



THE REPUBLIC OF UGANDA

**DRAFT**

**POLICY**

**FOR**

**INFORMATION AND COMMUNICATION**

**TECHNOLOGY**

**IN THE**

**EDUCATION SECTOR**

**JULY 2005**

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## **Acronyms and Abbreviations**

UNCST	Uganda National Council of Science and Technology
USA	United States of America
ICT	Information and Communication Technology
UNESCO	United Nations Education Scientific Cultural Organization
UNEB	Uganda National Examinations Board
ITEK	Institute of Teacher Education Kyambogo
HE	His Excellency
WWW	World Wide Web
R&D	Research and Development
PTCs	Primary Teachers Colleges
MoES	Ministry of Education and Sports
TV	Television
NCDC	National Curriculum Development Center
NTCs	National Teachers Colleges
UNISE	Uganda National Institute for Special Needs Education
EMIS	Education Management Information System
NUDIPU	National Union of Disabled Persons of Uganda
MTBF	Medium Term Budget Frame Work
AED	Academy for Educational Development
PEAP	Poverty Eradication Action Fund
IICD	International Institute of Communication and Development
DUIIAP	Developing a Uganda Information Infrastructure Agenda Program
RCDF	Rural Communication Development Fund
UIA	Uganda Investment Authority
SMART	Specific/Sustainable, Measurable, Acceptable, Realistic, Time bound
CONNECT-ED	Connectivity for Educator Development

### **Definition of terms**

CD ROM of	(Compact disc read only memory); Type of optical disk capable storing large amounts of data
INTERNET	A global network connecting millions of computers
COMPUTER keyboard, hard	Comprises of a central processing unit, screen, cables, disc, memory and floppy drives.
VSAT station used	These are very small aperture terminal. It is an earthbound in satellite communications of voice, data and video
signals excluding	broadcasting television
HACKING	Accessing Information without permission
ICT Architecture Focus is	Design of a system created to meet specific application needs. on architectures that can enable the exploitation of
unforeseen	opportunities and meet unpredictable ICT needs.

## **EXECUTIVE SUMMARY**

The ICT Policy in Education has emerged at a critical point in time when the world especially less developed countries are transforming their economies from primary -based goods and services economies to knowledge-based economies promoting global knowledge-sharing, with the purpose of enhancing partnership with the private providers and communities, as well as disseminating information on ICTs for development. The ICT policy in the education sector therefore, has to play a critical role in rationalising and harmonising ICT related activities/programmes within the sector which are hitherto, uncoordinated and fragmented. Streamlining and mainstreaming of these activities is of prime importance.

In an era where government is divesting itself from direct involvement in the provision of goods and services, the role of the private sector through SMART partnership will remain a driving force in the development and investment in the information economy, with full support from government. The draft policy has therefore emphasised the importance of SMART dialogue amongst stakeholders.

The fundamentals underlying the transformation from the 'information society' to 'knowledge- based society' are in investing in ICT in education right from primary to tertiary levels. These efforts have already started but need support and dialogue from government. ICT programmes have been initiated at secondary and tertiary institution level, though on a much-limited scale compared to the demand for such services. The role of government in partnership with the private providers of ICT is crucial in narrowing student/computer ratio deficiency.

Legal and security measures for the effective use of ICT in Education has exposed the need to update the ICT related sections such as the copyright Neighbouring Rights Law of 1964 and the Industrial Designs Law of 1954. In addition, security management is required to ensure that access to confidential data is controlled and authorised. On the other hand, equity and access issues which are to some extent embedded in the fabrics of our societal norms and cultures create complex scenarios which give rise to the need to address socio-economic, language, disability as well as cultural barriers to development, with full participation of the parents and communities.

The high cost of ICT equipment including installation and maintenance costs require the intervention of government in partnership with the private providers and the community. Reduced costs of ICT related equipment would facilitate the design of local on-line content as well as paving the way for equitable access to ICT equipment. The effectiveness of ICT policy in education will depend on how the different components of ICT Architecture are mainstreamed and supported within the education sector.

The policy has also recommended the need for curriculum revision, need for teachers to be ICT literate in order to be able to impart ICT skills to the pupils and students. Infrastructure provision to the rural poor secondary schools in the first phase of implementation of this program so that a digital divide is minimised between the rural and urban schools.

## 1.0 INTRODUCTION

### 1.1 Background to the Policy

In order to oversee the integration of science and technology in the socio-economic development process and get appropriate technical advice, government mandated the Uganda National Council for Science and Technology (UNCST) to coordinate, formulate and manage explicit national policies in respect to science and technology. As a result of its corporate responsibilities, UNCST, assisted to draft a National Science and Technology Policy in 1994.

In 1998, a number of International organisations from USA, Norway, Germany, Ireland and Sweden approached UNCST to be given an opportunity to develop ICT policies based on different sectors. This came about after H.E the President of the republic of Uganda attended the Global Knowledge Conference in Toronto Canada in June 1997 and requested for massive investment in ICT in Uganda. Makerere University was identified by the Swedish and Norwegian organisations to support the use of ICT in infrastructures and for human development. In August 1999, UNESCO and UNCST agreed to initiate processes that will lead to the development of sectoral policies.

In June 1999, Ministry of Education and Sports signed a contract with the Academy for Educational Development (AED) based in Washington DC and their partners AFRICON based in South Africa. The purpose was to design and implement EMIS with the long-term objective of servicing three levels of information needs namely: policy and strategy, middle management and operational level at districts.

An ICT Roundtable Process on education was initiated in Uganda in July 2000. The round table initiative delivered a coherent set of six ICT programmes and project ideas, which included the development of an ICT policy for the education sector. As a follow up, a multi-country workshop for a period of five days was organised and funded by IICD, May 2001 in Mbale. The theme of the workshop was "Designing ICT Policy in Education", with the purpose of enabling participants to design ICT policies for further elaboration within national sector management. Participants were drawn from Zambia and Uganda. The implementation has started in Ministry of Education and Sports with the formulation of a draft Policy document on ICT in Education. Ministry of Education and Sports hopes to link the emerging ICT policy to its annual planning for the education sector.

KYU as a stakeholder in the Round Table plans to run two ICT-based projects that have emerged from it. One of the projects is to ensure that teachers undergoing diploma training have the requisite ICT skills. The second project

involves the use of ICTs to produce teaching materials, which are currently in short supply within the education sector. The ICT projects at KYU are linked to support synergy.

Uganda joined the Global Teenager Project in 2000, under the coordination of SchoolNET Uganda. Six schools involving around 110 students have so far participated in the project, which focuses on the use of ICT in Secondary Education. Three schools have been connected to the Global Teenager Network through support from the Adopt-a-School plan.

