INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) AS A RESEARCH TOOL IN LIBRARIES

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ABSTRACT:

There are evidences that libraries in developed countries are loosing their users very fast. Fewer patrons are visiting the libraries than before, because what they used to go to libraries for are now easily available in electronic libraries accessible from anywhere in the world. In conducting a research, anybody with a computer can now go on-line to locate, order and receive a copy of articles and journals on diverse subject areas without ever leaving his or her home. In order to retain their relevance in this digital age, libraries have begun to offer services to their numerous clientele even outside the four walls of their institutions, an effort only made possible through the warm embrace of ICT tools especially for the purpose of research .

INTRODUCTION

Information and Communication Technology (ICT) can be described as a range of technologies for gathering, storing, retrieving, processing, analyzing and transmitting information. Advances in ICT have progressively reduced the costs of managing information. It is enabling individuals and organizations to undertake information-related tasks much more efficiently. Such advances have equally introduced innovations in products, processes and organizational structures.

Akintunde (2004), defines ICT as a terminology which has overtaken Information Technology (IT) because of its appropriateness and its relevance. He went further to say that information technology was the terminology used in the 80s and the 90s but since this decade, Information Communication Technology (ICT) has taken over.

While Information Technology (IT) focused on the computer, Information and Communication Technology (ICT) emphasises the use of technology for development thus focusing on the use of computers and other technologies such as telephones to process, transport, transfer voice/video and other data singularly or mixed with least interference or

distortion of content.

Preliminary results of a survey of 3,200 students and faculty staff at Universities and Liberal Arts Colleges in the United State, sponsored by Digital Libraries of America and carried out by Oustsell Inc. showed that out of the total time students devote to research, roughly one-third is spent in the campus libraries while one half of that time span is spent in their residences. This is because according to Stoffle, (2003), members of the information industry offer alternative sources of information to libraries. Already we have examples of Google, Question Media, XanEdu, Jones – e-global, eGranary and ebrary as current competition to libraries. This competition is growing in leaps and bounds as the years roll by.

As information scientists, whose primary tool is DATA, there is a need to identify the appropriate ICT tools relevant to our operations: that is, tools that enhance effective service delivery and ensure good QoS (Quality of Service). Maximizing the use of these identified tools would place us ahead of others, either as professionals or organizations.

It will therefore, not be out of place to consider some of these common ICT tools relevant in the area of research and information dissemination.

They are;

a) Computers
b) Digital Camera
c) Scanners
d) Printers
e) Mobile Phones with WAP

COMPUTERS: These are electronic machines which accept and process data. I simply call them wonder machines that simplify human effort or work.

They are of different types and come in different sizes and capacity.

- *Types of Computers*: Analog, Digital and Hybrid
- *Sizes of Computers*: Micro, Mini, Mainframe

DIGITAL CAMERAS: These are electronic devices used to capture pictures in digital format and record sounds with enhanced features that allow for downloads for the purpose of editing, storage, file transfer and printing. Digital Cameras are economical to use, because they are operated

using upgradeable (increasable) memory cards and not films. There are special digital cameras used for TELECONFERENCING (online Video/ Audio meeting) which enable professionals from divers geographical locations to communicate in *real time*.

SCANNERS: These are devices used to replicate or convert hard copies of information into electronic format for the purpose of editing, storage and transfer. They are machines that are specially required for digitization (*conversion of hardcopy materials to electronic format*) of hard copies of information. Scanners are input devices used to scan hardcopy (Physical) materials such as pictures, documents, newspapers, magazines etc. and convert to electronic format for storage, editing, reproduction and generation of e-books. Examples are: Scanjet 740c, Officejet G85, etc.

PRINTERS: These are output devices required by computers to generate hardcopies of information, as a result of computer processed data. They are of different types and speed. Examples are: Laserjet and Deskjet

MOBILE PHONES with WAP (*Wireless Application Protocol*): These are special electronic/communication devices which make information dissemination and gathering possible regardless of geographical location via the internet.

Some benefits of ICT are;

1) Conservation and Preservation of Library Materials
2) Electronic Data Exchange
3) Better Information Dissemination
4) Provision of Easy Information Access to Multiple Users
5) Enhanced Data Processing and Management
6) Stress free Research and Study

As a result of the above benefits, and many more enumerated here, information scientists in the digital age have come to terms with the use of ICT tools for managing information.

How are ICT Tools Harnessed?

ICT being the fusion of Computers and Communication, as a tool

enables information scientists to work with ease, but they are limited in terms of what they can access. Adding a communication channel, such as a NETWORK significantly extends the capability of the computer and its peripherals.

