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Creating Learning Networks for African Teachers

UNESCO PROJECT (Contract No. 408.302.9)

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Background

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INFRASTRUCTURE GUIDE

Technical and managerial requirements and considerations of introducing ICTs in schools

When introducing ICT in a school,one must consider both the technical and professional and economic needs of the ICT infrantructure.

ICT INFRASTRUCTURE

An ICT infrastructure will assist a school by:

Presentations
Spreadsheets
Databases
Word
Processing
Html Editors

Pedagogy & Internet

E-mail
Listservs
WWW
Collaborative
Projects

Managerial

use of ICT
Mail Merge
School Budget
Grade Book

An ICT infrastructure will assist a school by:

- increasing access to up-to-date curriculum materials that will enhance student learning.
- increasing administrative efficiencies in both the classroom and in school administration.
- providing opportunities that encourage the collaboration between schools locally and internationally.

This includes:

1. A computer laboratory.

A separate room should be dedicated for computer use.

Recommendation for a computer room for 10 computers:

-Room dimension: 10 meters x 6 meters (30ft x 20ft)
-Number of power sockets: 15
-Furniture: Tables and chairs
-AC Power condition: Reliable without surge, irregularity and fluctuation

Infrastructure Guide

-Well ventilated (because computers generate a lot of heat)

-Humidity: As low as possible

-Reasonably dust-free. Practical suggestions for this include selection of computer lab site away from a murram road and/ or planting grass around the computer lab, plastic carpet and curtains for the windows.

-Burglar-proof for windows, roof and doors to ensure security for the expensive technology.

2. Electric power.

-There should be enough fixed power points along the sides with no cables running across the room.

-Surface sockets are recommended because they are the easiest to troubleshoot.

-A Separate circuit breaker inside the computer laboratory.

-One UPS (Uninterruptible Power Supply) per computer (at least 500VA). APC UPS is a good brand as it also has a built-in voltage stabilizer.

3. ICT equipment.

This includes Computers, Printers, Scanners, Digital cameras, Projectors, etc.

Computers:

There are many generations of computers. The common ones which are available for use in schools range from Intel 486s to Pentium III 700MHz and above computers. Some come with CD-ROM drives ranging from 8X to 52X speed, RAM ranging 16 to 64MB, Hard Disk space ranging 250MB to 24 GB and CPU speeds ranging from 66MHz to 700MHz and above.

Such computers are capable of running Windows95, Windows98 and Windows NT.

Minimum recommendations:

- CD-ROM speed (48 X)
- RAM (16 MHz)
- Hard Disk space (500MB)
- CPU speed (300 MHz)

Printers:

Printers:

There are many printers on the market today. These include color, black & white, deskjet printers, laser and dot matrix printers.

- Dot Matrix printers are cheap both in cost and maintenance but don't produce quality work and are very slow at printing and noisy. There are 9pin, 24pin and 36pin dot matrix printer heads. The more pins, the higher the quality of print. Dot matrix printers are

also capable of cutting stensils.

 - Deskjet printers are reasonably cheap but have high running costs. One set of cartridges (color printer) prints one ream of paper. In a school environment, some departments -- e.g Fine Art, Projects, etc -- may need a color printer.

 - Laser Printers are expensive to buy, reasonably cheap to maintain and produce high quality work and print faster than Deskjets. A Laser ink catridge will print five reams of paper.

Desirables:

- Scanners:

Scanners are used to convert normal photographs(taken by ordinary cameras) into digital images which can be stored as files on computers. In the digital form, the images can be inserted in documents and also sent as email attachments.

Recommendations: LG Flatbed color 600dpi Optical Resolution

Scanners

- Digital cameras:

These produce digital images but are more expensive than ordinary cameras .

- CD writers:

These are used to save/store large amounts of information on CD-Rs (CD Recordables).

Advantages of CD-Rs:

   -High storage capacity to the tune of 700MB and above.

   -Compact and Portable.

