CHAPTER- 2

Electronic Resources and its Importance to Teaching and Research
2.1 Introduction

The beginning of the twenty first century has witnessed a growing competition to deliver new digital information services to millions of users. The knowledge of the technologies of information and communication is especially important because it refers to an area of knowledge generated by men and that has been produced to make viable exchange forms and relations; they are fundamental support of the process of the current globalization that leads to the knowledge society. The electronic media has provided many possibilities and opportunities for providing faster and quicker access to information at the global level.

Electronic resources are regarded as the mines of information that are preserved through modern ICT devices, refined and redesigned and more often stored in the cyber space in the most concrete and compact form and can be accessed simultaneously from infinite points by a great number of audience. The phrase “electronic resources”, has broadly been defined as information accessed by a computer, maybe useful as bibliographic guides to potential sources but, as of yet, they infrequently appear as cited references in their own right (Graham, 2003). Moreover, electronic resources refer to that kind of documents in digital formats which are made available to library users through a computer based information retrieval system. Because of the effective presentation with multimedia tools, electronic resources have become the source of information.

Electronic resources on the Internet manifest themselves in numerous flavours and categories. Although most of them emulate the traditional publishing while others are revolutionary in their design and approach. While the present trend to imitate and emulate the traditional models of scholarly communication may continue for some time, eventually the capabilities added by the new media would be used in more innovative ways.
2.2 Types of Electronic Resources

The different types of electronic resources are identified and explained as follows:

2.2.1 Primary Sources of Information

➢ Electronic Conferences

Technological developments on the Internet in the early 1990s created an environment which was suitable for holding an electronic conference. In 1994, the electronic means for meeting was all in place. The World-Wide Web provided a robust environment for presenting scientific information. The web permits a document to contain text, figures and links to other materials. In November 1994, the first Electronic Computational Chemistry Conference (ECCC-1) was held.

Electronic Conferences, variably known as electronic forums, electronic user-group, listservs, and discussion groups are important resources for researchers and scholars in every discipline. New scholars in particular get an opportunity to discover what topics are being discussed in their field, to learn who are involved in these discussions, and to make them known within their discipline by their own contributions.

➢ Courseware/Tutorials/Guides/Manuals

The web-based educational tutorials or guides called online courseware that provide higher degree of interactivity, flexibility and benefit of self-pace to the users. The courseware available on the internet varies to a great extent, in terms of their coverage and quality, from provision of basic lecture notes and lecture support material to integrated and highly interactive tutorial packages. The online coursewares are in the forefront of technological, multimedia and instructional innovation designed to provide computer-based training to users over the internet. Some of these coursewares are comprehensive resource kits focused on developing practical skills that can be applied immediately. They
are amongst the electronic resources created exclusively for the web, imbibing all features and facilities offered by the new technology. The courseware are proliferating the web as strong contenders for distant education. Institutions of higher learning, especially distant and continuing education departments are actively supporting and contributing to the development and implementation of computer-assisted instructions and multimedia courseware.

Electronic Journals

Electronic journals or “e-journals” are used for those journals and newsletters that are prepared and distributed electronically. Electronic Journals may be defined very broadly as any journal, magazine, e-zine, webzine, newsletter or type of electronic serial publication which is available over the internet and can be accessed using different technologies such as www, Gopher, ftp, telnet, email or listserv. Several traditional journals are now being published both on the web and in print. Current issues or content lists for most of the journals are available on the web or distributed to subscribers as e-mail text messages.

Internet-based electronic journals started to appear in the beginning of 1990. These journals were mostly delivered as an attachment to email while their back issues were mounted on anonymous ftp sites and users were required to download them from these ftp sites. The Libraries and information centres made them accessible through their gopher site. With the advent of www technology in 1993, electronic publishing became more than a novelty. The web as a means of delivery of electronic information has grown steadily since then. As publishers experiment with different publication modes and models, the very definition of a journal is undergoing change in the electronic environment. New journals have evolved based on the graphic capabilities of the internet that are available only in electronic form.

Patents

Patents are specifications concerning the design or manufacture of products and processes that are protected and secured for the exclusive profit of the
designer or inventor for a limited number of years that varies in different countries from fifteen to twenty years.

The term patent usually refers to an exclusive right granted to anyone who invents any new, useful and non-obvious process, machine, article of manufacture or composition of matter or any new and useful improvement thereof, and claims that right in a formal patent application. The procedure for granting patents, the requirements placed on the patentee, and the extent of the exclusive rights vary widely between countries according to national laws and international agreements. Important patent-related sites are listed below:

Network
World Intellectual Property Organization

➤  **Electronic Preprints and E-prints**

Electronic preprints are research articles that are made available for distribution through the network in electronic format before they go through the process of peer reviewing. Ginsparg preprint archive, started in 1991, has become a fundamental means of communication for a growing number of fields, starting with theoretical high-energy physics, later spreading to other areas of physics; and now also to computer science and mathematics. Ginsparg’s preprint archive is a sterling example of how technology can lead to a sudden profound and beneficial transformation. A few examples of preprint servers are:

Open Archives Initiative  http://www.openarchives.org/
UK e-Print Archive Mirror  http://xxx.soton.ac.uk/
CERN Preprint Server  http://preprints.cern.ch/
‘E prints’, is the term generally used to describe electronically mounted copies of the final, peer-reviewed versions of journal articles. One important international movement is the Open Archives initiative (OAI), which aims to develop and promote the use of a standard protocol, known as the Open Archives Metadata Harvesting Protocol (OAMHP), designed for better sharing and retrieval of e-prints residing on distributed archives.