The marriage of the computer and communication channels allows it to be not only an inexpensive communication device, it can also become a means of obtaining education, information, conducting research and working creatively with other professionals irrespective of geographical barriers.

What is a Network?

A network consists of two or more computers that are linked in order to share resources (such as printers and CD-ROMs), exchange files, or allow electronic communication. The computers on a network may be linked through cables, telephone lines, radio waves, satellites, or infrared light beams.

The basic types of network include:

1. Local Area Network (LAN)
2. Metropolitan Area Network (MAN)
3. Wide Area Network (WAN)
4. Internet

1. Local Area Network

A Local Area Network (LAN) is a network that is confined to a relatively small area. It is generally limited to a geographic area such as a writing laboratory, school, Library, or building. Rarely are LAN computers more than a mile apart.

In a typical LAN configuration, one computer is designated as the file server. It stores all of the software that controls the network, as well as the software that can be shared by the computers attached to the network. Computers connected to the file server are called workstations. The workstations can be less powerful than the file server, and they may have additional software on their hard drives. On most LANs, cables are used to connect the network interface cards in each computer.

2. Metropolitan Area Network

This is simply the connectivity of several LANs within a particular Metropolis or city, a typical example is the Radio Network between National Library of Nigeria (NLN) Headquarters and NLN Area 2, Abuja.

3. Wide Area Network

Wide Area Networks (WANs) connect larger geographical areas, such as Abuja, Lagos, or the world. Dedicated transoceanic cabling or satellite uplinks may be used to connect this type of network.

Using a WAN, universities or institutions in Nigeria can communicate with places like New York or Tokyo in a matter of minutes, without paying enormous phone bills. A WAN is complicated. It uses multiplexers to connect local and metropolitan networks to global communications networks like the Internet. To users, however, a WAN will not appear to be much different from a LAN or a MAN due to the speed of data transfer between two points.

Let us consider a School Network; this network is special in that it carries a lot of data and also handles heavy network traffic. School Network therefore is a Network set up within a school primarily for the purpose of resource sharing. Resources such as educational materials, student assignments, results, general information, peripherals, etc. are shared. Examples of School networks can be found at University of Jos (Unijos), Ahmadu Bello University, Zaria (ABU), and Obafemi Awolowo University, Ile- Ife (OAU).

ADVANTAGES OF INSTALLING A SCHOOL NETWORK

- *Speed*: Networks provide a very rapid method for sharing and transfering files. Without a network, files are shared by copying them to floppy or flash disks, then carrying or sending the disks from one computer to another. This method of transferring files is very time-consuming, unreliable and unsafe

- *Cost*: Networkable versions of many popular software programs are available at considerable savings when compared to buying individually licensed copies. Besides monetary savings, sharing a program

on a network allows for easier upgrading of the program. The changes have to be done only once, on the file server, instead of on all the individual workstations.

- *Security*: Files and programs on a network can be designated as "copy inhibit," so that you do not have to worry about illegal copying of programs. Also, passwords can be established for specific directories to restrict access to unauthorized users.

- *Centralized Software Management*: One of the greatest benefits of installing a network at a school is the fact that all of the software can be loaded on one computer (the file server). This eliminates the need to spend time and energy installing updates and tracking files on *'Stand alone'* (independent) computers throughout the building.

- *Resource Sharing*: Sharing of resources is another area in which a network exceeds stand-alone computers. Most schools cannot afford enough laser printers, fax machines, modems, scanners, and CD-ROM players for each computer. However, if these or similar peripherals are added to a network, they can be shared by many users.

- *Electronic Mail*: The presence of a network provides the hardware necessary to setup an e-mail system. E-mail aids in personal and professional communication for all school personnel, and it facilitates the dissemination of general information to the entire school staff. Electronic mail on a LAN can enable students to communicate with teachers and peers at their own school. If the LAN is connected to the Internet, students can communicate with others throughout the world.

- *Flexible Access*: School networks allow students to access their files from computers throughout the school. Students can begin an assignment in their classroom, save part of it on a public access area of the network, then go to the media center after school to finish their work. Students can also work cooperatively through the network.

- *Workgroup Computing*: Workgroup software (such as Microsoft Back Office) allows many users to work on a document or project concurrently. For example, educators located at various schools within a county could simultaneously contribute their ideas about new curriculum standards to the same document and spreadsheets.