This policy is prepared in the context of a global interest in the use of ICT, as seen in the World Summit on the Information Society (WSIS). Uganda, along with many other countries has identified ICT as a key area for development, and has developed a National ICT strategy. As recognised in this strategy the education sector plays a key role in the human development of ICT. It is with this aim that the following ICT strategy is prepared.

### **1.1.1 Policy definition of ICT**

ICT (ICT) can be defined as 'electronic means of capturing, storing, communicating information, manufacture and assembly'. ICTs are based on digital information and comprise computer hardware, software and networks. There are other technologies, which deal with information like the 'intermediate technologies' based largely on analogue information held on electro-magnetic waves such as radio, television and telephony; 'literate' technology based on information held as written word such as books and newspapers and 'organic' technology based on human body such as the brain and sound waves. These technologies are now merging rapidly as they join the digital world.

### **1.2 Why action is needed**

ICT is an important part of the education system for a number of reasons. Mostly, ICT is now a key skill that is required for a rapidly increasing range of jobs. Developing good ICT skills in young people can help them to find employment. Further, the presence of a workforce with good ICT skills can help in attracting and growing industry and employment. Conversely the absence of ICT skills can be a barrier to development.

In the longer term, as e-government and e-commerce initiative take hold and Uganda moves towards an information society, ICT skills will be a necessary prerequisite for full participation in society. ICT is often described as a literacy, and is seen as a universal right. In this context there is concern about a growing "digital divide" between the people with ICT skills and those without, which could place those without at an increasing social and economic disadvantage as ICT becomes more pervasive.

There are also good educational reasons for using ICT. Young people are often attracted to ICT and teachers report that using ICT helps with motivation. Computers provide the opportunities for students to redraft and edit their work, and so encourage them to produce better quality work and to develop good writing skills. When the computers have access to the Internet students have access to the largest library in the world with endless resources for learning. These are only some of the benefits which have been demonstrated for ICT in repeated projects in many countries.

Getting the benefit of ICT in education requires skilled teachers. Simply providing computer and Internet access will not ensure learning, and in some cases can result in inappropriate use. Teachers familiar with more traditional teaching methods often find it difficult to find good uses for the technology, often leading to underused equipment. The situation is further complicated by a widespread lack of understanding of the potential of ICT. ICT in schools has often been driven by pressure from parents, who may have no aim beyond the acquisition of basic computer skills.

A further problem with ICT in education is the high cost of the equipment. In Uganda the cost of a typical computer is similar to the annual salary cost of a teacher. The initial capital cost of a computer is not the only expense. Research in South Africa and Zimbabwe suggests that the cost of computer hardware may be only 15-20% of the total cost of ICT, excluding labour cost, over five years (Cawthera). While there have been some programmes based on recycling used computers into schools, these may be cheaper, but less reliable than new machines (James et al, 2002).

Internet connectivity in Uganda is relatively expensive, although prices have been falling in recent years. Leased line access costs in the region of US\$6 million per annum (US\$ 3,000) while dial up access costs 6,000US\$ per hour (US\$3). Nevertheless, connectivity may be particularly important in “resource poor” contexts, or where teachers’ own knowledge is limited. In such cases potential of the Internet to provide resources and facilitate student learning may be of particular value (Hilton 2000). In addition, use of the Internet in itself may be an important part of the digital literacy outlined earlier.

**2.0 Present National Strategy of Government related to ICT for Education is enshrined in the National ICT Policy. This was enacted in 2002. The first objective of the ICT policy for Uganda is to sensitise and create awareness of the use of ICT.**

**As its objective number 2, it is to improve Literacy Improvement and HR Capacity Building. This is broken down into various components below.**

**Strategies:**

- a) Integrate ICT in mainstream educational curricula and provide for

- equitable access by pupils and/or students at all levels.
- b) Develop and manage ICT Centres of Excellence to provide basic and advanced ICT training.
  - c) Set up mechanisms that promote collaboration between industry and training institutions so as to build human resources capacity.
  - d) Promote twinning of training institutions in Uganda with those elsewhere so as to enhance skills transfer.
  - e) Promote appropriate incentives to public and private sector partners in order to ensure contribution to skills development in the ICT sector.
  - f) Design and develop incentives aimed at attracting foreign-based Ugandan ICT professionals to the country.
  - g) Establish training schemes as well as training manuals for development information providers and for workers at district and sub county levels responsible for its on ward transmission.
  - h) Provide technical assistance and training for communication experts in the maintenance of equipment as well as in media economics and social sustainability.
  - i) Develop in collaboration with professional bodies, business and other organisations, standard curricula in all institutions engaged in training communication and ICT specialists of all categories.
  - j) Put in place mechanisms that will improve ICT skills among employees of the public sector.

#### **4.0 NATIONAL VISION/OBJECTIVES/STRATEGIES OF ICT**

The ICT Policy in Education will work towards the achievement of the Uganda Vision 2025 and the broad aims of Education as stated in the Government White Paper on Education 1992, outlined below:

##### **4.1 Long-term strategic plans for Uganda Vision 2025**

- a) Create a resilient, dynamic, integrated, diversified and competitive economy.

- b) Eradicate mass poverty and ensure rural transformation.
- c) Develop society with high quality of life.
- d) Develop a democratic society with full observance of human rights.
- e) Foster respect for our cultural diversity, national pride and patriotism.
- f) Build a critical mass in science and technology, research, and development, and skilled labour for economic transformation and development.
- g) Ensure that resource-use and development activities sustain and enhance environmental quality and;
- h) Develop and effectively utilise information systems and services in development.

#### **4.2 Broad Aims of Education**

- a) To promote understanding and appreciation of the values of national unity, patriotism and cultural heritage, with due consideration of international relations and beneficial inter-dependence.
- b) To inculcate moral, ethical and spiritual values in the individual and to develop self-discipline, integrity, tolerance and human fellowship.
- c) To inculcate a sense of service, duty and leadership for participation in civic, social and national affairs through group activities on education institutions and the community.
- d) To promote scientific, technical and cultural knowledge, skills and attitudes needed to promote development.
- e) Eradicate illiteracy and equip the individual with basic skills.
- f) Contribute to the building of an integrated, self-sustaining and independent national economy.

The strategic objectives of ICT policy and the strategies to operationalise activities outlined below are meant to work towards the fulfilment of the National ICT vision, Ministry Vision/objectives and the mission statement of ICT policy. They will all support synergies towards the attainment of the corporate purpose of government.

#### **4.3 National Vision for ICT**

A Uganda where the good governance and human resource development are sustainably enhanced, promoted and accelerated by efficient and timely access to information through use of ICT.

#### **4.4 Ministry Vision**

- a) Quality Education and Sports for All.

#### **4.5 Mission Statement for the Ministry**

- a) To provide for, support, guide, co-ordinate, regulate and promote quality education and sports to all persons in Uganda for national integration, individual and national development..