➢ Projects (Ongoing and Completed)

There are several agencies that award time-bound research undertakings to individuals, group of individuals and institutions with well-defined goals and or tangible products or services. Information on projects that are ongoing or those that are completed is now easily available through directories and compilations including:

- Compilations by sponsoring agencies;
- Compilations by the institutions that get the projects from various sponsoring agencies; and
- Other compilations and directories. Such compilations provide a list of research projects currently underway in specified fields with a brief description of the projects including details of the investigators and place of investigation. A few examples of such compilations are given below:

Knowledge Discovery in Databases: Projects. [http:/orgwis.gmd.de/explora/pages.html](http://orgwis.gmd.de/explora/pages.html)
Signal Processing Information Base (SPIB) [http://spib.rice.edu:80/spib.html](http://spib.rice.edu:80/spib.html)
Social Science Research Resources [http://socsci.colorado.edu/POLSCI/RES/](http://socsci.colorado.edu/POLSCI/RES/)
Science/Research News

Science and research news are important sources of information for scientists and technologists. Science and research news are good sources of information for most recent developments. Several core disciplines have periodicals devoted exclusively to publish science, research and technical news for a given discipline. Some of the important resources on science and research news include:

- NewsCenter: Up to the Minute News [http://gwis2.circ.gwu.edu/~gprice/tech]
- The Scientific world Newslab [http://www.thescientificworld.com/]

Software

Software is a collection of computer programmes and related data that provide the instructions for telling a computer what to do and how to do it. In other words, software is a conceptual entity which is a set of computer programmes, procedures and associated documentation concerned with the operation of a data processing system.

There are a large number of free software and scripts of all kinds and types available on the Internet. People have freedom to run, copy, distribute, study, change and improve the software under General Public License (GPL). Some of the sites that provide free software are as follows:

- GNU Downloads.com [http://download.cnet.com/]
- Freeware Home [http://www.freewarehome.com/]
- Shareware.com [http://www.shareware.com/]
Standards

Standards are agreed targets for performance, or an accepted format for the
operation of a system. Technical standards specify how materials and products
should be manufactured, defined, measured or tested according to proven and
accepted methods. Standards maybe issued by companies, or by other
organizations both national and international.

Standards are very important both in the library and computer fields. MARC
and its variant are bibliographic standards that are used most extensively in the
libraries for cataloguing of bibliographic records. Similarly, AACR-II is a
standard for rendering, display and printing of bibliographic records. Universal
Decimal Classification Scheme (UDC) is a British standard (BS-1000). Some
of the important websites providing information on standards are as follows:

British Standard Institution  www.bsi-global.com/
Bureau of Indian Standards  http://www.bis.org.in/
IEEE Standards  http://ieeexplore.org/lpdocs/epic03/
World Standards Services  http://www.wssn.net/WSSN/index.html
Network

Technical Reports

A technical report is a scientific paper or an article that provides a detailed
account of work done on a particular project. Technical reports are generally
prepared by the research workers themselves for submission to their employer,
funding agency or to others interested in the work. Technical reports are today
a major source of scientific and technical information. They are prepared for
internal or wider distribution by many organizations, most of which lack the
extensive editing and printing facilities of commercial publishers.

Technical reports are often prepared for sponsors of research projects. Another
case where a technical report may be produced is when more information is
produced for an academic paper that is acceptable or feasible to publish in a
peer-reviewed publication. Technical reports are considered ‘non-archival’
publications, and so are free to be published elsewhere in peer-reviewed venues with or without modification. Some of the important Internet-based sources of information for technical reports are:

DOEs Scientific and Technical Literature  http://www.osti.gov/bridge/

National Technical Information Service  http://www.ntis.gov/

NASA Technical Reports Server  http://techreports.larc.nasa.gov/cgi-bin?NTRS


➢ Electronic Theses and Dissertations

Theses submitted to the universities as requirement for the award of PhD degree constitute a useful source of information for the new and ongoing research. A thesis contains records of an original contribution to knowledge. Although a large number of doctoral theses are submitted to every university each year, they are not being used to their fullest potential because most libraries keep them in closed-access collections.

Doctoral theses submitted to universities and academic institutions are originally created in digital format using word processing software packages like MSWord, LaTex, Word Perfect, word Pro, etc. These documents are undisputedly highly valuable collections especially in digital format that qualify to be an important component of a digital library. Several universities and institutions have already implemented electronic submission of doctoral dissertations under the overall umbrella of an international digital library initiative called “Networked Digital Library of Theses and Dissertations (NDLTD)”. Some of the important sites for electronic theses and dissertations are:
2.2.2 Databases, Data sets and Collections

- **Abstracting and Indexing Databases (Bibliographic Databases)**

Databases are a collection of records pertaining to a specific field of study. An increasing number of bibliographic database with abstracts of chapters in books, journal articles and conference proceedings are now available on various media. Availability of CD-ROM, as a media with high storage capacity, longevity and ease of transportation, triggered production of several CD-ROM based information products including several bibliographic databases which were earlier available only through online vendors or as abstracting and indexing services in printed format. Some of the important online databases accessible on the internet include:

- ERIC Databases [http://ericir.syr.edu/Eric/](http://ericir.syr.edu/Eric/)