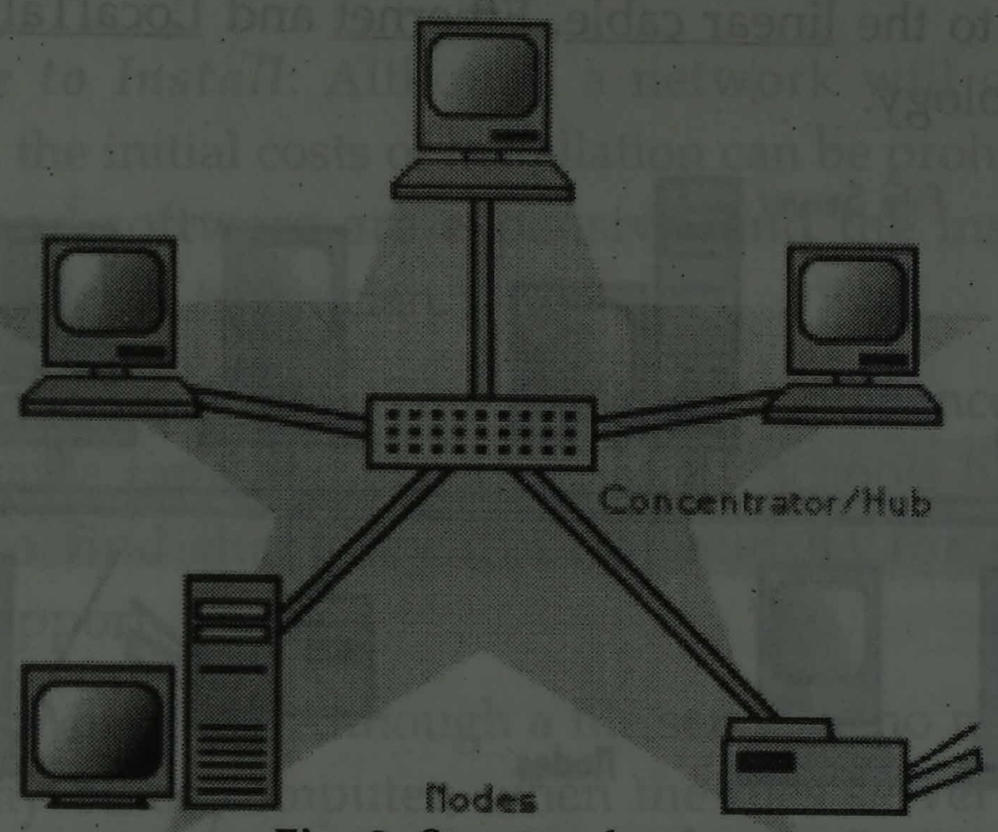

Fig. 2. Star topology

ADVANTAGES OF A STAR TOPOLOGY

- Easy to install and wire.
- No disruptions to the network when connecting or removing devices.
- Easy to detect faults and to remove parts.

DISADVANTAGES OF A STAR TOPOLOGY

- Requires more cable length than a linear topology.
- If the hub or concentrator fails, nodes attached are disabled.
- More expensive than linear bus topologies because of the cost of the concentrators.

The protocols used with star configurations are usually Ethernet or LocalTalk. Token Ring uses a similar topology, called the star-wired ring.

STAR-WIRED RING

A star-wired ring topology may appear (externally) to be the same as a star topology. Internally, the MAU (multistation access unit) of a star-wired ring contains wiring that allows information to pass from one device to another in a circle or ring . The Token Ring protocol uses a star-wired ring topology.

TREE

A tree topology combines characteristics of linear bus and star topologies. It consists of groups of star-configured workstations connected to a linear bus backbone cable (**See fig. 4**). Tree topologies allow for the

expansion of an existing network, and enable schools to configure a network to meet their needs.