#### **4.6 Ministry strategic objectives**

- a) To ensure Universal and Equitable Access to Quality basic education for all children.
- b) To improve the quality of education and sports.
- c) To ensure equal access by gender, district and special needs at all levels of education.
- d) To build capacity of districts by helping Education Managers acquire and improve on their knowledge, skills and attitudes to be able to plan, monitor, account and perform managerial functions.

#### **4.7 Vision for ICT policy in Education**

- a) Mainstreaming of ICT in the Education Sector

#### **4.8 Mission Statement of ICT Policy**

- a) Provide equitable access to quality education and timely accurate information using ICT (ICT).

As a matter of fact, ICT still remains the tool for the future, which should be developed as a matter of urgency. The basic goal is to improve and broaden equitable access to information, communication and technology as a way of creating new opportunities for socio-economic development in the country. The policy objectives outlined below are meant to cascade the implementation of ICT Policy to the end users.

## **5.0 Policy principles**

### **5.1 Setting a framework**

The use of ICT in schools and colleges is already growing. This policy aims to develop a framework of curriculum and teacher training that will facilitate and guide this development with a view to gaining the best advantage for the country as a whole. The policy does not envisage large-scale purchase of equipment for schools in the short term. While it would be desirable to have computers in every school, this is impractical for reasons of financial constraints, and because of the limited capacity of the teachers to make effective use of the technology.

### **5.2 Balance of ICT applications and computer science**

Human development in the context of ICT involves a range of different types of skills. As more and more jobs involve use of computers, it is likely that large numbers of people will need skills in computer applications. This will involve knowing what the technology can do, and being able to use it appropriately.

A smaller number of people will need more technical ICT skills. Personnel will be required to install and maintain equipment and networks, giving rise to a demand for qualified computer technicians. In addition there will be a demand for some programmers and systems analysts, to work on software development, financial systems, web development and so on.

The strategy aims to provide opportunities for the development of computer applications skills to as many people as possible at secondary and third level. At the same time it provides pathways to developing more technical skills for a smaller number of people with a specific interest in the area.

### **5.3 Focus on curriculum and teachers**

The policy recognises that the issues of ICT are not so much issues of “having ICT” as issues of “what is done with ICT”. Strategies driven by equipment provision may easily result in underused technology. In ensuring that the best use is made of ICT, the key focus must be on the teachers/trainers/lecturers and on the curriculum that they are expected to follow.

### **5.4 Focus on equity**

At present many of the computers in Ugandan schools are concentrated in those in wealthier areas, where the parents are able to raise the money to buy and

maintain the ICT infrastructure. ICT equipment is also more frequently used in urban schools than in rural schools.

It is the view of the Ministry that the benefits of access to ICT should be spread as equitably as possible. In the short to medium term it is not practical to provide ICT infrastructure to all schools, for reasons of cost, and because of the lack of power, suitable buildings and other facilities in some areas.

These constraints are reducing year by year. The rural electrification scheme is systematically connecting more areas to the national power grid. In addition the Rural Communication Development Fund, administered by the Uganda Communications Commissions is using its funding to ensure that there are Internet points of presence in all areas.

The policy will tackle the issue of equity through a number of measures. First, any ICT related projects that are seeking schools will be encouraged to select schools in rural areas or in poor urban areas. Second, the Ministry will set up a fund targeting rural-poor schools. Third, by ensuring that all teachers begin to receive ICT training as part of the teacher training, a foundation of ICT skill and experience will be developed throughout the country.

There is also a question of gender equity. Computers have been traditionally associated with boys and although the gender gap is fast disappearing in many countries, it is important that girls' schools are encouraged to take as much interest in ICT as boys schools. Consideration to gender will also be made in the selection of teachers for training as computer specialists. International research suggests that female role models play an important part in encouraging girls to begin using ICT.

## **6.0 Policies**

### ***6.1 Primary sub-sector***

The majority of primary schools in Uganda do not have a computer at present, and many lack the infrastructure (electricity, security and connectivity) to use one, even if it was available. It is appropriate that primary students should be required to use computers and that a curriculum for ICT at primary level should be developed.

However small numbers of primary schools are starting to acquire computers, often for administrative purposes within the school. The Ministry should encourage these schools to use the technology to support teaching, either by producing teaching materials or by use of the technology with students. Guidelines should be produced for schools to show how this can be done. In addition computer awareness should be introduced into the training of primary teachers on a phased basis, so that newly qualified teachers are equipped to make use of ICT as it becomes available.

## **6.2 Secondary sub-sector**

At secondary level the aim is that secondary teachers should be equipped to make use of ICT in their lesson preparation, and to use ICT in their teaching where the equipment is available. In addition a specific subject based on ICT applications is provided for schools that have sufficient equipment. The implications of this for curriculum, teachers, and infrastructure are identified below.

### **Curriculum**

The focus of ICT in the secondary sub-sector is on the provision of computer applications skills at ordinary level. This is done through a subject called Computer Studies, taught in the schools that have sufficient equipment, and assessed at O level.

Some consideration is being given to the development of a further subject called Computer Science at Advanced level. Such a subject, focused more on the technical side of computers seems very attractive. However there are risks to introducing it. The advantages and drawback of developing such a subject are outlined as Appendix B. Further consideration should be given to the issue of ICT at A level as part of the up-coming curriculum review.

### **Teacher education**

The strategy has two implications for teacher education. First, as many teachers as possible should be provided with computer awareness, basic skills, and enough experience to make use of ICT in lesson preparation and in making teaching materials. This will help to improve the quality of secondary education, and also lay the foundations for future use of ICT within primary and secondary classrooms.

Secondly, a cohort of teachers needs to be developed to teach the computer applications course at O level.

To meet these needs two strategies are needed:

- On a phased basis, all NTCs will begin to provide ICT courses for their student teachers. These courses should not be aimed to prepare them to teach the subject, but should allow them to use ICT in their own studies, in lesson preparation and in making teaching materials.

### **Equipment**

At present the majority of secondary schools have no computers or connectivity. The NCDC estimates that only 80-100 of the 851 Government secondary schools have computers, and many of these have only a handful of machines. The schools in wealthy urban areas have been more successful in acquiring equipment, as they can draw more resources from parents.

While the Ministry ICT strategy is aimed primarily at curriculum and teacher training, it is recognised that if no specific action is taken, the gradual development of computers in schools will encourage the growth of a digital divide. To begin to address this, the strategy proposes the provision of a limited amount of equipment targeted at a small number of rural-poor schools.

The number of schools that could be equipped under this scheme is dependant on the resources available. Possible scenarios are outlined in appendix C.

### **6.3 Tertiary sub-sector**

The aim of the policy at tertiary level is to encourage the provision of ICT skills in all higher education courses, so that as far as possible, all those leaving their level have basic computer skills.

Within the University sector, the Strategic Plan for Higher Education has already identified targets for increased levels of equipment. Universities are expected to reach a student-computer ratio of 1:15 by 2007.

