learning content	Efforts have started to develop digital content.	The lack of available relevant and linguistically appropriate content is a major constraint.
Procurement regulations	The need to update and streamline regulations and procedures is recognised by government.	
Attitudes	The importance of ICTs to national	Attitudes seem to vary regarding the

	development and the need to be ICT literate is recognised throughout the education system.	use of distance and open learning/e-learning. The tertiary sector seems more disposed to embrace such delivery strategies, perhaps because of more substantial experience.
Sustainability	The ministry has recognised the need to ensure that projects are planned on the basis of a "total cost of ownership" basis.	Educators have seen so many projects fail because they could not be sustained beyond the pilot phase.

Notes

1. The World Factbook 2007. https://cia.gov/cia//publications/factbook/geos/us.html
2. "Uganda National Report." Republic of Uganda: Ministry of Finance, Planning and Economic Development. www.un.org/special-rep/ohrlls/ldc/MTR/Uganda.pdf
3. Country Profiles: Uganda. 2006. DFID. www.dfid.gov.uk/countries/africa/uganda.asp
4. Data & Statistics: Uganda. 2006. World Bank. http://web.worldbank.org/WBSITE/EXTERNAL/COUNTRIES/AFRICAEXT/UGANDAEXTN/0,,menuPK:374963~pagePK:141132~piPK:141109~theSitePK:374864,00.html
5. Country Fact Sheets: Uganda. "Human Development Report." 2006. UNDP. http://hdr.undp.org/hdr2006/statistics/countries/country_fact_sheets/cty_fs_UGA.html
6. Ward, M., A. Penny, and T. Read. "Education Reform in Uganda – 1997 to 2004: Reflections on Policy, Partnership, Strategy and Implementation." 2006. DIFD. www.dfid.gov.uk/pubs/files/education-reform-uganda-60.pdf
7. "The Education Sector Annual Performance Report 2005 – 2006." Education Planning Department, Ministry of Education and Sports. www.education.go.ug/Final%20ESAPR%202006.htm
8. Ayoo, P.O. "A National Distance Education Solution for Uganda." 2003. Inter-University Council for East Africa. https://host110.jolis.net:8443/sitepreview/http/iucea.org/downloads/DE_Solution_%20Uganda.doc
9. National Council for Higher Education. www.unche.or.ug/content/view/50/80/
10. "National Information and Communication Technology Policy." 2003. Ministry of Works, Housing and Communications. http://www.ucc.co.ug/nationalIctPolicyFramework.doc
11. The National ICT Master Plan and E-Government Network Feasibility Study was submitted by MEGA-TECH, Inc., in August 2006. In addition to outlining a master plan, it provides a comprehensive summary of the process of ICT policy development in the country. http://www.wougnet.org/ICTpolicy/ug/docs/NationalICTMasterPlan_FinalReport9.1.2006.pdf
12. These comments are based on an interview with staff from the National Planning Authority as well as the Ministry of Education and Sports in connection with an evaluation of the NEPAD e-Schools Demonstration project. October 2006.
13. Tusubira, F.F., I. Kaggwa, and J. Ongora. "Uganda," *Towards an African e-Index: ICT: Access and Usage 2005.* 2005. reserachICTafrica.net. http://www.researchictafrica.net/modules.php?op=modload&name=News&file=article&sid=504&CAMSSID=e6501939a722422e76cfe7915ff21cdc
14. Uganda Communications Commission. http://www.ucc.co.ug/rcdf/default.php
15. The sources of these data are the World Bank ICT at a Glance (http://devdata.worldbank.org/ict/uga_ict.pdf) and the Uganda Communications Commission.
16. http://www.internetworldstats.com/stats1.htm
17. Eremu, J. "ICT Connectivity in Schools in Uganda." 2005. I-Connect Online. www.iconnect-online.org/Articles/iconnectarticles.2005-05-3

18. Aguti, J.N. and W.J. Fraser. "Integration of Information Communication Technologies (ICTs) in The Distance Education Bachelor of Education Programme, Makerere University, Uganda." July 2006. *Turkish Online Journal of Distance.*
19. Obot, D., F. Kintu, and L. Elder. "The Uganda Knowledge and Information Society: Early Lessons from ICT Projects," in *At The Crossroads: ICT Policymaking in East Africa.* 2005. IDRC. http://www.idrc.ca/en/ev-93065-201-1-DO_TOPIC.html
20. Farrell, G.M. and C. Wachholz, eds. 2003. *ICT in Education: Meta-Survey on the Use of Technologies in Asia and the Pacific.* UNESCO. www.unescobkk.org/index.php?id=1225
21. Etta, F.E. and L. Elder, eds. 2005. *At The Crossroads: ICT Policy Making In East Africa.* IDRC. www.idrc.ca/openebooks/219-8/
22. Nyaki Adeya, C. and B. Oyelaran-Oyeyinka. 2002. *The Internet in African Universities: Case Studies from Kenya and Nigeria.* United Nations University, Institute for New Technologies
23. Murray, Lize. "AVU Gap Analysis Report: August 2005." 2005. Prepared for the Hewlett Foundation OdeL Initiative. http://www.avu.org/acep.asp

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