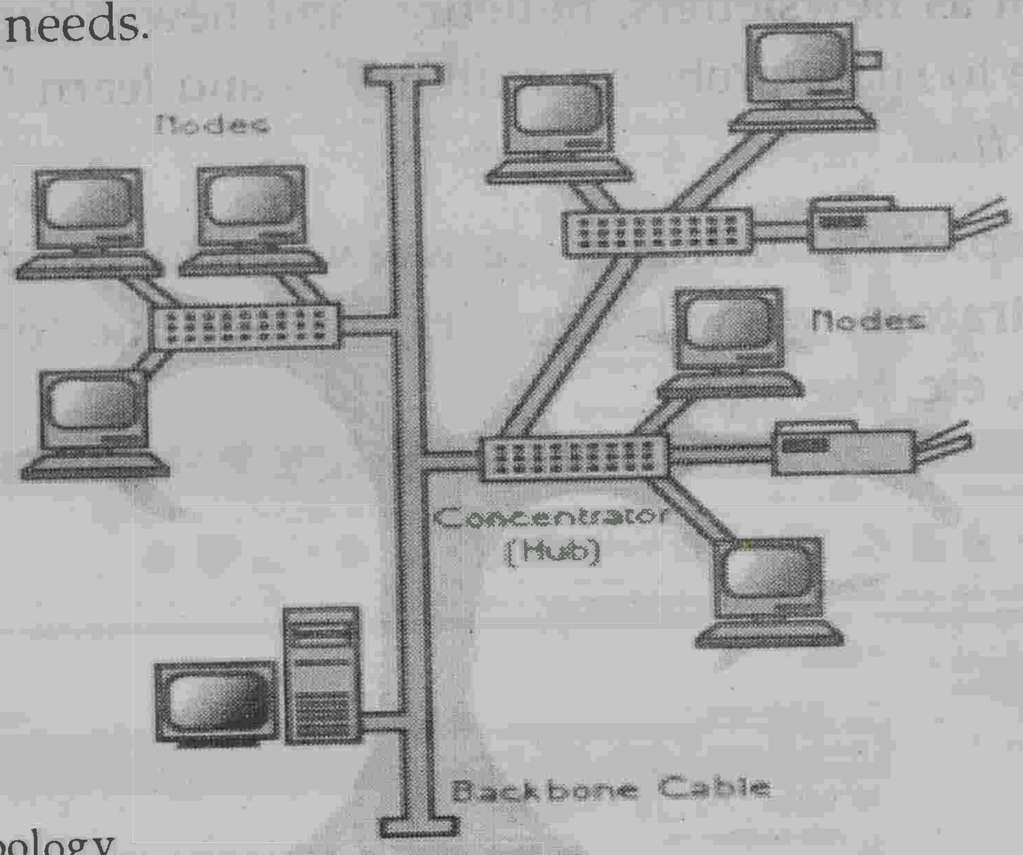

Fig. 4. Tree topology

ADVANTAGES OF A TREE TOPOLOGY

- Point-to-point wiring for individual segments.
- Supported by several hardware and software vendors.

DISADVANTAGES OF A TREE TOPOLOGY

- Overall length of each segment is limited by the type of cabling used.
- If the backbone line breaks, the entire segment goes down.
- More difficult to configure and wire than other topologies.

4. INTERNET: This is an ***Inter***-national ***Net***-work of Computers which provides a medium for accessing huge resources across the globe, either for research, general information or social interaction. It is a useful tool in the hand of Information Scientists as it hosts diverse resources/tools.

WHAT DOES THE INTERNET OFFER?

The internet offers a wide variety of tools/resources some of which are:

(1) Professional User groups
(2) E-mail facilities
(3) Search Tools e.g. Yahoo & Google
(4) VPN for banks online services
(5) Websites e.g. www.nlnig.org

1). ***Professional User groups***: On the Internet, professional sites are

available for professionals to log into and receive support materials such as newsletters, bulletins, and news. Registered members are able to share problems with others and learn from their experiences *real time*.

Examples of such site are www.networkadmin.com for network administrators, www.loc.gov/rr/, nla-online forum for information scientists, etc. See fig.5