Within the other Higher Education Institutions there is also a need for a gradual increase in the numbers of computers. Within each institution there is also a need to review the status of ICT, with a particular focus on the skill development of the teaching staff and the curriculum that they follow. Key objectives for each institution are:

- A curriculum for ICT awareness and skills should be tailored to meet the needs of the learners (for example, in engineering this could include CAD, while medics may need to be familiar with online medical resources).
- A number of existing teaching staff should be provided with additional training as needed to prepare them to teach ICT to their students.

Achieving this has cost implications, as the institutions will need funding for skill development and for equipment. Given the resource constraints it will be necessary to equip colleges on a rolling basis. The immediate priorities should be:

- The courses training computer technicians,
- The Uganda Colleges of Commerce, which prepare students for a business environment.
- The teacher training institutions (PTCs and NTCs)

### **Technical colleges**

The availability of skilled technicians is a key factor in facilitating the development of ICT in Uganda. As a result, a particular focus must be given to technical courses aimed at developing computer technicians. At present there are two technical colleges which offer a computer technician course, and they produce approximately 15 technicians per year each.

These courses should be reviewed, both in terms of their quality and the numbers trained. If the courses are of sufficient quality and there is sufficient demand for their students, consideration should be given to expanding the numbers trained.

### **The Uganda Colleges of Commerce (UCCs)**

These colleges are engaged in preparing people for the world of business, where ICT skills are a daily requirement. As with the technical colleges, these ICT provision in these courses should be reviewed, and there may be a need for additional equipment and staff development.

### **Teacher Education**

The medium term aim of the policy is that all teachers receive exposure to ICT during their initial training. Within teacher education, student teachers can make use of ICT in a number of ways:

- a) All teachers should get familiarity with ICT in line with the policy that all of the students in third level institutions should gain ICT skills.
- b) Student teachers can gain benefits from access to ICT in the course of their own study. In particular, access to the Internet can allow them access to a range of resources and research materials.
- c) Student teachers can also use ICT to make teaching materials for use when they are in schools.

These uses of ICT will equip future teachers to make use of ICT to make teaching materials, once the technology is available in their school, and will lay the foundations for the use of ICT in the classroom, when appropriate. Teacher Education Institutions and the National Curriculum Development Centre will be charged with working together to develop this syllabus.

In addition there will be a need for specialist teachers to teach the O level ICT syllabus. One NTC may be designated to take on this function. This NTC will require additional resources in order to carry out this task.

### **Private Colleges and Higher Education Institutions**

Within Uganda private colleges have developed, many of which offer courses accredited internationally. While some of these operate to a very high standard, others are less well run. As part of an aim to regulate these colleges and monitor their standards, the Ministry will examine the provision of ICT within private colleges, and encourage appropriate levels of equipment, access and ICT training.

### **Special Needs and Non Formal Education**

There is application software that is now a recognised standard for that is developed. E.g. Joysticks. Pupils, students and teachers who teach in SNE and

the students who are in these classes use this application software. For Non Formal Education these students can still use the application software that is used normally.

## **7.0 Infrastructure**

The Ministry will seek to reduce the cost of ICT to schools in the following ways.

### **7.1 Connectivity**

At present the cost of connectivity is high, and many of the schools with computers have no access to the resources of the Internet. In recognition of the importance of the Internet in education, three specific actions will be taken to encourage connectivity:

- The Ministry will negotiate with the Uganda Communications Commission (UCC) to seek to develop a low cost rate of access to the Internet for schools. This model of an e-rate has been successfully used in other countries to facilitate Internet connectivity.
- The Ministry will authorise schools to allow members of the community to use their computer facilities after school hours. This will provide a service to the wider community, and allow the schools to make some income that can be used to reduce the cost of Internet connectivity. Guidelines and regulations for this activity will be developed by the Ministry.
- Where schools are located in rural areas and are prepared to make their facilities available to the community, the Ministry will seek to direct funds from the Rural Connectivity Development Fund (RCDF) of the UCC to provide connectivity at reduced cost.

### **7.2 Software measures**

The Ministry will engage in negotiations with the manufacturers of software with a view to arranging an educational rate for the main applications to be used in schools.

### **7.3 Hardware and maintenance**

- The Ministry will encourage sponsors and donors of equipment to schools to direct their donations to schools that are unlikely to be able to raise funds for equipment of their own. In particular rural schools and girls schools will be targeted.
- The Ministry will provide limited funding to provide ICT equipment in a small number of rural-poor schools each year.
- The Ministry will provide limited funding to equip or upgrade the ICT facilities in some of the BTVET colleges each year.
- The training in ICT provided to teachers will include a module on first line maintenance, enabling teachers to solve routine problems themselves and as and when they occur.

- The capitation grant to schools will be modified to provide a modest increase in grant to secondary schools that have been targeted for the provision of computers because of their rural-poor status. This will provide some funding for maintenance and upkeep of the equipment.

## **8.0 Critical success factors**

A series of factors have been identified as critical to the success of this policy.

### **8.1 Co-ordination**

Firstly it is important that there be co-ordination between the different strands of the policy. It would be damaging if computers were provided to schools before the appropriately trained teachers were in place. Similarly, it would be damaging if the training provided to teachers did not match the curriculum or guidelines. Ensuring good co-ordination will require co-operation between all of the implementing bodies.

### **8.2 Training of trainers**

A second key element is the training of trainers. As the quality of use of ICT will depend largely on the quality of the training provided, the training of the trainers is crucial. As it is likely that many of the people charged with training in ICT have relatively little ICT experience themselves, care must be taken to ensure that:

- a) Trainers have the opportunity to develop sufficient ICT skills
- b) Trainers are assisted to develop appropriate methods for teaching ICT
- c) Trainers develop an awareness of the role of ICT in their specialism. If this is not done then all of the ICT training may become generic skills courses with little tailored content.

### **8.3 Curriculum design**

The design of appropriate curricula is also of central importance. The curricula for ICT should be practical in providing relevant skills and experiences. At the same time they need to be constant updates to keep pace with rapidly changing technology. The curricula need to strike a balance between the principles and the operational details of the software, bearing in mind that the operation may change very rapidly.

### **8.4 Monitoring and Evaluation**

ICT policy in education requires periodic monitoring and critical evaluation of its performance. This is to ensure that it remains responsive to the needs, aspirations and the dynamics of the global trends in ICT.

The aim of the review will be to determine, relative to available systems, how cost-effective and adequate for improvement, the existing deployed technologies, curriculum, trainers and teachers are. Those responsible for the review will be expected to generate an up-to-date priority list to be considered. The review will

also take into consideration the effectiveness of the policy at the implementation level. The policy will be reviewed annually to cater for global trends.