- **Citation Databases**

A citation is a reference to an article or part of an article identifying the document in which it may be found. References given at the end of an article are called “cited articles” while the article that provides references are called “citing article”. A citation index consists of list of cited articles, each one of them followed by the citing articles. ISI Citation Databases are multidisciplinary databases of bibliographic information gathered from thousands of scholarly journals. It is indexed so that one can search for specific articles by subject,
author, journal and author address. The important citation indices produced by the Institute for Scientific Information (http://www.isinet.com/), are as follows:

Science Citation Index Expanded
Social Science Citation Index
Arts and Humanities Citation Index
BioSciences Citation Index

➢ Digital Collections (Images, Audio, Video)

The Internet and web technology is a suitable substrate for multimedia websites including information in the form of text, images, sounds and movies. The web hosts a rich collection of sounds and images, many of which can be used for commercial as well as personal purposes. A few examples of multimedia digital collection on the web are:

NASA’s multimedia Gallery http://www.nasa.gov/hqpub/library.html/
The Great Buildings http://www.greatbuildings.com/
Collection
The Nine Planets http://seds.lpl.arizona.edu/nineplanets/

➢ Equipment/Product Catalogues

A web-based catalogue is a listing of products along with complete specifications about the product. Equipment/product catalogues are generally searchable. Catalogues are especially helpful for corporate in identifying the recent products available in the market in order to purchase them. Reviews of the product from users are also included on the site. Important examples of product catalogues are:

Camie-Campbell Product Catalogue http://www.camie.com/prod_brochures.htm
Sony Electronic Products http://www.sonystyle.com/home/home.jsp
Minolta Europe http://www.minoltaeurope.com/products
DesignInfo.com http://www.DesignInfo.com/
Scientific Data sets (Numeric, Property and Structural Databases)

Scientific data sets (numeric, property, structural databases) are databases that contain factual data like numeric, property and structural information on the topic indexed. The data collections are critically assessed by individual experts, hence are an authentic source of information for researchers. Important examples of scientific data sets are:

- Data Analysis in the Social Sciences: [http://uts.cc.utexas.edu/~fackler/data.html](http://uts.cc.utexas.edu/~fackler/data.html)

Library Catalogues (including Union Catalogues)

Librarians, as the earliest inhabitants of the Internet and the web started putting their contents on the web. Not only did the libraries build Meta resources for their home pages, they also web-enabled their library catalogues. Most standard library software packages have web interfaces to their catalogues. Several integrated library packages are now moving towards doing all operations using Internet clients. The sites given below also provide links to the Library’s Web OPAC:

- The British Library: [http://www.bl.uk/](http://www.bl.uk/)
- Melvyl Homepage: [http://www.melvyl.ucop.edu/](http://www.melvyl.ucop.edu/)

Museum and Archives

The virtual museum websites facilitate virtual visits of users to a museum and examine the exhibits closely from their desktop. Using various tools and techniques, the user is also able to rotate an object in any direction. Art auction
sites are also using similar techniques to promote auction of their art works. Some of the virtual museum and auction sites are:

Virtual Library Museums Pages (VLMP)  http://www.icom.org/vlmp/
Smithsonian Institution  http://www.si.edu/
World Wide Arts Resources  http://wwar.com/
Art Museum Network  http://www.amn.org/

Virtual Libraries

The term “Virtual Library” or “library without wall” usually refers to the Meta resources or subject portals that extend virtual accessibility of digital collections from several diverse sources without the users even knowing where the resource actually resides. A virtual library could potentially be enormous, linking huge collections from all around the globe, or it could be very small, consisting of a few hundred links to digital resources maintained by an individual.

A virtual library also known as a Digital Library or an electronic Library may be defined as the online facility provided by a conventional library to read books and access other facilities or it may mean a website which offers links to various sites with a large store of information in a catalogued or archived form. The term is more often used to refer in a collective manner to the entire number of online books and other literary material related to any subject available on the Internet.

Virtual libraries can be very useful and very diverse in what they contain. The options for what they can include are virtually endless, and become more and more boundless as technology advances. Some of the content of virtual libraries may include, but certainly is not limited to CD-ROM, Internet subscriptions, lists of annotated web links, internal work products, proprietary databases and even web spiders or push technology that deliver targeted research to the user.
2.2.3 Electronic Books, Online Book Selling and Print-on-Demand

- **Electronic Books**

Borchers (1999) defines an electronic book as a portable hardware and software system that can display a large quantity of readable textual information to the user and let the user navigate through this information. An e-book is digital reading material that a user can view on a desktop or notebook, personal computer, or on a dedicated, portable device with a large storage capacity and the ability to download new titles via a network connection.

An e-book is based both on emulating the basic characteristics of traditional books in an electronic format as well as leveraging internet technology to make an e-book easy and efficient to use. An e-book can take the form of a single monograph or a multi-volume set of books in a digital format that allows for viewing on various types of monitors, devices and personal computers. It should allow searching for specific information across a collection of books and within a book.

- **PDAs and Pocket PCs**

A personal digital assistant (PDA), also known as a palmtop computer or personal data assistant is a mobile device that functions as a personal information manager. It is a handheld device that combines Computing, Telephone, Fax, Internet and Networking features. Current PDAs often have the ability to connect to the Internet. A PDA has an electronic visual display, enabling it to include a web browser.