   -Information on them can be changed.

   -Affordable cost.

   -Durable.

   -Can be read by any computer with a CD-ROM drive

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- Projectors:
There are two common types of projectors; Overhead projectors

and LCD projectors.

(i) Overhead projectors
These project work off transparent paper and off particular colored
paper on to a screen like a wall.

(ii) LCD projectors
These are used to project work off a computer on to a screen like a
wall.

4. Local Area Network (LAN) (workgroup).

(i) Why should computers be networked?

It is recommended that the computers are networked. Networking
computers allows them to share resources like drives, files ,
printers,CD-ROMs and other computer peripherals. For example,
all Networked computers can share one printer.

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In a networked laboratory, it is not necessary to have all computers being the lastest model.
A particular computer laboratory could have 10 computers with at least one Pentium III 64MB RAM, 10GB Hard Disk, 52X CD-ROM and other older models all linked up on a Local Area Network . The older models could share resourses which are on the superior computer.
Sharing resources reduces both capital and operational costs.

(ii) How should the computers be networked?

A star arrangement (topology) is recommended for the LAN. In a Star arrangement each computer has a separate network cable to a central hub. A star arrangement is easy to expand, to troubleshoot and to maintain.

Requirements for a 10 computer Star topology LAN:

- One 12-port 10BASE-T Hub (D-Link , 3-COM , ReadyLink are good brands)

- Cable Trackings - 40 strips of 2" x 1"
- UTP CAT5 Cable role (100 meters)
- RJ45 Jacks & RJ45 Sockets - 40 of each (to provide 10 extra sockets for future expansion)
- 10/100Kbps Network Interface Cards (NICs) - (one per computer) . These come in two types i.e ISA and PCI. Most computers on the market today come with   PCI slots. Therefore you need technical advice before purchasing NICs.
- Wood screws - 4 boxes of 100 screws per box
- Wall plugs- 4 boxes of 100 plugs per box

5. Internet access.
It is necessary to connect the networked computers to the internet to enable students and teachers communicate, collaborate with other people and access global information.

There are a number of ways in which computers on a Local Area Network can be connected to the internet. These are:

Ordinary Dialup Connection - What is involved?
-Fixed telephone line running form the PTT (General Post Office) to

the Computer Laboratory
-Modem (56Kbps)
-Dialup internet account subscribed with an Internet Service
Provider (ISP)
-Recurrent monthly costs: telephone bill, Internet subscription.
Advantages: Easy to setup, low capital costs.
Disadvantages: Expensive for a school, small bandwidth hence slow
access speed, unreliability of telephone line like the Uganda case.

Cellular Dialup Connection - What is involved?
-Cellular mobile phone with a data cable.
-Modem (56Kbps)
-Dialup internet account subscribed with an Internet Service
Provider.

-Recurrent monthly costs: Airtime (pay-as-you-use) expense,
internet subscription and monthly service fee.
Advantages: Easy to setup, low capital costs.
Disadvantages: Expensive for a school , small bandwidth hence
slow access speed.

Wireless connection.

Wireless connection:

This ranges from connection via spread spectrum links from local ISP points-of- presence to connections via VSATs (Very Small Aperture Terminals) from International ISPs over satellite.

Spread Spectrum - What is involved?
-Outdoor Antenna
-Wireless Modem (Indoor unit)
-Wireless internet account subscribed with an Internet Service Provider. Wireless internet account costs about four times as much as a dialup account as it allows access for 24 hours.
-Recurrent monthly costs: Internet subscription

PROFESSIONAL DEVELOPPMENT

Providing opportunities for school leaders and teachers to increase their ability to use ICT.
Professional development will assist schools to:

- discover what their particular needs are.
- set school-specific objectives that aimtoimprove the skills and

confidence of teachers using ICT in order to enhance student learning.

- promote good practice in the use of ICT to enhance teaching and learning.
- provide opportunities for teachers to improve their skills at their own pace.
- increase administrative efficiencies.

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