## 9.0 Key targets and timescales

### Curriculum:

Task	Completion	Key agency
Provision of guidelines for the use of ICT in primary schools.	December 2005	NCDC
Development of an O level curriculum for ICT in secondary schools.	Complete	NCDC
Consideration of an A level subject for secondary schools.	December 2005	NCDC with stakeholders, as part of curriculum review
Provision of ICT curriculum for BTJET courses.	Gradual as colleges are equipped.	NCDC and the relevant colleges.
Regulation and approval of private higher education institutions ICT courses.	December 2005	Ministry of Education and Sports

### Teacher Education

Task	Completion	Key agency
Provision of ICT infrastructure in all NTCs.	Roll out dependant on funding.	Ministry of Education and Sports
Development of an ICT curriculum for NTCs, focused on preparing teachers to use ICT in preparation of teaching materials and in the classroom.	December 2005	Teacher Education Institutions with NCDC.
NTC's to prepare teachers to teach the O level ICT curriculum.	Early 2006	Ministry of Education and Sports
Phased equipping of PTCs with ICT equipment.	Roll out dependant on funding.	Ministry of Education and Sports
Development of an ICT curriculum for PTCs, focused on preparing teachers to use ICT in preparation of teaching materials and in the classroom.	December 2005	Teacher Education Institutions with NCDC.

### Infrastructure

Task	Completion	Key agency
Encouragement of funder and NGO projects to target schools "on the wrong side of the digital divide", especially rural schools and schools in poor urban areas.	Immediate	Ministry of Education and Sports
Ministry funding for equipment to a small number of	Beginning	Ministry of

rural-poor secondary school each year.	2005	Education and Sports
Negotiations with software companies to arrange low cost software for schools.	Beginning 2004	Ministry of Education and Sports
Negotiations with UCC and telecommunications companies to ensure low cost Internet access for educational institutions.	Beginning 2004	Ministry of Education and Sports
Restructuring of the school capitation grant to provide increased payments for secondary schools making appropriate use of ICT, thus facilitating maintenance of ICT facilities.	2004	Ministry of Education and Sports

## 10.0 INSTITUTIONAL FRAMEWORK FOR IMPLEMENTATION

### 10.1 Operationalising ICT Policy

The ICT Policy in Education will not be made operational in isolation, but will rather, work in conformity with the existing laws and Statutes such as the Local Government Act 1997, Uganda Communication Commission Act 1997, National ICT Policy Framework, Vision 2025, National Science and Technology Policy 1994, Education Sector Strategic Plan, Poverty Eradication Action Plan among others.

### 10.2 Stakeholder identification

There is critical need for more dynamic partnerships between stakeholders and Ministry of Education and Sports to create an enabling environment for a more effective and efficient coordination and networking of ICT programmes in the education sector. The following stakeholders have been identified for that purpose:

- a) **Ministry of Education and Sports (lead agency)**
- b) Ministry of Local Government
- c) Ministry of Gender, Labour and Social Development
- d) Ministry of Justice and Constitutional Affairs
- e) Ministry of Finance, Planning and Economic Development
- f) Ministry of Public Service
- g) Ministry of Works, Transport and Communication
- h) Ministry of Energy and Mineral resources.
- i) National Council for Higher Education.
- j) Department of Information-President's Office.
- k) NGOs, Multi-lateral and Multi-national organisations
- l) Uganda National Council for Science and Technology
- m) Uganda Communication Commission
- n) Universities and other Tertiary Institutions
- o) Founding bodies

- p) Religious leaders
- q) Political leaders
- r) District and county levels
- s) Teachers
- t) Students/pupils
- u) Schools
- v) Parents/community

### **10.3 Role of Ministry of Education and Sports**

Ministry of Education and Sports will be the government lead agency for implementation of the ICT policy in education. The Ministry will be responsible for the following:

#### **10.3.1 Ministry of Education and Sports**

- a) Raise awareness and mobilize support for ICTs in education.
- b) Advocate for and mobilize resources for ICTs.
- c) Promote research, documentation and serve as a depository for ICTs in collaboration with other organisations within and outside the country.
- d) Routine monitoring and assessment of the performance of ICT in education sector.
- e) Implementing and review of ICT policy and developing an action plan with appropriate qualitative and quantitative indicators.
- f) Initiate and promote coordination, collaboration and networking amongst all the stakeholders.
- g) Develop ICT related guidelines for educational Institutions.
- h) Provide information to the private sector on partnership opportunities
- i) Harmonise and rationalise the activities of the private and local training institutions
- j) Policy re-formulation, monitoring and evaluation.

### **11.0 National framework**

At the national level, the Ministry will oversee implementation of this policy. In order to realise its coordinating role, the Ministry will establish and chair a multi-sectoral committee composed of the following institutions:

### **11.1 Membership**

- a) Line Ministries (the ministries responsible for; Local Government, Finance, President's Office-Information).
- b) Relevant statutory bodies.
- c) Representative(s) of donor agencies.
- d) Representative(s) of the private sector.
- e) Member(s) of Parliament.
- f) Representative(s) of Religious Institutions
- g) Representative(s) of founding bodies.

### **11.2 Functions**

The committee is charged with the following responsibilities:

- a) Ensure coordination and collaboration on ICT policy in education.
- b) Budget for the cost of management, operations, maintenance and expansion through Ministry of Education and Sports Medium Term Budget Framework.
- c) Determine/ approve ICT Policy adjustments.
- d) Ensure that the ICT policy in education and organisation plans integrate with the National ICT policy.
- e) Oversee the implementation of ICT Policy in education.
- f) Advocate for ICT concerns and resources for implementation of the policy, programmes and services to the benefit of the education sector.
- g) Coordinate with inter district ICT forum.

### **11.3 Meetings**

The committee will meet quarterly. The Commissioner, Education Planning will call and chair such meetings. The Ministry will act as a secretariat to the committee. Each of the line ministries and organisations in this committee will ensure that a focal person in the institution reports on the activities of the institution, which relate to ICT policy in education.

The focal person will work with the Ministry and the multi-sectoral committee to promote and ensure implementation of components of the policy that falls under their mandate. The outcomes from the meeting will feed into the Ministry Working Groups before finally feeding into the National ICT Coordination Committee.

### **12.0 District Framework**

In accordance with the Local Government Act, 1997, the District Education offices will perform the duties/functions of the department responsible for ICT policy in education at district level, and ensure implementation of this policy at these levels in liaison with sector departments and service organisations i.e. NGOs and Community based organisations.

If membership to these committees is limiting, the committees will be mandated to co-opt any other member as and when necessary.



### **13.0 Appendix: Current situation**

There are different initiatives of ICT in the education sector, which are operating at different levels of the education system in Uganda. There is urgent need to harmonise all these initiatives so that we know for certain what each initiative is up to, so that we avoid duplication of efforts and maximize the synergies of working in unison.