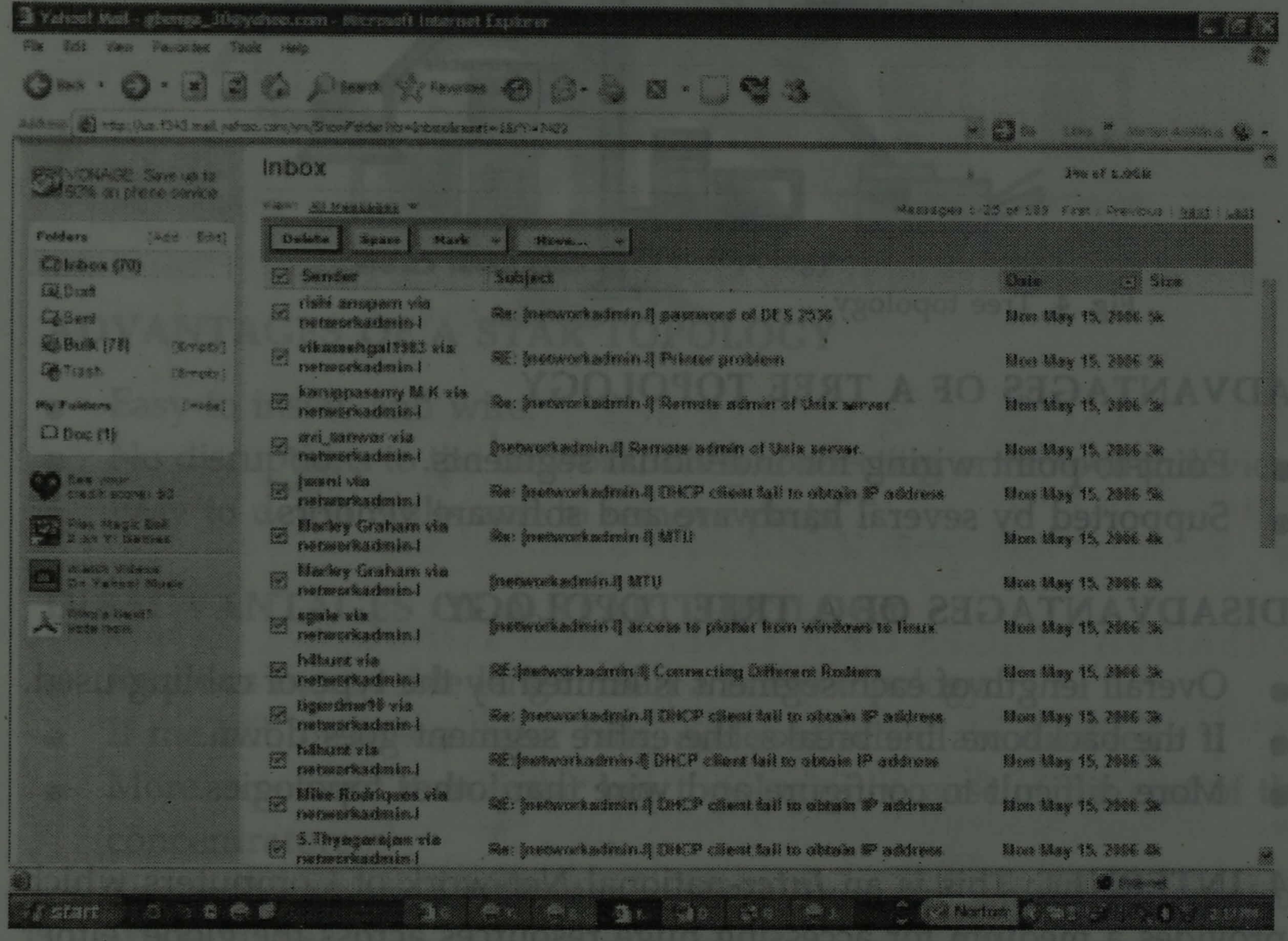

Fig. 5: Networkadmin user Group

2). *E-Mail Facilities*: This is an internet resource that allows users to send both short and long text messages to friends, relations and colleagues around the world. Examples of e-mail service providers are Yahoo and Hotmail. *Yahoo* reserves as much as 100mb memory for e-mails. Some of the benefits of this tool are:

a) Free exchange of electronic mails
b) Fast mail transfer in few seconds
c) Secure mail exchange
d) Easily accessible mails
e) Large memory to host mails
f) Contains other tools such as: Address book, Photo album, Calendar, Voice messages, Chat etc.