A Pocket PC is also known by Microsoft as a “Windows Mobile Classic Device”. It is a hardware specification for a handheld-sized computer, Personal Digital Assistant (PDA), that runs the Microsoft ‘windows mobile Classic' operating system. It has some of the abilities of modern desktop PCs. According to Microsoft, the pocket PC is a “handheld device that enables users to store and retrieve e-mail, contacts, appointments, tasks, play
multimedia files, games, exchange text messages with Windows Live Messenger, browse the web and more.”

➢ E-Books on the web

Project Gutenberg started digitizing public-domain texts for download in 1992. The Project has a team of volunteers re-keying texts. New kinds of businesses are now emerging on a new scale involving a large number of publishers to make thousands of books available online for libraries and individuals at relatively lower cost. Three major companies that have recently emerged in the market are Questia, ebrary and Net Library.

➢ Online Bookselling

Amazon.com started a new phenomenon on the web with its online bookshop, which has been expanded to include other products like CDs, music, electronics, toys, art works, computers and other store items. Amazon.com was termed as the “Earth’s Biggest Library” although it does not perform all the functions of a library. There are several sites that are now in the business of online book selling. Some of them are:

Abebooks.com http://www.abebooks.com/
Amazon.com Bookstore http://www.amazon.com/
Book Finder http://www.bookfinder.com/
Varsitybooks.com http://www.varsitybooks.com/

➢ Print-on-Demand

Print-on-Demand (POD), is about printing things only when there is a demand; instead of keeping an inventory, Print-on-demand is essentially digital printing with high end production printing machines supported by a system which can streamline and automate the process of printing books and documents. Print-on-demand books are digitally printed from electronic files by high quality laser printers, and then bound and cut. It is a process of replacing traditional paper media with digital print files. Printing becomes a
demand process where the end-user determines the requirement for printed copies. The Print-on-Demand method is quite new and is a cost-effective and efficient way to print one copy at a time.

Print-on-Demand with digital technology is used as a way of printing items for a fixed cost per copy, regardless of the size of the order. While the unit price of each physical copy printed is higher than with offset printing, the average cost is lower for very small print runs, because setup cost are much higher for offset printing.

➢ **Reference Sources**

The web hosts an extraordinarily rich and varied variety of reference books that have been ‘published’ on the web for some years. The commercial publishers, recognizing the potential of web delivery, have converted their most important works into web-based reference services, backed by professional promotion and customer support. There have already been some notable achievements: The Oxford English Dictionary, the Grove Dictionary of Art, and the Large Reference Works published by the Gale Group are pioneers in this gradual mobilization of reference resources to the World Wide Web (WWW).

➢ **Dictionaries**

Thousands of general-purpose and subject-specific dictionaries are now available on the web. A few important dictionaries available on the Internet are mentioned as:

**Electronic Encyclopaedia**

Availability of enormous storage space in the CD-ROM coupled with sophisticated search software witnessed the appearance of several encyclopaedias on CD-ROM. Later, web versions of these encyclopaedias became available as important reference tools on the web. Web versions of several important encyclopaedias are available over the Internet. A few examples are given:

Enyclopaedia Britannica  \[http://www.britannica.com/\]
Columbia Encyclopaedia  \[http://www.bartleby.com/\]
Encarta Encyclopaedia  \[http://encarta.msn.com\]
Important Encyclopaedia  \[http://www.encyberpedia.com/cyberlinks\]

**Biographies**

A biography is a detailed description or account of someone’s life. More than a list of basic facts, biography also portrays the subject’s experience of those events. A biography presents the subject’s life story, highlighting various aspects of his or her life, including intimate details of experience, and may include an analysis of the subject's personality.

Biographical sources provide information about people considered important in various disciplines. Internet serves as an excellent source of information for biographical information whether the information is available in a biographical source or through websites of individuals or organizations. There are several biographical sources available on the internet. Some of the important ones are mentioned below:

Biography.com  \[http://www.biography.com/\]
Lives, the Biography resource  \[http://amillionlives.com/\]
World Biographical Index  \[http://www.biblio.tu-bs.de/wbi_en/\]
Acronyms and Abbreviations

An acronym is a word formed by using the initials of a phrase or other groups of words. An acronym is often considered to be a type of abbreviation. Generally, if an abbreviation is pronounced as a word rather than as the letters individually, it is considered an acronym. Often the distinction is not always made between acronyms and abbreviations, especially when the abbreviation is more widely known than what it stands for, such as ‘PVC’ (Polyvinyl Chloride) and ‘ATM’ (Automated Teller Machine).

Acronyms and abbreviations are used extensively in day-to-day communication. Besides, they are also used as part of vocabulary in subject-specific disciplines. Information technology has several acronyms and abbreviations that are used on a day-to-day basis. Internet hosts several good resources for finding acronyms and abbreviations. A few of them are listed below:

- Acronyms and abbreviations: [http://www.ucc.ie/info/net/acronyms/](http://www.ucc.ie/info/net/acronyms/)
- Abbreviations and acronyms of the U.S Government: [http://www.ulib.iupui.edu/subjectareas/](http://www.ulib.iupui.edu/subjectareas/)

Thesauri and Subject Headings

A thesaurus may be defined either in terms of its functions or its structure. In terms of function, it is a terminological control device used for translating from the natural language of documents into controlled vocabulary. In terms of structure, a thesaurus is a controlled and dynamic vocabulary of semantically and generically related terms in various fields have been published in order to achieve a unity of indexing terminology in their respective field. Subject headings are words or group of words under which books and other material on a subject are entered in a catalogue in which the entries are arranged in alphabetical order. List of subject headings are used by the cataloguers to achieve uniformity. Typical examples of standard subject headings used in
libraries are: Library of Congress Subject Headings (LCSH), Medical subject Headings (MeSH), Subject Headings in Engineering (SHE) and Sears List of Subject Headings (SLSH). Some of the thesauri and subject headings available on the internet are:

Roget’s Thesaurus  
http://www.thesaurus.com/Roget_Alpha-Ind

M-W Thesaurus  
http://www.m-w.com/mw/thesaurus.htm

Medical Subject Headings  

Roget’s Thesaurus Online  
http://www.bartleby.com/62/

➢ Handbooks and Manuals

Handbooks are treatises on a special subject containing concise information written primarily for practitioners. A number of handbooks are available on the web in various subject speciality. Some of them are:

Country Studies/ Area Handbooks  
http://lcweb2.loc.gov/frd/cs/cshome.html

Earthquake Preparedness Handbook  
http://www.lafd.org/eqindex.htm

Handbook for Digital Projects  
http://www.nedcc.org/digital/dighome.htm

Handbook of Forensic Services  
http://www.fbi.gov/hq/lab/handbook/intro.htm

Merck Manual of Diagnosis and Therapy  
http://www.merck.com/pubs/mmanual/

➢ Maps

Maps constitute a special collection in a library consisting of documents that make plane representation of the earth’s surface or its part indicating its physical features, political boundaries, etc. internet contains a large number of sites that provide maps and other geographical information. With availability
of tools and techniques offered by the Geographical information System (GIS) and associated geo-coded data, there are several sites that provide computer-based geo-sensitive information. Some of the important sites that provide maps and GIS-based information services include:

Map.com http://www.maps.com/explore/atlas/
Worldtime http://www.worldtime.com/
Mapnet Visual Search http://maps.map.net/start
Geographic Names http://mapping.usgs.gov/www/gnis/

- **Organizations and People**

Internet hosts a plethora of information about people and organizations through the websites that these organizations or people host on the web or through various websites that contain information on people or organizations. Further, Internet also hosts compilations like biographical sources and directories containing information on people and organizations respectively.

- **Employment / Career Sources**

The Internet is a good source of information both for employers and those who are seeking employment. Important employment and career sources on Internet are:

jobs.com http://www.jobs.com/
Employment Service www.employmentservice.gov.uk/
Academic Employment Network http://www.academploy.com/
scijobs.org http://www.scijobs.org/
Funding / Grants Sources

Information on funding and grant-giving agencies can be easily sourced through the Internet. Most grant-giving agencies have their websites on the Internet. Moreover, there are web sites that provide information on various grant-giving agencies. Some of the important Internet resources are as follows:

The Regional Alliance: [http://ra.terc.edu/resources/](http://ra.terc.edu/resources/)
Funding opportunities: [http://www.grantsnet.org/](http://www.grantsnet.org/)

Libraries / Information Centres

Having recognized the importance of Internet in providing better services to users, the libraries have made their presence on the web through the Library Home Pages which serves as an integrated interface to various network-based library services it offers. Information sources on Internet are becoming an essential ingredient in the collection development of the library. A large number of libraries are making their appearance on the web not only in the developed countries but also increasingly in the developing world. The LibDex ([http://www.libdex.com/](http://www.libdex.com/)) which maintains a worldwide searchable directory of library websites list more than 17000 libraries. Each record in the index provides links to web-based OPACs (Online Public Access Catalogues). Further, Libweb, the Digital Library SunSITE Project ([http://sunsite.berkeley.edu/Libweb/](http://sunsite.berkeley.edu/Libweb/)) maintained by the University of California at Berkeley, lists more than 6100 libraries with websites from over 100 countries organized by type of library for United States listings, by Continent and alphabetically for others. Some of the important libraries,
library catalogues, union catalogues, sources of information for libraries and information centres are as follows:

Libweb - Library www Servers http://sunsite.berkeley.edu/Libweb/
The LibDex http://www.libdex.com/
The British Library http://www.bl.uk/
Library of Congress (LOCIS) http://lcweb.loc.gov
Library of Congress Catalogue http://catalog.loc.gov/
Melvyl Homepage http://www.melvyl.ucop.edu/

➢ Organizations/ Research Institutes/ Companies/ Societies

The Internet is an excellent source of information for organizations, business houses, research institutions, companies, societies and associations. Since most of these bodies have their presence on the Internet through their website or through other websites that lists them, they can be accessed through any of the web search engines. Moreover, Internet also hosts compilations and directories containing information on institutions and organizations. Some of the important sources on organizations/ research institutes/ companies/ societies on the Internet are as follows:

Associations on the Net http://www.ipl.org/ref/AON/
International Organizations http://www.uia.org/website.htm
And NGO Websites
Helping.org http://www.helping.org/
iCollege http://www.icollege.com/
Researching Companies http://home.sprintmail.com/~debflanagan/index.html
Online Associations Online Search http://info.asaenet.org/gateway/
Directory (ASAE) OnlineAssocSlist.html
People/ Experts/Scientist Directories

The Internet hosts a plethora of information about people, experts and scientists through the websites that these people host either on their institute’s site or on personal website or through various websites that contain information on people, experts and scientists. Further, the Internet also hosts compilations like biographical sources, telephonic directories, regional directories, etc. There are several sites on “Ask-an-Expert” or “Ask-a-Scientist”. It can be used to obtain profiles of leading personalities or subject experts in specific fields. Details regarding their areas of expertise, affiliations, contact information, their research interests, etc can also be obtained. Some of the important sites are as follows:

- AgNIC: Agricultural Network Information Centre [http://www.agnic.org/]
- Biomedical Stars
- Caesar, Julius [http://www.virgil.org/caesar/]
- Gates, Bill [http://www.microsoft.com/billgates/]
- Women in Biology [http://pingu.salk.edu/~forsburg/bio.html]
- Ask-a-Scientist [http://olbers.kent.edu/alcomed/Ask/ask.shtml]

2.2.4 Meta Resources:

Meta resources, variably called Subject Gateways, Subject-based Information Gateways (SBIGs), subject-based gateways, subject-index gateways, virtual libraries, clearing houses, subject trees, pathfinders, and guide to Internet resources are facilities that allow easier access to networked-based resources in a defined subject area.

A Meta resource can be defined as an organized and structured guide to Internet-based electronic information resources that are carefully selected after a predefined process of evaluation and filtration in a subject area or speciality.
Meta resources are often independent websites or part of an institution or library’s website that serve as a guide to Internet resources considered appropriate for their target audiences. A Meta resource site that is a part of an institutional website or the library’s website may include resources that are on subscription by the parent organization or are accessible for free, to all. A Meta resource site may also be built by a commercial enterprise that is accessible free of cost up to the bibliographic level. However, a user may be required to pay if he/she wish to access the full-text. Home pages of all the major educational and research institutions, especially in the developed world, provide an organized and structured guide to electronic resources available on the Internet.

Portals, vortals and hortals are other concepts evolved primarily from the concept of meta resources. A portal is a website that offers a broad array of resources and services and is intended to be the main point of entry to the Internet for the users. Portal is a term, generally synonymous with gateway, for a Worldwide Web site that is or proposes to be a major starting site for users when they get connected to the Web or that users tend to visit as an anchor site. There are general portals and specialized or niche portals. Some major general portals include Yahoo, Excite, Netscape, Lycos, CNET, Microsoft Network, and America Online's AOL.com. Examples of niche portals include Garden.com (for gardeners), Fool.com (for investors), and SearchNetworking.com (for network administrators). Besides, hosting a catalogue of websites, a portal site may offer other enticements to the users such as e-mail, forums, search engines, calendars and on-line shopping malls so as to retain users at the site and to draw visitors repeatedly. The portals are also characterized by their ability to personalize the site for users according to their own preferences.

A vortal is a portal website that provides information and resources for a particular industry. Vortals are the Internet's way of catering to consumers' focused-environment preferences. Vortals typically provide news, research and statistics, discussions, newsletters, online tools, and many other services that
educate users about a specific industry. Vortals are the Internet’s way of catering to customers’ focused-environment preferences.

**Hortal** or horizontal portals are interesting group or community-specific portals that provide a business-to-consumer e-commerce web site which allows large numbers of community-based consumers to transact electronically with a limited number of suppliers. These suppliers generally supply goods specific to the interest or community group.

### 2.3 Advantages of Electronic Resources

**Easy Access**

Accessing e-resource is easier for the users. They can access the desired material within minutes, or even seconds, on their desktops, provided equipment is available. Large collections of material can be searched and retrieved simultaneously and instantly. There is an active dissemination of information by alerting the readers at their desktops about the new electronic resource that are accepted into the database. In other words, e-resources allow intelligent full-text retrieval based on past use and interests.

**Speed**

High speed and efficiency benefits the publishing and distributing electronically. Authoring and publishing systems can be integrated easily by computer-readable text. Also, electronic transmission, especially in the review process, saves valuable time.

**Linkages**

Linkages can be enabled by hypertext and hypermedia formats among sections within an electronic resources. E-mail contacts would be easier among users, publishers and suppliers. Users have more creative ways to have their information queries answered.
 Costs

The e-resources are published electronically rather than in paper and no new costs are introduced.

 Multimedia

Innovative ways of presenting research results can be supported by electronic page layout. Interactive three-dimensional models, motion video and sound are a few possibilities.

Commenting on the advantages of electronic resources, Dadzie (2007) writes that electronic resources are invaluable research tools that compliment the print-based resources in a traditional library setting. Their advantages include:

- Access to information that might be restricted to the user due to geographical location or finances.
- Access to more current information
- Provision of extensive links to additional resources related contents.

This rapid emergence and development of electronic information technologies therefore makes it possible to envision radically different ways of organizing the collections and services the library has traditionally provided. While the libraries approach a crisis point in financing collection development, these new technologies offer possible ways to mitigate costs and revolutionize ways to access information. Navjyoti (2007) also finds that speedy publication and availability on the desktop are the key advantages that attract research scholars.

2.4. Disadvantages of Electronic Resources

 Financial Constraints

The infrastructure required displaying, storing or print electronic resources are expensive. Downloading and printing will be a costly affair. This means a net
increase in economic and ecological costs and it becomes a relatively expensive way to acquire a single copy.

❖ **Social Constraints**

Electronic interfaces can take a long time to master. Electronic searching, downloading and printing replace the traditional activities of physically browsing, scanning and photocopying. The intricate steps to accomplish the previously simple or habitual tasks might frustrate users. People read up to 25 to 30 percent more slowly on a computer screen than on paper.