#### ***a) Education Management Information System (EMIS)***

Education Management Information System is a component of ICT in the Ministry of Education and Sports, it provides quality education statistics in a timely, cost-effective and sustainable manner. EMIS provides the education statistics and pupil details among others. After the procurement of computers, printers and accessories each district has hardware and software installed and is to carry out data gathering from schools for processing through ED\*Assist application Software which is used in EMIS. District officials have already benefited from computer training in the use of EMIS. The Ministry plans to network districts and the centre to enable information flow from districts to the centre (Ministry of Education and Sports) and vice versa, at the same time. This will enable districts to take a comparative analysis amongst themselves. Computers were procured and distributed to the districts.

At the Ministry all the offices are connected on a network and are able to use the internet and e-mail services as well as to access resources on the network. Ten districts have been connected on the wide area network as a pilot phase. These districts can send and receive information on that network.

#### ***b) School net Uganda***

SchoolNet is a national network of professional educators and schools whose vision is to transform the Uganda educational system from an Industrial model (learning by assimilation) to a knowledge-based model to prepare the youth of Uganda to effectively enter a Global Economy based on Knowledge, Information and Technology)

#### ***c) Connect-ED (Connectivity for Educator Development)***

In 1993, Uganda undertook a comprehensive reform of its primary education system. The reform redirected the function of primary teachers' colleges focusing mainly on "improving the quality and equity of primary education in Uganda." This requires the colleges to provide continuous professional development to teachers through refresher courses, helping teachers improve their effectiveness as well as make and use instructional aids among other things. All these functions need adequate support ranging from effective training to consistent access to updated information, knowledge and resources.

With the introduction of Universal Primary Education (UPE), greater demand on

teachers and the quality of primary education has increased. In order to address the need for quality primary education and the provision of additional resources for Ugandan primary teachers, the Connectivity for Educator Development (Connect-ED) project was initiated in May 2000.

The Connect-ED project is supported by the United States Agency for International Development (USAID) in close cooperation with Uganda's Ministry of Education and Sports and within the framework of the U.S. Education for Development and Democracy Initiative (EDDI). Connect-ED is using technology to enable and enhance learning and teaching for primary educators through the creation of multifaceted approaches to integrating media and computers in the Primary Teacher Colleges (PTC) classrooms. Connect-ED accomplished this by setting up Education Technology Centres thereby increasing access, availability, and provision of relevant and quality learning materials and support for teacher professional development.

Connect-Ed is a non-governmental organisation that is providing connectivity to 8 core PTC's namely: -

1. Shimoni PTC
2. Mukuju PTC
3. Gulu PTC
4. Bushenyi PTC
5. Ndegeya PTC
6. Kibuli PTC
7. Soroti PTC
8. Lira PTC

***e)IICD-Ministry of Education and Sports***

There are four projects going on between the Institute for Information and Communication Development (IICD) in conjunction with the Ministry of Education and Sports. These projects are namely:

- a) ICT Based Educational Content.
- b) ICT Training.
- c) ICT Workflow Management and Financial Information.
- d) ICT Maintenance Capacity.

***f)British Council***

British Council has a program in some Private Secondary Schools. This initiative aims at introducing ICT to be used in teaching and learning.

***g)Global Teenager Program***

Global teenager program is aimed at assisting Students to learn and use ICT in Secondary Schools.

### ***h)Curriculum Net***

National Curriculum Development Centre worked with International Development Research Centre to come up with the CurriculumNet project to develop, test and implement a mechanism for curriculum integration and delivery for primary and secondary schools in Uganda via Communication networks using computer related tools. In relation to the mandate of NCDC and its functions, the CurriculumNet Project was conceived to influence both the practice and policy of Education.

Notable to mention is that whereas these initiatives had made tremendous strides in school connectivity, teacher training and promotion of global learning, none had ever attempted content development-online format, to supplement the current campus learning system of the curricula of Uganda.

This necessitated development of local content that is relevant to the learner and the Ugandan approved National Curriculum hence creating an added value.

Thus the difference with Curriculum Net was it intended to enable students, educators and educational administrators to develop appropriate competencies to effectively use ICTs in the teaching and learning process. The ultimate goal of this project is to accelerate the participation of schools, teachers and learners in the use of ICT in teaching and learning process. The project supports all educators, and students who foster the use of ICT in teaching and learning process.

As an action research activity, it was intended to test the technical and operational feasibility, and economic viability of Information and Communication Technologies (ICTs) in the education delivery process. It is also expected to examine the “value added” by ICTs in core subject areas of the educational system in Uganda and the extent to which teaching and learning is enhanced.

### ***i)UNESCO***

Creating learning networks for Africa is meant to assist teachers in secondary schools to appreciate ICT in their works and is supported by UNESCO.

### ***j)U-Connect***

The goal of the Project is to introduce the more widespread use of ICTs in Uganda primary and secondary schools, especially in rural towns.

It raises awareness of the benefits of ICT-enhanced primary and secondary school education, especially the ability to dramatically amplify the limited

educational resources in rural towns, and demonstrate best practices in the economical provision of school computer labs and affordable high bandwidth connection to the Internet in a developing country.

### k)New Partnership for Africa in Development

More than 60% of Africa's population is made up of young people below the age of 25years. These young people are likely to be the ones who are most affected by the digital and knowledge divide. They also form the basis upon which the future economic activity of Africa will be built. Implementation of the NEPAD e-Schools Initiative will, therefore, ensure that the majority of the people on the continent will have the skills and knowledge required to function and participate as equals in the Information Society and Knowledge, Economy.

The NEPAD e-Schools Initiative is a priority NEPAD ICT Initiative.

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The objectives are:

- To provide ICT skills and knowledge to primary and secondary school students that will enable them to function in the emerging Information Society and Knowledge Economy.
- To make every learner health literate.
- To provide teachers with ICT skills to enable them to use ICT as tools to enhance the teaching and learning.
- To provide school managers with ICT skills so as to facilitate the efficient management and administration in the schools.

## ***l)E-education***

This study was funded by United Nations Development Programme through the Uganda National Council for Science and Technology. It was aimed at developing sector strategies and actions to enable the sector achieve e-Education.