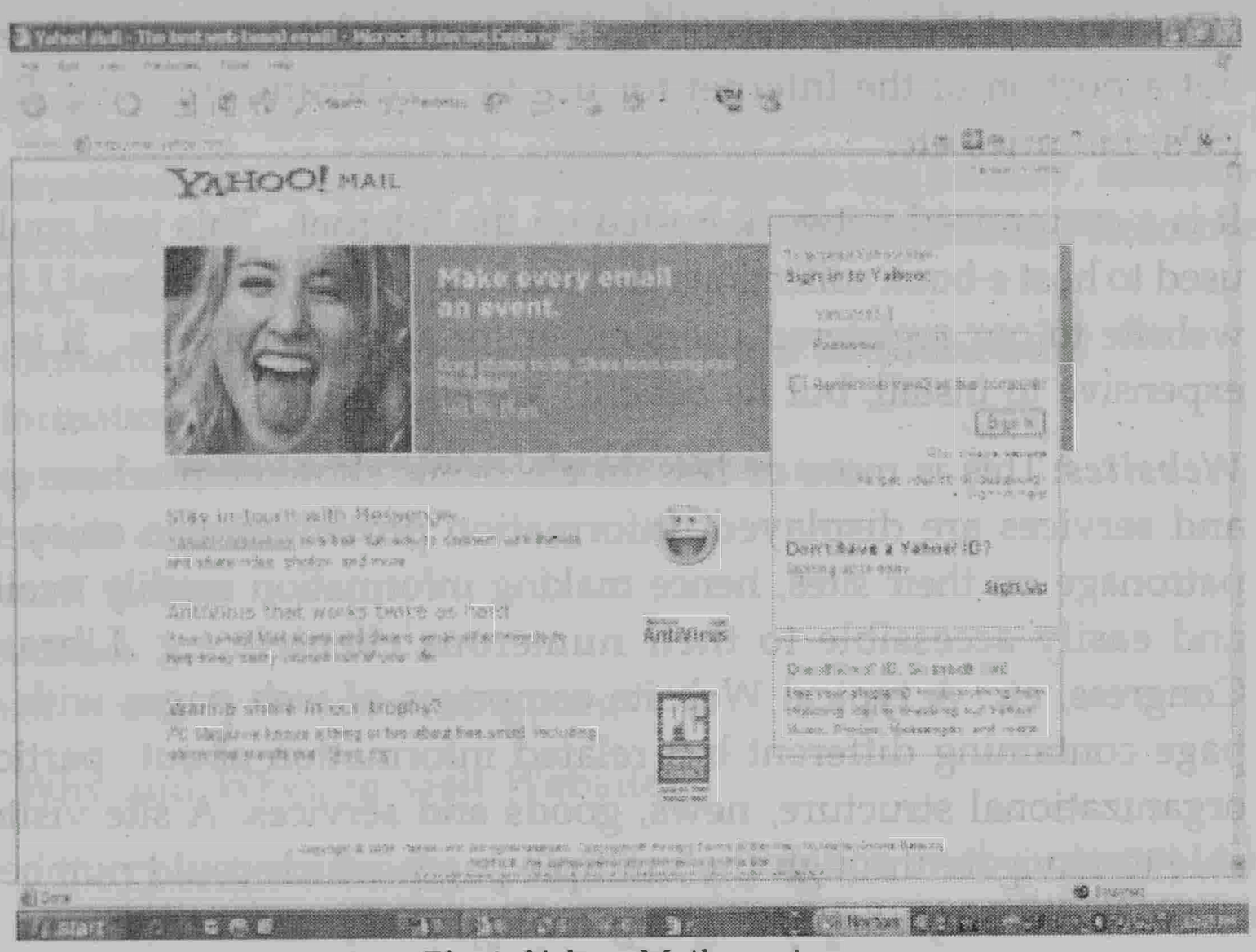

Fig.6: Yahoo Mail service.

3) ***Search Tools***: the two most popular search tools on the internet are Google and Yahoo. These tools are used practically to search for information on any subject area including web addresses.
They are engaged simply by typing a short but logical search criteria into the search box and clicking on the search button. The search is done at a tremendously high speed, in a matter of seconds. *See fig.7*