❖ **Technological Constraints**

The academic community can be divided into ‘haves’ and ‘haves-not’ because of access to equipment and network. The network or connection speed can be too slow. Screen quality of graphics and photos is still primitive when compared to print.

2.5 Educational E-Resources provided by selected Academic Institutions in India

The Open Educational Resources (OER) and Open Courseware (OCW) are some of the recent innovations that are especially relevant for achieving equitable access to quality education. OER are open content that are freely accessible worldwide from a common portal or gateway. Indian institutions have also recognized the importance and impact of OER to bridge the learning divide in the country. Recently, India’s National Knowledge Commission (NKC) has called for a “national e-content and curriculum initiative” to stimulate the creation, adaptation and utilization of OER by Indian institutions. In addition to NKC, University Grants Commission, National association of Software and Services Companies and many other advocacy, advisory and policy making bodies in India are supporting the cause and bridging knowledge and skill gaps (Ghosh, S.B & Das, 2007; Das, 2011)

India has been experiencing the incremental growth of OER, where a number of national institutions have established OER portals for providing nationwide
access to their educational resources. As the majority of higher education and professional education programmes in India are taught in English language, worldwide audiences, particularly who are located in developing countries, are benefitting from the OER produced and hosted in India.

Indian initiatives of open educational resources- Indian OER can be broadly categorized as audio-visual and textual OER. Some of the OERs are as follows:

2.5.1 Shodhganga: A Reservoir of Indian Theses

(\text{http://shodhganga.inflibnet.ac.in/})

Theses and dissertations are known to be the rich and unique source of information, often the only source for research work that does not find its way into various publication channels. Theses and dissertations remain an untapped and under-utilized asset, leading to unnecessary duplication and repetition that, in effect, is the anti-theses of research and wastage of huge resources, both human and financial. A thesis reflects quality of research work conducted by a student and the ability of an institution to lead and support original work of research in a given discipline.

“Shodhganga” is the name coined to denote digital repository of Indian Electronic Theses and Dissertations set-up by the INFLIBNET Centre. Shodhganga stands for the reservoir of Indian intellectual output stored in a repository hosted and maintained by the INFLIBNET Centre. The Shodhganga @ INFLIBNET is set-up using open source digital repository software called DSpace developed by MIT (Massachusetts Institute of Technology) in partnership between Hewlett Packard (HP). The DSpace uses internationally recognized protocols and interoperability standards. Shodhganga provides a platform for research scholars to deposit their PhD theses and make it available to the entire scholarly community in open access. The repository has the ability to capture, index, and store, disseminate and preserve ETDs submitted by the researchers. Online availability of electronic theses through centrally-maintained digital repositories will not only ensure easy access and archiving
of Indian doctoral theses, but will also help in raising the standard and quality of research.

2.5.2 Vidyanidhi: Digital Library and E-Scholarship Portal
(http://www.vidyanidhi.org.in/)

Vidyanidhi (meaning ‘Treasure of knowledge’ in Sanskrit) is India’s premier Digital Library Initiative to facilitate the creation, archiving and accessing of doctoral theses. Vidyanidhi is an information infrastructure, a digital library, a portal of resources, tools and facilities for doctoral research in India.

Vidyanidhi is a direct consequence of government policy initiatives and is intended to demonstrate the utility of digital library technologies in maintaining and enhancing access to and visibility of Indian academic research.

Vidyanidhi is envisioned to evolve as a national repository and a consortium for e-theses through participation and partnership with universities, academic
institutions and other stake holders. The vision of Vidyanidhi is to involve into an information infrastructure to strengthen the research capacities of Indian Universities by developing accessible digital libraries of theses and dissertations, sensitizing and training doctoral research students in scholarly writing, e-publishing and ETDs, developing appropriate policies and developing and making available requisite tools and resources.

2.5.3 eGyanKosh of Indira Gandhi National Open University (IGNOU) (http://www.egyankosh.ac.in/)

E-Gyankosh is a National Digital Repository set up by Indira Gandhi National Open University in 1985. E-gyankosh store, index, preserve, distribute and share the digital learning resources developed by the Open and Distance Learning institutions in the country. eGyanKosh is an initiative of IGNOU to provide open access to Self-Learning materials (SLMs) developed for different academic programmes of IGNOU. These SLMs are in text and video formats. These are being widely used by curricula designers and course writers of State Open Universities and other distance learning providers. These materials are also highly used by lifelong learner communities for various purposes such as preparation of competitive examinations, preparation of examinations.
eGyanKosh is accessible to registered users only, however registration is free of charge.

Education Broadcast is a webcasting facility available in eGyanKosh providing a link to IGNOU channels like GyanDarshan, GyanVani and EDUSAT. Virtual class also provides links to all the online programmes of the University.

2.5.4 SAKSHAT: A One Stop Education Portal (www.sakshat.ac.in)

A one stop education portal launched on October 30, 2006 by his Excellency, the then President of India to facilitate lifelong learning for students, teachers and those in employment or in pursuit of knowledge free of cost to them. The content development task for ‘SAKSHAT’ was looked after by the Content Advisory Committee (CAC) for the respective subject, which consisted of representatives from educational institutions like IGNOU, Delhi University, Kendriya Vidyalaya Sangthan (KVS), National Institute of Open Schooling (NIOS) and National Council for Educational Research and Training (NCERT) and the prominent academicians in the field. In addition, some NGOs had also provided the contents developed by them free of cost for this portal.
The vision is to scale up this pilot project ‘SAKSHAT’ to cater to the learning needs of more than 50 crore people through a proposed scheme of ‘National Mission in Education through Information and Communication technology (ICT)’. The scheme is to provide connectivity to all institutions of higher learning to world of knowledge in the Cyber space, to leverage the potential of ICT, in providing high quality knowledge modules with right e-contents, to address to the personalized needs of learners, in order to take care of their aspirations. These modules are to be delivered through ‘SAKSHAT’.