This is the utilisation of internet technology in the delivery of educational information over a distance. This delivery may be online (synchronous) or off line (asynchronous). E-education is a paradigm shift from the traditional methods and structures we have used to impart knowledge. This knowledge or information is a resource that if owned enables one to either have or produce viable goods and services and link them to viable markets. The use of ICT to create an environment for and impart this information is what is termed as e-education.

m) Piloting the applications of the curriculum online under the curriculumNet, which is being implemented by National Curriculum Development Centre in three Primary and Secondary Schools within Kampala.

n) Providing information and Telecommunication Services to the community, multi media centers at Nakaseke in Luwero District, Nabweru in Wakiso District, Buwama in Mpigi District, Kachwekano in Kabale District, Kagadi in Kibale District and Apac in Apac District. This is supported by UNESCO.

o) Establishing e-connectivity to Arua Public Primary School in Arua Municipality. The School was supplied with 13 computers and accessories in order to improve on the administration of the large School.

p) Equipping Kisowera Primary School in Mukono District with laboratory equipped with Information and Communication Technology equipment following the visit of the former President of US, His Excellency Bill Clinton.

q) Establishing a cyber café to access Internet connectivity for the students, teachers and the community to St. Mathias Kalemba S.S in Nazigo in Kayunga District. Uganda Communications Commission supported this project.

r) Constructing and equipping Ntare Secondary School in Mbarara District with computers, printers and accessories in order to improve the teaching and learning processes.

s) Enhancing the management of Education Information Systems in Masindi and Ntungamo Districts using support from the Voluntary Service Organisation.

t) Promoting teaching and learning processes using ICT to students and tutors at Sir Canon Apollo PTC in the Rwenzori area, which is being supported by the Development Cooperation of Ireland.

u) Promoting the use of ICT for Non-formal Education. UNESCO has produced a CD-Rom to guide the users.

### Appendix A: Curriculum grid

A key aim of the Educational ICT strategy is to provide curricula and guidelines that shape a coherent series of courses. The following general framework outlines the key areas where ICT courses are needed. This framework distinguishes between computer applications courses (aimed at the use of the technology) and computer science courses (aimed at developing professional skills like programming and network management). The general principle is to provide basic ICT skills to a large number of people, while providing more technical skills for smaller numbers with a specialist interest.

Level	Sub level	Place of ICT in the curriculum
Primary	Pre primary	No formal curriculum for ICT, although schools should be made aware that ICT may be a useful aid to learning where computers are available.
	Primary	No formal curriculum for ICT, although schools should be made aware that ICT may be a useful aid to learning where computers are available. Guidelines for the use of ICT in primary schools should be produced, highlighting the range of educational activities that can be done with ICT.
Post primary	Secondary	A curriculum for computer studies (ICT applications) has already been developed for O level. This has been offered in a small number of pilot schools already, and will be made available to all the schools that wish to take it up next year. This curriculum covers computer awareness and applications, and is assessed through written and practical examinations. This curriculum should be extended to other schools as equipment becomes available.  At A-level, consideration should be given to a curriculum for computer science. There is no curriculum for ICT. Schools should be encouraged to use ICT to support teaching and learning processes.
	BTVET	The BTVET institutions should aim to include ICT skills in all courses. The curriculum for each may be different, and should focus on the needs of the vocational specialism. A separate curriculum for each course should be prepared

		by the colleges, in consultation with the NCDC.
Tertiary	Universities	The Universities are autonomous and so their curriculum is not controlled by the Ministry. Universities should be encouraged to ensure that all students have the opportunity to learn the basic ICT applications skills.
	NTCs	It is important that all newly qualified teachers acquire basic computer skills. An appropriate module should be developed and made a compulsory part of the training offered in NTCs
	PTCs	It is important that all newly qualified teachers acquire basic computer skills. An appropriate module should be developed and made a compulsory part of the training offered in PTCs PTCs should also offer ICT training to teachers being trained in co-ordinating centres as part of the TDMS scheme.
	Private colleges	Private colleges are not controlled by the Ministry, but are required to register and have their courses approved. In the course of this process the Ministry will seek to ensure that adequate ICT provision is made within each college.

### Appendix B: ICT as an “A level” subject

Some consideration should be given to the possibility of ICT as an A level subject. Such a subject would probably be focused on the computer science area, albeit at a more junior level than University courses. The development of such a subject has obvious attractions in providing a valuable skill for those interested in the technical side of ICT, and acting as a feeder to University courses. However there are some potential drawback with this approach, as the presence of an advanced level subject might reduce the time available for other computer courses in the school, or reduce the take up of other science subjects. Further, it may be difficult to find sufficiently qualified teachers to teach the subject. The table below summarises the main points to be considered in deciding whether or not to have such a subject.

<b>Advantages</b>	<b>Drawbacks</b>
Provides a feeder into computer science at third level.	May damage the O level ICT course or other uses of ICT in school, by taking up all the available ICT time.
Provides a valuable vocational skill for those who do not intend to go on to third level.	May reduce take up of other science courses, as science oriented students may choose computer science.
Provides a follow-on to the O level course for those with a special interest. Lack of a follow-on may deter some people from taking up the subject at O level.	May be difficult to find qualified teachers.
	May be offered in only a small number of schools, and may narrow the access to computer science at third level (assuming that school leavers with A levels in computers are more likely to succeed in computer science in University).

## Appendix C: IDEAL TECHNICAL SPECIFICATION OF EQUIPMENTS

### MINIMUM TECHNICAL SPECIFICATIONS

#### Personal Desktop Computers

ITEM	SPECIFICATIONS
Main Processor	Min: Pentium IV Processor ( <b><i>Mandatory Requirement</i></b> )
Clock Speed	Min: 2.8 GHz ( <b><i>Mandatory Requirement</i></b> )
Cache	Pipeline Burst 256K L2 Cache
Memory	Min: 512 MB SD RAM ( <b><i>Mandatory Requirement</i></b> )
Mother Board	Bios Year 2000 compatible 1 serial and 2 USB ports
Chasis	Tower
CD ROM/DVD R/W Drive	52X (Minimum)
Hard Disks	Qty: 1 Hard Disk Minimum Capacity: 40GB ( <b><i>Mandatory Requirement</i></b> )
Floppy Disk Drive	1.44 MB, 3.5 inch drive
Network Interface Card	10/100 mbps ( <b><i>Mandatory Requirement</i></b> )
Monitor	17 Inch Colour ( <b><i>Mandatory Requirement</i></b> ) Digital, 0.26mm Dot Pitch, with internal glare protection.
Graphics	AGP Card, 320 MB RAM ( <b><i>Mandatory Requirement</i></b> )
Keyboard	Windows 95 Keyboard, English
Accessories	1 Mouse with Mouse Pad
	1 ECP/EPP Parallel Port, 1 serial and 2 USB ports
Operating System	Operating System: Windows XP pre-loaded or Open Source Software
Minimum Warranty	2 Years

**THE FOLLOWING ARE THE SPECIAL WARE THAT ARE NEEDED TO MAKE THE COMPUTER HARDWARE ACCESSIBLE TO PEOPLE WITH VISUAL IMPAIRMENT.**

Item	Definition
Jaws	A vice software installed into the computer to speak out whatever appears on the screen
Open Book	Scans written material into the computer and reads it.
Dot Matrix	For transcribing the print on the screen into Braille dots for the blind to read.
Magic or zoom	Enlarges letters on the screen to make it possible to a person with low vision to read.

text	
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**Network Printers (Black and White)**