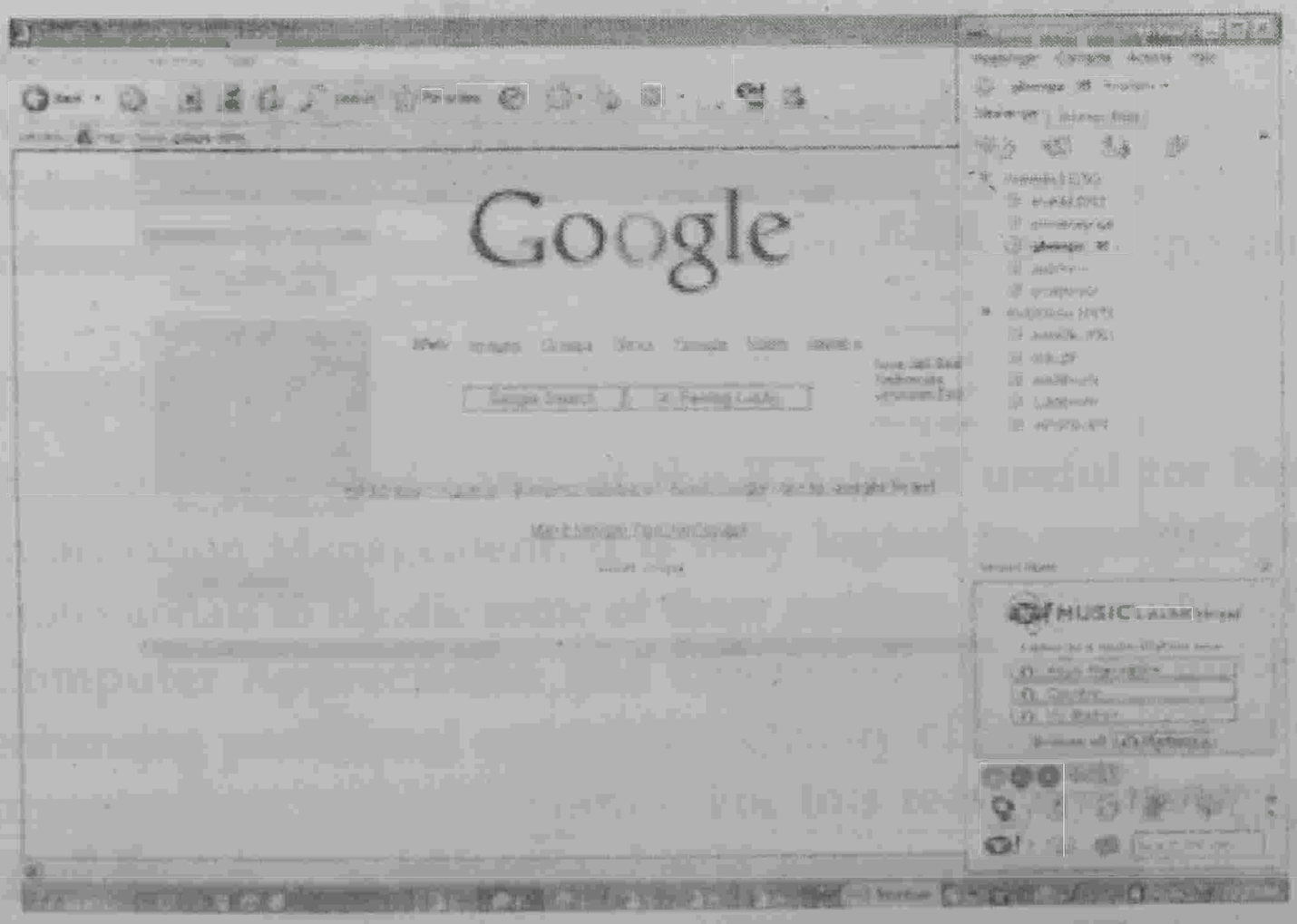

Fig.7: Google search engine.

3) *VPN* **(Virtual Private Network):** This tool is unique in that it carves out a portion of the Internet for use by an Organization e.g. Banks, ISPs, Libraries etc.

It is a customized network hosted on the Internet. This tool could be used to host e-book collections and made available on National Library website to our registered users either for a fee or for free. It is very expensive to install, but its benefits are enormous.

4) ***Websites*:** This is more or less an electronic showroom where goods and services are displayed. Information providers also enjoy high patronage on their sites, hence making information readily available and easily accessible to their numerous clientele e.g. Library of Congress, etc. A typical Website comprises of web pages with each page containing different but related information about particular organizational structure, news, goods and services. A site visitor is able to navigate through the multiple pages which could number up to 50 or more by simply clicking on *Hyperlinks*.

Websites are of *two main types*, namely;

1. Commercial sites
2. Professional sites

A good example of Professional Website is the National Library of Nigeria Website, *www.nlnig.org*. This serves as a tool for information scientists. See fig.8