2.5.5 National Science Digital Library (NSDL) of the National Institute of Science Communication and Information Resources (NISCAIR). (http://nsdl.niscair.res.in/)

The open source movement is driving the emerging knowledge society that is aimed at making information resources being freely available and such freely available information resources are being stored and managed on open source technology oriented platforms. NSDL envisages making available high quality contents through the open source technology platforms.
National Science Digital Library (NSDL) is envisaged as first of its kind to benefit the students at undergraduate level in Indian universities and colleges by providing Internet access to digital resources of curriculum related material in science and technology.

As curriculum based focused content is not easily available to the students leaving a gap in the information needs of the student community. To bridge this gap, NSDL embarked upon to create original and targeted contents by identified panels of experts for selected science disciplines.

Keeping the open source philosophy in view, Dspace the open source software had been selected for the digital library. The content creation and development of NSDL has gone through rigorous procedures to make available quality content for the students. Authored by eminent teachers and validated by renowned faculty in Indian universities and colleges, NSDL envisages bringing finest content to the students.
2.6 Evaluation of E-Resources

Information is important for all round activities. However, the information should be valid, reliable, authoritative and relevant. The information resources in the printed world go through a process of filtering, i.e. reviewing, authenticating and evaluating for its merits and claims. Users of such information resources are aware of the process of evaluation in the printed world. They come to trust the printed sources and accept the facts and assessments made by the author as valid and authoritative.

However, unlike the world of printed information, the Internet is a vast network of ever growing, unfiltered information sources. Most of the electronic resources on the Internet are not peer-reviewed, edited or revised. Almost anyone with access to a website can publish his or her works on the web. The volume of information resources available on the Internet is immense. A search executed on an Internet search engines such as Google or Alta Vista on any topic brings out thousands of links to electronic information resources, most of which are irrelevant while quite a few have ceased to exist.

The information resources available on the Internet cannot be treated differently from those available in the printed media. The Internet and the web is merely a new medium that provides access to different types of information resources. A better guide to information resources is one that provide links to the best information resources that are carefully selected after evaluation rather than the one that provides the most. Providing links to information resources are only useful if the links provided are useful to their users.

It is, therefore, imperative for libraries to apply their expertise in the process of selection, evaluation and filtration of electronic resources before adding them for their meta resource collection and subsequently, provide organized and structured access to them through their meta resources. A meta resource consists of information resources that are carefully selected by the librarians and information specialists to serve users best through
their value-added characteristics that provide intuitive access to a selective few, high-quality information resources. Some of the evaluation criteria used for printed resources may be used for evaluating electronic information resources.

2.6.1 Need for Evaluation of electronic resources

A library selects documents for its collection after careful evaluation and adds them to its collection in their proper context. The process of selective acquisition adds value to information resources available in a library that, in turn, helps library users to harvest the information that they need. Electronic resources cannot be treated differently from those in printed media considering the fact that most of the resources do not go through the process of filtration prevalent in the printed world. The web is merely a new medium that acts as an effective system for delivering electronic information. Librarians have been traditionally selecting, evaluating, describing and providing intelligent to information resources for decades; they are, therefore, best suited to do this job. The need for evaluation of Internet-based electronic resources can be justified on the following grounds:

- Authenticity of information published on the web need to be established;
- The author of published information may not be an authority or an expert in the area;
- The information on the Internet may be outdated;
- Reliability of information on the network may not have been established;
- The information needs to be presented for a given audience. The librarian needs to establish its relevance for the targeted audience.
2.7 Conclusion

The e-resources available in different formats help and support the faculty to carry out the teaching and research in an efficient manner and quickly, as the e-copies are available anytime and anywhere. The present age is rightly characterized as the age of information. The fact that information is a key resource for the economic, socio-cultural and political development of a nation is gaining increasing acceptance.

Electronic resources have ushered in a variety of media that can help library information management systems in efficient and effective acquisition, organization and dissemination of information. E-resources have found increasing acceptance in library and information centres. Multimedia has shown much potential for libraries, and information networks have broken down time and space barriers. By virtue of using a variety of electronic resources and its tools and techniques, academic libraries are now able to generate various kinds of information products and services.

It is said that e-resources cannot replace print formats yet because only a fraction of scholarly materials available electronically. What is available varies in quality, accessibility and price. But e-resources provide many opportunities and potentials for academic libraries. Out of the advantages and disadvantages of e-resources, libraries need to be able to identify and balance the factors that would make e-resources a success or failure. The following chapter will illustrate about the use of electronic resources for teaching and research by the faculty members of Mizoram University which constitute an important component of the present research work.
References


Sudhir, K.G. & Seethalekshmi, K.P. (2011). Use of e-resources by the students and researchers of Faculty of Arts, University of Kerala. *International Journal of Information Dissemination and Technology, 1*(3), 120-127
Web References


SAKSHAT: a one stop educational portal (n.d).


Shodhganga: a reservoir of Indian theses (n.d).


Vidyanidhi: Digital Library and E-scholarship portal @ University of Mysore (n.d).