ITEM	SPECIFICATIONS
Printing Colors (Min)	Black and White
Printing Speed (Min)	17 Pages per Minute <b>(Mandatory Requirement)</b>
Printing Technology	Laser
Memory (Min)	16 MB RAM <b>(Mandatory Requirement)</b>
Resolution (Min)	1200 DPI <b>(Mandatory Requirement)</b>
<b>Paper Handling Capabilities</b>	
Paper Input Trays (Min)	<ul style="list-style-type: none"> <li>- 1 Manual feed tray</li> <li>- Paper trays with a total min capacity of 400 A4 80gsm sheets,</li> </ul>
Paper output Tray Capacity	100 sheets of 80g/m <sup>2</sup>
Paper size (Min)	Letter, Legal, A4, A3
Paper Weight	Paper tray: 75 – 90 g/m <sup>2</sup> Manual Feed: 70 – 120 g/m <sup>2</sup>
Operating Environment	Temperature: 20°C – 40°C Relative Humidity: 30% - 60%
Power Requirements	220 – 240 V
Accessories and supplies	1 Printer cartridge 1 Power cable 1 bi-directional parallel port cable IEEE-1284 compliant
Connectivity	Bi-directional IEEE 1284-compliant parallel; 10/100 Base-TX network card
Minimum Warranty	1 Year

### Uninterruptible Power Supply Units – 0.5kVA

ITEM	MINIMUM REQUIREMENT
Output power capacity (Min)	500 VA <b>(Mandatory Requirement)</b>
Output power capacity	300 Watts <b>(Mandatory Requirement)</b>
Nominal output voltage	220 – 240 V
Nominal input voltage	220 – 240 V <b>(Mandatory Requirement)</b>
Input frequency	50Hz <b>(Mandatory Requirement)</b>
Minimum battery backup time at half load	20 Minutes <b>(Mandatory Requirement)</b>
Overload Capacity	120% for 2 Seconds
Battery type	Maintenance Free
Maximum Recharge Time	13 Hours
Audible alarm	Utility fail/Overload/Replace Battery
Indicators	On Line/Utility Fail/Overload/Replace battery
Surge Energy Capacity	300 Joules
Others	UPS must have inbuilt stabilisers
Minimum Warranty	1 Year

### Microsoft Office software Kit

ITEM	Specification /Requirement
Version	Microsoft Office 2000/XP or Open Source Software
Edition	Professional
Licenses	User license
Others	Must be Original CD With full set of manuals

### TECHNICAL SPECIFICATIONS OF SERVERS

ITEM	SPECIFICATIONS
Main Processor	Min: Pentium IV Processor <b>(Mandatory Requirement)</b>
Clock Speed	Min: 2-2.4 GHz <b>(Mandatory Requirement)</b>
Cache	Pipeline Burst 256K L2
Memory	Min: 256 MB RAM <b>(Mandatory Requirement)</b>
Mother Board	Bios Year 2000 compatible 1 Serial and 2 USB ports (minimum)
CD ROM Drive	56X (Minimum)

Hard disks	Minimum Capacity: 2X40 GB expandable to 240GB Type: 2 swap SCSI disks <b>(Mandatory Requirement)</b>
Floppy disk drive	1.44MB, 3.6 inch drive
Back up tape drive	20/40 GB Internal tape drive
Fax Modem	56 Kbps
Network Interface Card	3 Com 100mbps
Monitor	17 inch colour <b>(Mandatory Requirement)</b> Digital, 0.28mm dot pitch, SVGA, MPRI II, CE, Energy Star Compliant, with glare protection.
Graphics	Unit Video integrated PCI/AGP Card, 8MB RAM <b>(Mandatory Requirement)</b>
Key board	Windows XP Keyboard, English
Accessories	1 Mouse with Mouse pad 1 ECP/EPP Parallel Port, 1 serial and 2 USB ports
Power Supply	Must have redundant power supply
Minimum Warranty	3 Years

#### Option Recommended

Unit American Power Conversion	
Line-R12501 with voltage regulator	

#### Equipments.

Computers, Printers and other peripherals should be serviced and maintained regularly preferably quarterly. These services should include preventive and remedial maintenance. All computer equipments should be replaced after every three years.

#### Sustainability.

Heads of Education Institutions through the District Education Officers should propose ways of sustaining their ICT Projects to the Permanent Secretary for consideration. This is because different education institutions operate in different environments. So different institutions are expected to have different proposals for sustainability. The Permanent Secretary will issue clearance and guidelines for sustainability on a case by case basis.

## Other media

Other media other than computers should be used in the process of teaching and learning of ICTs. For instance the radios could be used in this case either by putting in place a studio where you will have to outsource subject specialists to broadcast their areas of specialisation on radio. You must also either distribute radios or encourage education institutions to purchase radios and tune in to these programs.

## Appendix D: Funding scheme for rural-poor secondary schools

It is recognised that some types of schools, particularly rural schools and schools in poorer urban areas, may have difficulty in getting ICT equipment and so may fall behind in the development of ICT. Current economic realities make it impractical to redress this imbalance completely. However it is proposed that a scheme be put in place, subject to funding, to provide a basic ICT infrastructure in a limited number of schools.

Schools should be selected on the basis of disadvantage in economic terms, but only schools where there is access to electricity should be included. In each of these schools it is envisaged that:

- One teacher will be withdrawn for a year for full time ICT training
- A suite of ten computers, a printer and a network will be provided for the school.
- Internet connectivity will be provided for the school.

The costs per school are shown in the table below.

<b>Cost per school</b>	<b>Year 1</b>
Equipment 10 computers, one heavy duty printer, networking and software licenses.	23,000,000
Connectivity	8,000,000
Subscription	6,000,000
Training cost	3,200,000
<b>Total</b>	<b>40,200,000</b>

### **Note:**

This is the ideal situation, but there is always a recurrent expenditure of Six million (6,000,000) Uganda Shillings every year on connectivity. The other option is to use the dial up at one hundred (100) Uganda Shillings per minute but it's very slow and it will defeat the purpose for improved learning and teaching processes at these institutions.



**Using these figures a series of different funding scenarios can be constructed.**

	<b>Cost per year</b>
<p><b>Scenario A No provision</b>            In this scenario no equipment is provided. Schools gain equipment from other sources, and there is no Ministry of Education and Sports “positive action” to assist rural-poor schools.</p>	0
<p><b>Scenario B Ten schools per year</b>            Ten schools are selected and equipped. This can be achieved at modest cost, but reaches only a very small number of schools.</p>	402,000,000
<p><b>Scenario C 18 schools per year</b>            In this scenario one school is selected in each district, but the schools are equipped on a three year rolling plan, so that only 18 new schools are equipped each year.</p>	723,600,000
<p><b>Scenario D 56 schools per year</b>            In this model one school is identified in each district each year. Using scenario D, a total of 168 schools would be equipped within 3 years, approximately one fifth of the total number of secondary schools.</p>	2,251,200,000