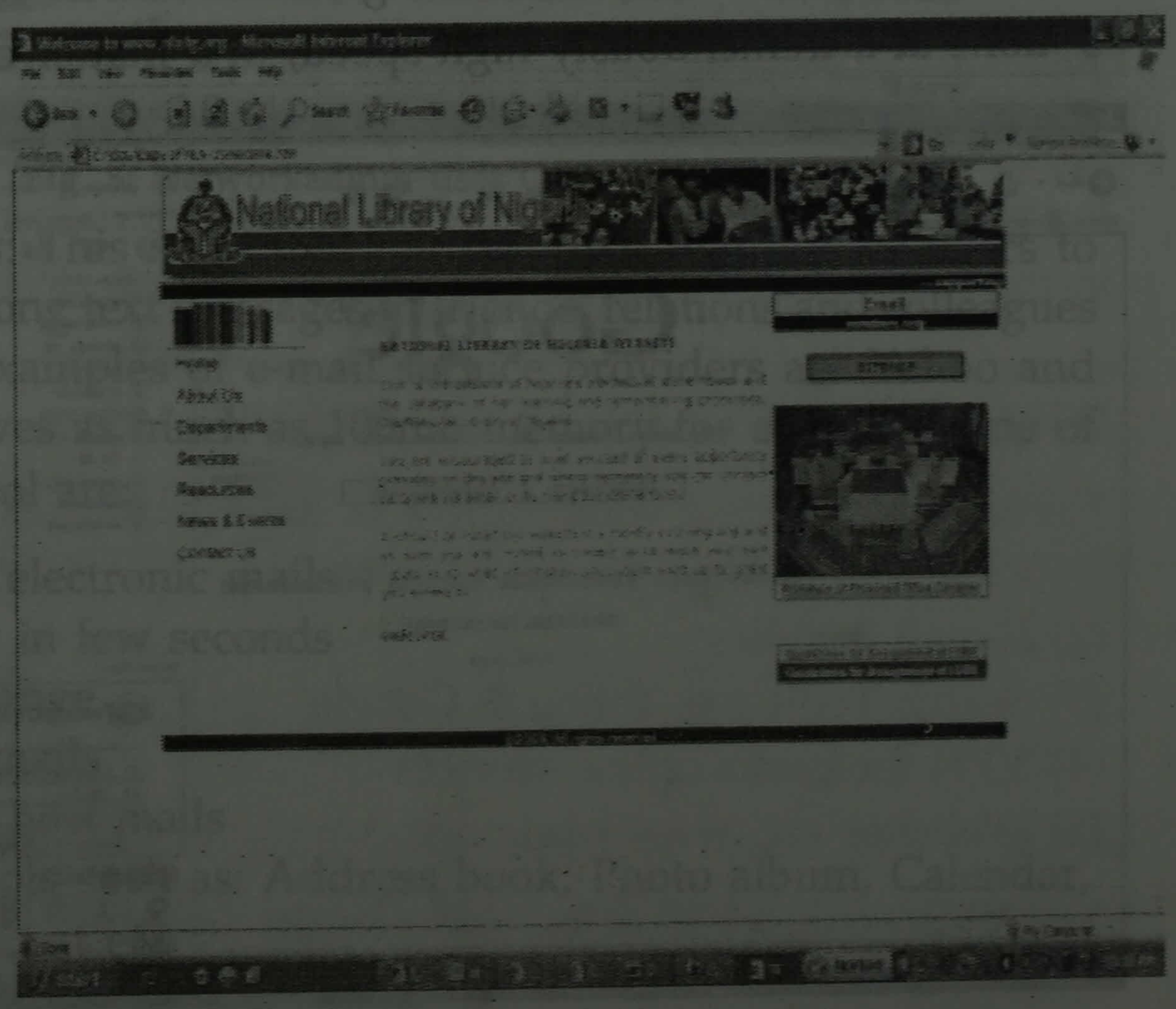

Fig.8 National Library of Nigeria website

www.nlnig.org **(National Library of Nigeria Website):**

Features:

(1) Information about National Library of Nigeria e.g. History, Mission & Functions, Library Board, State Branches, Departments, Resources, News, Events & Feedback.
(2) Information about departmental structures and functions
(3) Information about library services
(4) Information about National Library Resources
(5) News & events
(6) E-mail facility
(7) Feedback

Demonstration: www.nlnig.org

How, Why and When to visit Websites :

How: Every website resides at a particular location on the internet called Web Address. Websites are located using a tool called URL (Universal Resource Locator) by simply typing the web address in the address bar and then clicking on Go button.

Why: The need to visit websites is informed by the desire to acquire additional information on diverse subject areas. Staff of the National Library of Nigeria, are advised to visit NLN website to get update information about current events in the library. Online resources could be accessed without necessarily having to physically visit the office locations of the website Host.

When: Information Scientists are expected to visit the National Library Website and other professional websites *regularly* for professional information and information update on events and happenings.

CONCLUSION:

Having considered some of the ICT tools useful for Research and Information Management, it is only logical to consider the ability of professionals to handle some of these modern equipments. A basic skill in Computer Appreciation and Operation would be quite helpful in enhancing profesional output and Quality of Service (QOS) of staff and organizations such as libraries. For this reason, it is advised that the National Library of Nigeria should pay more attention to staff training

on ICT applications, by directing more resources towards acquiring training equipment, materials and setting up a well equipped and furnished training room where staff can be adequately trained on ICT applications. Individuals are also advised to personally develop themselves on ICT applications in order to meet up with the global requirement on information management. Efforts should also be made by institutions to provide Computers and accessories for staff that have made efforts to develop themselves on ICT applications to use on their tables for better output.

REFERENCES:

1. *www.smartstate.qld.gov.au/strategy/strategy05_15/glossary.shtm*
2. *www.fraw.org.uk/library/005/gn-irt/glossary.html*
3. *http://fcit.edu/network/chap5/chap5.htm*
4. *www.loc.gov/rr/*
5. Akintude, S. A. (2004) *"Libraries as Tools for ICT Development"*. Paper presented at the 42nd Annual National Conference and AGM of the NLA, Akure.
6. Stoffle, C. L. et al (2003) "Continuing to Build the Future: Academic Libraries and Their Challenges". *portal: Libraries and the Academy, Vol.3 No.3* p.363 – 380.